
**Geohydrology of the
218-W-5 Burial Ground,
200-West Area, Hanford Site**

B. N. Bjornstad

May 1990

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
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Pacific Northwest Laboratory
Richland, Washington **99352**

to 30% for the Hanford formation. A lot of data are available for the **transmissivity** and hydraulic conductivity of the middle **Ringold** unit, based on aquifer testing. There is very little information, however, on the hydrologic properties of other units, such as the **early** "Palouse" soil, the Plio-Pleistocene unit, and the upper **Ringold** unit, which together make up the central third of the stratigraphic sequence present in the unsaturated zone at W-5.

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1.0 INTRODUCTION

Construction of a disposal facility for solid, mixed low-level radioactive and hazardous wastes in the 218-W-5 Burial Ground (W-5) in the 200-West Area of the U.S. Department of Energy's (DOE's) Hanford Site in southeastern Washington State (Figure 1) is planned. DOE Order **5820.2A** requires a site-specific performance assessment for each new disposal facility to ensure that wastes will be isolated from the environment. To demonstrate the adequacy of the facility for isolating the wastes, computer codes are used to simulate the physical processes that could cause the waste to migrate to underground water supplies or to the land's surface.

The purpose of this report is provide a compilation and interpretation of geologic and hydrologic data available for the area near W-5 for use in the performance assessment modelling. A variety of data are needed to model flow and transport from a solid-waste burial trench. These data include soil water content, soil moisture potential, saturated and unsaturated hydraulic conductivity, and phase mineralogy of the soils and sediments within the vadose zone. The hydrologic data that are critical for quantifying the water storage and transport properties for unsaturated soils require a characterization of the heterogeneities of various soil layers and the moisture characteristic curves for these layers. Hydraulic properties and mineralogic data for the saturated sediments are also important for modelling the flow and transport of wastes in the unconfined aquifer.

This report begins with a discussion of the procedures and methods used to gather data both in the field and in the laboratory. This is followed by a summary of the geology, including the stratigraphic framework, lithofacies, and mineralogic/geochemical characteristics of the suprabasalt sediments. The hydrology of the region and of the W-5 site is discussed next. In this discussion, the characteristics of the uppermost aquifer(s), unsaturated zone, and the various hydrogeologic units are presented.

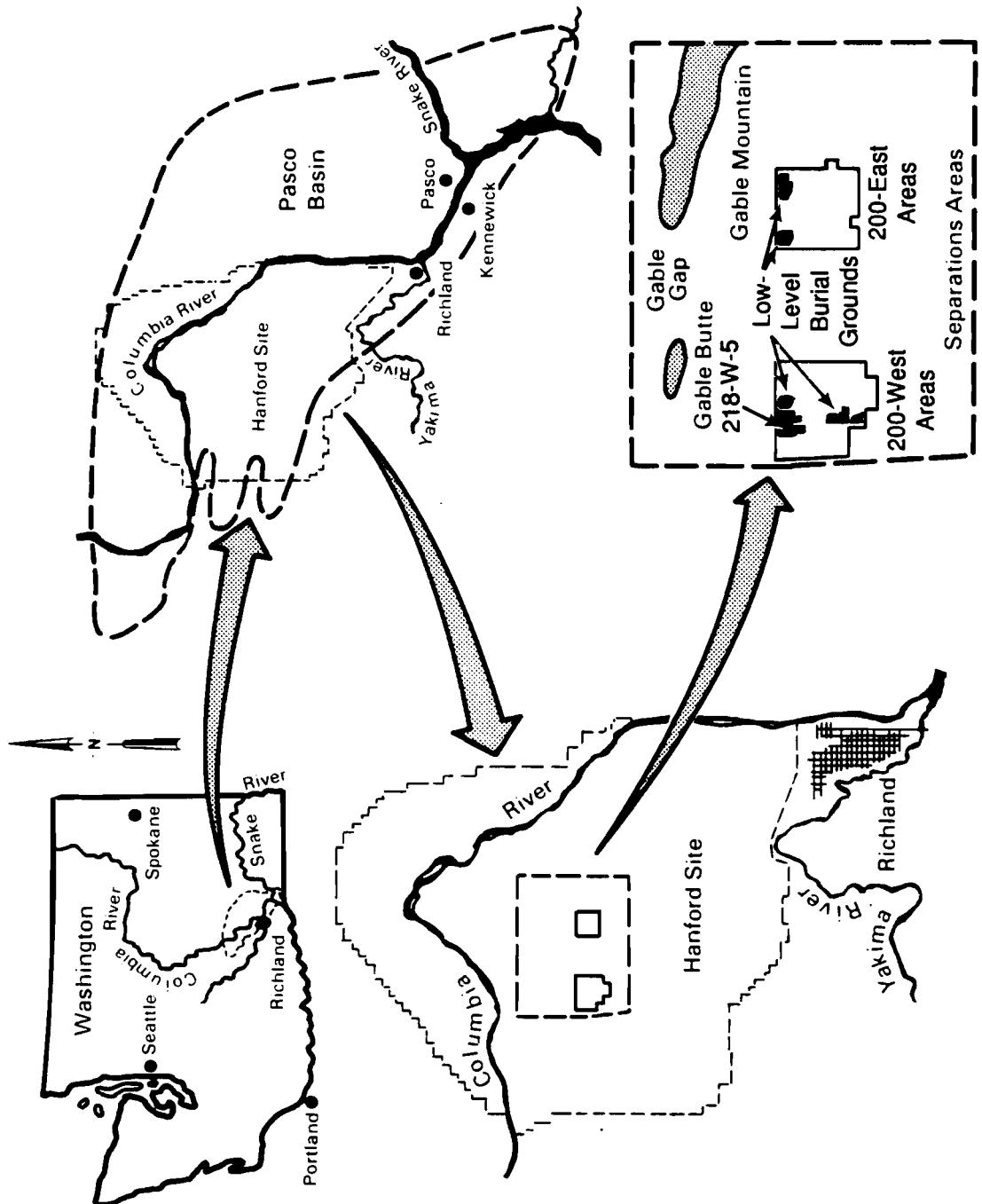


FIGURE 1. Map Showing Location of Hanford Site and the 200 Areas Low-Level Burial Grounds

20 INVESTIGATIVE METHODS

A variety of investigative methods have been used to evaluate the geology and hydrology of W-5. The methods used in the field have included sample collection, geologic logging, geophysical logging, aquifer testing, and water-level measurements. In the laboratory, several physical and chemical analyses of **borehole** samples were routinely performed; these include analyses of grain-size distribution, field moisture, and calcium carbonate content. Results of other, less routine laboratory analyses available for sediment samples include hydrometer and permeameter tests, as well as determination of cation exchange capacity, **mineralogy**, and bulk geochemistry. Most of these data were originally documented by Last et al. (1989); however, many of the data collected were not completely analyzed in time for that publication. Those data, listed in Table 1 and unavailable for publication by Last et al. (1989), are presented for the first time in this document.

A total of 11 **boreholes**, all within 1000 ft of W-5, were selected for use in the evaluation of the geohydrology of the area (Figure 2). Table 2 lists the 11 boreholes used in the present study, with their locations, elevations, total depths, screened intervals, dates of completion, and other data available. Eight of the 11 boreholes were drilled in the late 1980s for ground-water monitoring to comply with the Resource Conservation and Recovery Act (RCRA). The geohydrology and installation of these wells has been **documented** by Last et al. (1989) and Last and **Bjornstad** (1989). There are two sets of well clusters (299-W7-2/3 and 299-W10-13/14). Individual wells in these clusters are <50 ft apart; one well in the cluster is developed at the top of the unconfined aquifer and the other is developed at the base. The remaining boreholes include an older ground-water monitoring well (**299-W15-2**), and two (699-45-78 and 699-47-808) that were drilled for geologic investigation for DOE's Basalt Waste Isolation Project (BWIP). The only information used from well 699-47-808 is the level of the top of basalt and the gross gamma ray log. Other geologic data from this **borehole** are suspect and therefore were not used in the interpretation. A stratigraphic chart showing the sedimentary units present in the 200-West Area, which includes W-5, is presented in Figure 3.

2.1 FIELD METHODS

A variety of field methods have been used to obtain data from wells drilled in the vicinity of W-5. These include sample collection, geologic logging, **borehole** geophysical logging, aquifer testing, and water-level measurements. The methods used are described in this section.

TABLE 1. Special, Non-Routine Sample Inventory from Wells near the W-5 Burial Ground

Well #	Depth (ft)	Folk Classification*	Sampling Method..	Stratigraphic Unit	Water Retention	Permeameter Hydrometer	Cation Exchange Capacity	Petrography	X-Ray Diffraction	Bulk Geochemistry
299-W7-2	40	(g)sM	HT	Hanford formation	-	-	-	X	-	-
	64-65	m s G**	DB	Plio-Pleistocene unit	X	X	X	X	X	X
	94-95	m s G	DB	Upper Ringold	X	X	X	X	X	X
	154-155	m s G	DB	Middle Ringold	X	-	X	-	-	X
	219-220	m s G	DB	Middle Ringold	X	X	X	X	X	X
299-W7-3	320	sG	HT	Middle Ringold	-	-	-	X	-	-
	450	gS	HT	Basal Ringold (?)	-	-	X	X	X	X
	45	G	DB	Hanford formation	X	X	X	X	-	X
	80	m s G	DB	Hanford formation	X	X	-	X	-	-
	115	(gm)S	HT	Early 'Palouse' soil	-	-	X	-	-	X
299-W10-13	130	s M	HT	Plio-Pleistocene unit	-	-	X	-	-	-
	160	m s G	HT	Middle Ringold	-	-	X	-	-	X
	200	m s G	HT	Middle Ringold	-	-	X	-	-	X
	240	m s G	HT	Middle Ringold	-	-	X	X	X	X
	340	gS	HT	Middle Ringold	-	-	X	-	-	X
299-W10-14	440	(g)mS	HT	Middle Ringold	-	-	X	X	-	X
	460	not available	SB	Lower Ringold	-	-	X	X	-	X

* M=Mud; S=Sand; G=Gravel; m=muddy; s=sandy; g=gravely; ()=slightly
 ** HT=hard tool; DB=drive barrel; SB=split barrel (core)

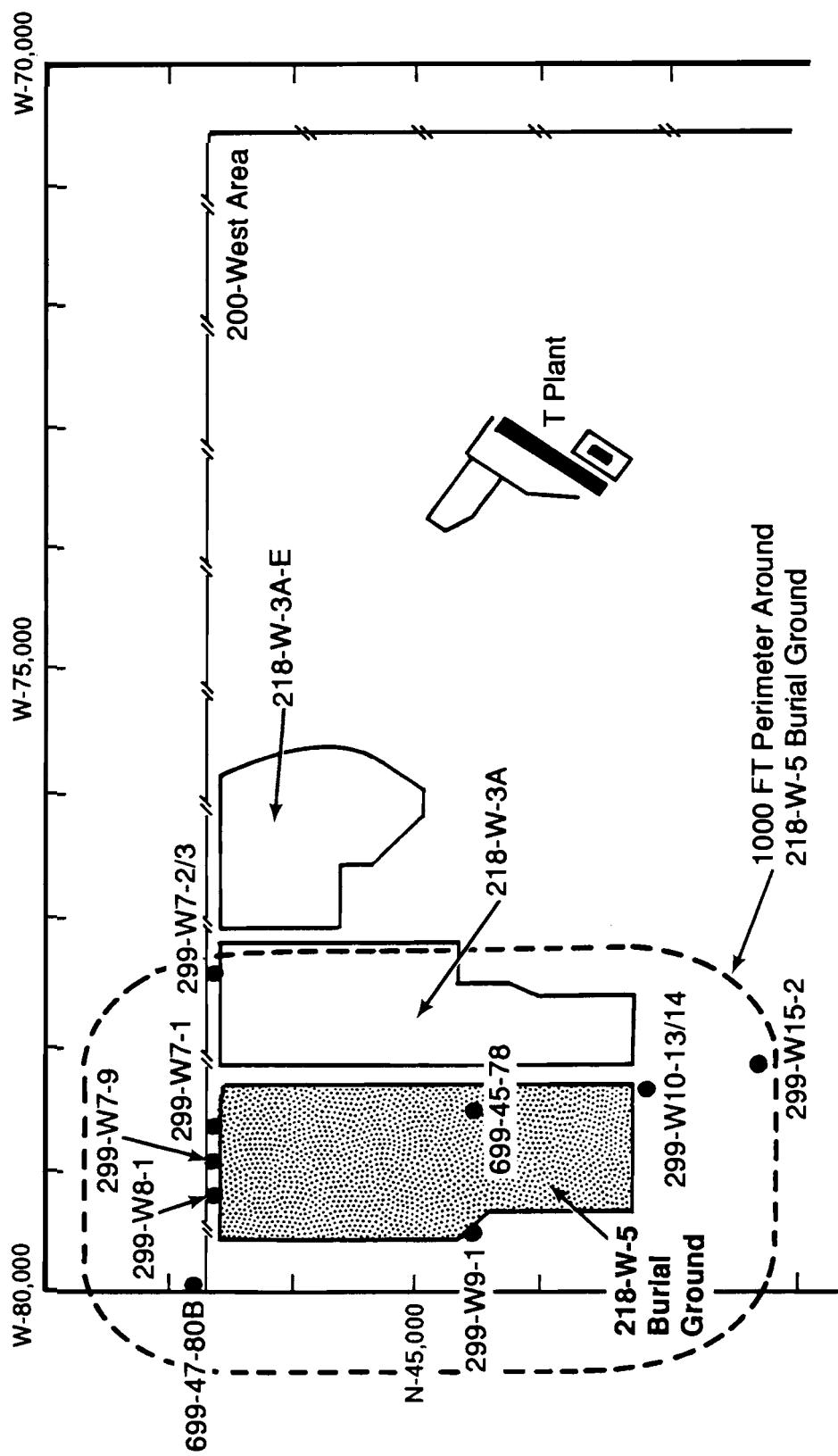


FIGURE 2. Locations of Boreholes Within 1000 ft of the W-5 Burial Ground

TABLE 2. Inventory of Wells Within 1000 ft of the W-5 Burial Ground

BORHOLE	HANFORD PLANT COORDINATES	DATE COMPLETED	CASING ELEV. (ft)	OPEN INTERVAL (ft)	AQUIFER/MONITORED	TOTAL DEPTH (ft)	DEPTH TOB# (ft)	WATER DEPTH (ft)	REFERENCE
299-W7-1	N46551 W78601	07/87	690.71	224.244	Middle Ringold	245	NR	228.61	Last et al. (1989)
299-W7-2	N46519 W77385	09/87	675.59	202-222	Middle Ringold	236	NR	214.48	Last et al. (1989)
299-W7-3	N46520 W77420	11/87	676.14	449-470	Middle/Basal Ringold	475	476	216.28	Last et al. (1989)
299-W7-9*	N46551 W78900	12/89	690	221-241	Middle Ringold	248	NR	227	
299-W8.1	N46551 W79200	07/87	701.33	257-287	Middle Ringold	270.5	NR	238.82	Last et al. (1989)
299-W9-1	N44508 W79507	10/87	737.73	266-286	Middle Ringold	295	NR	272.09	Last et al. (1989)
299-W15-2	N42251 W78082	08/54	690.71	218-258	Middle Ringold	260	NR	221.00	Last et al. (1989)
299-W10-13	N43137 W78297	09/87	699.04	227-247	Middle Ringold	250	NR	232.11	Last et al. (1989)
299-W10-14	N43143 W78330	11/87	699.43	427-447	Middle Ringold (base)	462	NR	232.90	Last et al. (1989)
699-45-78 (RRL-3)	N44575 W78294	10/81	689.81	None		730	508	uncertain	Bjornstad (1984)
699-47-80B (DC.208)	N46910 W79835	09/83	712.10	None		1632	531	uncertain	Ledgerwood (1986) McGhan (1989)

RCRA wells
Preliminary data

= top of basalt
NR = not reached

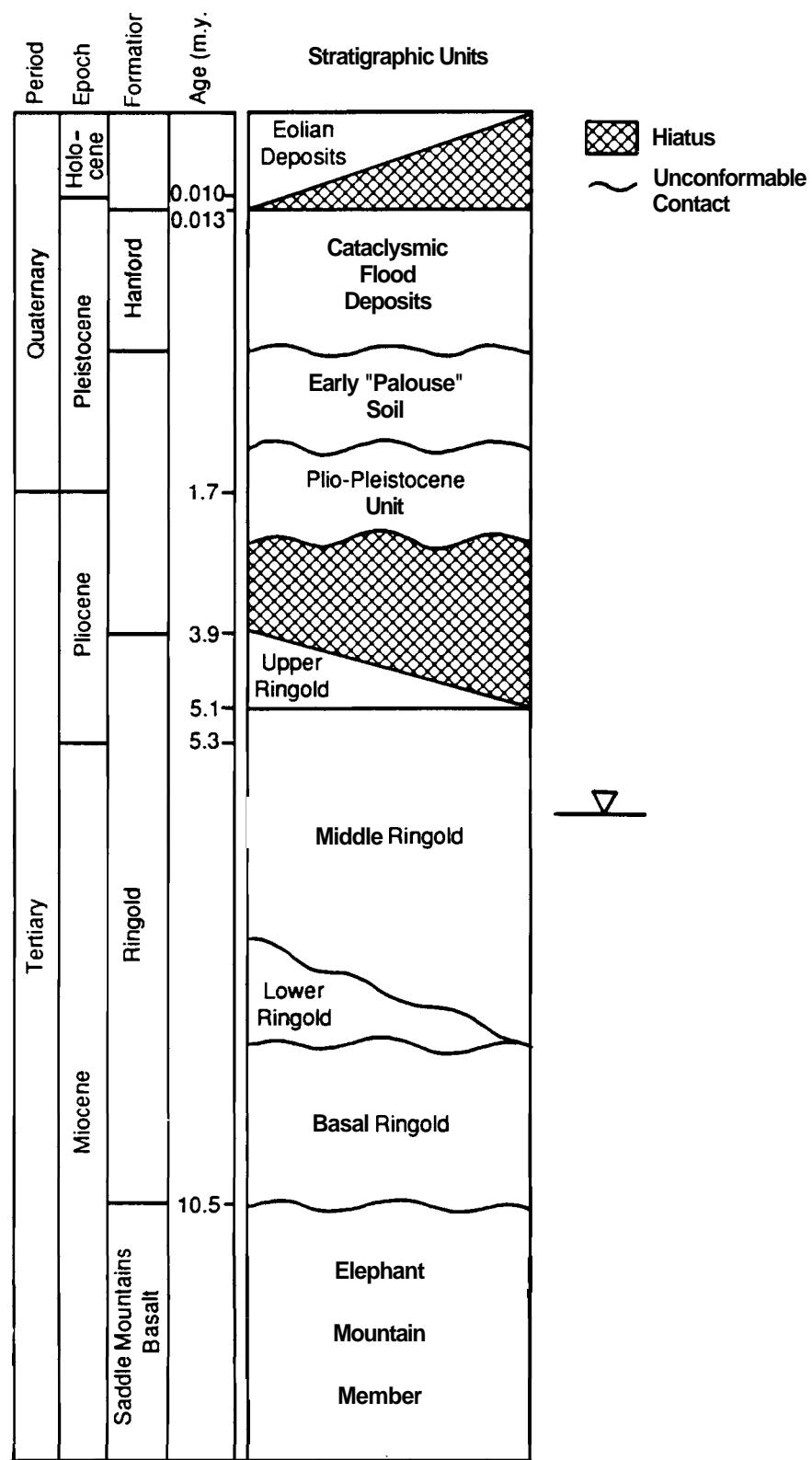


FIGURE 3. Stratigraphic Chart for the 200-West Area

2.1.1 Sample Collection

Geologic samples provide the materials necessary to perform laboratory analysis of the physical and chemical properties of the geohydrologic media. Two pint-jar geologic samples of drill cuttings were collected from RCRA ground-water monitoring wells every 5 ft **and/or** at changes in lithology (Last et al. 1989). Where possible, the sampled materials were recovered from the **borehole** using a drive barrel. Another sample for moisture content analysis was collected from each sampled interval above the water table from which samples were retrieved with a drive barrel or split barrel (*i.e.*, core). Where hard-tool drilling was necessary, the sampled materials were recovered with a bailer. **Additional** samples for other types of analyses (*e.g.*, water retention, hydrometer, **permeameter**, cation exchange capacity, mineralogy, and bulk geochemistry) were collected at irregular intervals.

The drive-barrel and split-barrel methods, which were the preferred methods of drilling and collecting samples, drive a hollow cylinder into the formation, immediately bringing the sample to the surface. Drive-barrel and split-barrel samples are similar except that split-barrel samples are collected intact within a plastic or metal liner, and drive-barrel samples are loose mixtures of the material hammered out of the drive barrel. These methods provide the most representative samples, which, when analyzed for grain size, most accurately represent the true particle-size distribution.

When drilling through flowing sands or consolidated **and/or** extremely coarse-grained strata, drillers often resort to drilling with the hard-tool method. The hard-tool drilling method uses a heavy metal bit to penetrate the formation while water is added to form a mud slurry, which is removed with a bailer. Therefore, the hard-tool samples produce **granulometric results** that are skewed toward the finer grained fractions more than results from an undisturbed sample would be. Thus hard-tool samples are representative of neither *in situ* grain-size distribution nor moisture content.

2.1.2 Geologic Logging

Geologic logs provide a cursory means of visual inspection and description of retrieved samples, as well as a record of drilling activities, unusual occurrences, or problems.

Geologic logs are of two types. The first type is recorded by geologists and based on observation of drill cuttings removed from the hole every 5 ft and at changes in lithology. The other type of geologic log is recorded by the driller and focuses on drilling properties, although it may also provide a general description of geologic materials.

Geologic samples from RCRA monitoring wells were collected and described according to standardized procedures (PNL 1989). Sample descriptions by geologists included a textural classification (after Folk 1974) and estimates of particle-size distribution, sorting, gross mineralogy, roundness, color,

calcium carbonate content, and relative consolidation. Summary geologic logs for each borehole, other than 699-47-80B, which is suspect, are presented in Appendix A. Data on several of these boreholes were originally presented by Last et al. (1989).

2.1.3 Borehole Geophysical Logging

Borehole geophysical logs (i.e., gross gamma ray logs) provide useful information for interpreting and correlating stratigraphy. Fine-grained sediments normally produce a higher gamma response than coarse-grained sediments. Gross gamma ray logs are available for all 11 boreholes within 1000 ft of W-5. Geophysical logging of the RCRA monitoring wells was conducted with a gross gamma probe, according to procedure GL-7 or GL-7A (PNL 1989), to assist in the identification of fine-grained sedimentary layers.

Gross gamma ray logs for the wells near W-5 are shown both on the cross sections (Figures 4 to 6) and on the individual summary logs presented in Appendix A. These logs are not suitable for quantitative purposes. Instead they are used qualitatively, in combination with geologic logs and granulometric and geochemical data, to aid in the interpretation and correlation of stratigraphic units.

2.1.4 Aquifer Testing

Aquifer tests provide in situ aquifer measurements of transmissivity, from which hydraulic conductivity and storativity can be derived. Several types of aquifer tests have been performed during the installation of RCRA ground-water monitoring wells in the vicinity of W-5 (Last et al. 1989). These tests include 1) constant-discharge withdrawal, 2) recovery, and 3) slug injection/withdrawal tests.

Constant-discharge withdrawal tests at the wells were designed to stress the aquifer as much as possible by pumping at a maximum constant rate. The wells tested were drilled to depth (at least 10 ft below the water table) and cased with temporary, 8-in.-diameter carbon steel casing and screened with a 10-ft section of 8-in. telescoping stainless steel screen. The lower 8 to 9 ft of screen were exposed by pulling back the temporary casing. The wells were generally pumped using a 20-hp submersible pump at a constant rate for up to 8 h. Discharge was measured using in-line flow meters. Totalizers on large-diameter flow meters read to the nearest 100 gal; the small flow meter reads to the nearest 1 gal. A measured 5-gal bucket and/or 55-gal drum was used to check the performance of the in-line flow meters. Discharge was stabilized at a constant rate with variations of no more than $\pm 10\%$. Water pumped from wells during aquifer testing was disposed of at least 1000 ft away from the wells and W-5. Constant-discharge tests were performed at the top of the unconfined aquifer at wells 299-W7-1 and 299-W7-2.

Water-level responses were measured during both the drawdown period and the recovery period (after pumping had been terminated). These measurements were made using an electric water-level indicator (E-tape) and/or a pressure transducer. The E-tape measurements may be no more accurate than

0.5 ft relative to the top of the well casing, but they are accurate to within at least 0.10 ft between successive measurements. The E-tape was placed in a stilling well wherever possible. Like the E-tapes, the pressure transducers were used only for relative measurements. The transducers were capable of measuring pressure ranges of 0 to 5, 0 to 10, or 0 to 15 psi. Steel tapes were used to obtain accurate measurements at the beginning and end of each test. Recovery tests were performed at wells 299-W7-1, 299-W7-2, 299-W8-1, 299-W10-13, and 299-W10-14.

A slug **injection/withdrawal** test was performed on well 200-W9-1 because the aquifer yield of the tested interval was too low for conducting a constant-discharge test. This well was completed with 4-in. stainless steel casing and screen and was developed only by bailing before the test. The slug consisted of a 10-ft-long, **2.375-in.-diameter** pipe filled with sand and sealed at both ends. This pipe displaced 0.31 ft³ of water. The slug was lowered instantly into the aquifer until completely submerged. After the water level reached equilibrium, the slug was rapidly removed from the aquifer. The aquifer response was measured using a 0- to 10-psi pressure transducer and verified using an E-tape. Both the injection and the withdrawal tests were monitored for 180 min.

Two methods were used to analyze the **drawdown** and recovery data obtained from the **constant-discharge** and recovery tests:

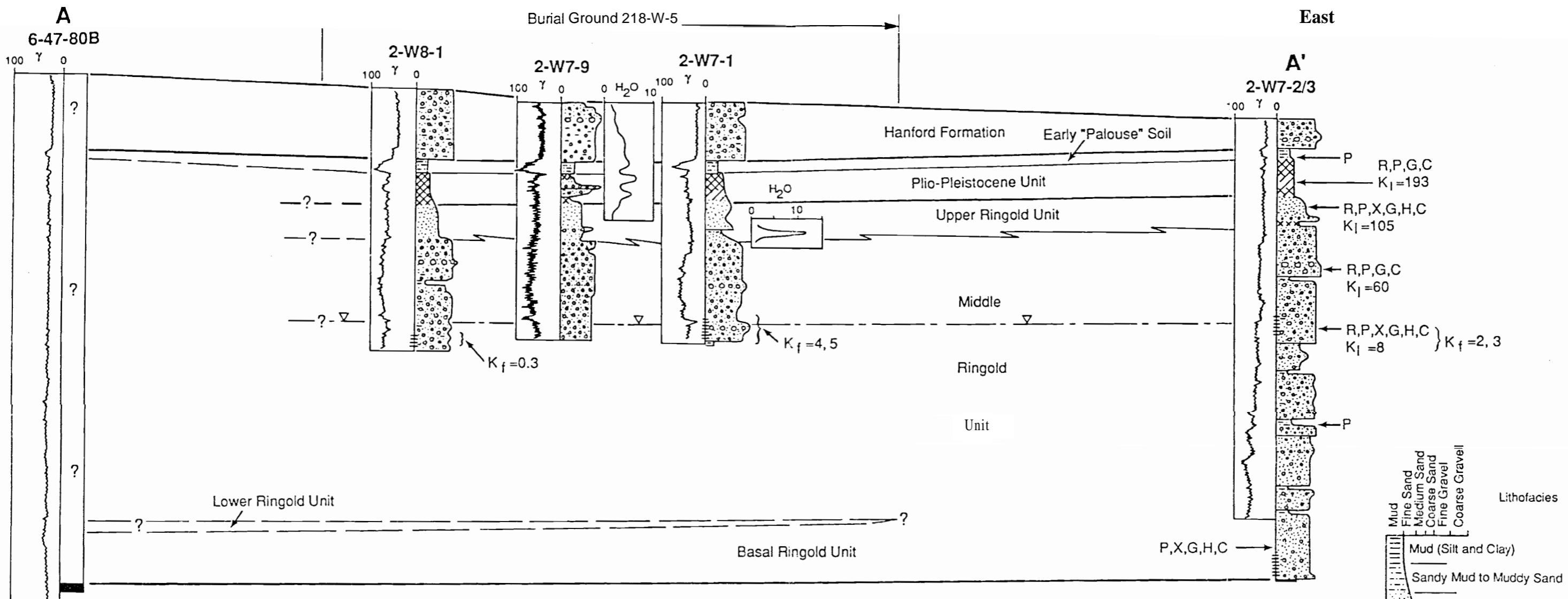
- **Theis** method (**Theis** 1935)
- Cooper-Jacob straight-line method (Cooper and Jacob 1946; Lohman 1972).

The following assumptions underlie the use of these methods:

- The aquifer is of infinite areal extent.
- The aquifer is homogeneous, isotropic, and of uniform thickness within the radius of influence of the aquifer test.
- The tested well penetrates and receives water from the full thickness of the aquifer by horizontal flow.
- The well is pumped at a constant discharge rate.
- The static level of the **piezometric** surface is horizontal within the radius of influence of the well.
- The well diameter is infinitesimal (**i.e.**, storage in the well is neglected).
- The water removed from storage is discharged instantaneously with decline of head.

Although some of these assumptions were obviously violated (**e.g.**, full penetration, homogeneity), the results obtained using these techniques do allow for a comparison of the hydraulic properties between the Hanford and **Ringold** Formations, the primary hydrogeologic units tested.

West



γ = Gross Gamma-Ray Log in counts/second
(Gamma activity increases to the left)

H_2O = Moisture content in wt. % H_2O
(Moisture content increases to the right)

$\{ K_f \}$ = Field-derived hydraulic conductivity (ft/day)

500' 250' 0
200m 100m 50'
VE=2X 20m 40m

Formation Contact
(Dashed where inferred)

Facies Contact
(Dashed where inferred)

Water Table

Special Analytical Sample (Lab analysis)

K_I = Saturated Hydraulic Conductivity (ft/day)

R = Water Retention

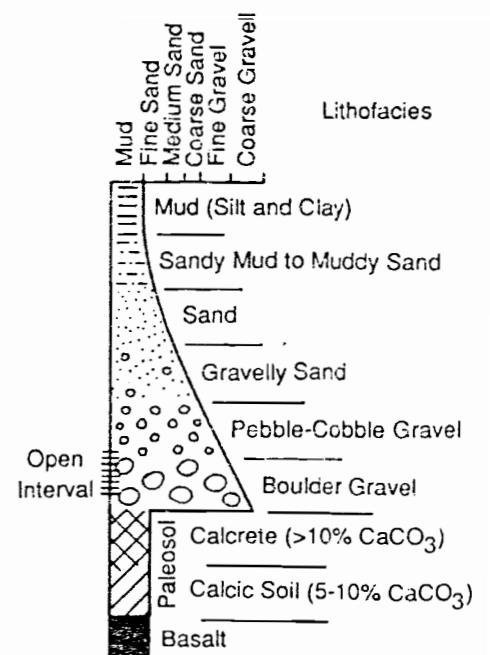
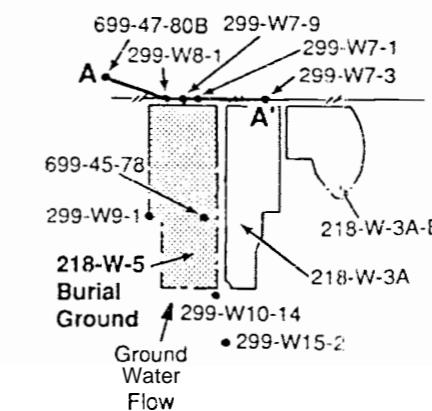
P = Petrography

X = X-Ray Diffraction

G = Bulk Geochemistry

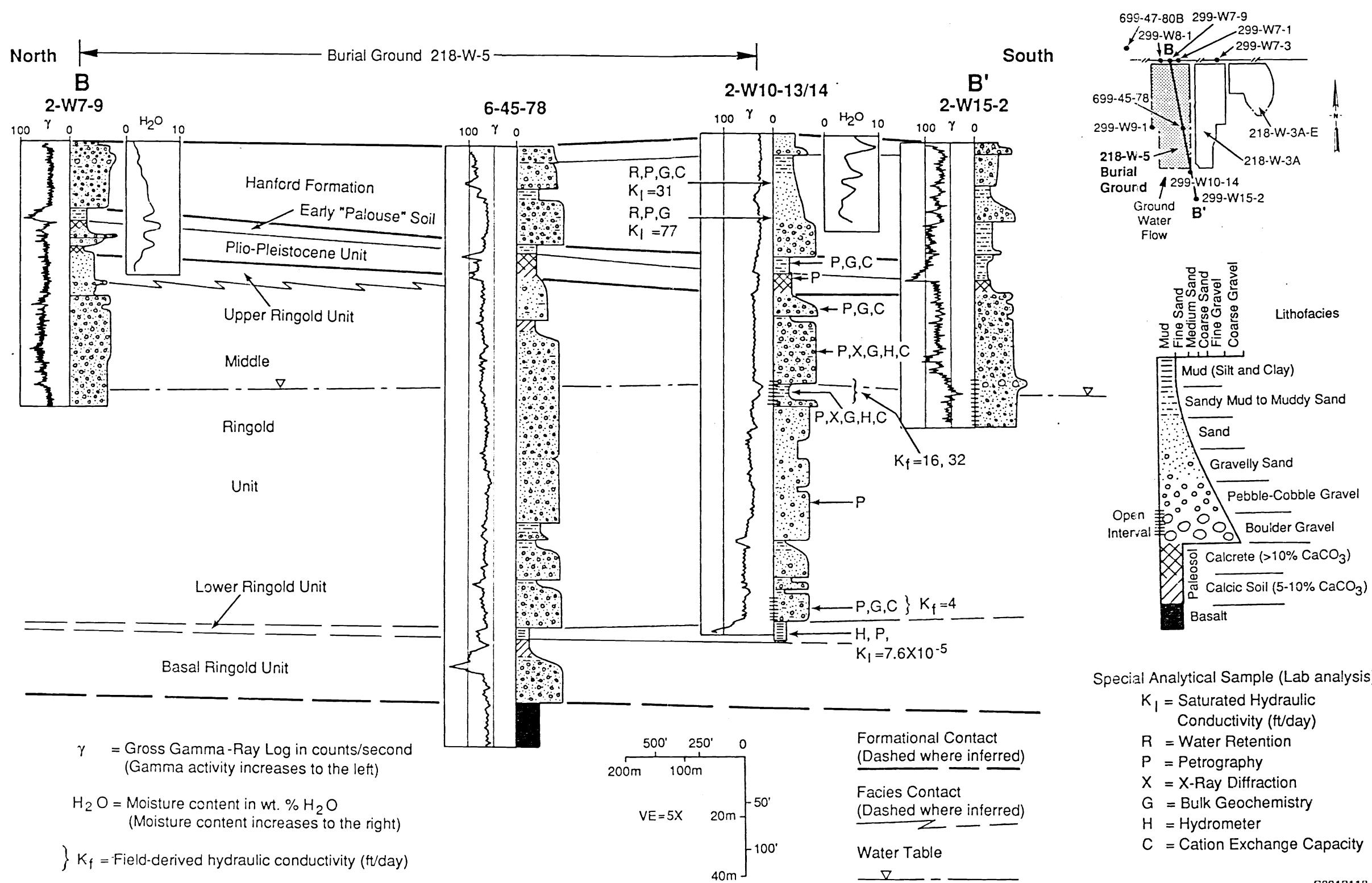
H = Hydrometer

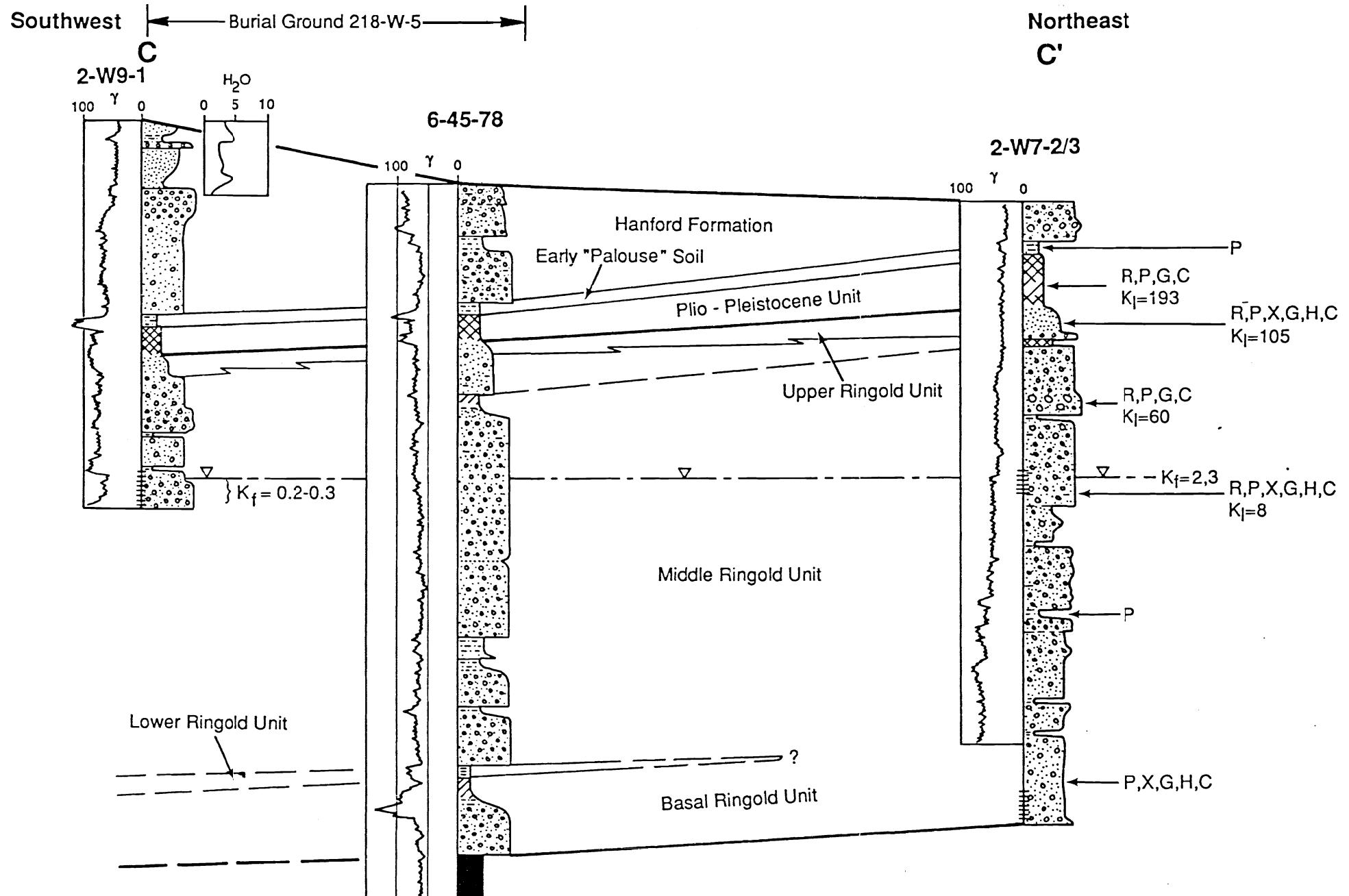
C = Cation Exchange Capacity



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FIGURE 4. Cross Section A-A'

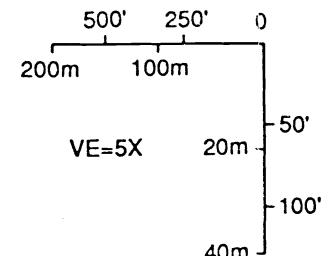




γ = Gross Gamma-Ray Log in counts/second
(Gamma activity increases to the left)

H_2O = Moisture content in wt. % H_2O
(Moisture content increases to the right)

} K_f = Field-derived hydraulic conductivity (ft/day)



Formation Contact (Dashed where inferred)

Facies Contact (Dashed where inferred)

Water Tab

Special Analytical Sample (Lab analysis)

K_s = Saturated Hydraulic Conductivity (ft/day)

R = Water Retention

P = Petrography

X = X-Ray Diffraction

G = Bulk Geochemistry

H = Hydrometer

C = Cation Exchange

C_e = Cation Exchange Capacity

S8912118.3

FIGURE 6. Cross Section C-C'

2.1.5 Water-Level Measurements

An interpretation of water-level measurements over time provides valuable information, such as the vertical component of ground-water flow, aquifer communication, and aquifer behavior in response to artificial recharge. Therefore, monthly water-level measurements are made for most ground-water monitoring wells in the vicinity of W-5. These measurements are made in duplicate using a steel tape in accordance with PNL procedures WL-1 through WL-5 (PNL 1989). Each steel tape is standardized against a steel tape to ± 0.10 ft. Hydrographs available for ground-water monitoring wells within 1000 ft of the burial ground are presented in Appendix B.

2.2 LABORATORY METHODS

A variety of laboratory analyses have been performed on samples from wells in the vicinity of W-5. Dry-sieve analysis and calcium carbonate analysis were conducted on a routine basis for most 5-ft samples from ten of the wells within 1000 ft of W-5 (the exception was well 699-47-808). Additional samples underwent, on a non-routine basis, a variety of other tests, including moisture content, water retention, permeameter, hydrometer analysis, cation exchange capacity, petrography, X-ray diffraction, and bulk geochemistry (Last et al. 1989). Sieve and calcium carbonate data are presented in Appendix C. Moisture content data are presented elsewhere in the text. Locations and types of analyses performed on other non-routine samples are summarized in Table 1.

2.2.1 Particle-Size Distribution

Particle-size analyses provide a quantitative measure of the size, distribution, and sorting relationships among individual particle grains. Particle-size analyses of the sand-to-gravel-sized particles were conducted using the dry-sieve method for 5-ft intervals of most of the wells near W-5. The dry-sieve procedure is presented in PNL (1989). Dry-sieve analysis is normally performed on one of the two pint-jar samples from all split-barrel, drive-barrel, or hard-tool samples. Six nested sieves had 2.00-, 1.00-, 0.50-, 0.25-, 0.125-, and 0.063-mm sieve openings. After the weight of material retained on each sieve was determined, the data were entered into the ROCSAN data base described by Tallman et al. (1979, p. 107-109). The ROCSAN (originally ROC) program calculates the total weight percent and particle-size distribution of the sample and classifies the sample according to one of the 19 sediment classes shown in Figure 7. Output on particle-size distributions generated by the ROCSAN program as of December 1, 1989, is presented in Appendix C.

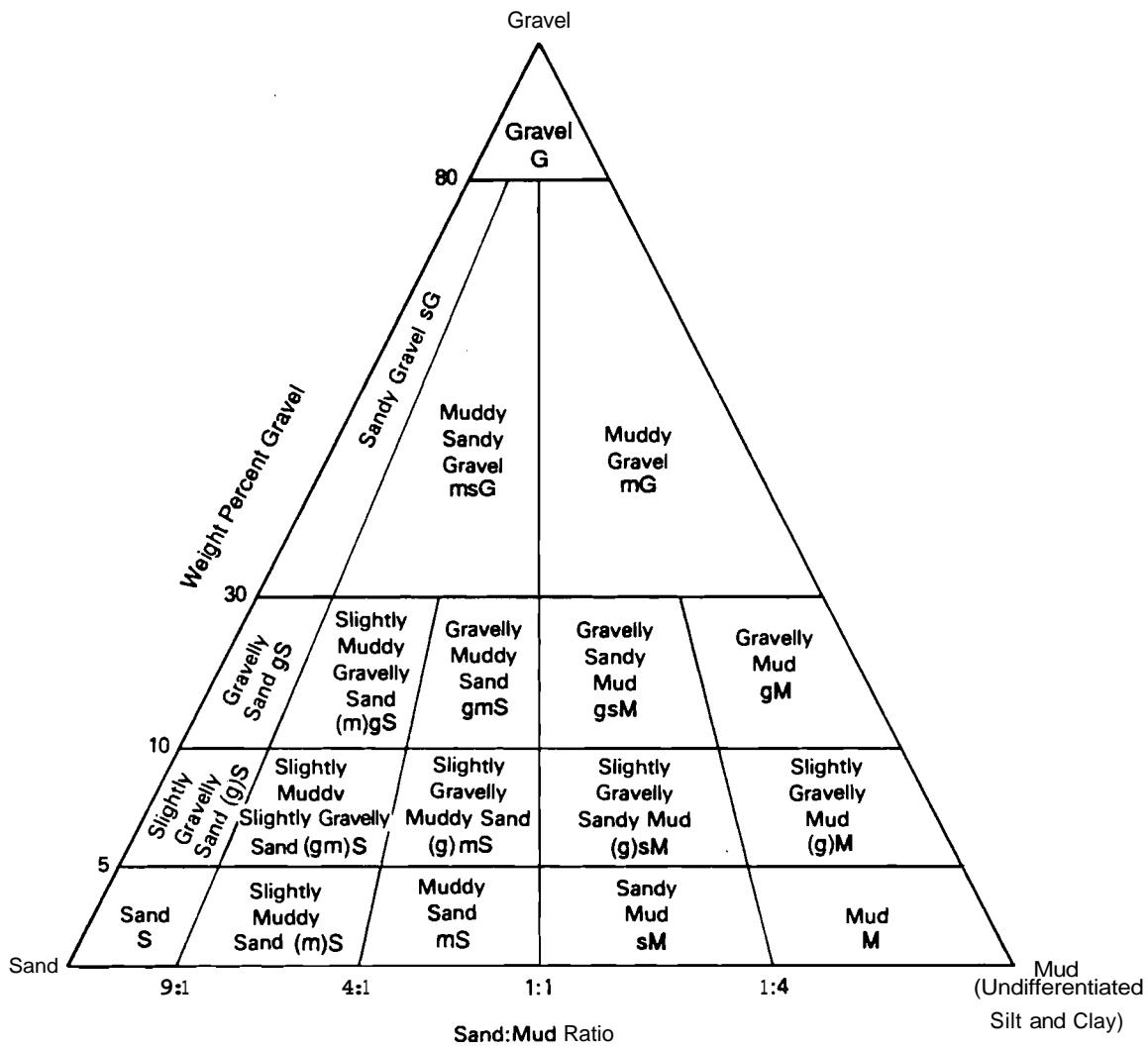


FIGURE 7. Sediment Classification According to Particle-Size Distribution

The fine-grained fraction of a few samples was also analyzed via **hydrometer/wet-sieve** analysis to determine the distribution of clay-to-silt-sized particles, using the methods described by ASTM (1986a) and Gee and Bauder (1986).

Particle-size distribution data are not absolute measurements and must be used qualitatively in combination with other data. While the results of dry-sieving may be representative for most samples collected with a drive-barrel or a split-banel sampler, the results for samples collected with a bailer after

hard-tool drilling are skewed toward finer grain sizes because of crushing and pulverizing by the hard-tool bit. Therefore, particle-size distribution data must be examined in combination with geologic logs and the gross gamma ray logs to arrive at an estimate of the in situ particle-size **distribution**.

2.2.2 Calcium Carbonate Content

Concentrations of calcium carbonate in sediments are often a function of cementation and soil development, and they are therefore a useful tool for identifying cemented zones and differentiating among stratigraphic units. Calcium carbonate analyses have been routinely conducted for the same samples as were analyzed for particle-size distribution. The calcium carbonate content is determined from a portion of the fine-grained fraction left over from dry-sieving. The weight percent of calcium carbonate present is analyzed by measuring the amount of carbon dioxide gas generated by the dissolution of calcium carbonate in acid. Procedures for measuring calcium carbonate in soils have been presented by Alison and Moodie (1965) and Nelson (1982). Results of calcium carbonate analysis are also entered into the ROCSAN data base and are included, along with particle-size data, in the ROCSAN output presented in Appendix C.

2.2.3 Field Moisture Content

In situ moisture content in the unsaturated zone is an important parameter for modelling unsaturated flow conditions. Samples for determining in situ water content were collected when drilling with a drive barrel or split barrel in the unsaturated zone. Field moisture samples were collected at 5-ft intervals along with the samples for particle-size analysis. Hard-tool samples were not analyzed for moisture content because the drilling method adds water to the formation. Because sediment samples are saturated below the water table, moisture samples were not collected below the level of the water table. Moisture content is plotted on the summary geologic logs presented in Appendix A.

Samples collected for moisture analyses were placed in airtight containers, sealed with tape, and enclosed in plastic bags to prevent moisture loss. At the end of each day, the samples were placed in a refrigerator, where they remained until the next working day, when analysis was initiated. After the plastic bag was removed, the entire sample was weighed, oven-dried at 105°C for 24 h, and reweighed in accordance with ASTM procedures (ASTM 1986b).

2.2.4 Permeameter

Permeameter measurements provide data on saturated hydraulic conductivity, an important parameter for modelling water movement through the saturated and unsaturated zones. Permeameter tests on two types of samples were performed in the laboratory. One type of sample consisted of repacked drive-barrel material; the other consisted of intact split-barrel (core) samples.

Hydraulic Conductivity of Drive-Barrel Samples

Saturated hydraulic conductivity was determined for six repacked sediment samples collected from the unsaturated zone in the vicinity of W-5. These measurements were made using the constant-head method described by Klute and Dirksen (1986). During this procedure, the loose sediment was packed into a cell 5.36 cm in diameter by 3 cm high, until a bulk density of 1.6 g/cm³ was attained. The ends of the cell were closed with lids, with an inflow valve at one end and outflow valve at the opposite end. The inflow valve was then connected to the constant-head device, and the outflow valve was connected to a collection vessel. Starting with a saturated sample, an initial time was recorded and the water allowed to flow through the sample for a set amount of time. The amount of water discharged from the sample was then recorded and the saturated hydraulic conductivity calculated.

Hydraulic Conductivity of Split-Barrel Samples

Three split-barrel samples from fine-grained Ringold material were analyzed for their vertical hydraulic conductivity using the falling-head method also described by Klute and Dirksen (1986). In this procedure, a 4-in.-long section was cut from the end of each split-barrel core while it was still encased in the sample liner. The sides of the core were then sealed to the liner, which was used as the containing cell. End caps, one with an inflow valve and one with an outflow valve, were placed on opposite ends of the cell. The inflow valve was then connected to a standpipe of known cross-sectional area and height. The samples were saturated before testing by slowly wetting them from the bottom. A solution of 0.01-M calcium chloride was used to ensure no interaction with the fine-grained sediment. Because the flow rates were extremely low, this saturation process took several months. At the start of the test, the hydraulic head in the standpipe was measured. The dilute calcium chloride solution was then allowed to flow from the standpipe through the sample for a set time. An ending head level in the standpipe was then recorded. Test runs were repeated five times and the values averaged to calculate the hydraulic conductivity.

2.2.5 Water Retention

The functional relation between soil water content and soil water potential, as displayed in moisture characteristic curves, and hydraulic conductivity are important parameters for ground-water transport models.

A total of six samples collected from wells near W-5 have been analyzed for water retention characteristics (Table 1). Water retention characteristics were measured at 5-, 10-, 20-, 30-, 40-, 50-, and 75 cm head pressure using hanging water columns (Figure 8). At 510-, 1020-, and 3060-cm head pressure,

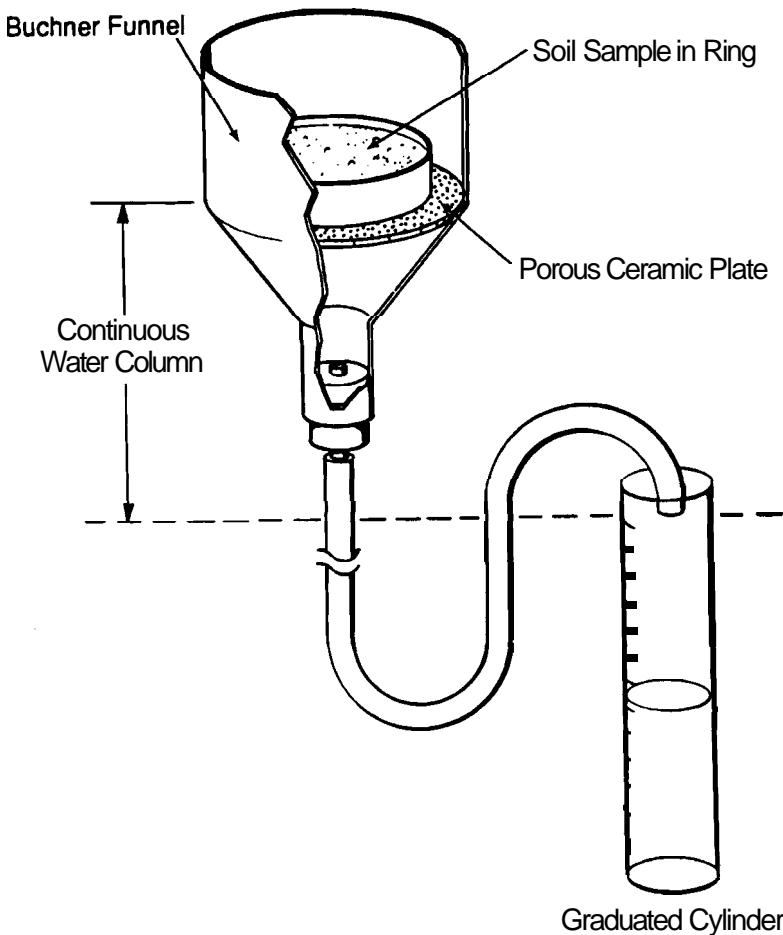


FIGURE 8. Hanging Water Column Apparatus Used to Measure Water Retention

the characteristics were determined using a pressure plate apparatus (Figure 9) and the method of Rawlins and Campbell (1986) and Klute (1986). Moisture characteristic curves, derived from the results of water-retention analyses, are presented in Appendix D.

Hanging water column analyses (Figure 8) were performed using the same saturated core-barrel samples used in the hydraulic conductivity analyses. These samples were transferred to the porous plates in Buchner funnels while they were still in their containing rings. The hanging water column is made by creating a continuous column of water up from the bottom of the porous plate through a cork in the neck of the funnel and into an narrow open-ended tube that is long enough to allow measurement of the pressure heads desired. The pressure head is measured from the center of the soil cell, which is in continuous contact with the column of water to the open end of the tubing (*i.e.*, the open water surface).

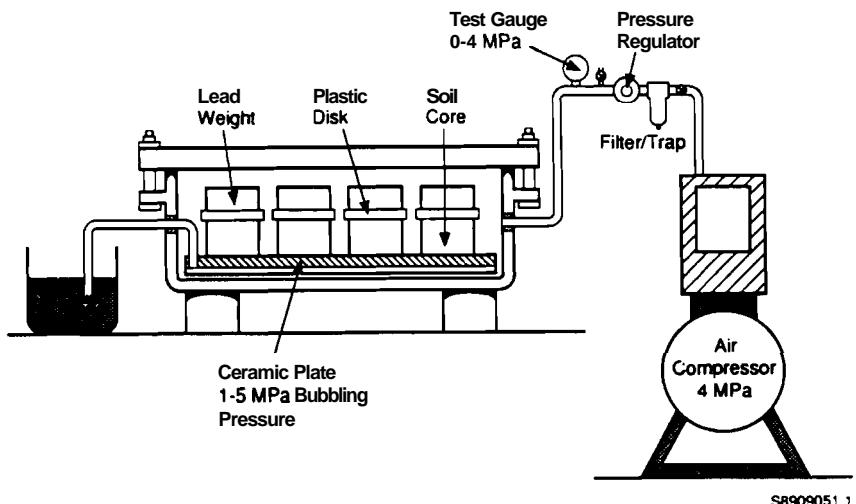


FIGURE 9. Pressure Plate Apparatus Used to Measure Water Retention

After equilibrium is reached at each head level, the soil cell is weighed, and the weight is recorded. After final head-value equilibrium has been achieved, the sample is oven-dried, and the water content at each level is calculated.

For pressure plate extractor analyses (Figure 9), samples were packed into containing rings on a porous plate and allowed to stand for 24 h. Equilibrium water contents were obtained by pressure-draining the samples in the extractor at the desired test level. At the end of each pressure run, the sample was weighed and oven-dried to determine the moisture content at that pressure (Klute 1986).

2.2.6 Cation Exchange Capacity

Cation exchange capacity (CEC) provides information on the relative ability of sediments to exchange one type of positive ion for others, such as radionuclides.

Cation exchange capacity analyses were performed by the Soil Testing Laboratory at Oregon State University, using the ammonium acetate method modified after Schollenberger and Simon (1945). Aliquots of borehole samples were sieved to recover the <2-mm size fraction. This fraction was then analyzed for CEC. The results of the CEC analysis are discussed in Section 4.3.8.

2.2.7 Mineralogical Analysis

The mineralogy of the sediments through which contaminants flow is important for determining the amount and extent of sediment/waste interaction. Of particular interest is the potential for sediments to adsorb radionuclides or hazardous constituents.

Sample splits were analyzed **mineralogically** using X-ray diffraction and petrographic techniques. In preparation for X-ray diffraction analysis, the sand- and silt-sized fractions were ground and randomly oriented. Twelve samples were run by PNL on an X-ray diffractometer and the **mineralogies** determined, qualitatively for the sand- to silt-sized particles and quantitatively for the clay-sized fraction.

A total of 33 petrographic analyses of the sand-sized fraction were performed by Washington State University (WSU) on loose, grain-mounted thin sections with a polarizing optical microscope. A total of 300 grains were **identified** per sample. Samples were stained to help differentiate plagioclase from potassium feldspar.

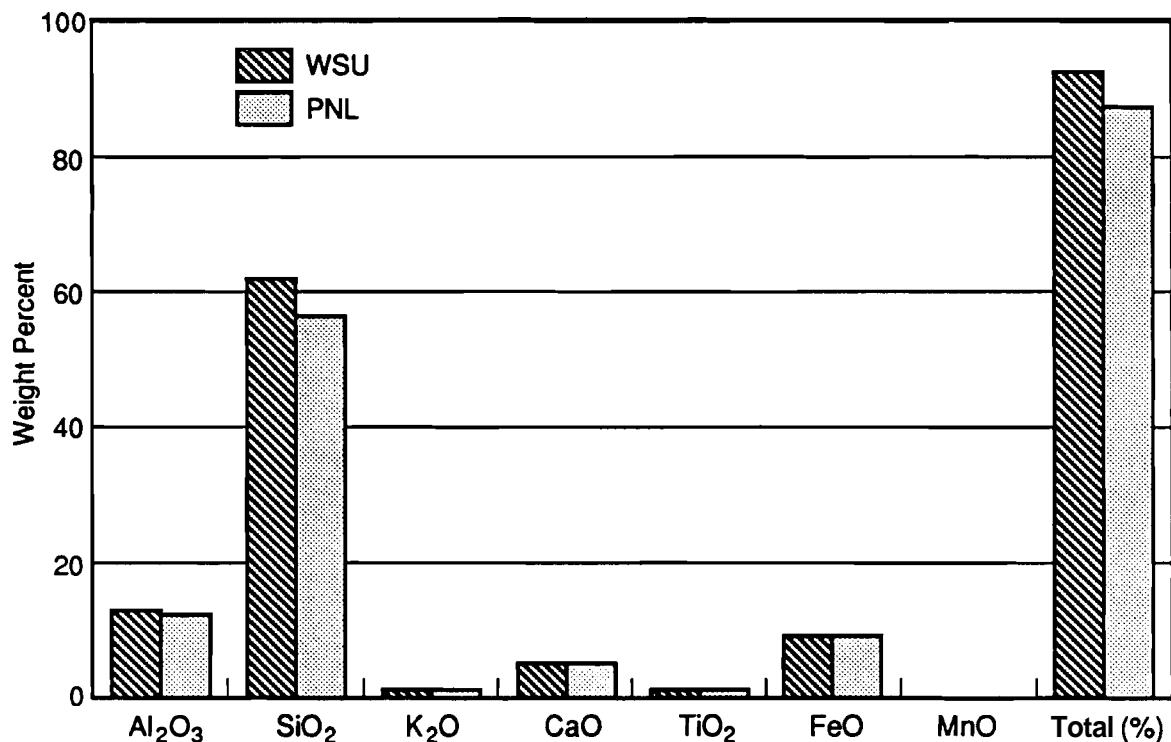
The results of the mineralogical analyses are discussed in Section 3.2.1.

2.2.8 Bulk Geochemistry

The bulk geochemistry of sediment samples provides useful information on the relative amounts of major and trace elements for the various hydrostratigraphic units. **Bulk** geochemical analyses provide 1) background values for the major and trace elements present in the sediments and 2) a potential method to refine stratigraphic correlations.

Bulk geochemical analyses of **borehole** samples have been determined by PNL and WSU using the X-ray fluorescence (XRF) method. Samples were separated by grain size, and powdered specimens of selected grain sizes were analyzed by XRF. A total of 55 samples were analyzed for bulk geochemistry; most were duplicate samples analyzed independently by PNL and WSU laboratories. Sample results from the two laboratories were in general agreement, as demonstrated in Figure 10. Major elements analyzed for included Al, Ca, Fe, K, Mn, Si, and Ti. Trace elements included As, Ba, Br, Ce, Co, Cr, Cu, Ga, I, In, La, Mo, Nb, Ni, Pb, Rb, Rh, Ru, Se, Sr, Sn, U, V, Y, Zn, and Zr. The results of the bulk geochemical analyses are discussed in detail in Section 3.2.2.

Well #: 299-W7-5
Depth = 10'
Stratigraphic Unit: Hanford Formation



S9003003.1

FIGURE 10. Comparison of X-Ray Fluorescence Analyses from WSU and PNL Laboratories

3.0 GEOLOGY

This interpretation of the geology is based on information from 11 wells located within 1000 ft of W-5 (Figure 2). These include seven wells installed as **RCRA-compliance**, ground-water monitoring wells, as well as three older wells documented by Last et al. (1989) and Last and Bjornstad (1989). The geology of the eleventh well, a recently drilled RCRA well (**299-W7-9**) that yielded nearly continuous split-barrel core samples to the top of the middle **Ringold** unit, is included with this report even though the well is incomplete.

Of the 11 wells used for the interpretation of geology and hydrology, seven are shallow wells primarily drilled to intercept the water table (210- to **310-ft** depth), one terminates within the confining lower **Ringold** unit, and three intercept the uppermost basalt flow.

The stratigraphy of the area around W-5 is typical for that of the 200-West Area, as presented in Figure 3. The regional geology is **discussed** in other reports (Myers/Price et al. 1979; Myers and Price 1981; DOE 1986, 1988). Previous reports on the geology in the vicinity of W-5 include those by Tallman et al. (1979, 1981), Van Luik (1980), DOE (1988), and Last et al. (1989), and Last and Bjornstad (1989).

Surface soils in the vicinity of W-5 are classified as **Rupert** Sand (Hajek 1966) and support a dominantly **sagebrush/cheatgrass** plant community (Van Luik et al. 1980).

3.1 STRATIGRAPHY AND LITHOLOGY

The subsurface geology of the W-5 site has been interpreted from field descriptions and laboratory analyses of **borehole** cuttings and cores. For each well, these included two or more of the following: 1) geologist's logs, 2) gross gamma logs, 3) driller's logs, 4) granulometric analyses, and 5) calcium carbonate analyses. These data were evaluated in accordance with the characteristics used by Bjornstad (1985) and DOE (1988) to distinguish between the various geologic units.

An analysis of the geology and facies distribution began with construction of the three detailed cross sections represented in Figures 4 to 6. Where data were not available for depths to the lower **Ringold** unit and the top of basalt, they were determined indirectly from structure contour maps presented by Last et al. (1989) and plotted onto the cross sections. From these cross sections, stratigraphic relationships were evaluated and correlations were made. From these correlations, a fence diagram (Figure 11) was generated.

The sedimentary units overlying the Elephant Mountain Member of the Saddle Mountains Basalt in this area include the four **Ringold** lithologic units (basal, lower, middle, and upper), as well as the Plio-Pleistocene unit (Bjomstad 1984, 1985), the early "Palouse" soil (Brown 1960; **Tallman et al. 1979**), and the glaaofluvial Hanford formation (**Tallman et al. 1979**). Locally, a thin veneer of Holocene sand may overlie the Hanford formation. Except for complex facies relationships typical of the Hanford formation, most of these stratigraphic units appear to be continuous beneath W-5. A more detailed discussion of each of these units except the Holocene sands is presented below.

3.1.1 Saddle Mountains Basalt

The Saddle Mountains Basalt is the uppermost formation of the Columbia River Basalt Group (**Swanson et al. 1979**). The uppermost basalt unit in the vicinity of W-5 is the Elephant Mountain Member (Van Luik et al. 1980; Last et al. 1989), which is dated at about 10.5 million years. W-5 lies along the northern flank of the Cold Creek syncline. Because it does, the basalt surface slopes gently to the southwest, ranging in elevation from -190 ft in the northeast to -160 ft in the southwest corner of W-5 (Figure 12).

3.1.2 Ringold Formation

Overlying the Elephant Mountain Member are fluvial-lacustrine deposits belonging to the **Ringold** Formation (**Tallman et al. 1979, 1981**). The **Ringold** Formation represents deposits from the ancestral Columbia and Snake rivers (Fecht et al. 1985). The **Ringold** Formation in the vicinity of the 200-West Area appears to be mostly of **fluvial** origin and contains a wide variety of sediment types (i.e., lithofacies), ranging from coarse sandy gravel (channel faaes) to fine-grainedmud (overbank-lacustrinefades) (Bjornstad 1985). For convenience and for consistency with past terminology, the **Ringold** Formation is subdivided into the basal, lower, middle, and upper **Ringold** units (**Tallman et al. 1979**).

These **Ringold** units, however, may not be correlative with the similarly defined units everywhere else in the Pasco Basin. For example, it has not been demonstrated, nor is it likely, that what is defined as the lower **Ringold** in the 200-West Area is correlative with what was originally defined as the lower **Ringold** unit in the east-central Pasco Basin (see Figure 1) by **Newcomb** (1958). **Fluvial** faaes, like those forming the **Ringold** Formation, may not be expected to correlate over more than a few kilometers (Walker and Cant 1984). For this reason, readers should not assume that the **Ringold** units referred to in this report are the same as those with the same names in other parts of the basin. Furthermore, considerable variation can occur, both within units of the **Ringold** Formation and within the Hanford formation. Because **lithofacies** better represent the lithologic heterogeneity inherent in **fluvial** depositional environments (Lindsey

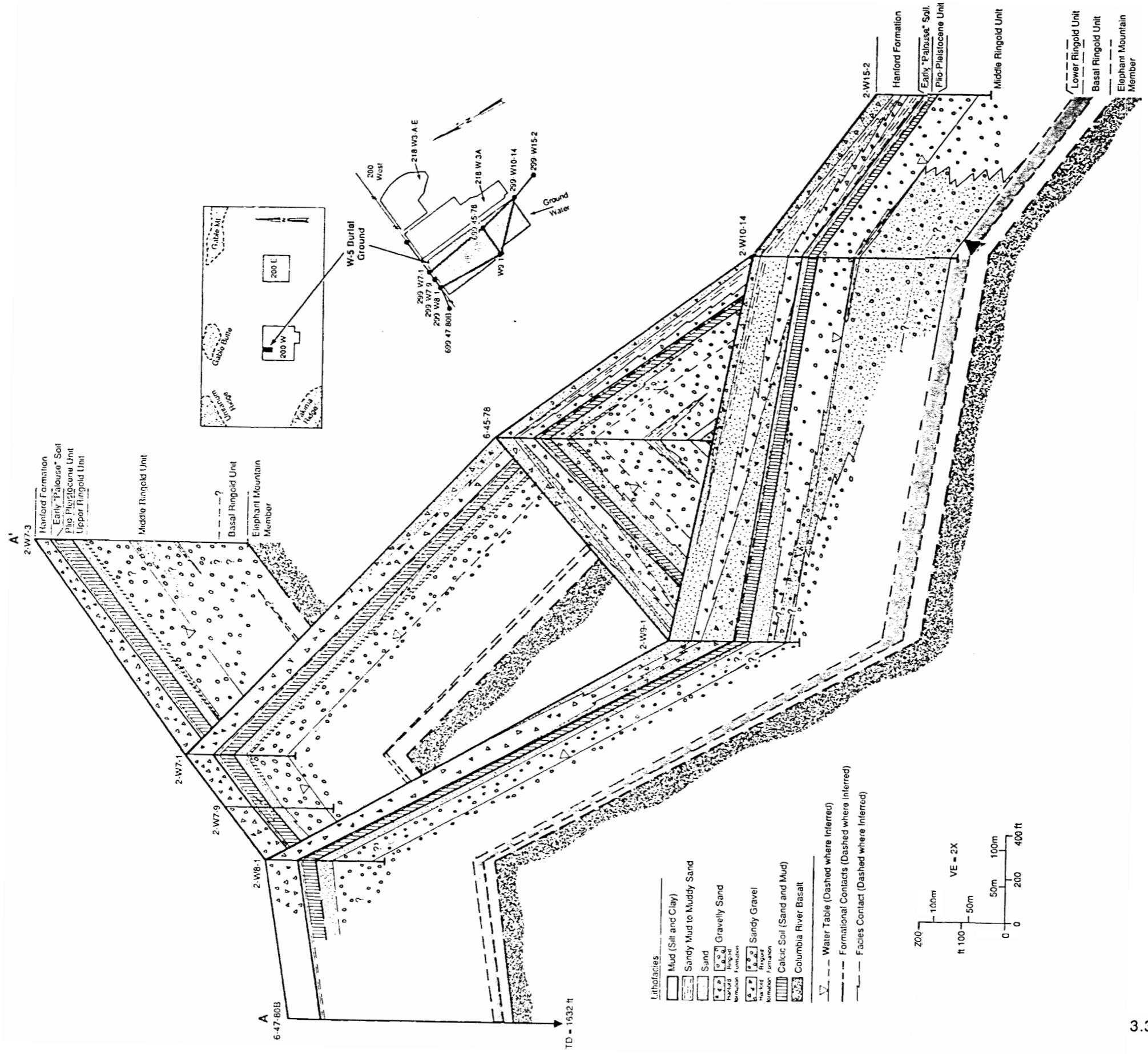


FIGURE 11. Fence Diagram of the Area near W-5

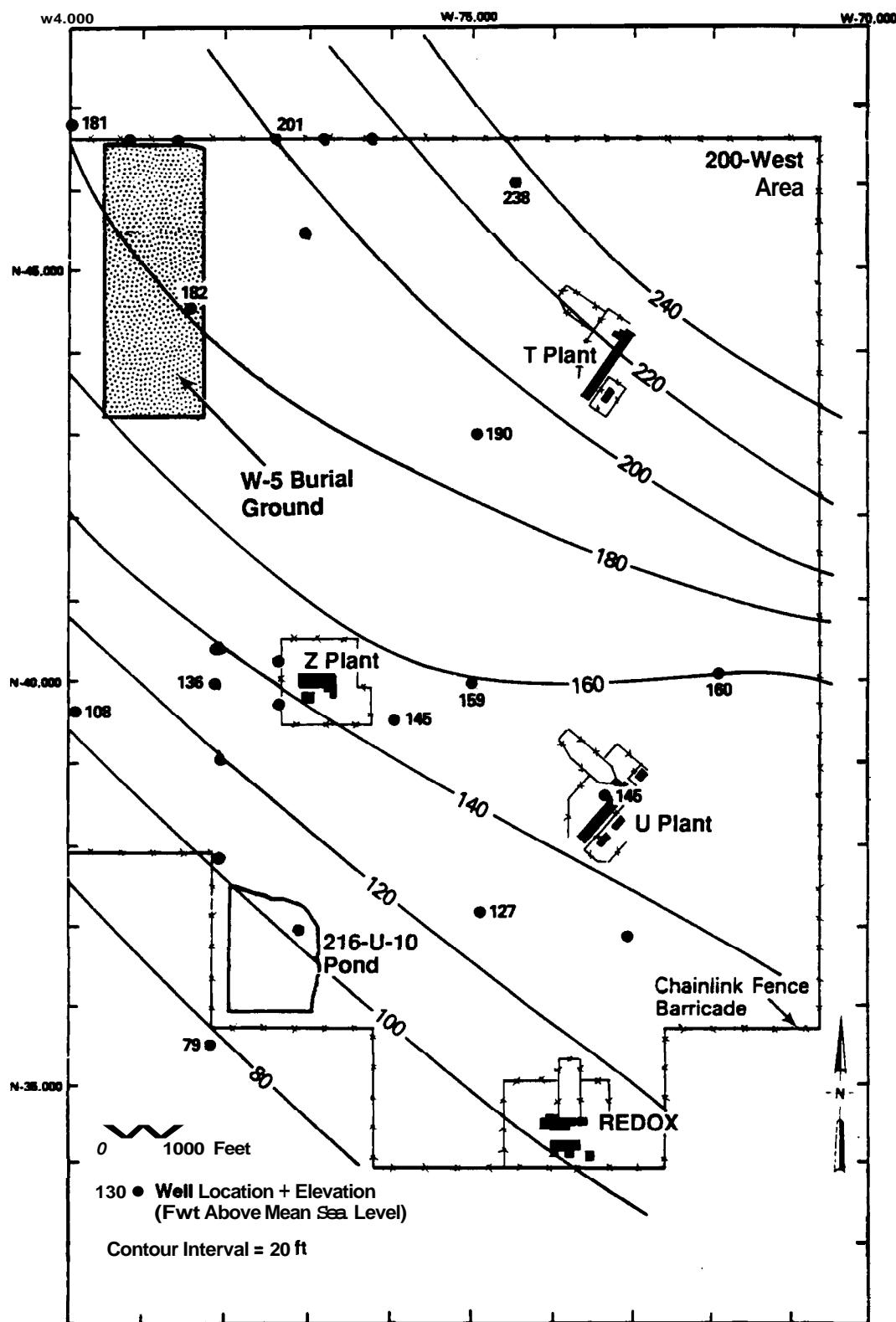


FIGURE 12. Surface of the Elephant Mountain Member Beneath the 200-West Area

and **Gaylord** 1989; Lindsey et al. 1989), the use of lithofaas such as those in the fence diagram (Figure 11) is a more appropriate method for describing and correlating stratigraphic units than is the use of traditional **Ringold** units (i.e., upper, middle, lower, basal).

Basal Ringold Unit

The basal **Ringold** unit is further subdivided into a coarse-grained and a fine-grained subunit (Bjornstad 1985; DOE 1988). The basal **Ringold** deposits show a moderate to strong **consolidation**, a result of either compaction or cementation. The coarse-grained subunit is composed of deposits of sandy gravel to gravelly sand. The coarse-grained **Ringold** sediments, which represent high-energy **river**-channel deposits, are usually moderately to well sorted, the composition of gravel clasts is <50% basalt, and neither the gravel nor the matrix generally reacts with dilute aad. The coarse-grained basal **Ringold** unit is overlain by increasingly finer sand and mud, which is capped by a well-developed, argillic (i.e., mud-rich) paleosol; this sequence is referred to as the finegrained subunit of the basal **Ringold** unit. The thickness and extent of this unit is inferred from regional isopach and structure contour maps presented by Last et al. (1989) and Last and Bjornstad (1989).

Lower Ringold Unit

Above the basal **Ringold** unit is another fine-grained unit -the lower **Ringold** unit. The results of a hydrometer analysis from the lower **Ringold** unit corroborate the high mud content; the unit consists predominantly of silt (44%), with approximately equal amounts of sand (29%) and clay (27%) (Table 3). The fine-grained lower **Ringold** unit is distinguished from the similar-textured basal **Ringold** paleosol by 1) the presence of welldeveloped laminae, 2) a distinct gray (as opposed to olive) color, and 3) a significantly higher natural-gamma response in geophysical logs (DOE 1988). The lower **Ringold** unit is generally less than 10 ft thick beneath W-5 and, along with the basal **Ringold** fine-grained subunit, pinches out near the northeast corner of W-5 (Figure 13). Where these fine-grained strata are missing, it is not possible to differentiate between the middle and coarse-grainedbasal **Ringold** units, which share a common texture and mineralogy. The lower and fine-grained basal **Ringold** units form a confining layer, which separates the upper **unconfined** aquifer from a semiconfined aquifer (i.e., this coarse-grained basal **Ringold** sub-unit). This subject is discussed further in Section 4.0.

Middle Ringold Unit

The middle **Ringold** unit is about 300 ft thick and is the thickest geologic unit beneath W-5. The middle **Ringold** unit consists of mostly coarse-grained gravel and sand deposited in a high-energy **fluvial**

TABLE 3. Hydrometer Analyses from Wells in the Vicinity of the W-5 Burial Ground

Well #	Depth (ft)	Stratigraphic Unit	Particle-Size Group (normalized wt%)*		
			Sand	Silt	Clay
299-W7-2	94 - 95	Upper Ringold	88.28	9.32	2.40
	220	Middle Ringold	78.92	16.51	4.58
299-W7-3	450	Middle Ringold	87.24	9.25	3.52
299-W10-13	200	Middle Ringold	73.67	12.80	13.53
	240	Middle Ringold	78.38	11.00	10.63
299-W-10-14	460	Lower Ringold	29	44	27

* Gravel-sized particles separated out prior to hydrometer analysis

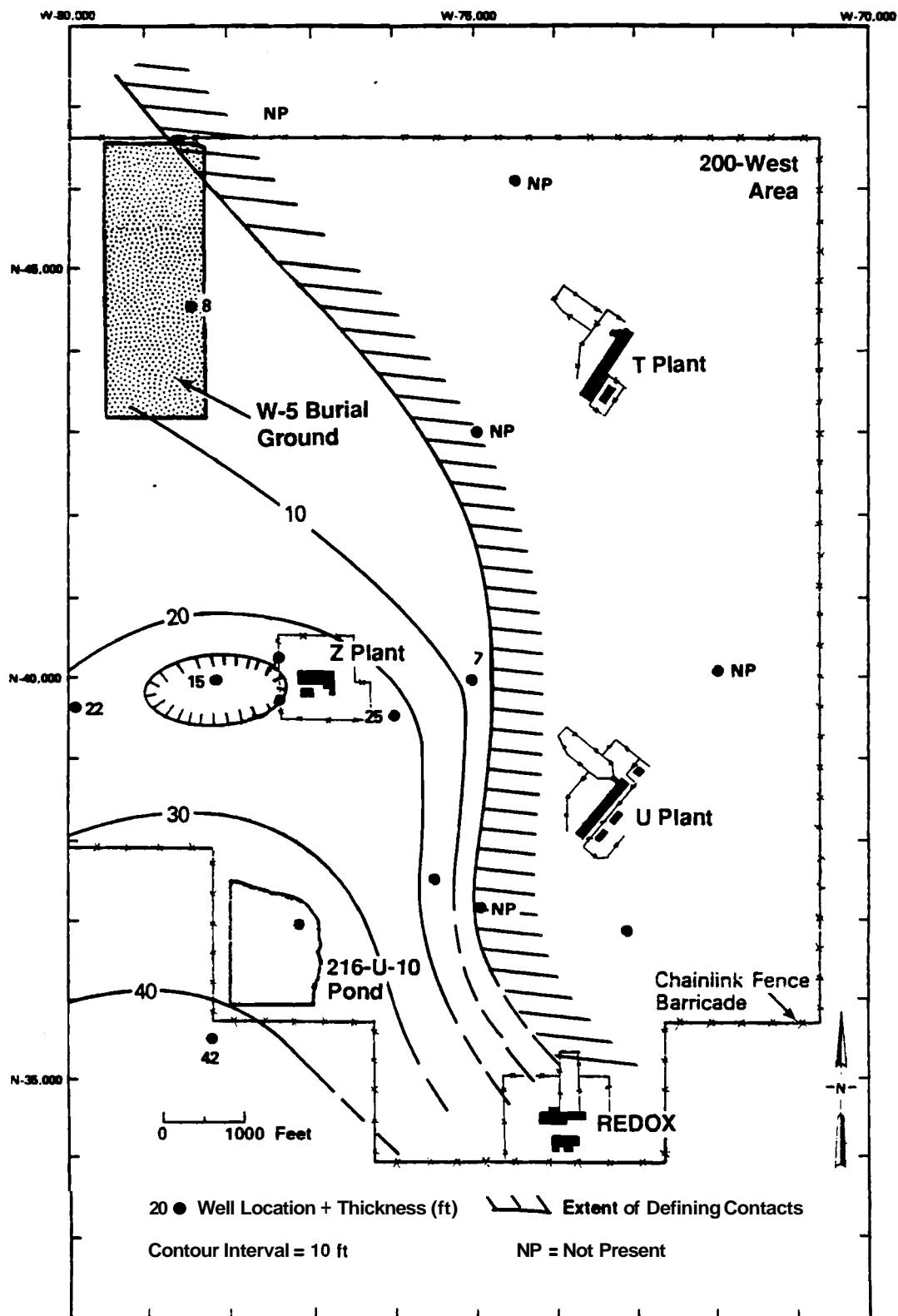


FIGURE 13. Thickness of the Lower Ringold Unit Beneath the 200-West Area

environment. As in the case of the **coarse-grained** basal **Ringold** subunit, the characteristics used to define the middle **Ringold** are its 1) coarse texture, 2) relatively high proportion of quartzite and granitic **clasts**, 3) relatively low calcium carbonate content, 4) partial consolidation, and 5) relatively low **natural-gamma** response. Hydrometer analyses of the sandy matrix from four samples of the middle **Ringold** unit indicate that they may contain from 9 to 16% silt and 3 to 13% clay in the non-gravel fraction (Table 3). The uniform clast-supported **texture** of the middle **Ringold** unit is **sometimes** interrupted with what appear to be thin, probably discontinuous layers of mud **and/or** sand.

Upper Ringold Unit

The upper **Ringold** unit, which is ~35 ft thick along the northern margin of W-5, pinches out to the south (Van Luik et al. 1980; Last et al. 1989); this is shown in cross section B-B' (Figure 5). The upper **Ringold** unit consists of finer-grained deposits, mostly muddy sand to gravelly sand, which represent a transition to a lower-energy **fluvial** environment than in the middle **Ringold**. Hydrometer analysis of one <2-mm sample from the upper **Ringold** unit (Table 3) indicates that it is mostly sand (**88.3%**), with only minor amounts of silt (9.3%) and clay (2.4%). The contact with the middle **Ringold** unit appears to be gradational and is generally defined by the interval above the middle **Ringold** where the amount of light-colored **arkosic** sand exceeds the amount of gravel. Characteristics of the upper **Ringold** unit are its 1) abundance of well-sorted sand, 2) light color, caused primarily by the predominance of quartz and feldspar over **basalt**; and 3) variable **natural-gamma** response.

3.1.3 Plio-Pleistocene Unit

The Plio-Pleistocene unit (Bjomstad 1984, 1985) consists of a chemically altered (*i.e.*, calcareous) mixture of sand and mud, which represents a highly weathered paleosurface that developed atop the **Ringold** Formation (Brown 1959, 1960). While some aggradation of new material may be associated with this unit, much of the material is the result of *in situ* weathering of the uppermost **Ringold** Formation (*i.e.*, middle or upper **Ringold** units). The characteristics of the Plio-Pleistocene unit, which suggest it is **pedogenic** in nature (Gile et al. 1966), are its almost white color, its high degree of cementation, and the presence of animal burrows and root traces in cores. Natural-gamma activity within the Plio-Pleistocene unit is erratic, high in places and moderate to low elsewhere.

The thickness of the Plio-Pleistocene unit ranges from ~40 ft along the north edge of W-5 to ~20 ft at the south, and the top of this unit dips approximated **1.5°** to the southwest (Figure 14). This is significant hydrologically, because highly cemented zones within this unit could inhibit the downward percolation of water in the unsaturated zone. If unsaturated flow moved downward along this surface, it would be moving opposite to the regional northeasterly trend of movement of ground water in the saturated zone (see Section 4.2).

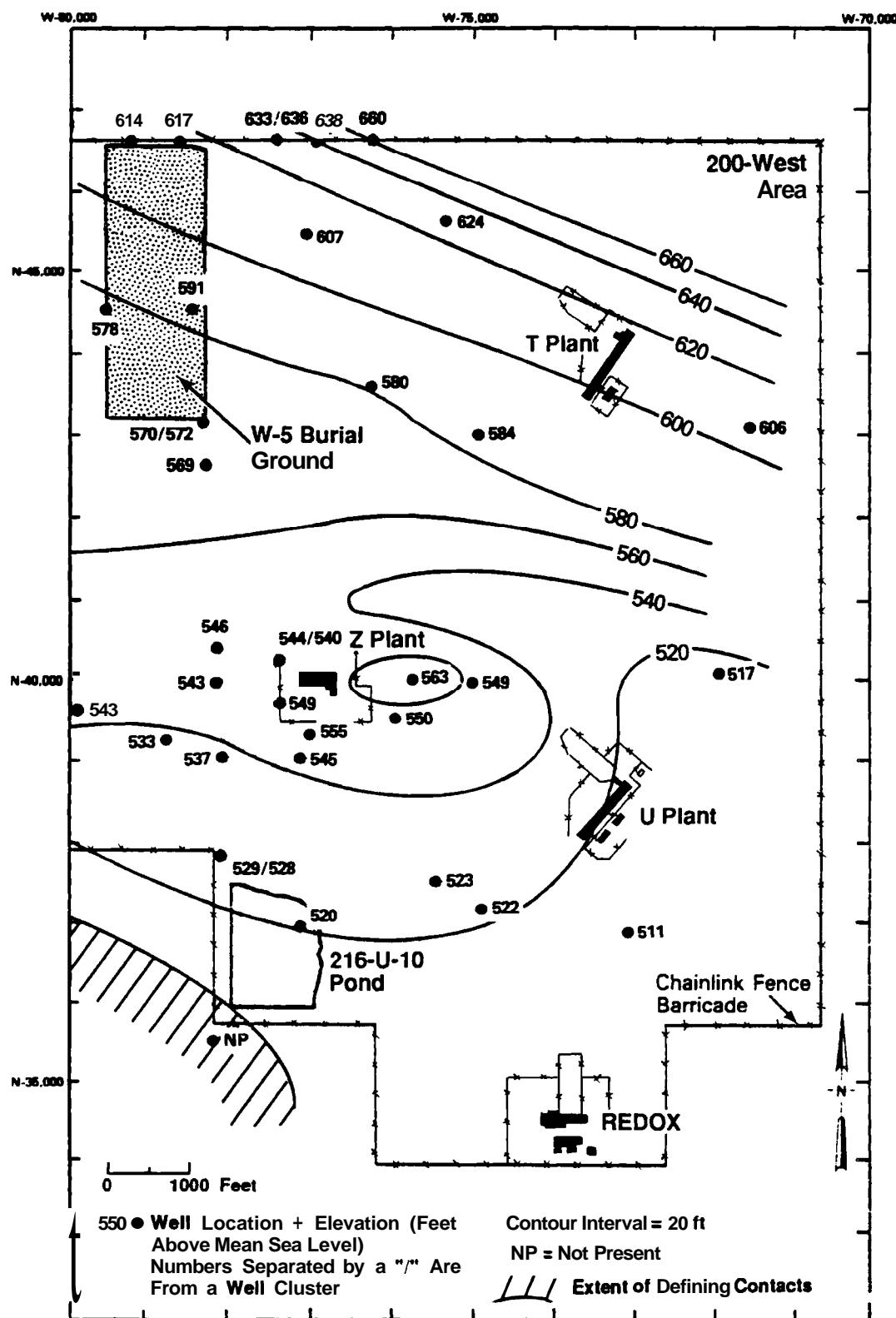


FIGURE 14. Top of the Plio-Pleistocene Unit

The concentration of secondary calcium carbonate cement, a common soil-development product in arid environments, exceeds 30 wt% in some samples. In places, this secondary cement may completely fill the voids between sedimentary particles, making it relatively impermeable. The **Plio-Pleistocene** unit is defined as that interval below the early "Palouse" soil where the concentration of calcium carbonate exceeds ~5% by weight. Those areas in the **Plio-Pleistocene** unit that contain between 5 and 10% calcium carbonate are referred to as **calcic soil**; zones containing >10% calcium carbonate are usually very firmly cemented and are referred to as **calcrete** (Machette 1985). Whether the **Plio-Pleistocene** unit in a particular area consists of a **calcic** soil or calcrete is indicated on the geologic cross sections (Figures 4 to 6). From the cross sections, it is apparent that the thickness and degree of **calcic-soil** development within the **Plio-Pleistocene** unit varies considerably from one location to another beneath W-5. This suggests that the impermeable **calcrete** layers are discontinuous and might cause only local perched-water even if there were enough recharge available for saturated conditions.

Interestingly, the **Plio-Pleistocene** unit in some places appears to be a single massive unit [e.g., at wells 299-W8-1 and 299-W7-1 (Figure 4)]. However, between these two wells (about a 600-ft distance), the two calcrete layers are separated by 15 ft of **non-calcareous**, basaltic gravel and sand. This suggests that, locally, channels transporting sidestream alluvium incised into the weathered **Ringold paleosurface**.

3.1.4 Early "Palouse" Soil

Overlying the **Plio-Pleistocene** unit is the early "Palouse" soil, an unconsolidated muddy fine sand to fine sandy mud layer believed to be an early Pleistocene loess (windblown silt and sand). This deposit is derived from either reworked **Plio-Pleistocene** unit or upper **Ringold** material (Brown 1960). Characteristics of the early "Palouse" soil include 1) uniform fine-grained texture, 2) unconsolidated nature, 3) high mica content, and 4) moderate calcium carbonate content (2-5%). The **most** distinctive characteristic of the early "Palouse" soil is its high natural-gamma log response; this is particularly apparent in cross section A-A' (Figure 4).

Compared to the **Plio-Pleistocene** unit, the early "Palouse" soil is relatively unconsolidated and less calcareous, and it displays a **consistently** higher natural-gamma response. Although thin (~10-15 ft), the early "Palouse" soil appears to form a continuous, relatively uniform layer beneath W-5. Van Luik et al. (1980) reported a thickness of at least 25 ft for the early "Palouse" soil beneath W-5. However, it is likely that they merged the early "Palouse" soil and **Plio-Pleistocene** units, because without a careful analysis of calcium carbonate data and gross gamma logs it can be difficult to differentiate these units.

3.1.5 Hanford Formation

The Hanford formation was deposited by Pleistocene cataclysmic floods (**Myers/Price et al. 1979**), which first inundated eastern Washington as early as 1 million years ago (Bjornstad and Fecht 1989). These floods were derived from the sudden release of glacial Lake Missoula near the northern **Idaho/Montana** border and covered eastern Washington perhaps dozens of times between 1 million and 13,000 years ago (Baker 1973; **Waitt** 1980). In the Pasco Basin, these floods eroded into the **Ringold** Formation and blanketed the area with mostly coarse-grained, poorly sorted glaaofluvial deposits that are now referred to, informally, as the Hanford formation.

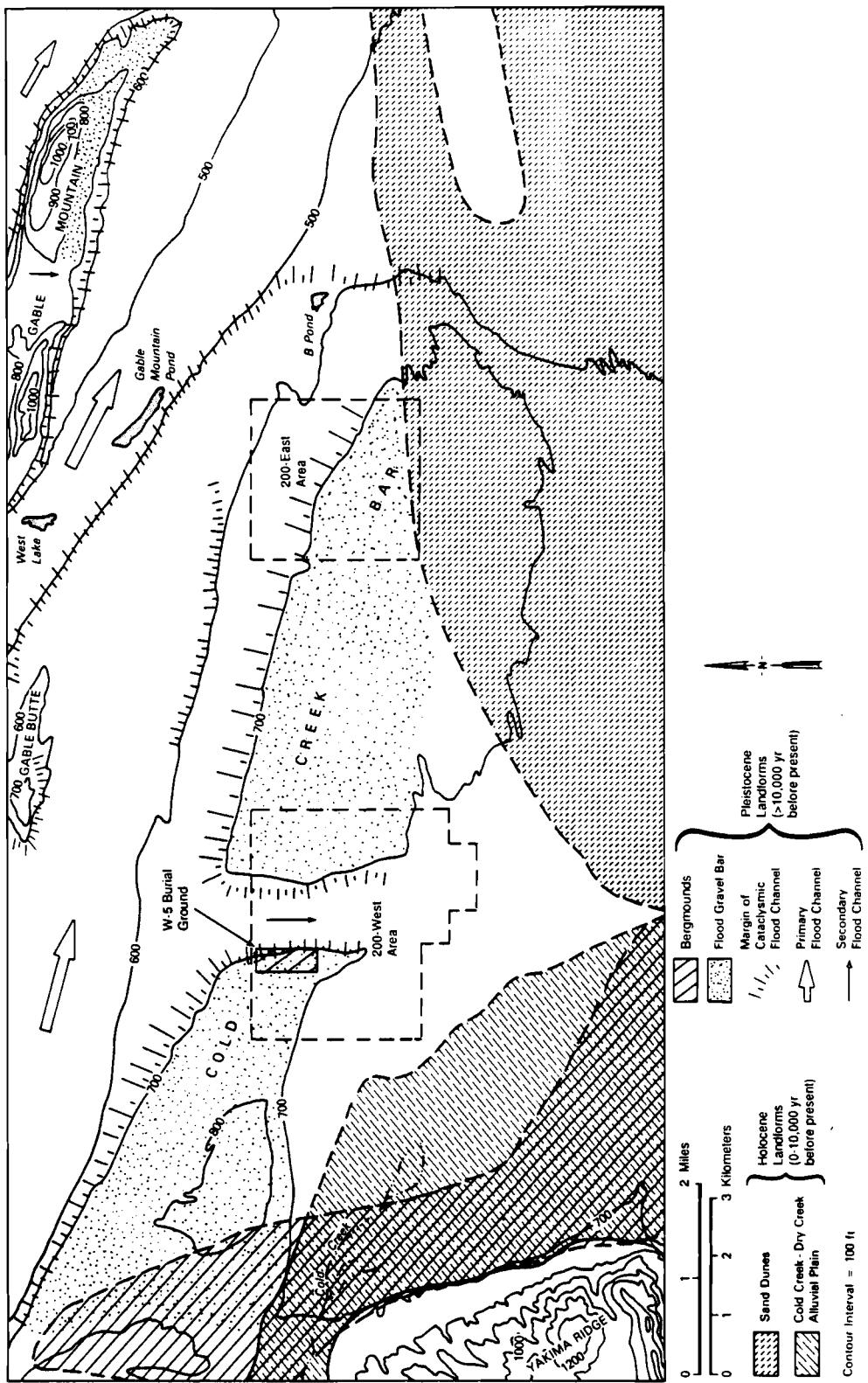
The Hanford formation is divided into three facies. Coarser sand and gravels were deposited where the current energy of the flooding was greatest; these deposits are referred to as the Pasco Gravels (**Myers/Price et al. 1979**). In what were slack-water areas during flooding, deposits consist predominantly of sand and silt belonging to the Touchet Beds (Flint 1938; Bjornstad 1980). The **third** facies, referred to here as the "transitionalfacies," is predominantly plane-laminatedsand (Bjornstad **et al. 1987**), but it may have characteristics of the Pasco Gravels or the Touchet Beds or both. The "transitionalfacies" occurs in depositional environments where flood gravels do not occur or where the intensity of the current energy was intermediate between those that deposited the Pasco Gravels and Touchet Beds.

The thicknesses and facies distribution within the Hanford formation are highly variable because of the dynamic nature of the flood currents in the vicinity of W-5. A detailed facies analysis of the Hanford formationis not possible with the present distribution of boreholes. This is a result of the highly variable nature of the Hanford lithofaaes, which can alternate and grade from coarse-grained cobbles and boulders to fine-grained sand and silt within a few hundred feet.

Geomorphically, W-5 lies along the northern edge of a giant flood bar (Cold Creek bar) and near the intersection of two flood channels (Figure 15). A major east-west flood channel lies north of Cold Creek bar, and a secondary **north/south-trending** channel runs parallel to the eastern boundary of W-5.

During the development of the relatively flat-topped Cold Creek bar, **aggradation** of flood deposits covered a sloping paleosurface. This resulted in less accumulation (~50 ft) of sediments to the north of W-5 than to the south, where as much as 150 ft of sediments were deposited in the Hanford formation (Figure 16).

Along the northern edge of **Cold** Creek bar, the Hanford formation appears to consist of a single sequence of coarse-grained**bouldery** gravel and sand (Pasco Gravels fades). To the south, on the other hand, where flood current energy was less vigorous, these coarse-grained deposits are replaced with "transitional" **and/or** Touchet Beds facies (Figure 17).



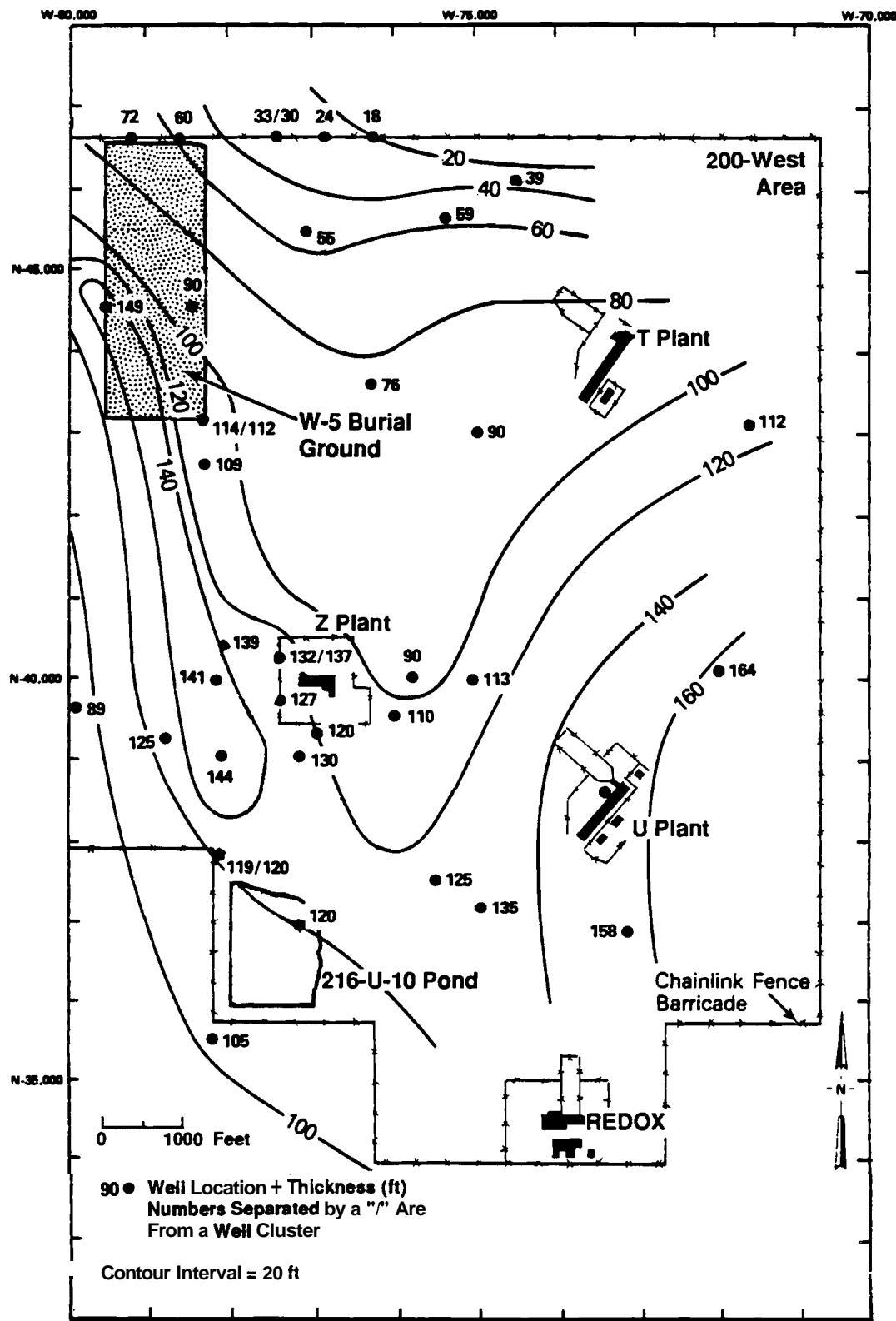


FIGURE 16. Thickness of the Hanford Formation Beneath the 200-West Area

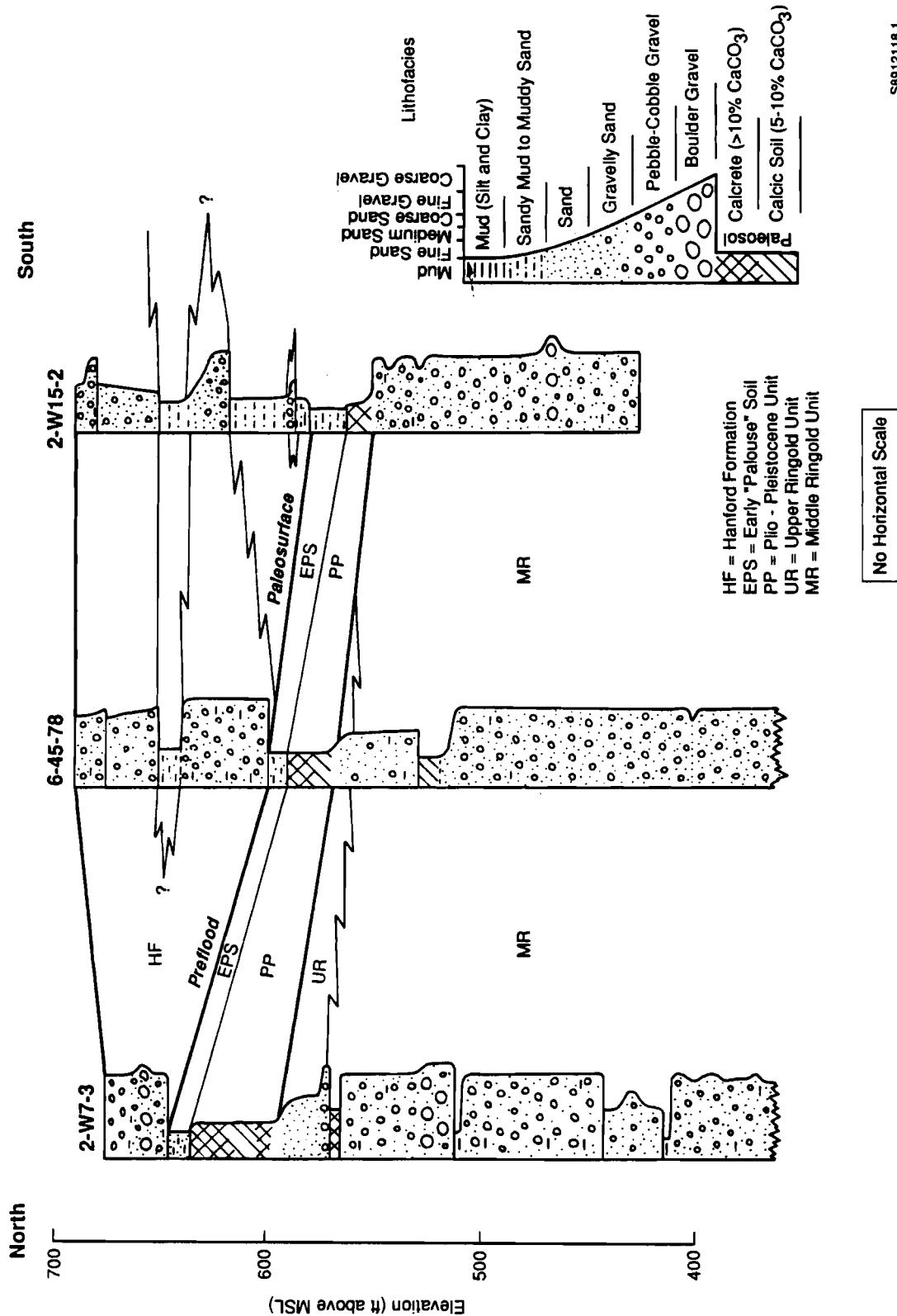


FIGURE 17. Example of Lateral Facies Variations Within the Upper Stratigraphic Section Beneath the W-5 Burial Ground

Clastic dikes (Figure 18) are a ubiquitous sedimentary structure observed in, but not restricted to, outcrops and trenches that expose the Hanford formation. These dikes are thought to represent dewatering structures that developed during compaction and settling of cataclysmic flood deposits during or soon after floodwaters drained from the Pasco Basin (Bergeron et al. 1987).

The true nature and extent of **clastic** dikes are **poorly** understood, however, because the dikes are rarely detected or observed in vertically oriented boreholes. This **occurs** because the clastic dikes are usually oriented vertically, although some may extend horizontally as well. Often they form a polygonal pattern where they intersect the ground surface; patterned ground is reported near the southern boundary of the 200-West Area (Lillie et al. 1978). Clastic dikes are significant hydrologically because they occur as alternating, vertically laminated layers of sand and mud, which may total a meter or more in thickness. They could act as hydrologic barriers to the lateral migration of water, in both the saturated and the unsaturated zones. At the same time, clastic dikes could act as vertical conduits whereby vadose-zone water would preferentially flow downward within the coarser-grained laminae in the dikes, as shown in Figure 18.

Clastic dikes are more common in slack-water flood sequences, although they may be present in the Pasco Gravels as well. No clastic dikes are visible in burial trench #40 in the 216-W-3A burial ground just east of W-5; the trench exposes coarse-grained Hanford formation gravels. The presence of clastic dikes at W-5 is more likely to the south, where the texture of the Hanford formation is finer grained (Figure 5).

Locally, the Hanford formation may be overlain by a few feet or less of windblown sand to silty sand.

3.2 MINERALOGY AND BULK GEOCHEMISTRY

Quantitative mineralogical and geochemical data for the sediments within the Pasco Basin are limited. Most of the following discussion is based on recent petrographic, X-ray diffraction (XRD) and X-ray fluorescence (XRF) analyses performed at PNL and WSU laboratories. The only previous mineralogical work was that of **Tallman** et al. (1979), who reported semiquantitative XRD and microprobe analyses on sediment samples from the 200 Areas. The **Tallman** study revealed 1) no significant differences in the types of minerals detected in the fine-grained portions of samples (<74 microns) and 2) the presence of quartz, feldspar, mica, smectite, and chlorite in all stratigraphic units sampled from several different wells. The results of microprobe analyses reported by **Tallman** et al. (1979) corroborated the identification of an

3.17

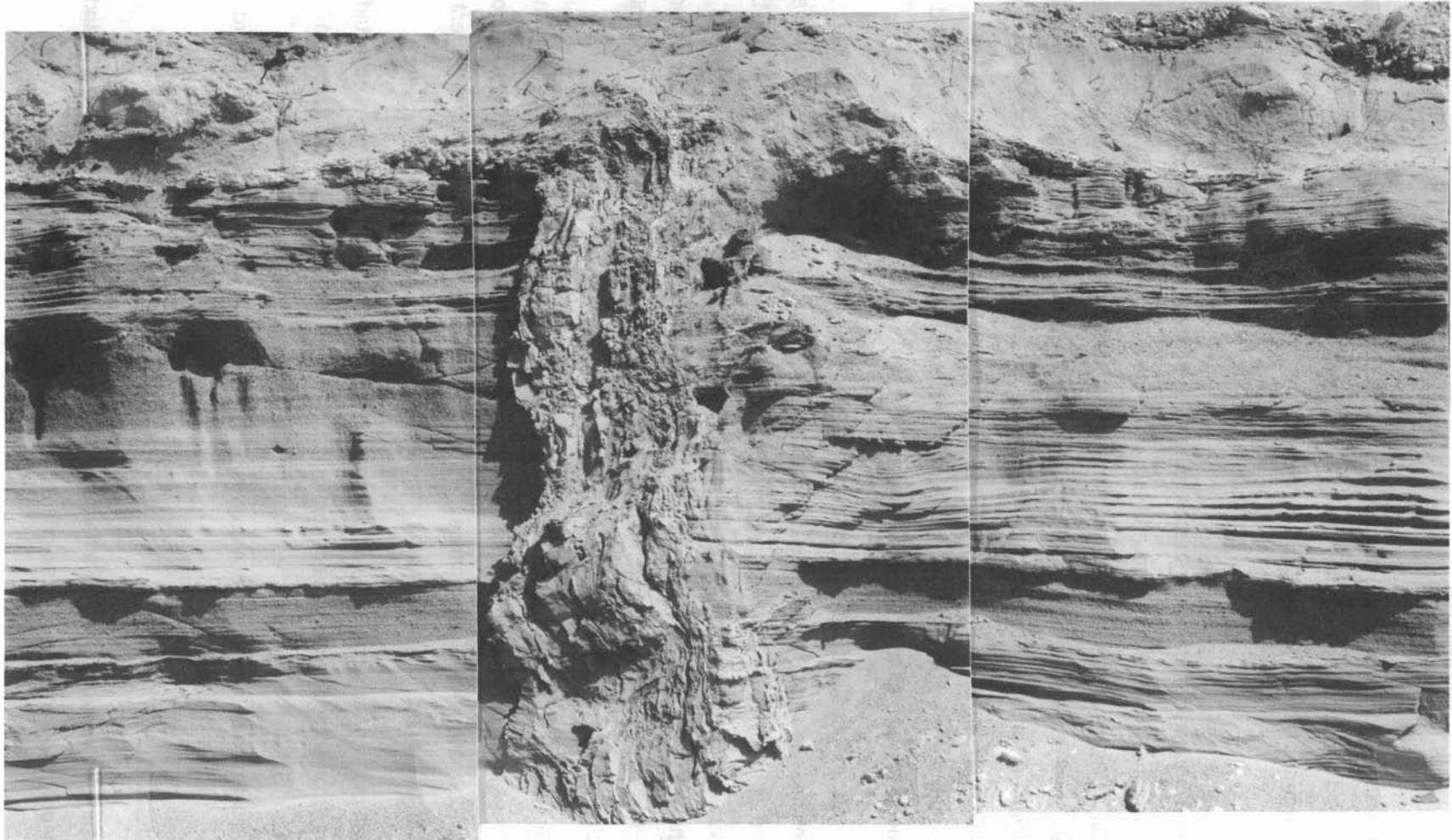


FIGURE 18. Clastic Dike

arkosic (i.e., predominantly quartz + feldspar) composition for the suprabasalt sediments. The following subsections present and discuss the results of more comprehensive mineralogical and geochemical analyses recently performed by PNL and WSU.

3.2.1 Mineralogy

Two types of mineralogical analysis are reported here: 1) petrographic analysis of sand- to gravel-sized particles (>62 microns) and 2) clay mineral analysis, using the XRD method, of particles less than 4 microns in diameter. Results of petrographic analysis are presented in Table 4. Overall, clay minerals represent a relatively small percentage of the total volume for most suprabasalt sedimentary units, except the lower **Ringold** unit (see Table 3). Because of their small size, silt particles (3.9-62.5 microns) are not usually analyzed petrographically. Based on the petrography of the sand and coarser particles, the suprabasalt sediments within the 200-West Area are considered predominantly mixtures of quartz and feldspar; rock fragments are also a major constituent (Figure 19).

Rock fragments are usually identified from the gravel-size portion of the sample. Once rock fragments are broken down to sand-size particles, they usually appear as individual mineral grains and are no longer recognized as rock fragments. For example, during hard-tool drilling, a granite boulder may be reduced to the individual minerals (monocrystalline quartz, potassium feldspar, mica, hornblende, and opaque minerals) that together constitute a granitic rock. Hard-tool drilling through a basalt boulder, on the other hand, produces abundant basalt fragments, in addition to individual grains of mafic rock-forming minerals, such as plagioclase feldspar and pyroxene.

Clay minerals are also present. Although they are a relatively minor constituent compared to the total volume, the types of clay minerals present serve as important indicators of the geochemical environment. Thus, much information on the provenance (i.e., source) and diagenetic history of the different stratigraphic units can be gained from studying the mineralogy.

A discussion of the mineralogy of the different stratigraphic units, based on samples collected from 200-West Area, is presented below. The mineralogical data used for this interpretation are summarized in Tables 4 and 5. All the XRD samples from the **Ringold** units listed in Table 5 were also analyzed petrographically; no petrographic analysis was performed for XRD samples from the Hanford formation.

Ringold Formation

A total of 17 samples were analyzed from hard-tool drill cuttings of the coarse-grained middle and basal **Ringold** units; only one sample of the fine-grained lower **Ringold** unit was analyzed.

TABLE 4. Petrographic Data from 200-West Area Wells

WELL #	DEPTH	STRATIGRAPHIC UNIT	DRILL METHOD ^a	FOLK CLASSIFICATION ^b	MINERALS (<i>normalized</i> volume %)								
					MONO QUARTZ	POLY QUARTZ	MONO/POLY QUARTZ RATIO	TOTAL QUARTZ	PLAGIOCLASE FELDSPAR	POTASSIUM FELDSPAR	TOTAL FELDSPAR	PYROXENE	
299-W7-5	10	HANFORD FORMATION	BH	G	19.61	2.52	7.8	22.13	21.29	4.48	25.77	1.96	
299-W18-21	25	HANFORD FORMATION	C	(m)gS	12.66	2.58	4.9	15.24	19.38	4.65	24.03	2.58	
299-W18-21	40	HANFORD FORMATION	C	(g)S	22.12	4.71	4.7	26.83	27.53	5.41	32.94	2.59	
299-W15-16	40	HANFORD FORMATION	C	S	17.30	4.11	4.2	21.41	21.11	3.52	24.63	2.64	
299-W10-13	45	HANFORD FORMATION	C	G	21.33	5.82	3.7	27.15	24.93	5.54	30.47	0.55	
299-W15-16	110	HANFORD FORMATION	C	msG	2.22	0.89	0.2	11.11	1.48	0.00	1.48	1.48	
299-W10-13	115	EARLY "PALOUSE" SOIL	H	(gm)S	24.32	8.31	3.9	30.63	20.72	5.41	26.13	1.20	
299-W18-21	129.130	EARLY "PALOUSE" SOIL	H	ms	37.34	2.51	14.9	39.85	38.10	9.02	47.12	1.25	
299-W7-2	39-40	EARLY "PALOUSE" SOIL	H	(g)sM	39.76	1.41	28.2	41.17	20.24	8.47	28.71	1.88	
299-W18-21	139-140	EARLY "PALOUSE" SOIL	H	sM	44.44	1.33	33.4	45.77	22.22	9.56	31.78	3.33	
299-W10-13	129-130	PLIO-PLEISTOCENE UNIT	H	sM	22.32	3.57	6.3	25.89	13.99	4.46	18.45	2.38	
299-W15-16	140	PLIO-PLEISTOCENE UNIT	H	sM	13.23	1.69	7.8	14.92	16.89	3.10	19.99	3.67	
299-W15-16	149-150	PLIO-PLEISTOCENE UNIT	H	(g)mS	13.17	1.68	7.8	14.85	16.81	3.08	19.89	3.64	
299-W7-2	65	PLIO-PLEISTOCENE UNIT	H	msG	19.54	2.03	9.6	21.57	9.64	2.28	11.92	1.52	
3.19	299-W7-2	94-95	UPPER RINGOLD	H	msG	16.05	13.18	1.2	29.23	15.76	5.44	21.20	0.86
299-W7-2	155	MIDDLE RINGOLD	H	msG	29.44	7.87	3.7	37.31	19.54	4.06	23.60	0.76	
299-W18-21	169-170	MIDDLE RINGOLD	H	gmS	13.66	8.54	1.6	22.20	12.20	2.68	14.88	4.15	
299-W15-16	189-190	MIDDLE RINGOLD	H	msG	18.15	11.15	1.6	29.30	10.51	1.27	11.78	0.64	
299-W15-16	225	MIDDLE RINGOLD	H	msG-gmS	25.84	12.11	2.1	37.95	14.80	3.87	18.47	0.81	
299-W7-2	220	MIDDLE RINGOLD	H	msG	20.77	13.42	1.5	34.19	11.18	7.67	18.85	0.32	
299-W10-14	340	MIDDLE RINGOLD	H	gs	18.71	13.23	1.4	31.94	4.84	3.87	8.71	0.32	
299-W10-14	440	MIDDLE RINGOLD	H	(g)mS	30.03	15.01	2.0	45.04	11.61	2.83	14.44	1.13	
299-W18-22	429-431	MIDDLE RINGOLD	H	(g)mS	30.14	11.48	2.6	41.62	15.07	4.07	19.14	0.00	
299-W7-3	320	MIDDLE RINGOLD	H	gS	30.03	17.43	1.7	47.46	20.11	5.90	26.01	0.27	
299-W15-17	425	MIDDLE RINGOLD	H	gs	29.53	15.20	1.9	44.73	11.40	4.68	16.08	0.58	
299-W10-13	160a	MIDDLE RINGOLD	H	msG	22.40	10.73	2.1	33.13	24.61	4.42	29.03	0.95	
299-W10-13	160b	MIDDLE RINGOLD	H	msG	19.88	10.98	1.8	30.88	17.60	3.86	21.86	1.19	
299-W10-13	200	MIDDLE RINGOLD	H	msG	23.48	5.01	4.7	28.49	22.98	4.22	27.18	1.32	
299-W10-13	240	MIDDLE RINGOLD	H	msG	11.90	39.58	0.3	51.48	14.58	7.14	21.72	0.60	
299-W10-13	280	MIDDLE RINGOLD	H	#	10.03	8.41	1.2	18.44	7.77	1.29	9.06	0.97	
299-W15-17	335	MIDDLE RINGOLD	H	(g)S	31.79	20.81	1.5	52.60	7.51	3.76	11.27	0.87	
299-W7-3	450	MIDDLE OR BASAL(?) RINGOLD	H	gs	15.71	12.99	1.2	28.70	19.34	2.72	22.06	1.21	
299-W10-14	455	LOWER RINGOLD	H	sM	8.92	5.19	1.3	12.11	2.31	2.31	4.62	0.29	

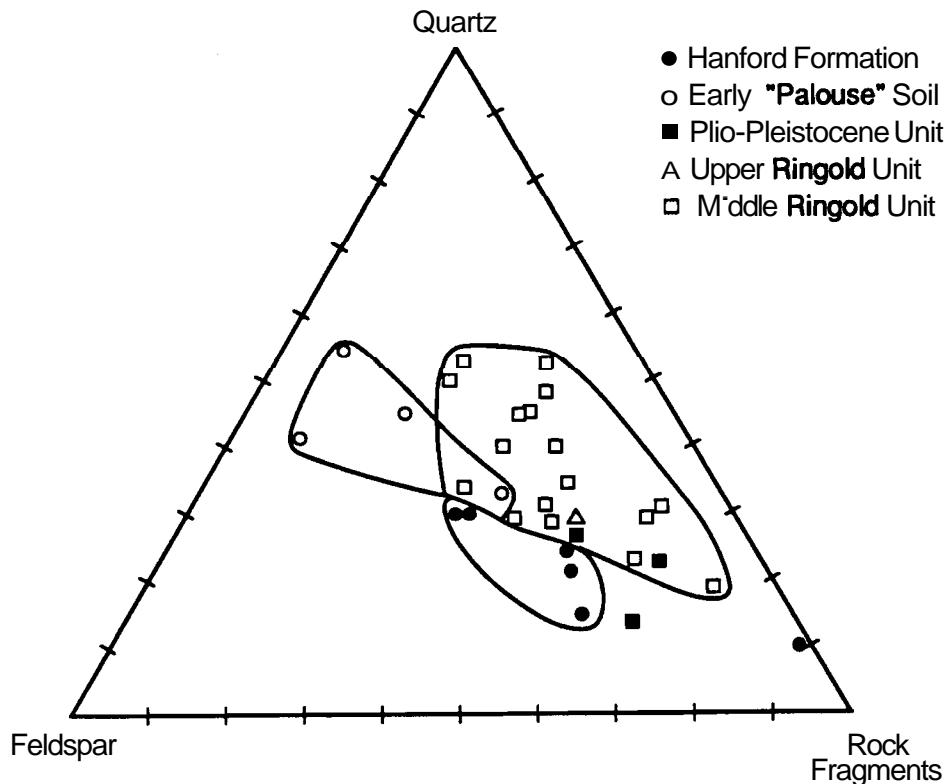
*BH=backhoe, C=drive barrel, H=hard tool

**M=mud, S=sand, G=gravel, m=muddy, s=sandy, g=gravelly, ()=slightly

No grain-size data

TABLE 4. (contd)

HORN-BLENDE	MINERALS						ROCK FRAGMENTS (normalized volume %)						
	BIOTITE	MUSCOVITE	TOTAL MICA	OPAQUES	GARNET	EPIDOTE	Malic clasts	Granitic clasts	Metamorphic clasts (exclud-ing quartzite)	Sedimentary aggregates	Carbonate clasts	Other clasts	Total
1.12	3.08	0.00	3.08	1.96	0.00	0.00	29.41	2.80	0.56	1.40	1.12	8.68	43.97
1.55	4.85	0.78	5.43	1.55	0.00	0.00	33.85	5.43	0.52	2.33	1.55	5.94	49.82
1.18	2.35	0.24	2.59	2.59	0.94	0.24	11.29	9.65	1.42	1.41	0.24	6.35	30.38
1.17	1.47	1.17	2.64	2.35	0.29	0.00	32.55	3.52	1.17	1.47	0.29	5.88	44.86
1.68	6.09	0.28	6.37	1.11	0.00	0.00	8.92	11.91	1.39	1.66	2.22	8.59	32.69
0.00	0.74	0.00	0.74	0.00	0.00	0.00	84.44	7.41	0.00	3.33	0.00	8.89	84.07
0.90	5.41	0.90	6.31	0.90	0.30	0.00	11.71	11.71	0.90	2.70	1.20	5.40	33.62
1.25	1.25	0.25	1.50	0.00	0.00	0.50	0.50	0.75	0.25	4.51	0.75	1.75	8.51
0.71	8.12	2.35	8.47	1.18	0.24	0.00	4.24	1.85	0.24	8.94	1.85	0.94	17.66
2.44	4.22	0.44	4.66	1.33	0.67	0.00	1.33	1.33	0.22	0.22	1.78	2.00	6.88
1.79	2.38	1.19	3.57	1.19	0.30	0.00	3.27	3.27	0.30	25.30	11.61	2.39	46.14
0.28	0.57	0.28	0.85	1.13	0.28	0.00	10.42	2.53	0.00	0.28	44.76	0.85	58.84
0.28	0.58	0.28	0.84	1.12	0.28	0.00	10.36	2.52	0.00	0.28	44.54	0.84	58.54
0.78	1.52	0.25	1.77	1.78	0.25	0.00	17.01	5.84	0.00	31.98	2.03	3.55	60.41
0.29	2.29	0.00	2.29	0.29	0.00	0.29	20.34	16.05	1.15	1.15	0.00	6.87	45.58
0.25	1.27	0.76	2.03	0.76	0.25	0.25	9.65	16.24	0.25	1.02	0.00	7.61	34.77
0.24	0.73	0.00	0.73	1.95	0.00	0.49	38.05	5.85	0.00	1.46	0.00	7.08	52.44
0.32	0.84	0.32	0.96	0.84	0.00	0.00	18.80	11.15	2.55	8.60	0.00	15.29	58.39
4 . 8 1	0.54	0.27	0.81	1.07	0.27	0.00	12.92	13.73	5.37	2.96	0.00	5.65	40.63
0.32	0.84	0.00	0.64	0.00	0.00	0.00	13.42	18.21	4.15	3.83	0.00	4.79	44.40
0.00	0.32	0.65	0.97	0.00	0.00	0.00	23.22	9.68	3.22	16.45	0.00	5.48	58.05
0.85	1.13	0.85	1.98	0.85	0.85	0.00	10.49	5.95	2.55	10.20	0.28	4.82	34.29
0.98	1.44	0.00	1.44	0.72	0.72	0.00	7.42	10.77	1.87	11.24	0.00	2.63	33.73
0.80	2.14	0.27	2.41	0.80	0.27	0.00	8.04	6.97	1.34	1.81	0.27	3.76	21.99
0.58	1.75	0.00	1.75	0.58	0.29	0.29	8.14	9.08	2.83	11.11	0.29	4.37	33.60
0.63	2.21	0.32	2.53	2.21	0.00	0.32	10.72	12.82	2.52	0.63	0.32	4.31	31.12
0.59	0.59	0.30	0.89	0.89	0.00	0.00	18.99	11.87	1.18	2.97	1.19	7.72	43.92
1.06	1.85	0.00	1.85	0.53	0.00	0.26	8.44	20.32	1.06	4.75	0.00	4.75	39.32
0.30	2.88	0.30	2.98	0.00	0.60	0.00	3.87	10.71	0.30	3.57	0.00	3.87	22.32
0.00	0.97	0.32	1.29	0.97	0.32	0.00	26.88	9.39	1.94	22.98	1.94	5.50	88.81
0.29	0.58	0.00	0.58	0.29	0.00	0.29	8.38	8.87	1.18	11.85	0.29	3.47	33.82
0.60	0.30	0.00	0.30	0.00	0.80	0.60	28.09	6.95	1.81	0.91	0.00	7.88	45.62
0.00	0.00	0.29	0.29	0.00	0.00	0.00	2.01	4.61	0.29	75.22	0.00	0.58	82.71



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FIGURE 19. Ternary Diagram Showing the Ratio of Quartz, Feldspar, and Rock Fragments for Various Stratigraphic Units

Petrographically, the lower **Ringold** sample consists predominantly of sedimentary aggregates (73% by volume), followed by quartz (12%), and feldspar (5%). The high proportion of sedimentary aggregates actually represents mud clumps, which result from **hard-tool** drilling through the soft, cohesive muds of the lower **Ringold** unit.

Within the coarse-grained **Ringold** deposits, quartz is the predominant mineral (up to 53%). The higher quartz content relative to other stratigraphic units (Figures 19 and 20) is probably a result of the higher proportion of **arkosic** sand and quartzite gravel clasts, which were transported into the Pasco Basin from the margins of the Columbia Plateau by the ancestral Columbia and Snake rivers (Fecht et al. 1985). Quartzite is a metamorphosed rock consisting of tightly bonded grains of quartz; as a result, it is very resistant to weathering and abrasion. During hard-tool drilling, quartzite pebbles and cobbles are pulverized by the hard-tool bit and reduced to sand grains, which, when observed under a petrographic

TABLE 5. Results of Clay Mineralogy Analyses

Well #	Depth (ft)	Folk Classification**	Stratigraphic Unit	CLAY MINERALS (normalized weight %)				
				Illite	Kaolinite Group	Chlorite Group	Vermiculite Group	Smectite Group
299-E28-26	294-295	msG	Hanford Formation	11	22	26	19	23
299-E34-3	49-50'	msG	Hanford Formation	11	13	11	10	55
299-W15-16	110'	msG	Hanford Formation	13	15	15	10	47
299-E28-26	319-320	sG	Hanford Formation?	16	27	27	9	21
<i>Average</i>				13	19	20	12	37
299-W7-2	94-95	msG	Upper Ringold Unit	17	21	27	5	30
299-W7-2	220	msG	Middle Ringold Unit	2	5	6	1	86
299-W10-13	200'	msG	Middle Ringold Unit	4	8	2	7	79
299-W10-13	240	msG	Middle Ringold Unit	1	2	0	1	96
299-W18-22	429-430	(g)mS	Middle Ringold Unit	2	3	3	0	95
<i>Average</i>				2	5	3	2	89
299-W7-3	450	gS	Basal Ringold Unit	1	5	4	5	85

'Sample is from unsaturated zone

**M=mud, S=sand, G=gravel, m= muddy, s= sandy, g=gravelly, ()=slightly

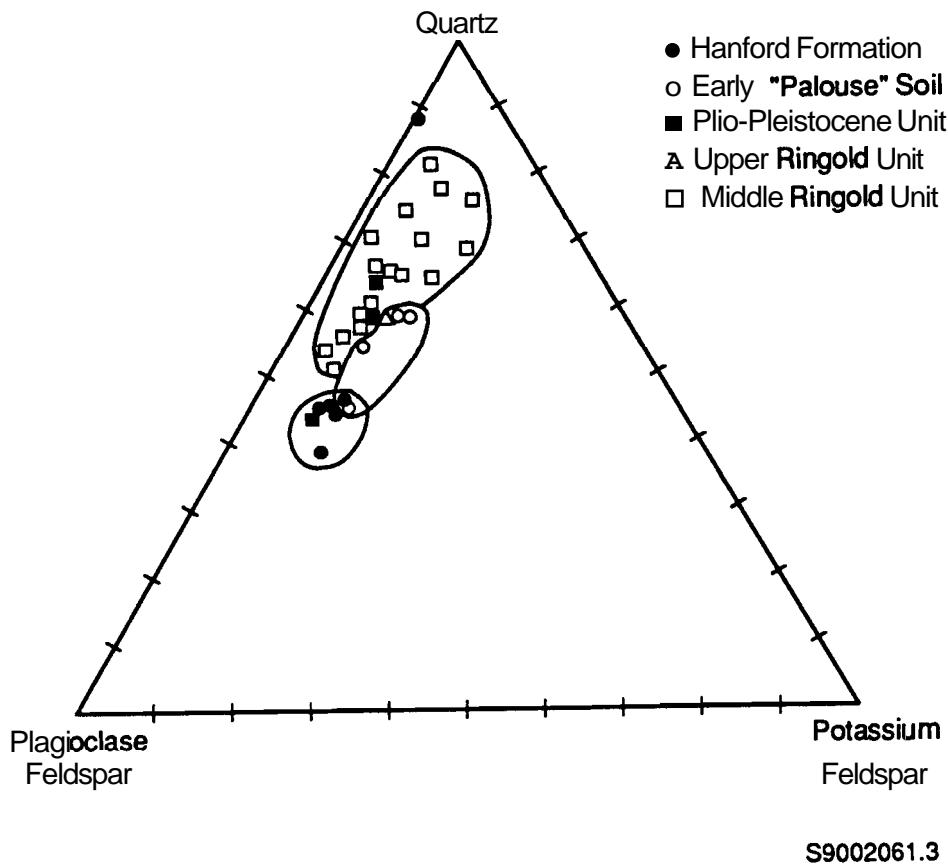


FIGURE 20. Ternary Diagram Showing the Ratio of Quartz, **Plagioclase**, and Potassium Feldspar for Various Stratigraphic Units

microscope may appear as polycrystalline quartz. The results of this **pulverization** are reflected in the ratio of polycrystalline to **monocrystalline** quartz (Table 4), which is considerably higher for the middle **Ringold** unit than for younger stratigraphic units.

The second most predominant mineral is feldspar, which accounts for up to **29%** of the volume of **Ringold** sediments; plagioclase feldspar is significantly more abundant than potassium feldspar (Figure 20). Coarse-grained **Ringold** deposits have less mica (biotite and muscovite) than the younger stratigraphic units. The proportions and types of rock fragments vary considerably within the **coarse**-grained **Ringold** units, which range from 21 to 69% of the total volume. In general, mafic rock fragments (principally basalt) are the most abundant type of rock fragment; quartzite clasts might be as abundant but drilling probably reduced most quartzite clasts to smaller grains of polycrystalline quartz. Other **lithic** constituents include granitic clasts (Figure 21), which are followed in abundance by sedimentary aggregates.

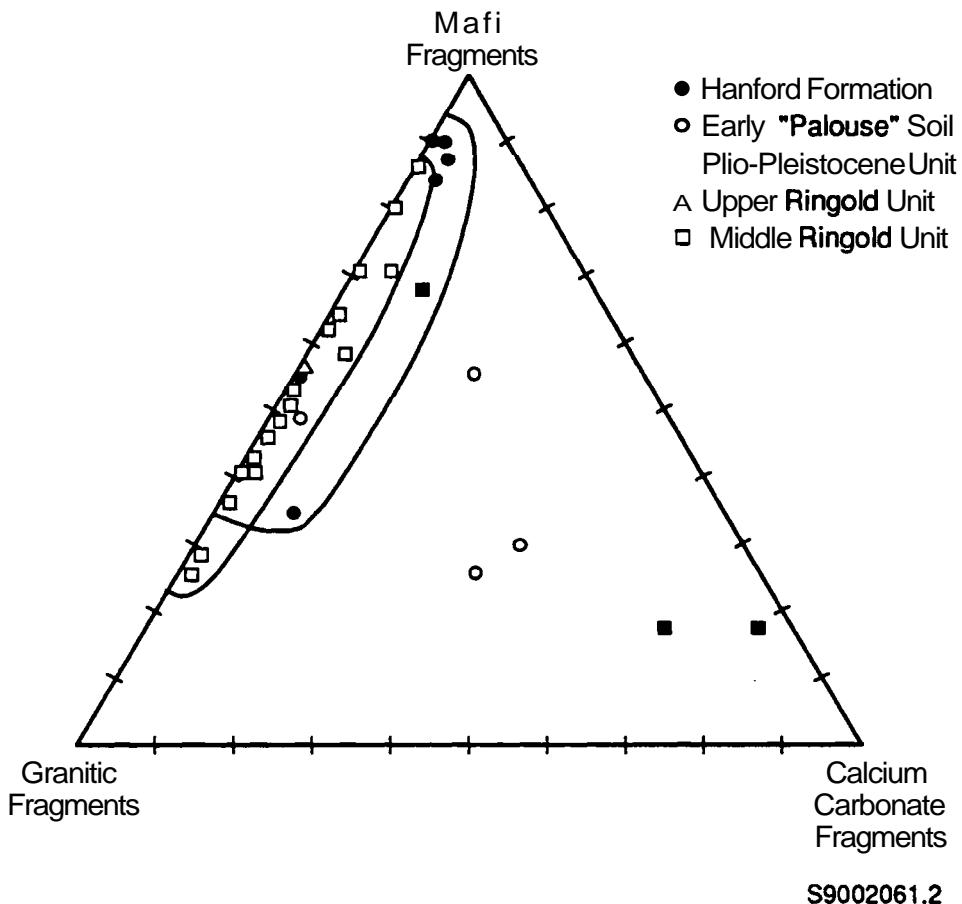
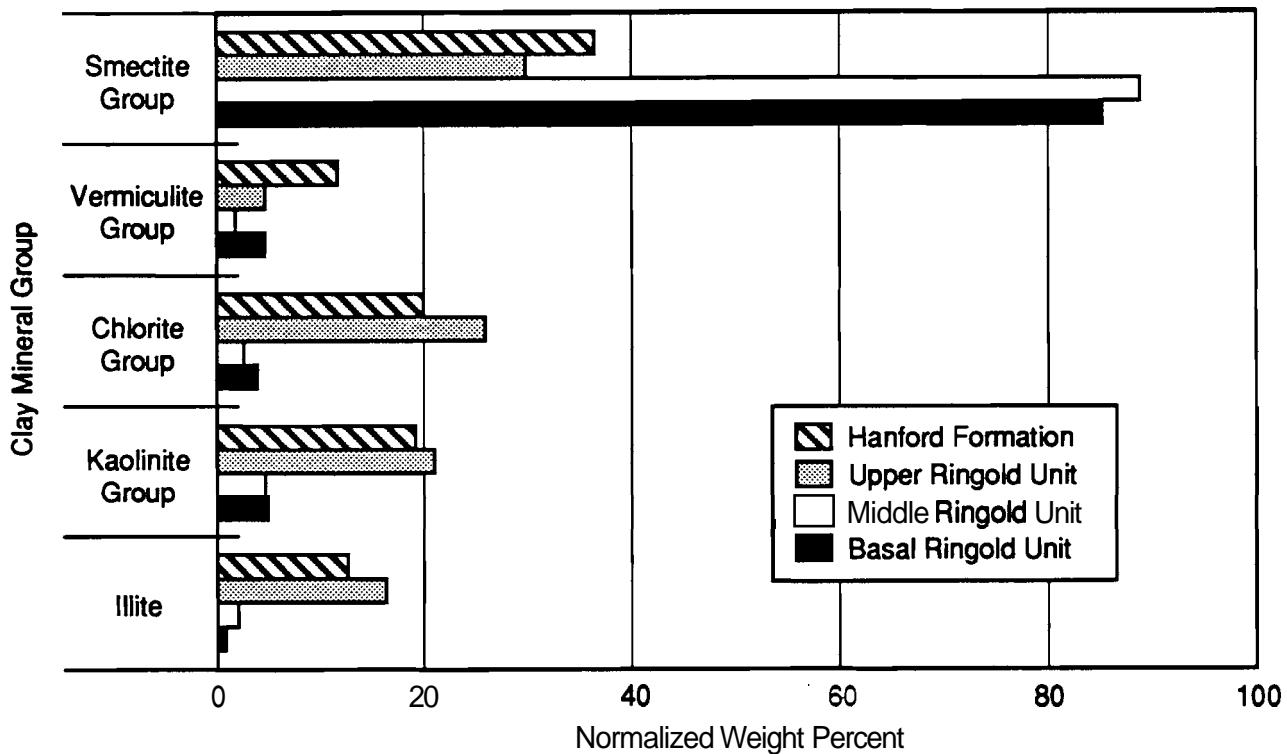


FIGURE 21. Ternary Diagram Showing the Ratio of Three Common Types of Rock Fragments for Various Stratigraphic Units

Clay mineralogical analysis of four samples from the middle **Ringold** unit and one from the basal **Ringold** unit shows **smectite** to be the dominant clay mineral in these units of the **Ringold** Formation (Table 5, Figure 22). The very high amounts present (79-96 wt% of the clay fraction) suggest that smectite is authigenic and that geochemical **conditions** favor it as the thermodynamically stable clay mineral in the **Ringold** Formation. Typically, **smectites** form in neutral- to **high-pH** environments that are rich in soluble **Si** and **Mg** and that are not extensively leached. The presence of authigenic smectite therefore suggests a stable weathering regime involving **contact** with a nearly stagnant water reservoir

In contrast, the upper **Ringold** unit contains a diverse assemblage of clay minerals. X-ray **diffracton** analysis of a single sample shows that **smectite**, **chlorite**, and kaolinite each make up about 20-30 **wt%** of the total, with lesser amounts of **illite** (17 **wt%**) and vermiculite (**5 wt%**) being present. This diversity suggests that perhaps several sources contributed to the primary mineralogy, and that the sediments are in a relatively early stage of weathering compared to the older **Ringold** units. Vermiculite is a



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FIGURE 22. Predominant Clay Minerals

metastable weathering product of illite and will eventually weather to form smectite or kaolinite. The chlorite present is a "swelling" chlorite (meaning that only part of the hydroxyl interlayer is present, enough to prevent collapse to a 1.0-nm spacing as **vermiculites** and **smectites**, yet not enough to prevent swelling like a smectite). It is probable that this swelling chlorite is a weathering product of **ferruginous** illite or vermiculite and that it will eventually transform to smectite with continued leaching of Al and Fe from the unit. The substantial presence of the illite and its metastable weathering products (vermiculite and swelling chlorite) is good evidence for a slow weathering regime in a well-drained position and is typical of arid climates with xeric moisture regimes.

Kaolinite is normally formed under neutral to slightly aadic weathering conditions where moderate leaching is prevalent. Because the upper **Ringold** sample appears to be well-drained, the kaolinite present may be authigenic, although a detrital origin is also possible. Weathering of ferrous-iron-containing minerals (**e.g.**, pyroxenes and biotites) is an aad-producing reaction and may provide sufficient localized acidity to allow kaolinite to form. This possibility is supported by the presence of biotite in the sand fraction

(2.3 vol%) and the absence of muscovite. It is probable, therefore, that the kaolinite is a direct weathering product of a biotitic **illite**, which is abundant in this sample. However, kaolinite is also a direct weathering product of potassium feldspar, which is relatively abundant in the sand fraction as well. No evidence for carbonates was found in the coarser fractions of this sample, helping to confirm that the geochemical environment in the region from which this sample was taken is neutral or slightly acidic and that it is subject to more leaching than the older units in the **Ringold** formation. The coexistence of **smectite** and kaolinite suggests that the weathering solution composition lies along the intersection of their thermodynamic stability fields (i.e., lower concentrations of OH, Si, and Mg than in the older **Ringold** units).

Plio-Pleistocene Unit

The Plio-Pleistocene unit in the 200-West Area represents a weathering surface developed on top of the **Ringold** Formation, characterized by mostly fine-grained sand and silt cemented together with a calcium-carbonate precipitate. Mineralogical analysis of four samples from the Plio-Pleistocene unit (Table 4) corroborates that this unit consists predominantly of calcium carbonate **and/or** sedimentary rock fragments, with lesser amounts of quartz (**monocrystalline**) and feldspar (plagioclase) in roughly equal proportions (Figure 19). The relatively high proportion of plagioclase feldspar and pyroxene compared to other stratigraphic units indicates that the Plio-Pleistocene unit may be largely derived from either reworked and weathered **Ringold** deposits containing a relatively high percentage of basalt or eolian (wind-transported) material derived from the **basaltic** highlands surrounding the Pasco Basin. No clay mineralogy analyses are available for the Plio-Pleistocene unit.

Early "Palouse" Soil

The early "Palouse" soil contains higher concentrations of quartz (up to **46%**), feldspar (up to 47%), and mica (up to 8.5%) than the other stratigraphic units present in the 200-West Area. The quartz is **almost** entirely the monocrystalline variety, and plagioclase is the predominant feldspar, although there are higher concentrations of potassium feldspar in the early "Palouse" soil than in the other units. The early "Palouse" soil represents a buried loess (windblown silt and sand) deposit. Apparently aggradation of this unit occurred relatively quickly; otherwise, carbonate-cemented horizons, **similar** to those in the Plio-Pleistocene unit, would have formed. The mineral assemblage indicates that, in contrast to the Plio-Pleistocene unit, the early "Palouse" soil is derived primarily from the weathering and reworking of granitic material by eolian transport.

A moderate amount of carbonate rock fragments is present, which may account for the field tests often indicating that hand samples are calcareous. Other types of rock fragments are generally sparse, which is consistent with the typically fine grain sizes associated with this unit. As in the case of the Plio-Pleistocene unit, no clay mineralogy analyses are available for the early "**Palouse**" soil.

Hanford Formation

Deposits of the Hanford formation were laid down instantly, relative to geologic time, during giant cataclysmic floods originating along the **northern** margin of the Columbia Plateau. Unlike the other stratigraphic units, the Hanford formation was derived from a wide variety of sources, including massive reworking and transport of **Ringold** Formation and other unconsolidated suprabasalt sediments, scouring of Columbia River Basalt, as well as erosion of a wide variety of other rock types surrounding the Columbia Plateau. As a **result**, the Hanford formation contains a more diverse mineral and rock-fragment assemblage, any one of which is present in moderate amounts compared to other units. An exception is indigenous mafic (*i.e.*, basalt) **clasts**, which usually occur in greater amounts in the Hanford formation (up to 64%) (Figures 19 and 21). Weathering profiles are not well developed in the Hanford formation beneath the 200 Areas, and therefore significant amounts of calcium carbonate fragments or sedimentary aggregates are also poorly developed.

The clay mineralogy of the Hanford formation is similar to that of the upper **Ringold** unit, except that vermiculite is more prevalent in the Hanford **formation**, at the expense of **illite** and swelling chlorite (Table 5, Figure 22). Whether these differences are significant cannot be judged on the basis just of four Hanford samples and one upper **Ringold** sample. As in the case of the upper **Ringold** unit, the diverse mineralogy of the Hanford formation is indicative of limited weathering in a relatively welldrained xeric environment.

3.2.2 Bulk Geochemistry

More than 60 bulk sediment samples were analyzed using XRF for major and trace elements. The major-element geochemistry is discussed first, followed by the trace-element geochemistry.

Major Elements

Some statistical parameters for the major elements by stratigraphic unit are presented in Table 6; these data are presented graphically in Figures 23 and 24. For consistency, the concentration of the major elements has been converted to weight percent of oxide compound. Silicon is the most abundant element, followed by aluminum (Figure 23), iron, calcium, potassium, and titanium (Figure 24).

The total amount of silicon is greatest in the **Ringold** Formation, averaging 75-80% (Table 6), which is consistent with the formation's quartz-rich mineralogy. The **amount** of silicon is least (~65%) in the Plio-Pleistocene unit, apparently because of enrichment with calcium carbonate, which **partially** to completely filled the particle matrices during soil formation. This enrichment with calcium carbonate is indicated in Figure 24.

TABLE 6. Statistical Parameters for Major Elements According to Stratigraphic Unit

		MAJOR ELEMENT (normalized weight %)						
		A1203	SiO ₂	K ₂ O	CaO	TiO ₂	FeO	MnO
HANFORD FORMATION	# Samples	14	14	14	14	14	14	14
	Average	14.50	69.47	2.10	5.42	1.26	7.12	0.11
	Standard Deviation	0.46	4.25	0.37	1.49	0.50	2.37	0.04
	Minimum	13.63	64.19	1.54	3.26	0.52	3.15	0.06
	Maximum	15.17	76.77	2.79	7.63	1.85	9.73	0.16
EARLY "PALOUSE" SOIL	# Samples	6	6	6	6	6	6	6
	Average	14.00	73.25	2.37	4.69	0.86	4.74	0.08
	Standard Deviation	0.71	2.23	0.18	0.72	0.19	0.99	0.01
	Minimum	13.07	70.26	2.15	3.51	0.53	3.19	0.06
	Maximum	15.00	76.54	2.63	5.64	1.06	5.96	0.10
PLIO-PLEISTOCENE UNIT	# Samples	6	6	6	6	6	6	6
	Average	12.87	64.45	1.75	12.48	1.40	6.93	0.11
	Standard Deviation	1.84	6.64	0.26	8.24	0.27	1.54	0.02
	Minimum	9.56	53.41	1.33	6.43	0.93	4.45	0.08
	Maximum	14.34	70.77	2.11	27.07	1.66	9.22	0.13
UPPER RINGOLD UNIT	# Samples	2	2	2	2	2	2	2
	Average	13.25	75.52	2.06	3.76	0.72	4.61	0.07
	Standard Deviation	0.47	0.75	0.07	0.19	0.00	0.04	0.01
	Minimum	12.92	74.99	2.01	3.63	0.72	4.58	0.06
	Maximum	13.58	76.05	2.11	3.90	0.73	4.64	0.08
MIDDLE RINGOLD UNIT	# Samples	29	29	29	29	29	29	29
	Average	11.71	78.35	1.82	3.20	0.66	4.19	0.07
	Standard Deviation	1.32	3.22	0.17	0.83	0.16	1.06	0.02
	Minimum	9.92	69.13	1.55	2.05	0.48	2.72	0.05
	Maximum	14.03	82.65	2.27	5.75	1.31	8.01	0.13
LOWER RINGOLD UNIT	# Samples	4	4	4	4	4	4	4
	Average	11.02	80.80	1.75	2.50	0.55	3.31	0.07
	Standard Deviation	0.33	0.45	0.11	0.20	0.03	0.26	0.02
	Minimum	10.67	80.18	1.66	2.24	0.53	3.06	0.06
	Maximum	11.45	81.14	1.89	2.68	0.58	3.59	0.09
BASAL RINGOLD UNIT	# Samples	2	2	2	2	2	2	2
	Average	12.17	75.32	1.58	4.25	0.91	5.68	0.09
	Standard Deviation	0.13	0.03	0.07	0.08	0.03	0.06	0.01
	Minimum	12.08	75.30	1.53	4.19	0.89	5.63	0.09
	Maximum	12.26	75.34	1.63	4.30	0.93	5.72	0.10

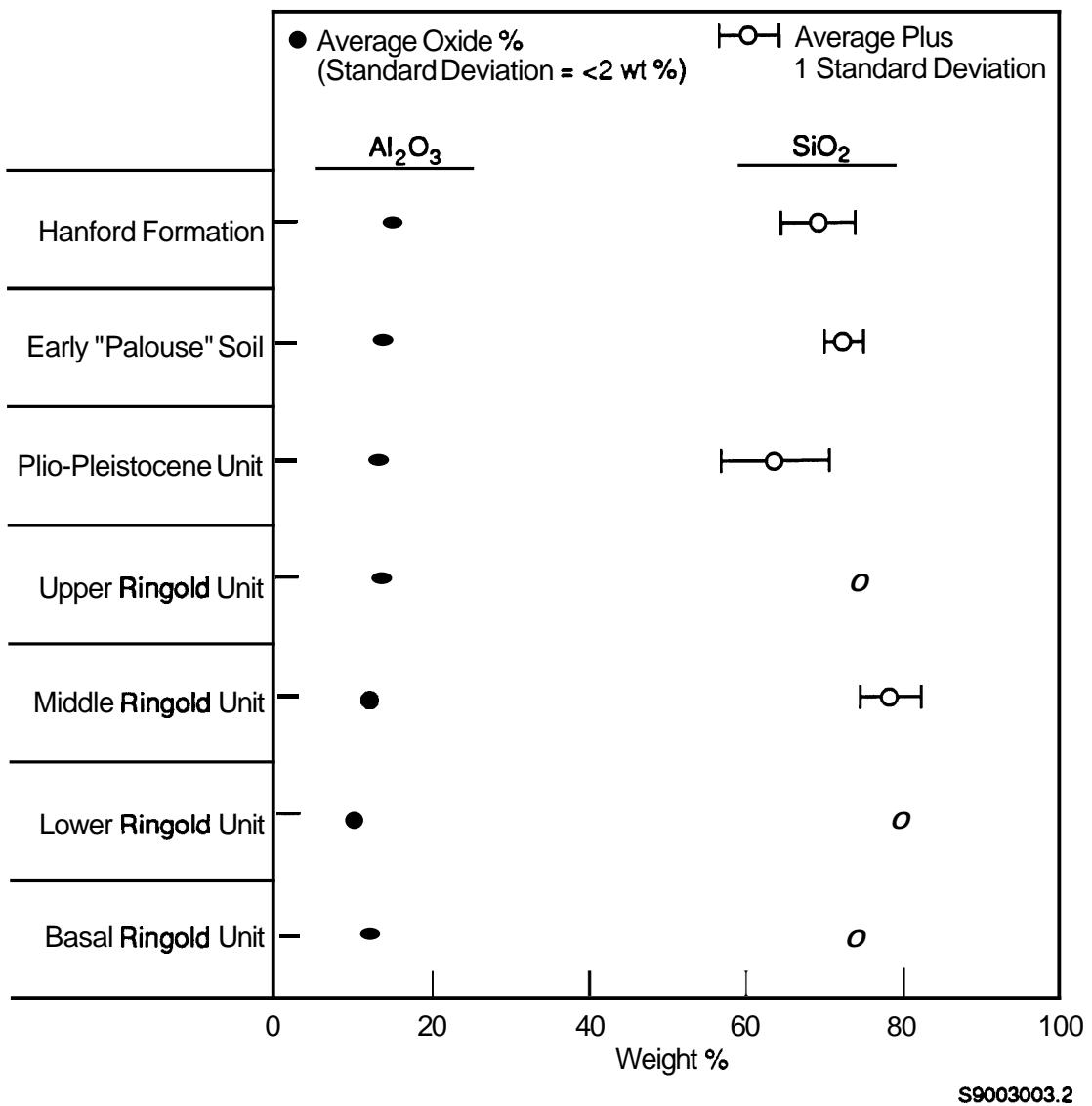
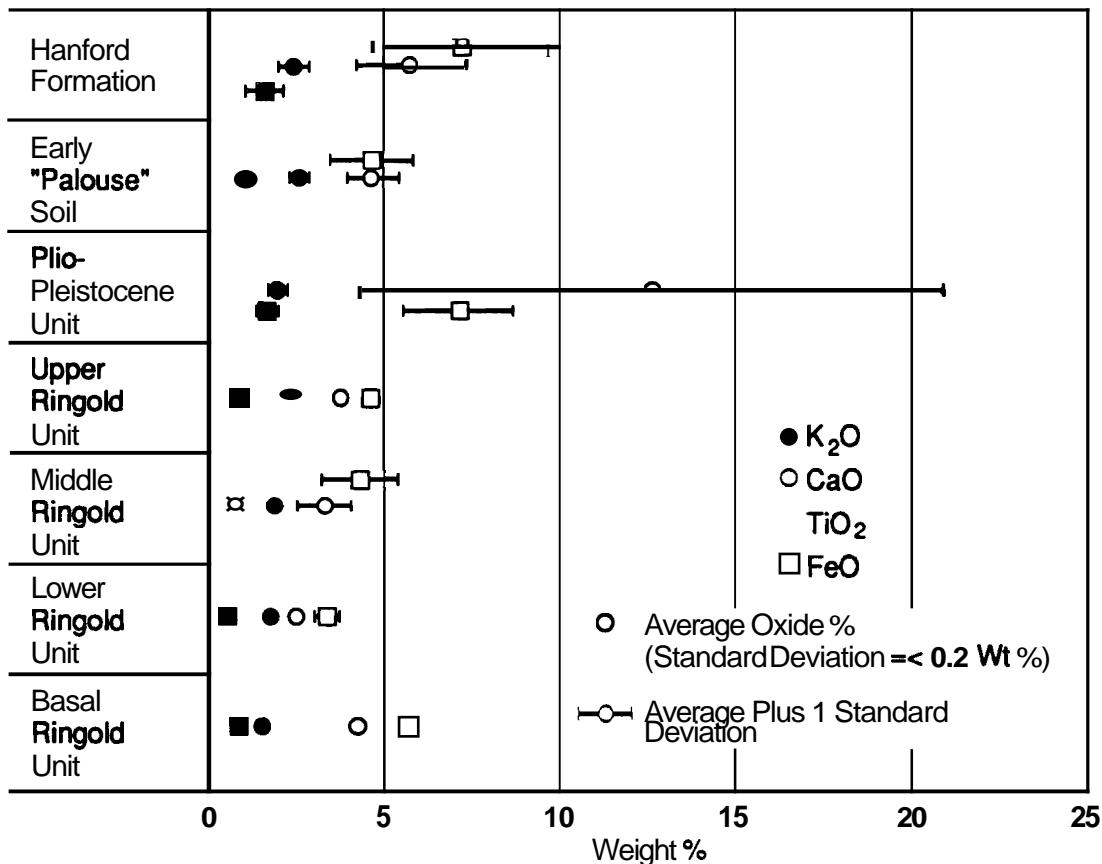


FIGURE 23. Average Distribution of Al_2O_3 and SiO_2 for Stratigraphic Units Analyzed Within the 200 Areas

Among the other major elements, aluminum ranges between 10 and 15%; averages are slightly higher within the Hanford formation and early "Palouse" soil than in the underlying stratigraphic units (Figure 23). The total amount of iron is greatest (~7%) in the Hanford formation as well, although there is a wide range in the distribution of iron values. On the average, slightly less iron is present in the early "Palouse" soil and Plio-Pleistocene unit; the least amount of iron (3.3 to 4.6%) is present in the Ringold Formation, although the basal Ringold unit has an average about 5.7% iron oxide (Figure 24). Amounts of titanium are greatest (1.3-1.4%) within the Plio-Pleistocene unit and Hanford formation.



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FIGURE 24. Average Distribution of K_2O , CaO , TiO_2 , and FeO for Stratigraphic Units Analyzed Within the 200 Areas

Some geochemical characteristics of the different stratigraphic units can be identified through bivariate plots. For example, by plotting the relative amounts of Al_2O_3 versus SiO_2 , it becomes apparent that the Hanford formation and middle **Ringold** unit occur in two **semidistinct** fields (Figure 25). In the middle **Ringold** unit, silicon is distributed over a narrower range than that for aluminum, whereas the opposite occurs in for the Hanford formation. Furthermore, there appears to be a linear relationship between the amounts of silicon and aluminum for the middle **Ringold** unit. However, no such function is apparent for the Hanford formation. The Hanford formation does not lie in a totally separate, welldefined field possibly because the formation consists of a mixture of reworked **Ringold** and other sedimentary deposits.

A linear relationship between the distributions of silicon and iron is apparent for both the middle **Ringold** unit and the Hanford formation (Figure 26). The amount of iron is generally greater and occurs over a wider range in the Hanford formation, however.

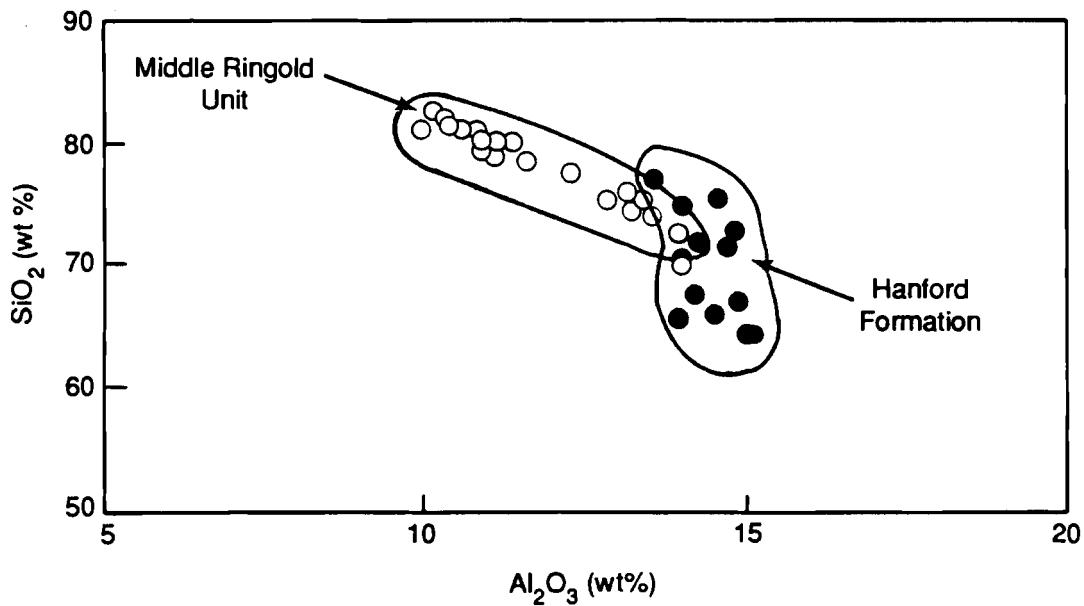


FIGURE 25. Bivariate Plot of Al_2O_3 and SiO_2 for the Hanford Formation and Middle Ringold Unit

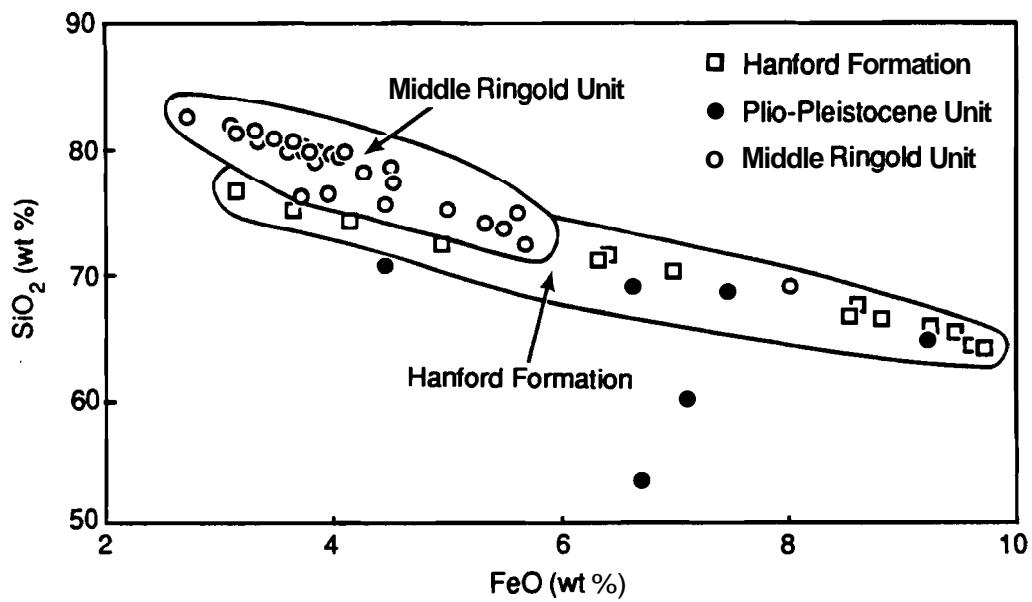


FIGURE 26. Bivariate Plot of SiO_2 Versus FeO

The total organic carbon present in the suprabasalt sediments is low (Figure 27). The organic carbon content for the Plio-Pleistocene unit and Hanford formation is highly variable; some samples contain up to **0.2 wt%** organic carbon, while other samples do not **contain** any detectable organic carbon. The middle **Ringold** unit and early "Palouse" soil, however, are consistently very low (**~0.05%**) in organic carbon.

Trace Elements

Trace elements, while **perhaps** not important from a standpoint of geochemical stability, appear to be a useful tool for identifying and distinguishing among stratigraphic units. In general, the post-**Ringold** units (Plio-Pleistocene unit, early "Palouse" soil, and the Hanford formation) contain higher concentrations of trace elements than the **Ringold** units do. Three **bivariate** plots are presented as examples; these are rubidium vs. zinc (Figure 28), barium vs. zirconium (Figure 29), and arsenic vs. rubidium (Figure 30). In Figures 28 and 29, the fields for the Hanford and **Ringold** Formations are almost mutually exclusive. The multiple sources from which the Hanford **formation** derives are indicated in these figures by larger fields, in contrast to the **Ringold** Formation, which is derived from a more restricted source area and whose fields cluster into a tighter group in these plots.

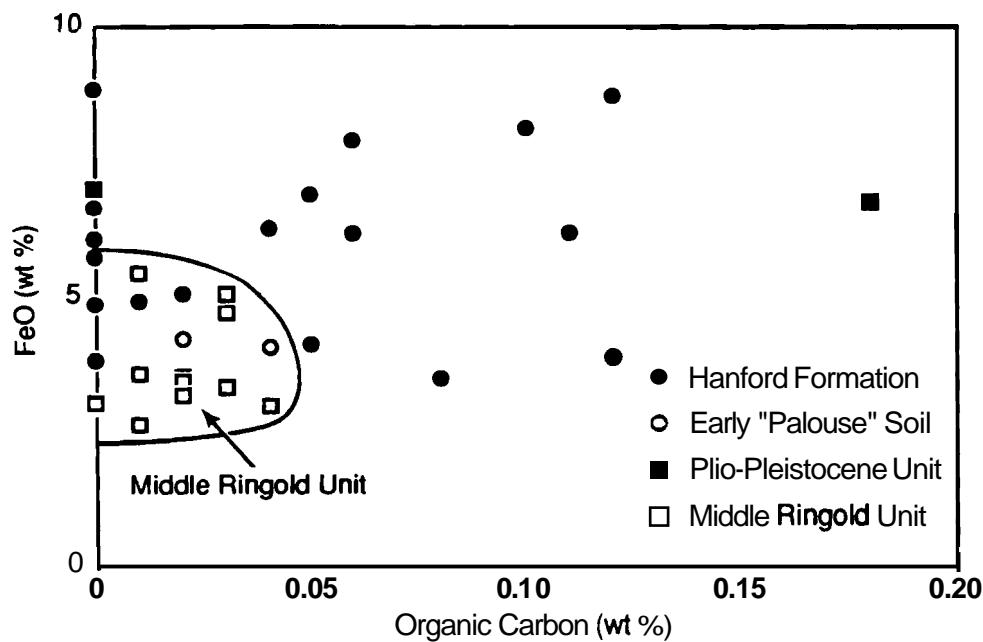


FIGURE 27. Bivariate Plot of FeO Versus Total Organic Carbon

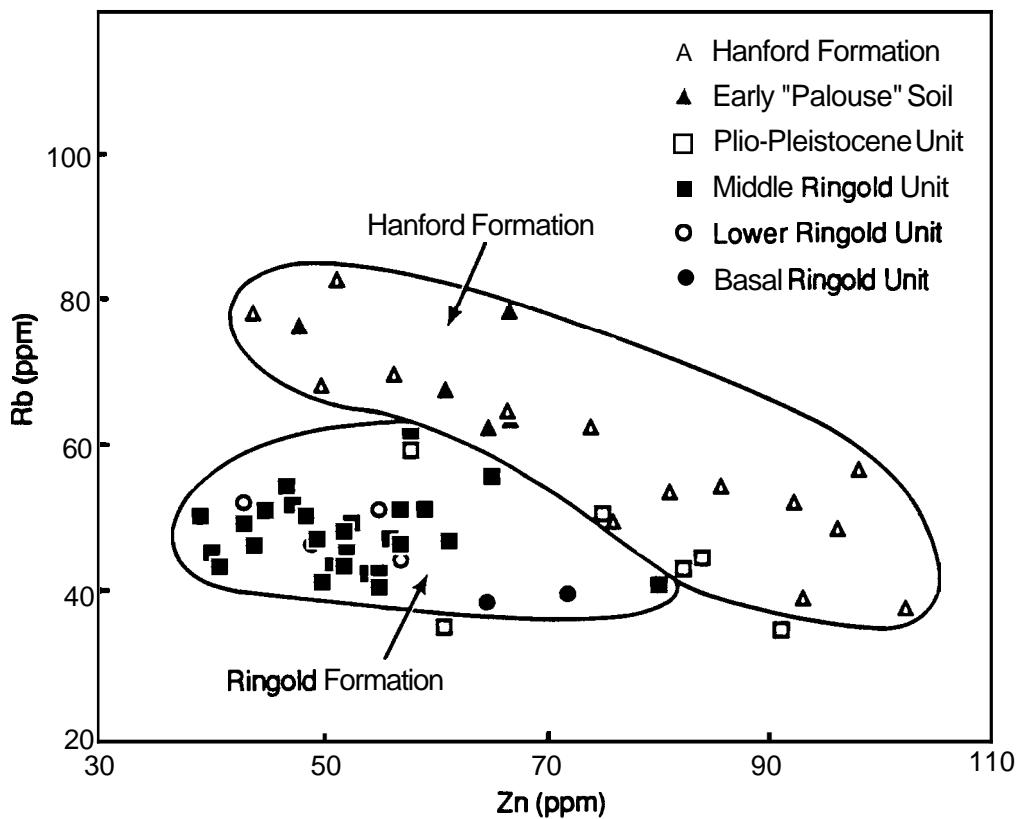


FIGURE 28. Bivariate Plot of Rubidium Versus Zinc

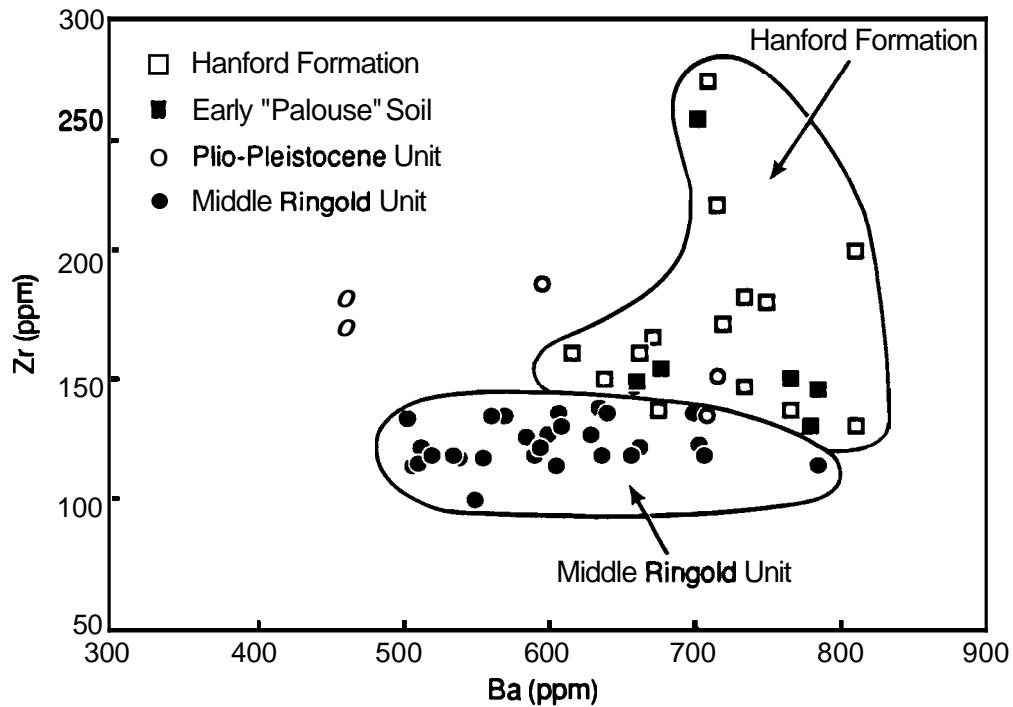


FIGURE 29. Bivariate Plot of Zirconium Versus Barium

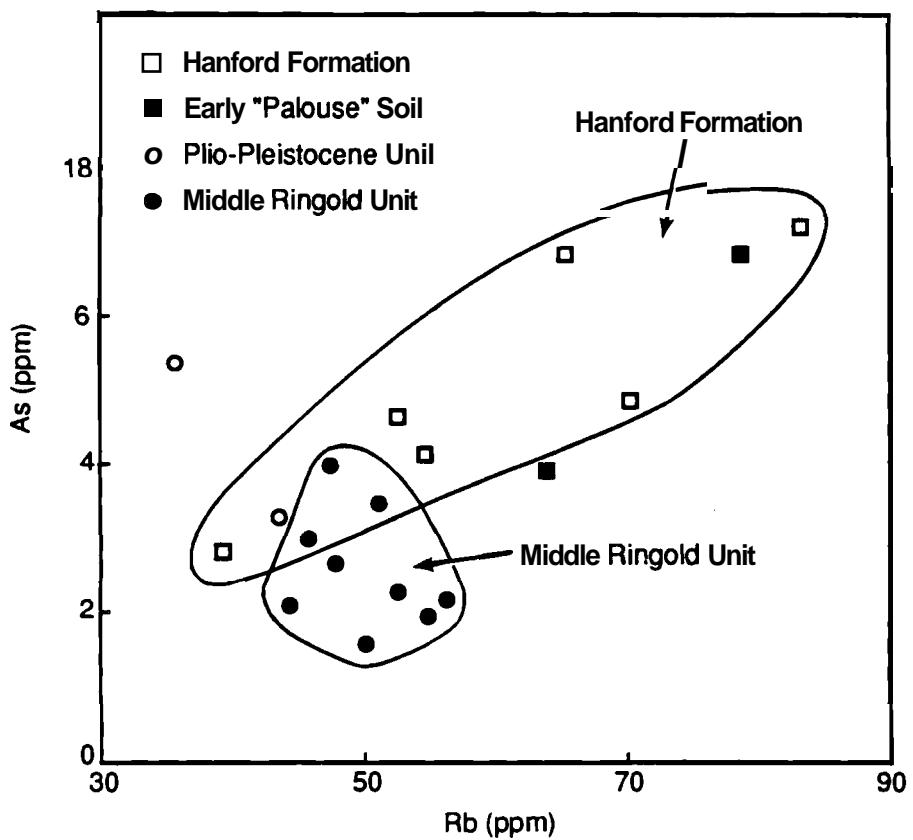


FIGURE 30. Bivariate Plot of Arsenic Versus Rubidium

4.0 HYDROLOGY

The following discussion of hydrology is based on a multitude of previous geohydrologic studies performed in the Pasco Basin and 200 Areas (Newcomb et al. 1972; Gephart et al. 1979; Graham et al. 1981, 1984; Strait and Mercer 1987; DOE 1986, 1988). Hydrologic data for the area in the immediate vicinity of W-5 have been presented by Last et al. (1989).

As discussed in Section 3.0, several diverse hydrogeologic units are present, including several Ringold units (basal, lower, middle, upper Ringold), the Plio-Pleistocene unit, the early "Palouse" soil, and several facies of the Hanford formation. As a result, a wide variety of hydrogeologic units of variable thicknesses are present beneath W-5. In general, most units are relatively homogeneous, except for the Hanford formation.

Units in the saturated zone include the **coarse-grained** facies and the fine-grained facies of the basal Ringold unit, the fine-grained lower Ringold unit, and the relatively thick coarse-grained middle Ringold unit, which extends 50 to 60 ft or more above the water table. The basal, lower, and middle Ringold units appear to be continuous across W-5; however, the fine-grained basal and lower Ringold units pinch out near the northeastern boundary.

Overlying the middle Ringold unit in the unsaturated zone are the upper Ringold unit, the Plio-Pleistocene unit, the early "Palouse" soil, and the Hanford formation. The upper Ringold is a unit of mostly sand to gravelly sand that pinches out in the northern portion of W-5. The Plio-Pleistocene unit consists of a fine-grained, calcareous, weakly to strongly cemented mixture of mud and sand; locally, however, it may contain lenses of basaltic gravel and sand. Above this is a uniform layer (10 to 15 ft) of loose, sandy mud (early "Palouse" soil). The Hanford formation ranges in thickness from 50 to 150 ft across W-5, thickening to the south. Internally, the Hanford formation is extremely heterogeneous; it consists of **bouldery** gravel along the northern boundary, and grades southward into finer-grained gravels interbedded with sand and mud.

The following discussion of hydrology will cover 1) regional hydrology, 2) the characteristics of the aquifer(s) and confining beds in the suprabasalt sediments, 3) the unsaturated zone, and 4) hydrologic properties of the various local hydrogeologic units.

4.1 REGIONAL HYDROLOGY

Principal sources of natural recharge to the unconfined aquifer, where precipitation and surface runoff infiltrate to the water table, occur west of the **200-West** Area. Several small streams, such as Cold Creek and Dry Creek that are located between the Rattlesnake Hills and **Umtanum** Ridge, drain the western slopes of the Pasco Basin, losing water to the subsurface as they spread across the lower valley plains. From here, ground water moves through the sediments generally from west to east (DOE 1988). Studies performed on the Hanford Site indicate that some recharge to the water table (**0-4 in./year**) may occur locally depending on surface conditions, especially during the winter months (Gee 1987); most precipitation, however, is returned to the atmosphere through evapotranspiration.

Artificial or synthetic recharge to the unconfined aquifer from liquid-waste disposal operations occurs at the Hanford Site, mainly in the 200 Areas. Recharge from the 200 Areas wastewater-disposal facilities is estimated to be approximately 10 times the natural recharge at the Hanford **Site** (Graham et al. 1981).

The present direction of ground-water flow in **the** vicinity of the 200-West Area is highly influenced by a ground-water mound associated with past artificial recharge at 216-U-10 Pond (U Pond) and with current recharge to the 216-U-14 ditch, which lies just east of U Pond. The influence of the U Pond mound on ground-water flow beneath W-5 is demonstratedon a regional water table map that also indicates generalized ground-water flow directions (Figure 31). Artificial recharge at U Pond raised the level of the unconfined aquifer 55 ft between 1944, which was prior to the construction of U Pond, and 1987. Even though U Pond has been decommissioned since 1984, the ground-water mound is expected to persist for a number of years. As the ground-water mound is allowed to dissipate, the direction of ground-water flow beneath W-5 will likely swing to the east, perhaps returning to the due-east regional ground-waterflow direction recorded in 1944 (Figure 32).

Based on water-level measurements collected at well 299-W15-2 (Appendix B), it appears that the water table has fluctuated as much as 15 ft over the last 35 years. The fluctuationsare probably the result of varied volumes of process water being deliveredto U Pond. Since about the time U Pond was decommissioned, water levels have been in general decline, having fallen a total of -7 ft in the last 6 years at 299-W15-2. Hydrographs from the other wells located within 1000 ft of W-5 corroborate a general drop in water levels over the last two years relative to those measured ever since the water levels have been measured at the site (Appendix B).

The relatively young, **uncompacted** and unconsolidatedsands and gravels belonging to the **Hanford** formation are the most conductive unit, transporting water at rates ranging from 500 to 90,000 **ft/day** across the Pasco Basin (Table 7). Within the 200-East Area, located 5 to 6 miles east of W-5, Last et al.

4.3

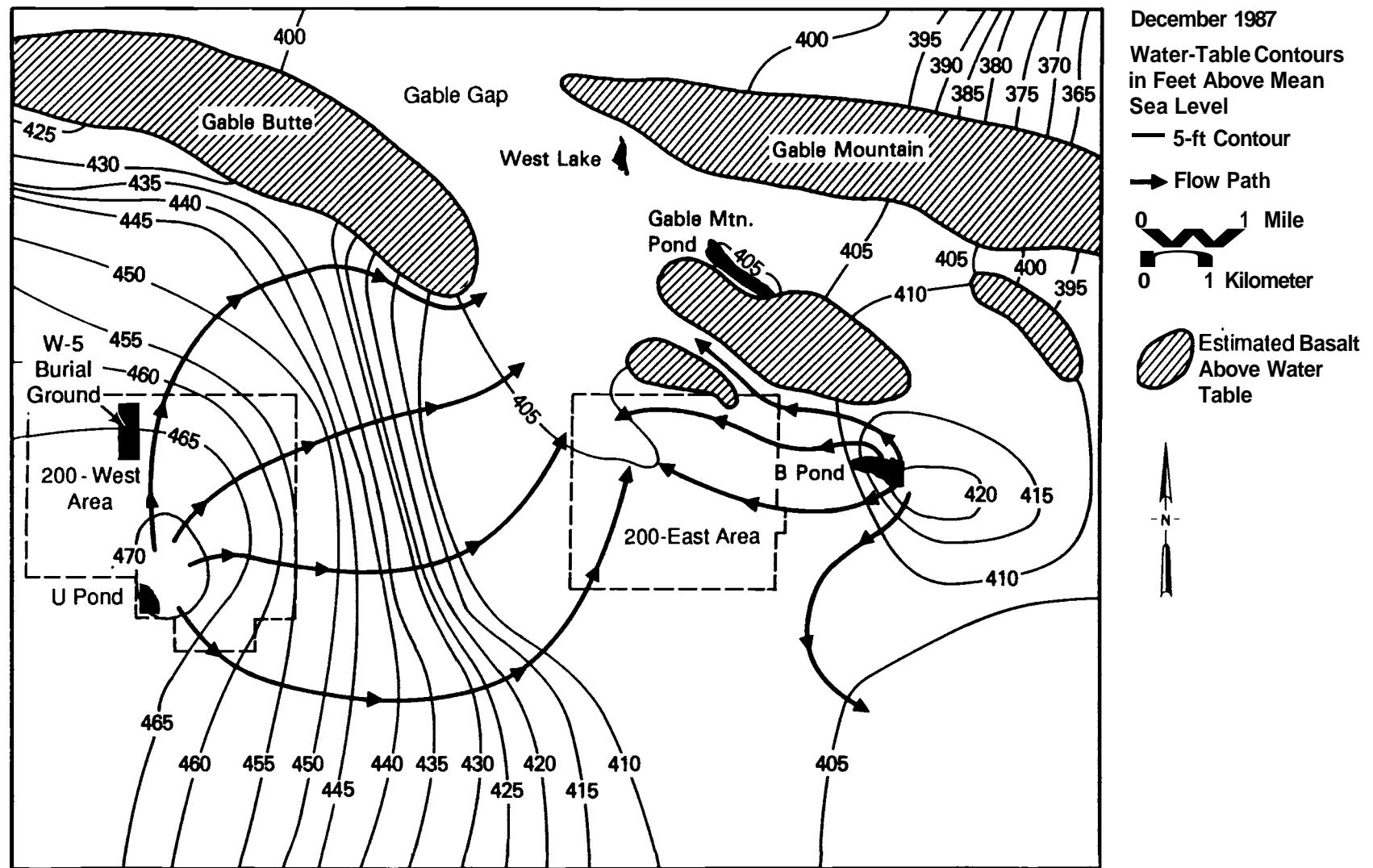


FIGURE 31. Water-Table Map for the 200 Areas Measured in December 1987

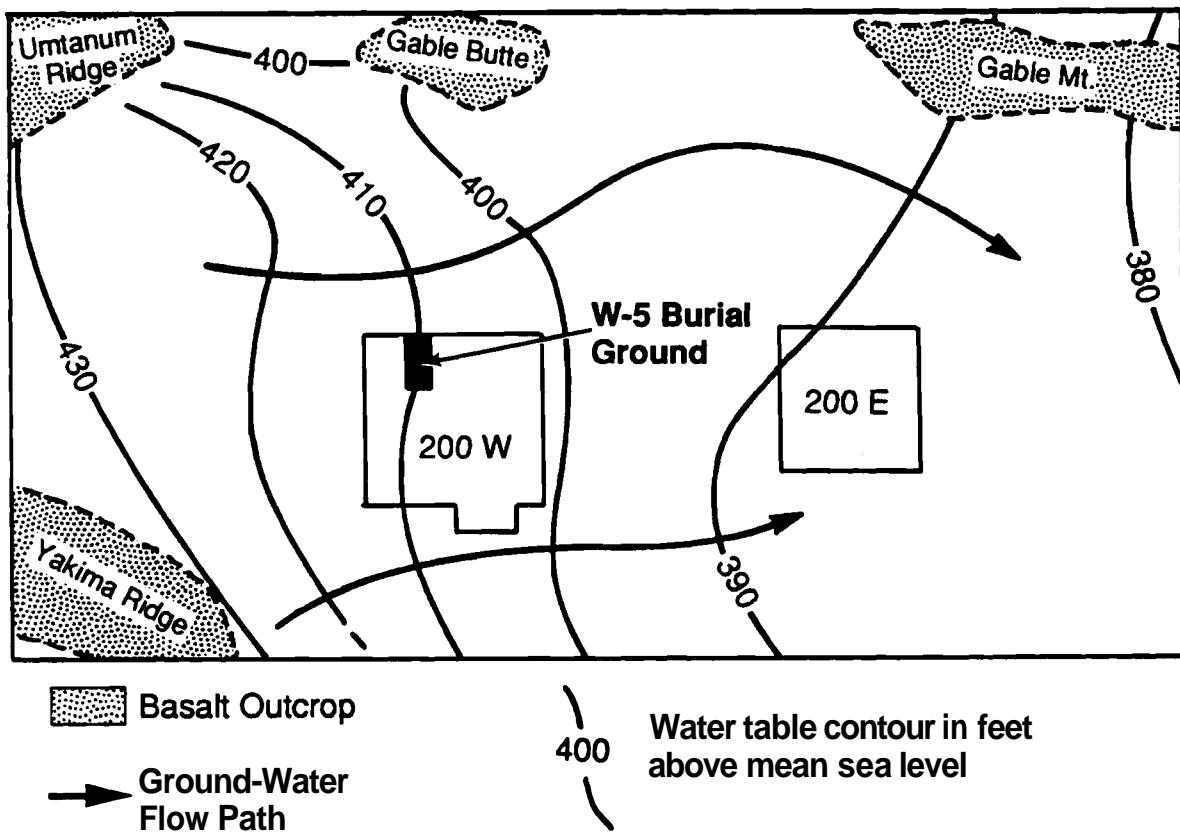


FIGURE 32. Estimated 1944 Water-Table Map

(1989) used aquifer testing to measure hydraulic conductivities for the Hanford formation ranging from 1500 to 90,000 **ft/day** and hydraulic **conductivities** for the upper part of the **Ringold** Formation ranging from 0.1 to 200 **ft/day**. Elsewhere, Bergeron et al. (1987, p. 41) have reported saturated hydraulic **conductivities** between 1.5 and 125 **ft/day** for relatively **fine-grained** sands and muds of the Hanford formation present at the U.S. Ecology Site. The compact **silts** and clays of the lower **Ringold** unit transmit water at rates of only 0.1 to 12 **ft/day**. The hydraulic conductivity of the middle **Ringold** gravels, the most voluminous and extensive hydrogeologic unit, range from 9 to 600 **ft/day**, whereas the hydraulic conductivity of the basal **Ringold** ranges from 0.004 to 20 **ft/day** (Table 7).

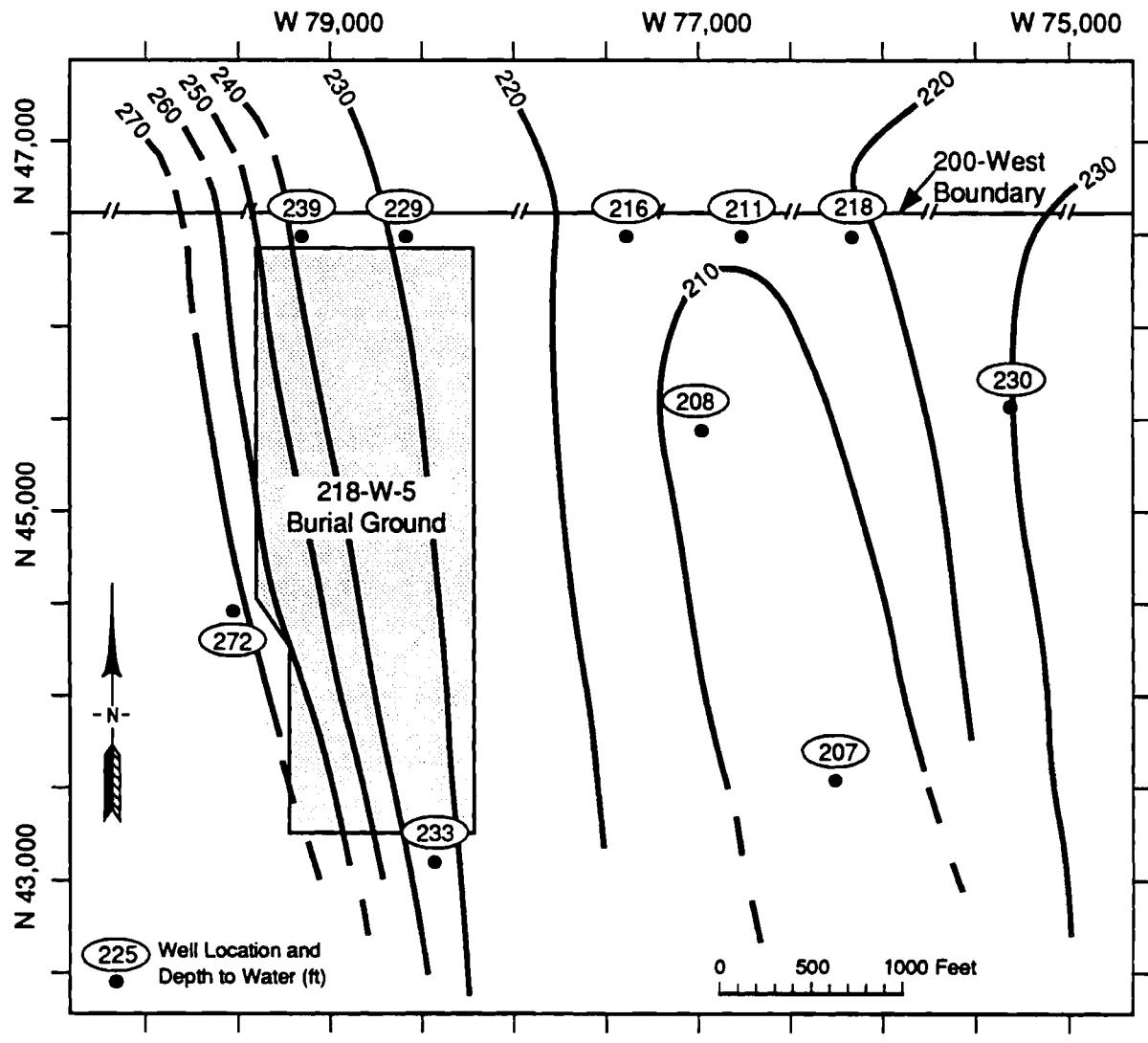
4.2 UPPERMOST AQUIFER(S)

The top of the unconfined aquifer lies between 225 and 270 ft below ground surface (Figure 33). The depths to water are greatest to the west of W-5 because of the higher topography in this area. The

TABLE 7. Summary of Hydraulic Properties Reported for the Hanford Site

Ranges of Hydraulic Properties Reported for the Hanford Site

Geographic Area	Saturated Hydraulic Conductivity (ft/day)	Storativity	Effective Porosity	Reference
Hanford Formation	500-20000 0			Gephardt et al. (1979)
	1,500-30,000			Last et al. (1989)
	2,000-10,000	0.07	0.3	Graham et al. (1981)
	1.5-25			Burgmann et al. (1987)
Upper Ringold	2000 Areas	0.1-00		Last et al. (1989)
Middle Ringold	Pasco Basin	20-600		Gephardt et al. (1979)
	200 Areas	9-230	0.02	Graham et al. (1981)
Lower Ringold	Pasco Basin	0.11-10		Gephardt et al. (1979)
	200 Areas	10-12	0.1	Graham et al. (1981)
Basal Ringold	200 Areas	0.004-20		Last et al. (1989)

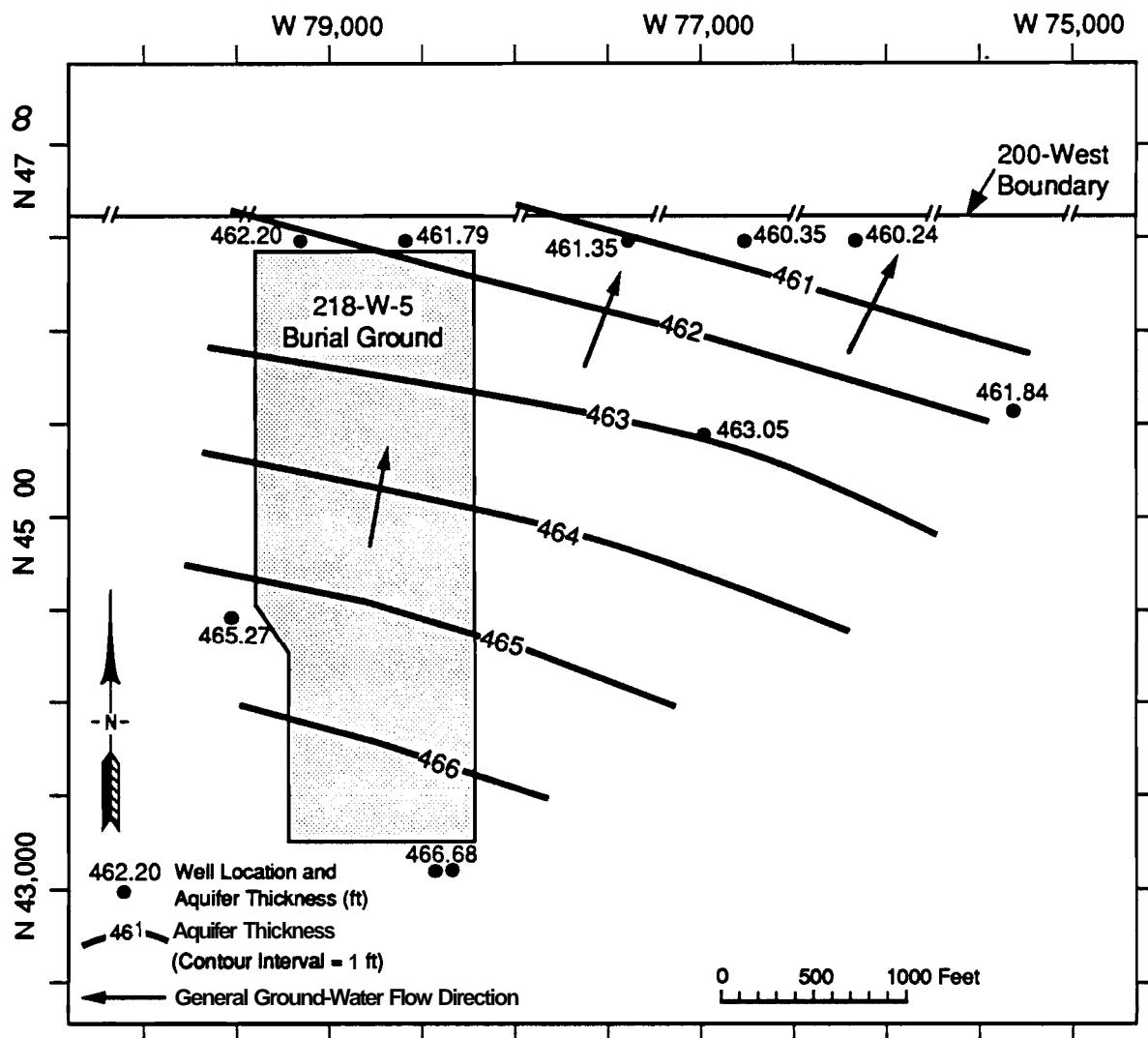


S8912118.6A

FIGURE 33. Depth to Water Table in the Vicinity of the W-5 Burial Ground

water table lies within the upper portion of the coarse-grained middle **Ringold** unit everywhere in the vicinity of W-5 (Figures 4 to 6). Changes in elevation of the water table are shown in hydrographs presented in Appendix B. Water-table maps indicate that the present direction of ground-water flow is to the north-northeast (Figure 34).

The Elephant Mountain Member, which is continuous across the central Pasco Basin, acts as a confining unit that separates the unconfined aquifer system from the **lower** confined aquifers found within the Columbia River **basalts**. The base of the unconfined aquifer lies atop the lower **Ringold** unit, except to the north and east where the lower and the fine-grained basal **Ringold** units appear to pinch out (Figure 35).



S8912118.6B

FIGURE 34. Surface of the Water Table in the Vicinity of the W-5 Burial Ground, Measured on February 27, 1988

The lower **Ringold** unit and the fine-grained facies of the basal **Ringold** unit combined consist of up to 70 ft of what is predominantly mud (i.e., silt and clay). These muds act as a single confining unit separating the middle unit of the **Ringold** Formation from the coarse-grained facies of the basal **Ringold** unit. A confined aquifer exists locally within the coarse-grained facies of the basal **Ringold** unit. Where the confining **Ringold** layers are present beneath W-5, the saturated thickness of the unconfined aquifer ranges from about 215 ft along the eastern boundary to about 230 ft along the western boundary of W-5 (Figure 36).

Where lower and fine-grained basal **Ringold** facies are missing, the undifferentiated sandy gravel sequence of the basal and middle **Ringold** units extends downward to the top of the Elephant

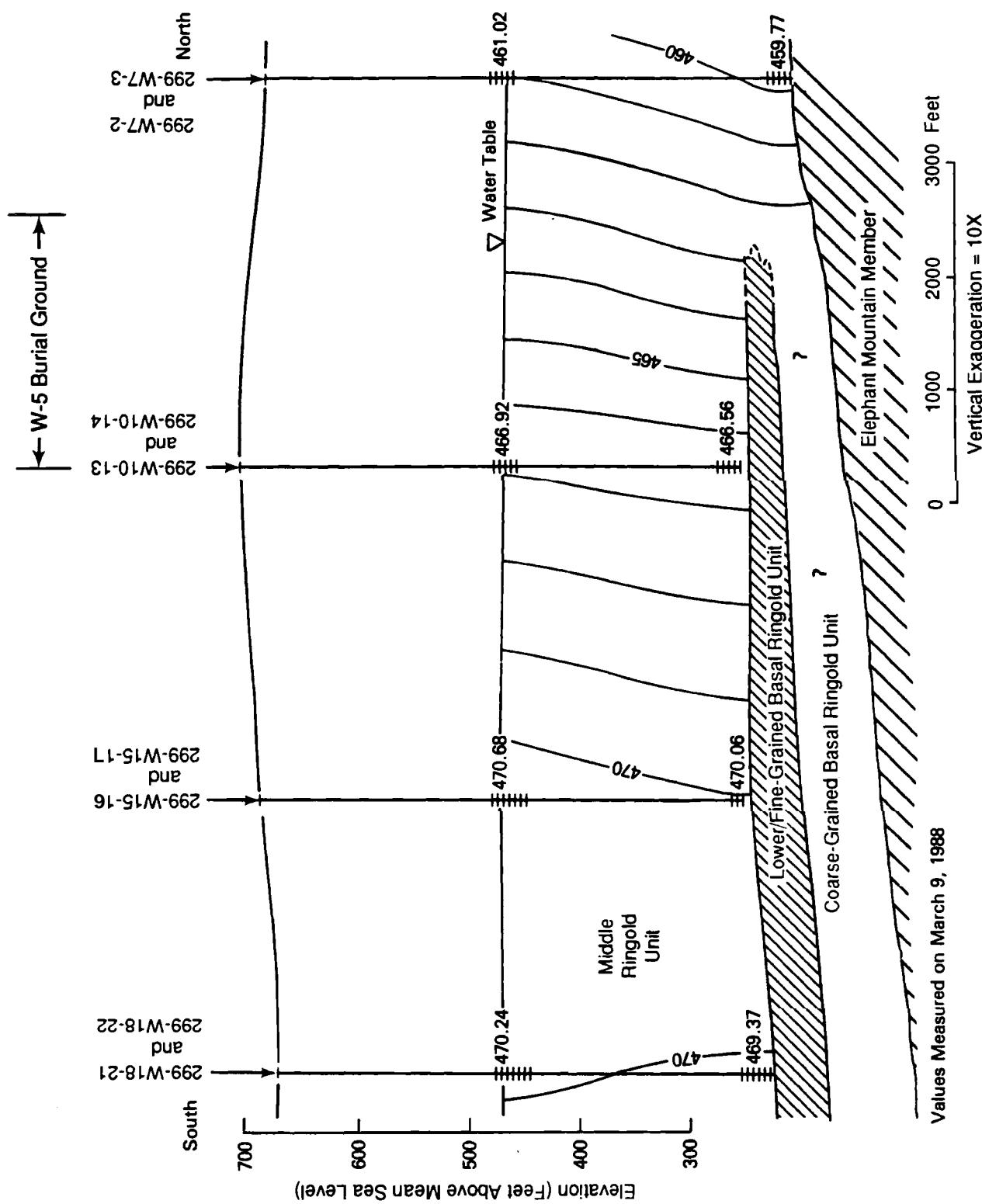
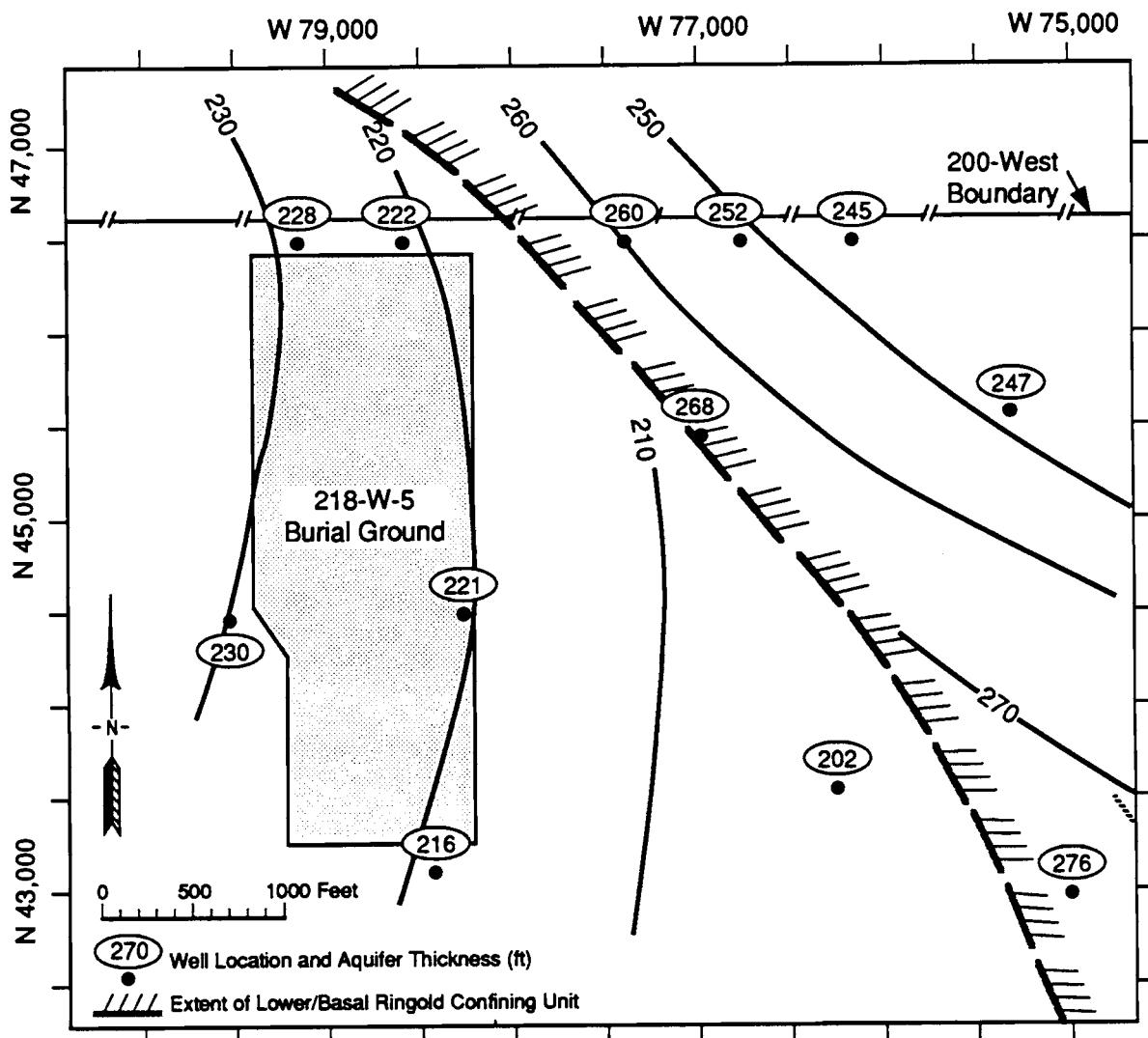


FIGURE 35. Generalized Hydrogeologic Cross Section Beneath the 200-West Area



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FIGURE 36. Saturated Thickness of the Unconfined Aquifer

Mountain Member. Without the confining layers, it is difficult to distinguish the middle **Ringold** unit from the **coarse-grained** basal **Ringold** unit. Here the saturated thickness of the aquifer is -260 ft (Figure 36).

4.3 UNSATURATED ZONE

The movement of water through the unsaturated zone to the underlying aquifer is controlled by many factors, including the thickness of the unsaturated zone (Figure 33), the hydraulic properties of sediments in the unsaturated zone, and the moisture content of these sediments (Last *et al.* 1989). Any excess recharge water not removed by evapotranspiration could move downward through the

unsaturated and relatively permeable, coarse-grained Hanford formation deposits. Upon reaching the relatively fine-grained early "Palouse" soil and the carbonate-rich Plio-Pleistocene unit, water may move within these units **and/or** collect on them and move laterally. Water in the unsaturated zone may also collect atop or within fine-grained lenses within the Hanford and **Ringold** Formations.

Because grain size generally increases northward across the Hanford formation, it is expected that water might move downward more rapidly in the northern portion of W-5. To the south, there are more fine-grained layers of sand and mud within the Hanford formation. These fine-grained layers have lower hydraulic conductivities and greater water retention capacities and so would retard water movement.

An estimate of the length of time it would take for water from the bottom of the U.S. Ecology waste facility to reach the water table is 1060 to 1400 years, based on a model presented by Bergeron **et al.** (1987). This depth to the water table in the area for which the estimate was made is 2300 ft. Furthermore, the geohydrology in that area is considerably different from that at W-5, so these travel times are not necessarily applicable to W-5.

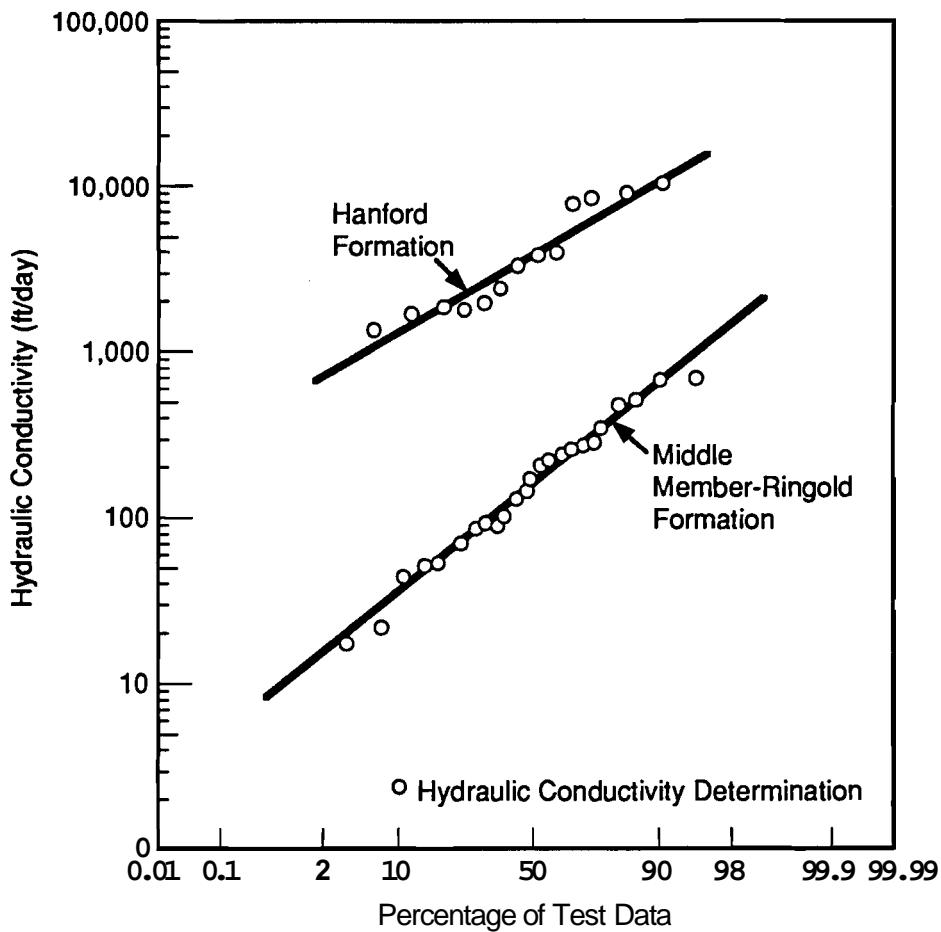
4.4 HYDROLOGIC PROPERTIES

Most of the information on hydrologic properties is from the unsaturated Hanford formation (**Routson** and Fecht 1979; Bergeron **et al.** 1987). Facies of the Hanford formation vary considerably from one part of the Hanford Site to another. Therefore, data from one site may not be representative of the Hanford formation at other sites. A lot of information for the **transmissivity** and hydraulic conductivity of the middle **Ringold** unit is based on aquifer tests (Gephart **et al.** 1979; Graham **et al.** 1981; Last **et al.** 1989). There is very little information, however, on the hydrologic properties of other units, such as the early "Palouse" soil, the Plio-Pleistocene unit, and the upper **Ringold** unit, which make up the central third of the stratigraphic sequence within the unsaturated zone at W-5 (Figure 3).

The following discussion presents the information available on physical and chemical properties of the sediments represented at W-5. Included are data on hydraulic conductivity, **transmissivity**, **storativity**, effective porosity, field moisture content, soil bulk density, water-retention characteristics, and cation exchange capacity.

4.4.1 Hydraulic Conductivity

A large amount of hydraulic conductivity data is available for sediments in the **Pasco** Basin. In general, a one- to three-order-of-magnitude difference exists in hydraulic conductivity between the Hanford and **Ringold** Formations (DOE 1988, p. 3.9-88), yet large differences in the range of conductivities also exist within units (Figure 37).



S8912118.7

FIGURE 37. Distribution and Range of Hydraulic Conductivities for the Hanford and **Ringold** Formations

Results of aquifer tests performed in wells open to the **Ringold** Formation near W-5 are summarized in Table 8. Transmissivity and hydraulic conductivity apparently decrease with depth within the basal and middle **Ringold** units. This is corroborated by slower drill rates, which suggest that the **Ringold** Formation becomes increasingly more compacted and indurated with depth.

Hydraulic conductivity values for the middle **Ringold** unit, calculated from transmissivities measured during aquifer testing in the vicinity of W-5, range from 0.2 to 32 ft/day (Table 8). These values are at the low end of the range given for hydraulic conductivity elsewhere on the Hanford Site (see Table 7).

TABLE 8. Hydraulic Parameters Measured and/or Derived near the W-5 Burial Ground

	Well #	Depth (ft)	Stratigraphic Unit	Saturated Hydraulic Conductivity (cm/sec)	Saturated Hydraulic Conductivity (ft/day)	Transmissivity (ft ² /day)	Storativity	Comments**
4.12	Permeameter Tests	299-W10-13	45	Hanford Formation	1.10E-02	31.17		1
			80	Hanford Formation	2.70 E-02	76.52		1
	299-W7-2	64-65	Plio-Pleistocene Unit	6.80E-02	192.71			1
		94-95	Upper Ringold	3.70E-02	104.86			1
		154-155	Middle Ringold	2.10E-02	59.51			1
		219-220	Middle Ringold	2.70E-03	7.65			1
		299-W10-14	460	Lower Ringold	2.69E-08	7.62E-05		2
	299-W15-17'	448-450	Lower Ringold	6.42E-09	1.82E-05			2
		299-W18-22'	455-456.7	Lower Ringold	2.17E-08	6.15E-05		2
4.12	Aquifer Tests (Last et al. 1989)	299-W7-1	233-243	Middle Ringold	1.41 E-03	4	1,000	Constant discharge
			233-243	Middle Ringold	1.76E-03	5	1,400	Recovery
		299-W7-2	212-222	Middle Ringold	7.06E-04	2	430	Constant discharge
			212-222	Middle Ringold	1.06E-03	3	740	Recovery
		299-W8-1	257-267	Middle Ringold	1.06E-04	0.30	80	Recovery
		299-W9-1	266-286	Middle Ringold	7.06E-05	0.2-0.3	43-65	Slug withdrawal
			266-286	Middle Ringold	9.17E-05	0.26	55	Slug withdrawal
		299-W10-13	227.5-237.5	Middle Ringold	1.13E-02	32	7,000	0.009
		299-W10-14	240	Middle Ringold	5.65E-03	16	3,500	0.009
		437-447	Middle Ringold (base)	1.41 E-03	4	900		Recovery

* located 1 mile or less south of W-5 burial ground.

** 1 - Repacked drive barrel sample

2 - Split barrel (core) sample

Hydraulic conductivity values calculated from permeameter tests performed in the laboratory range from about 30 to 200 ft/day for the Hanford formation, 104 **ft/day** for the upper **Ringold** unit, and 7 to 60 ft/day for the middle **Ringold** unit.

The vertical hydraulic conductivities determined from split-barrel (core) samples of the lower **Ringold** unit in the 200-West Area are four to seven orders of magnitude less than values reported for the lower **Ringold** elsewhere in the Pasco Basin (see Table 7). These values are based on three permeameter measurements, all of which are on the order of **10⁻⁵ ft/day** (Table 8). One of the lower **Ringold** samples was collected immediately south of W-5 (299-W10-14; **460-ft** depth); the other two lower **Ringold** samples are from wells located within a mile south of W-5.

A permeameter measurement performed on the Plio-Pleistocene unit (64-ft depth, well **299-W7-2**) yielded a value of 192 ft/day (Table 8), which seems anomalously high considering the degree of cementation and normally fine-grained texture of this unit. This anomaly might result from the fact that the repacked drive-barrel material that was placed in the permeameter consisted of mostly broken up **gravel-** and sand-sized aggregates of finer-grained calcrete.

4.4.2 Transmissivity

Transmissivity values in the vicinity of W-5 obtained from nine aquifer tests performed within the upper portion of the middle **Ringold** unit (Table 8) range from a low of 50 ft²/day to a maximum of 7000 ft²/day (Last **et al.** 1989). A transmissivity value of 900 ft²/day was obtained from the base of the middle **Ringold** unit (well 299-W10-14; 437- to **447-ft** depth). Transmissivities measured from the middle **Ringold** unit a few thousand feet south of W-5 were as high as 51,000 ft²/day (Last **et al.** 1989).

4.4.3 Storativity

Only a few storativity values are available for wells near W-5; these values are based on aquifer tests of the middle **Ringold** unit. A storativity of 0.009 was obtained from the 299-W10-13/14 well cluster (Table 8). Storativity values of 0.001 and 0.038 were obtained from other well clusters located a few thousand feet south of W-5 (Last **et al.** 1989). Elsewhere on the Hanford Site, storage coefficients range from 0.02 to 0.07; the lower values are associated with the **Ringold** Formation and the higher values with the Hanford formation (Graham **et al.** 1981).

4.4.4 Porosity

Very few data on porosity are available for sediments within the Pasco Basin. The effective porosity (*i.e.*, interconnected pore space) of the unconfined aquifer within the 200 Areas ranges between 10 and 30%. The lower value is correlated with the lower **Ringold** unit, and the upper value approaches the total porosity of the Hanford formation (Graham **et al.** 1981).

The total porosity calculated from mean particle and bulk densities ranges from 0.256 to 0.477 cm³/cm³, measured from predominantly sandy facies of the Hanford formation at the Grout Treatment Facility.

4.4.5 Field Moisture Content

Moisture contents vary depending on sediment grain-size distribution and stratigraphic relationships to adjacent units. In general, finer-grained sediments, particularly those with significant amounts of silt and/or clay, contain the most moisture. This is shown in Table 9, in which most samples with >5% water are associated with mud. Moisture contents in the unsaturated zone may range from as little as 1-2% to as much as 18% water (Last et al. 1989). Most measured water contents are within the range of 2 to 6% water. Zones with the highest moisture content are usually concentrated along significant textural boundaries where large contrasts in average grain size exist. For example, in well 299-W7-1, a moisture content of 12% water occurs at the ~140-ft depth within a poorly sorted, calcareous sandy mud layer where it is overlain by a clean sand, within the unsaturated upper **Ringold** unit (see Figure 4).

4.4.6 Soil Bulk Density

Soil bulk density and particle density are important parameters for determining porosity of the sediments. Accurate measurement of bulk density requires intact, undisturbed sediment samples. A procedure to determine soil bulk density has been given by Blake and **Hartage** (1986). No soil bulk density measurements have been performed on samples near W-5 to date. Bulk density has been measured in sediment cores collected from the Grout Treatment Facility located ~7 miles east of W-5. In that area, the mean bulk density ranged from 1.27 to 1.97 g/cm³ for the predominantly sandy facies of the Hanford formation.

4.4.7 Water-Retention Characteristics

A total of six water-retention analyses are available for wells in the immediate vicinity of W-5. Water-retention data recently obtained from wells in the 200 Areas are presented in Table 10. Plots of each of the characteristic curves for moisture are presented in Appendix D. Figure 38 shows the contrast in characteristic curves for four different-textured samples of the Hanford formation collected from the 200-West Area. Saturated, these samples contained up to 40% water.

Moisture characteristic curves from other hydrogeologic units sampled from well 299-W7-2 are shown in Figure 39. The sample from the Plio-Pleistocene unit contains the highest saturated water volume (almost 50%). One sample from the middle **Ringold** unit (at a depth of 219 ft) is probably significantly more compacted or cemented, judging by its relatively low saturated volumetric water content.

TABLE 9. Field Moisture Data Collected from Wells near the W-5 Burial Ground

Moisture Data from Wells Within 1000 ft of W-5

WELL #	DEPTH (ft)	FOLK CLASSIFICATION*	MOISTURE CONTENT (wt%)	WELL #	DEPTH (ft)	FOLK CLASSIFICATION	MOISTURE CONTENT (wt%)
299-W7-1	5-6	msG	2.53	299-W7-9	4	gmS	1.79
	10-11	msG	1.98		6-8	msG	1.85
	130	gS	1.85		12	msG	2.29
	135	(gm)S	11.39		15	msG	2.68
	140	S	1.96		20	msG	2.24
	142-143	**	1.31		25	msG	2.72
					30	msG	2.91
299-W7-2	4-5	msG	7.90		35	msG	3.48
299-W7-3	5	G	1.94		45	sG	4.59
299-W9-1	5	S	3.51		50	sG	4.45
	10	S	4.13		55	msG	4.29
	15	mS	7.22		60	sG	4.51
	20	sG	2.20		65	gmS	5.27
	25	S	2.39		71	**	3.20
	30	(g)S	2.38		73	**	3.21
	35	S	3.02		80	(m)gS	6.59
	40	(m)S	2.56		86	msG	3.70
	45	(m)S	4.64		90	(m)S	3.77
	50	S	2.65		94	**	5.27
	55A	sG	1.79		102	(g)S	3.18
	55B	sG	2.30		106	S	2.96
					110	S	2.16
					114	(m)S	1.75
					120	S	1.72
299-W10-13	5	S	5.98				
	10	(m)S	9.91				
	15	(gm)S	5.89				
	20	gS	3.92				
	25	gS	4.17				
	30	msG	4.97				
	36	S	7.33				
	40	S	3.94				
	45	G	3.78				
	50	S	6.20				
	55	S	4.46				
	60	S	3.60				
	65	S	3.84				
	70	sG	3.21				
	75	gS	3.64				
	80	msG	5.46				
299-W10-14	4-5	S	5.92				
	9-10	S	6.94				

** = no sieve data

Samples with >5% water are shown in bold type.

*M=Mud; S=Sand; G=Gravel; m=muddy; s=sandy; g=gravelly; ()=slightly

TABLE 10. Water-Retention Data from the 200 Areas

Water Content (cm³/cm³) Versus Water Potential Data from 200 Area Wells

Well #	Depth (ft)	Stratigraphic Unit	Folk Classification	Saturated Hydraulic Conductivity (cm/sec)										Saturated Hydraulic Conductivity (cm/sec) 1.10E-2 31.17	
				5	10	15	20	30	40	50	75	80	100		
299-W 8-1	46	Hanford Fm.	G	0.378	0.374	0.347	0.303	0.256	0.216	0.190	0.142	0.052	0.048	0.040	
	8.0	Hanford Fm.	mG	0.404	0.363	0.326	0.301	0.272	0.256	0.249	0.233	0.165	0.159	0.127	2.70E-02 78.52
29-W 7	66	Phi-Phi-Limestone Unit	mG**	0.478	0.415	0.377	0.329	0.287	-	0.265	0.241	0.150	0.139	0.097	0.80E-02 192.71
34-35	34	Upper Ringold	mG	0.4 01	0.387	0.340	0.298	0.224	0.198	0.184	0.128	0.064	0.0 60	0.032	3.70E-02 104.86
154-156	154	Middle Ringold	mG	0.4 14	0.382	0.343	0.312	0.261	0.233	0.233	0.190	0.116	0.1 03	0.054	2.10E-02 69.51
219-220	219	Middle Ringold	mG	0.2 39	0.231	0.219	0.201	0.175	0.166	0.157	0.150	0.124	0.1 22	0.080	2.70E-02 7.46
29-E 2-26	129-130	Hanford Fm.	gG1	0.152	0.273	0.234	0.201	0	0.130	0.126	11	0.053	0.065	0.045	5.80E-02 164.37
230	130	Hanford Fm.	sG	0.369	0.298	0.203	0.157	d	0.102	0.093	64	0.051	0.040	0.036	1.00E-02 26.34
29-E 2-30	139-140	Hanford Fm.	s	0.3 21	0.281	0.242	0.209	0.181	0.1 6	0 0	0.111	0.064	0.0 48	0.031	1.10E-01 311.7
239-240	140	Hanford Fm.	sG	0.3 27	0.304	0.256	0.212	0.185	0.79	0 7	0.165	0.083	0.0 76	0.047	7.40E-02 209.7
29-W 7-5	10	Hanford Fm.	p	0.52	0.322	0.289	0 74	0.254	0.1 4	0.233	0.221	0.1 14	0.087	0.0 62	4.6 34
29-W 15-16	40	Hanford Fm.	s	0.4 05	0.372	0.330	0.281	0.217	0.187	0.169	0.168	0.064	0.0 56	0.040	3.80E-02 .02
110	110	Hanford Fm.	mG	0.3 34	0.310	0.287	0.271	0.230	0.226	0.219	0.204	0.117	0.0 11	0.078	1.10E-02 17
299-W 18-21	25	Hanford Fm.	(mgS	0.2 93	0.251	0.224	0.206	0.186	0.174	0.170	0.086	0.0 60	0.076	0.50E-02 155.87	
	4.0	Hanford Fm.	(gS	0.4 05	0.382	0.374	0.347	0.310	0.273	0.266	0.189	0.092	0.0 60	0.067	1.10E-02 31.17

* M=Mud; S=Sand; G=Gravel; m=muddy; s=sandy; G=gravelly; l= lignite

** fractional water content at respective water pressure

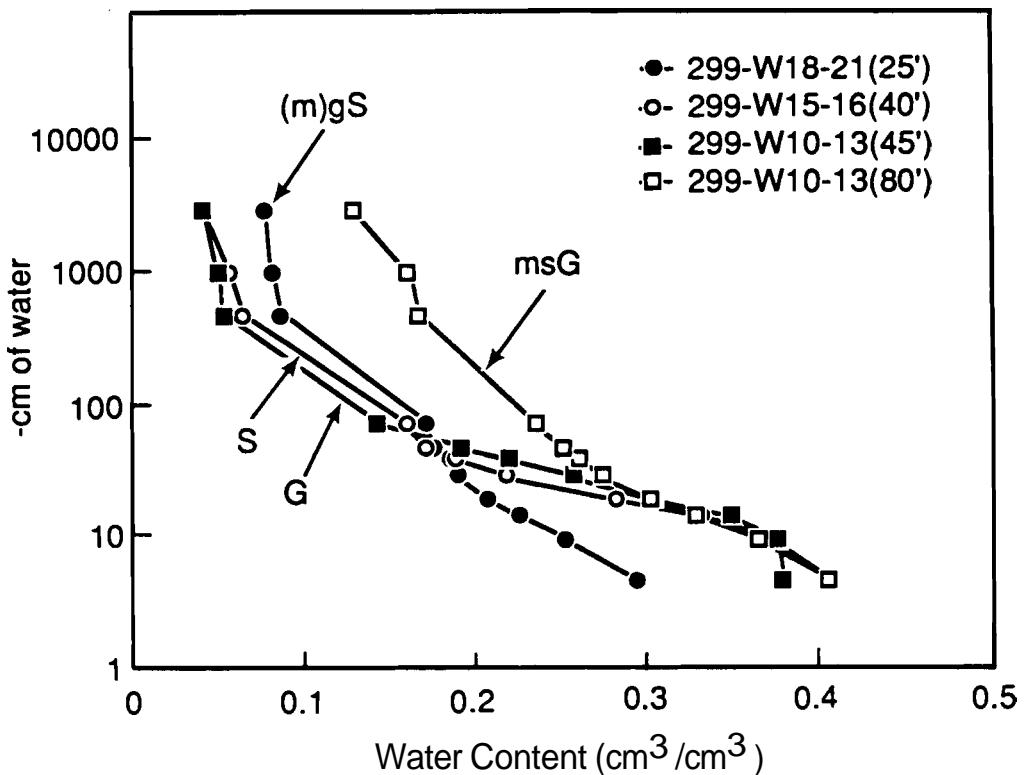


FIGURE 38. Moisture Characteristic **Curves** for the Hanford Formation

Like those shown for the Hanford formation (Figure 38), the samples represented in Figure 39 lose the most water between 10 and 100 cm of head pressure.

Water-retention characteristics were measured on 24 samples from sands and muds (transitional facies) of the Hanford formation just south of the 200-East Area (Bergeron et al. 1987, p. 39). Some of these data may be representative of the finer-grained portions of the Hanford formation in the southern portion of W-5.

4.4.8 Cation Exchange Capacity

A total of 11 samples from wells near W-5 have been analyzed for cation exchange capacity (CEC; Table 11). The stratigraphic locations that these samples came from are shown in the cross sections (Figures 4 to 6).

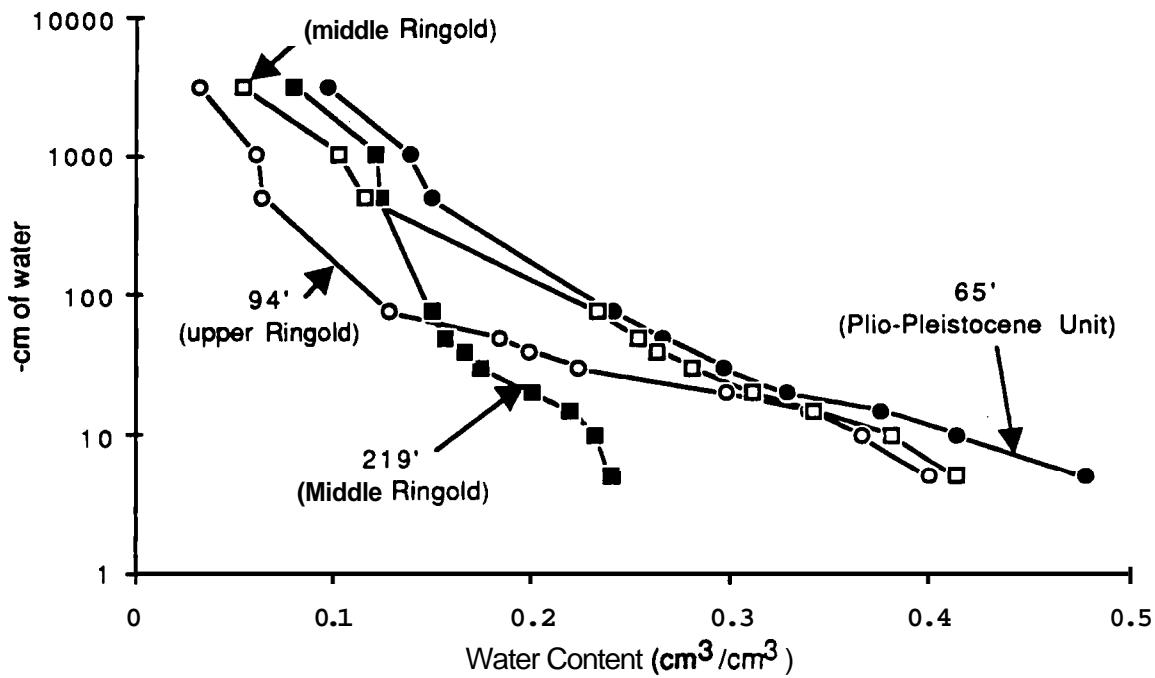


FIGURE 39. Moisture Characteristic Curves of Four Stratigraphic Intervals from Well 299-W7-2

TABLE 11. Cation Exchange Capacity of Sediment Samples Collected near the W-5 Burial Ground

Well #	Depth (ft)	Stratigraphic Unit	Cation Exchange Capacity (meq/100 g soil)
299-W7-2	64-65	Plio-Pleistocene Unit	6.0
	94-95	Upper Ringold	2.3
	155	Middle Ringold	2.2
	220	Middle Ringold	3.6
299-W7-3	450	Basal Ringold (?)	3.2
299-W10-13	45	Hanford Formation	2.9
	115	Early "Palouse" Soil	4.1
	160	Middle Ringold	1.8
	200	Middle Ringold	3.2
	240	Middle Ringold	6.2
299-W10-14	440	Middle Rinaold	6.2

With the limited data available, it is difficult to identify any trends relating CEC and hydrogeologic unit. The highest CEC values came from the Plio-Pleistocene unit (6.0 meq/100 g) and the middle Ringold unit (6.2 meq/100 g), yet the middle Ringold unit also yielded some of the lowest CEC values. Only one sample each was analyzed from the Hanford formation, early "Palouse" soil, and basal Ringold units, and all yielded intermediate CEC values (2.9 to 4.1 meq/100 g).

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Waitt, R. B., Jr. 1980. "About Forty Last Glacial Lake Missoula Jokulhlaups through Southern Washington." Journal of Geology 88:653-679.

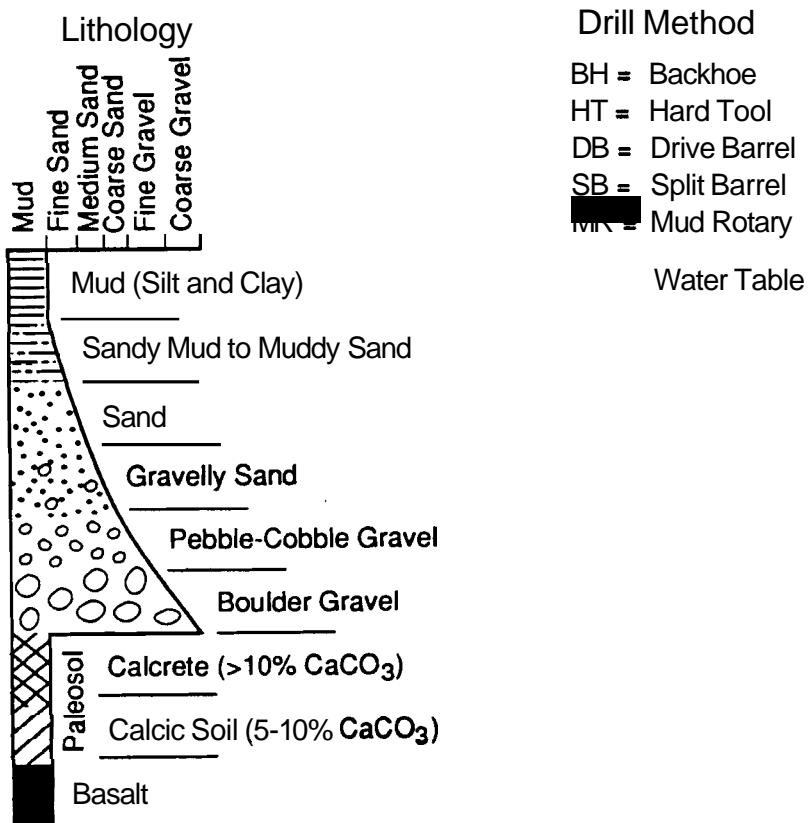
Walker, R. G., and D. J. Cant. 1984. "Sandy Fluvial Systems." In Facies Models, 2nd ed., ed. R. G. Walker, pp. 71-89. Geological Association of Canada, Toronto, Ontario.

APPENDIX A
GEOLOGIC LOGS

APPENDIX A

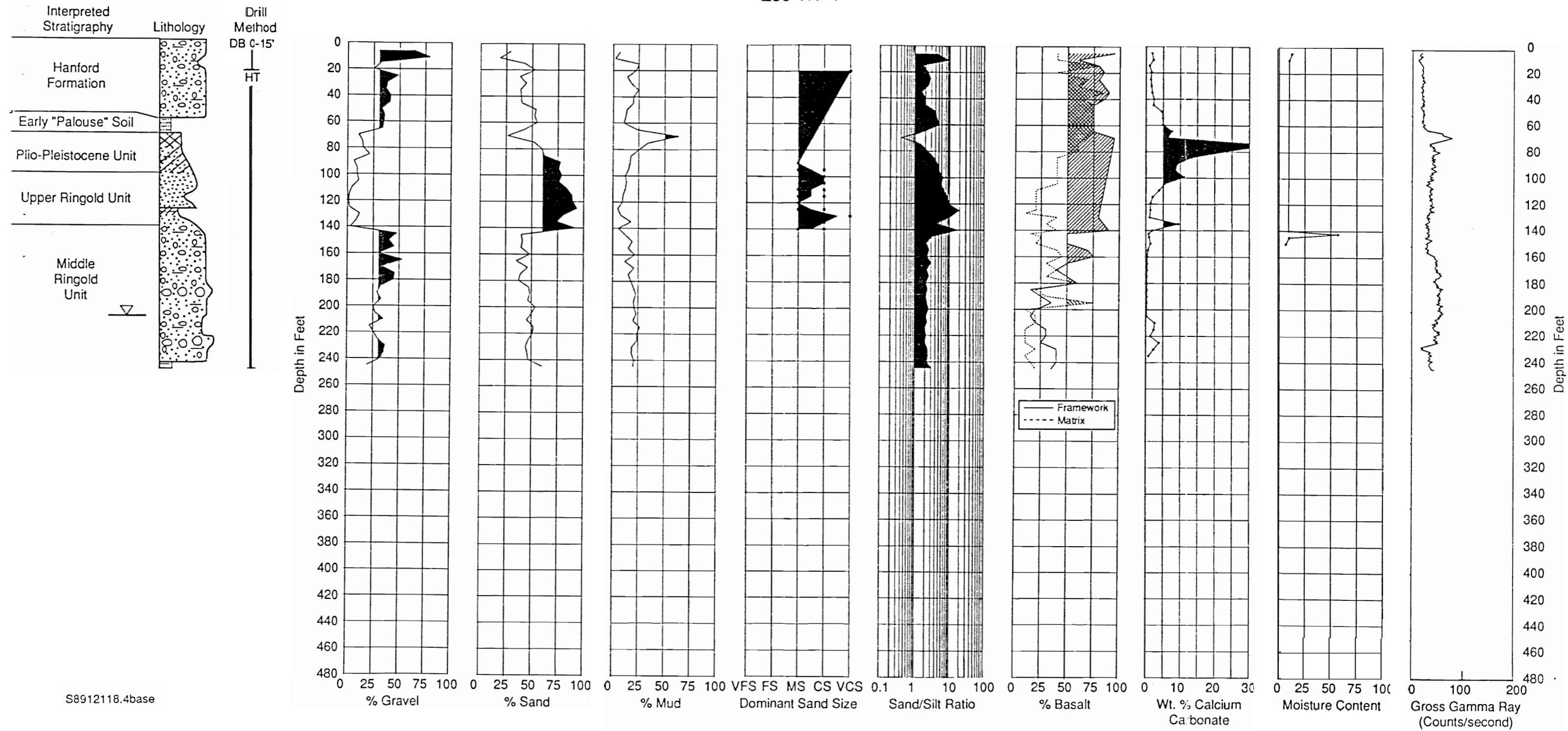
GEOLOGIC LOGS

This appendix provides a summary of geologic and geophysical data available for existing boreholes within 1000 ft of W-5. These logs were used to construct cross sections (Figures 4 through 6) and the fence diagram (Figure 11) presented in the text. The locations of these boreholes are shown in Figure 2. Specifically, these logs include plots of percent gravel, percent sand, percent mud, dominant sand size, sand/silt ratio, percent basalt, weight percent calcium carbonate, moisture content, **and/or** gross gamma-ray log. The shaded or blackened areas appearing in these plots are arbitrary and intended to visually enhance those areas for which a given parameter is higher. The symbols used on the geologic logs are defined below.

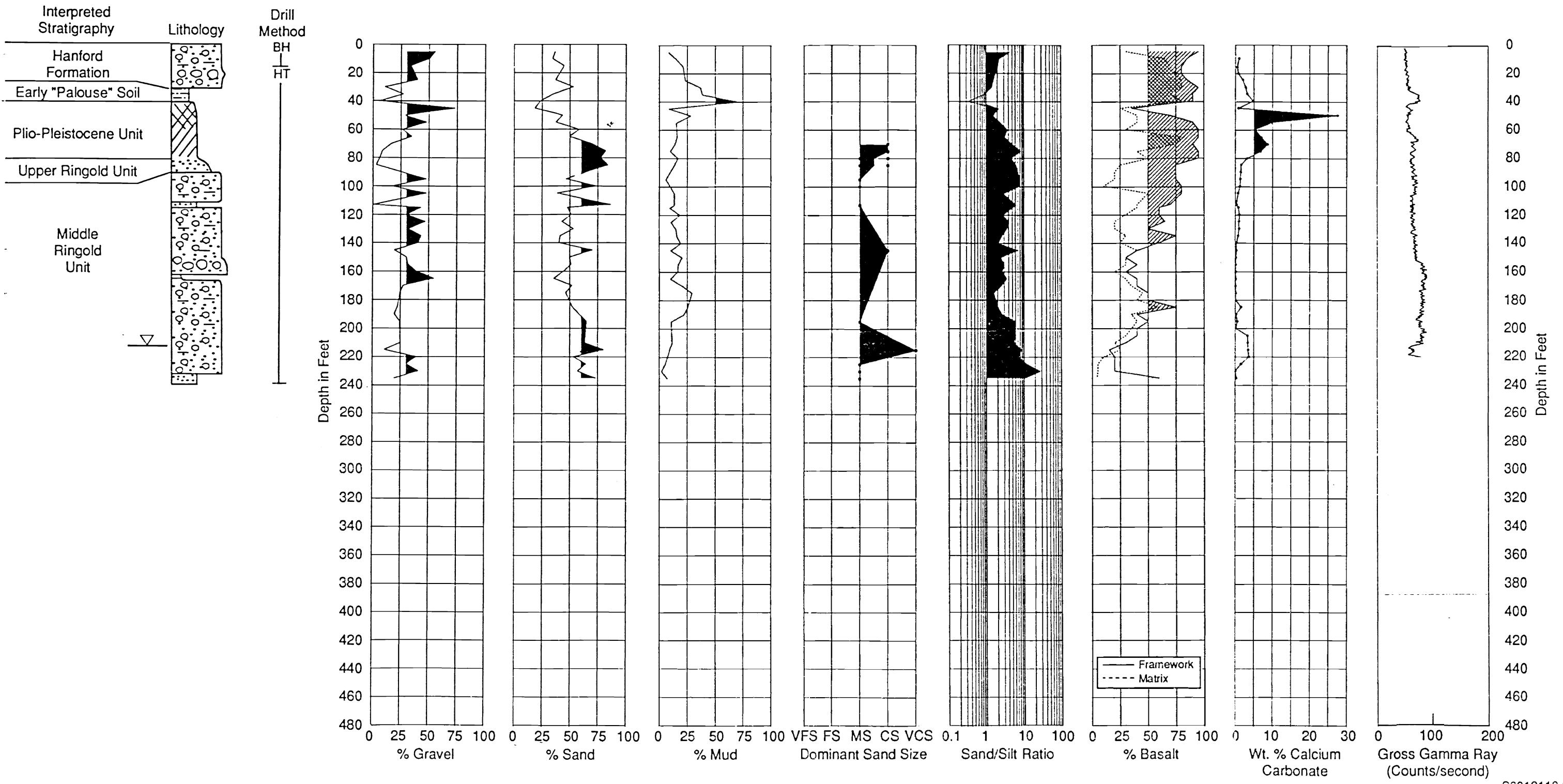


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299-W7-1

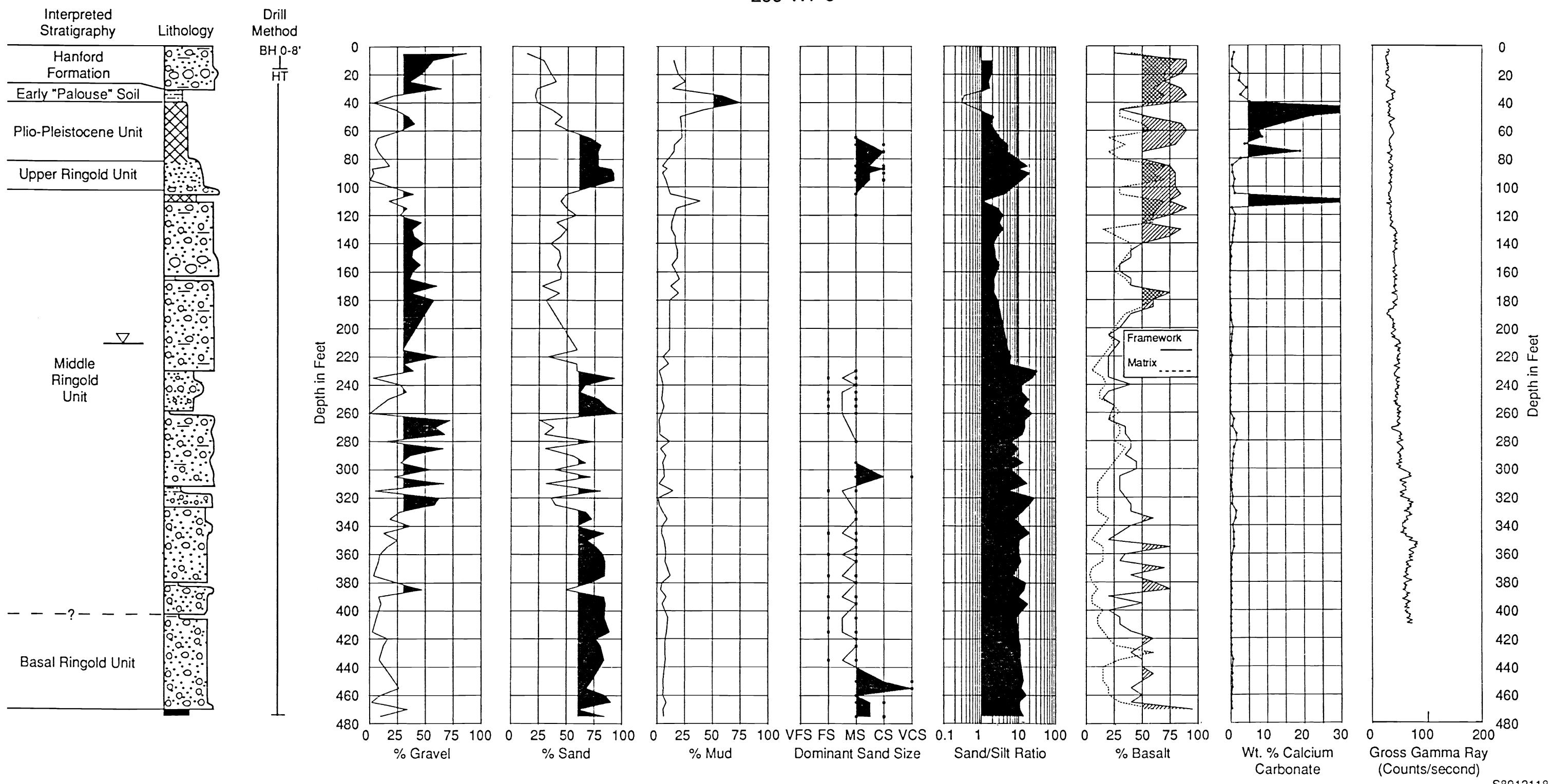


299-W7-2



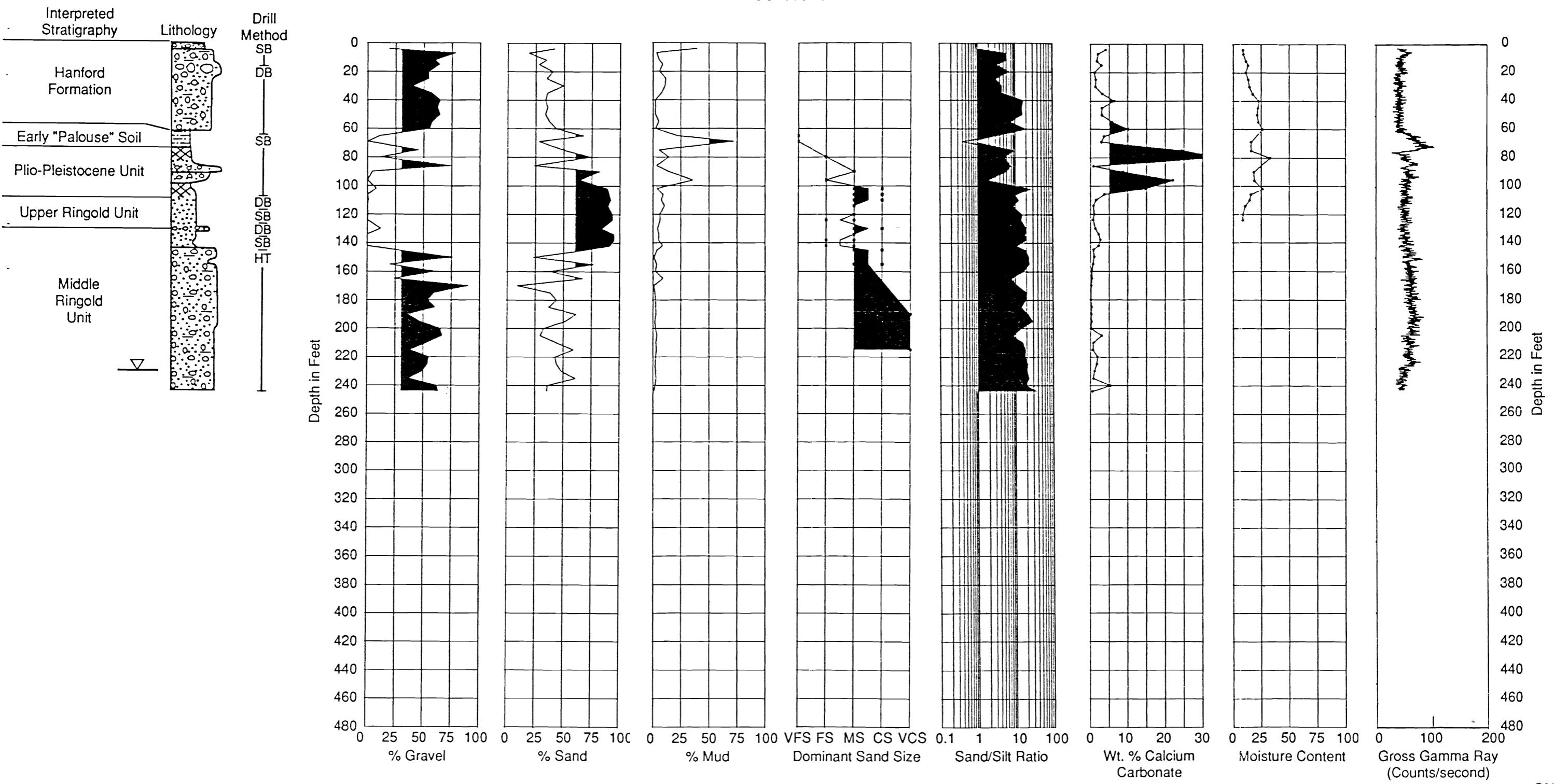
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299-W7-3



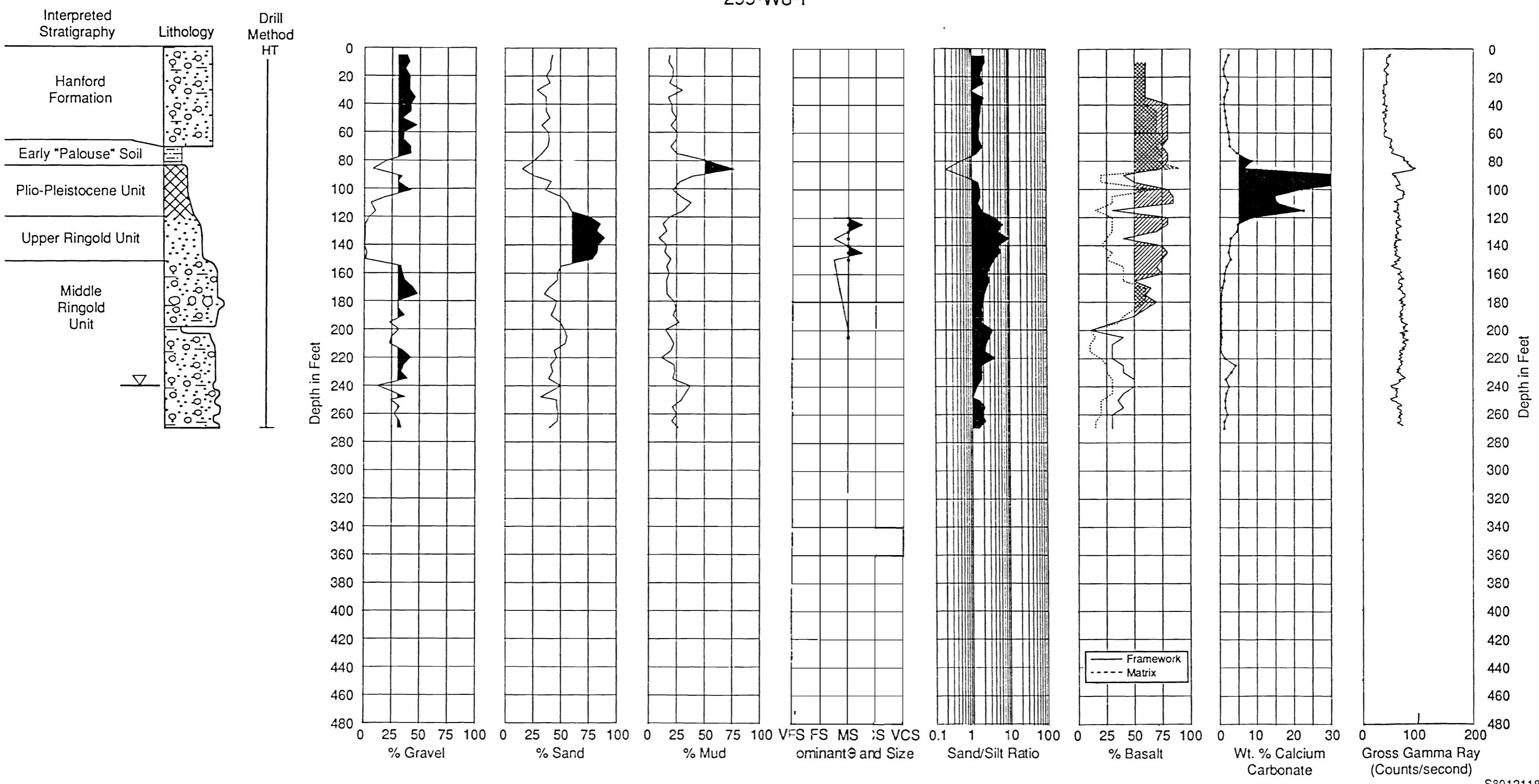
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299-W7-9



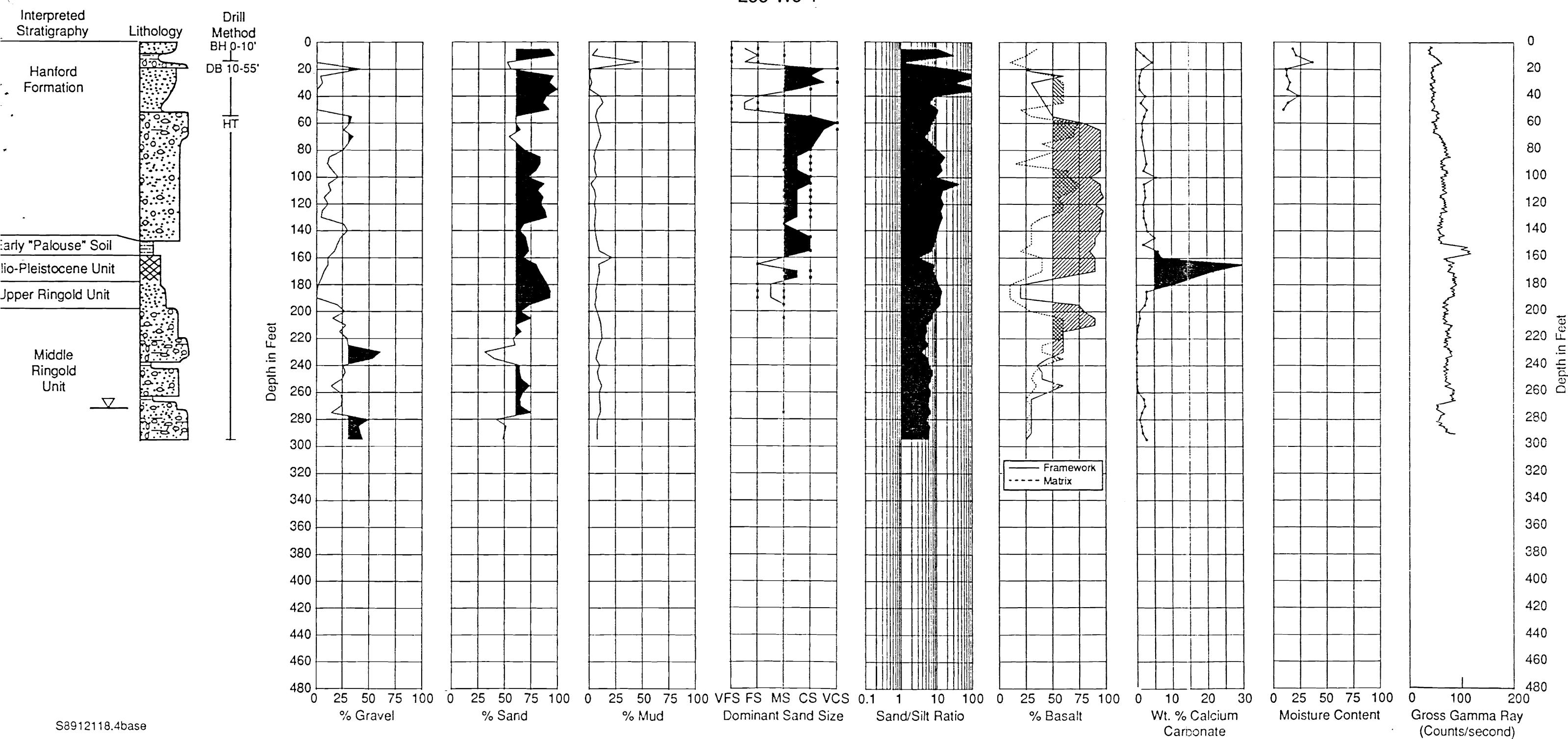
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299-W8-1

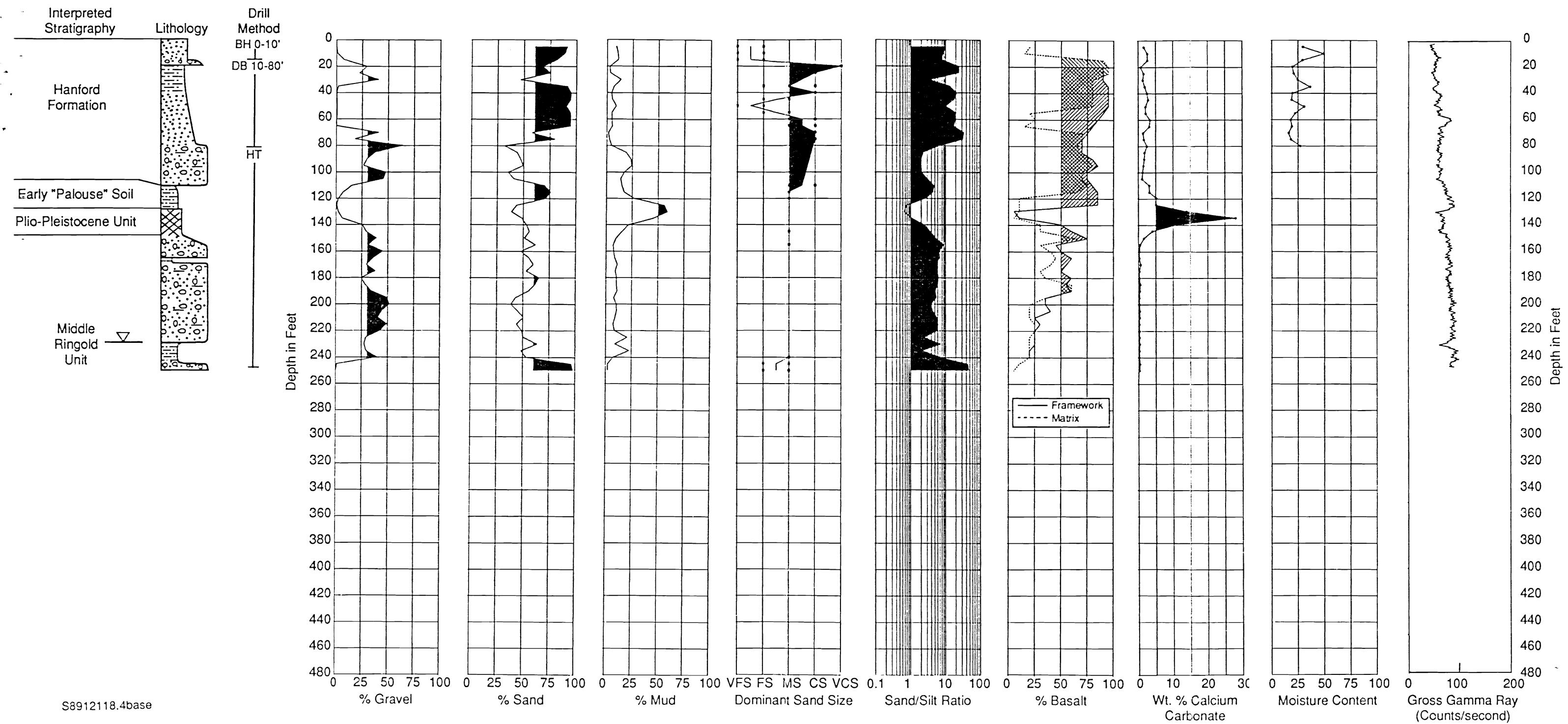


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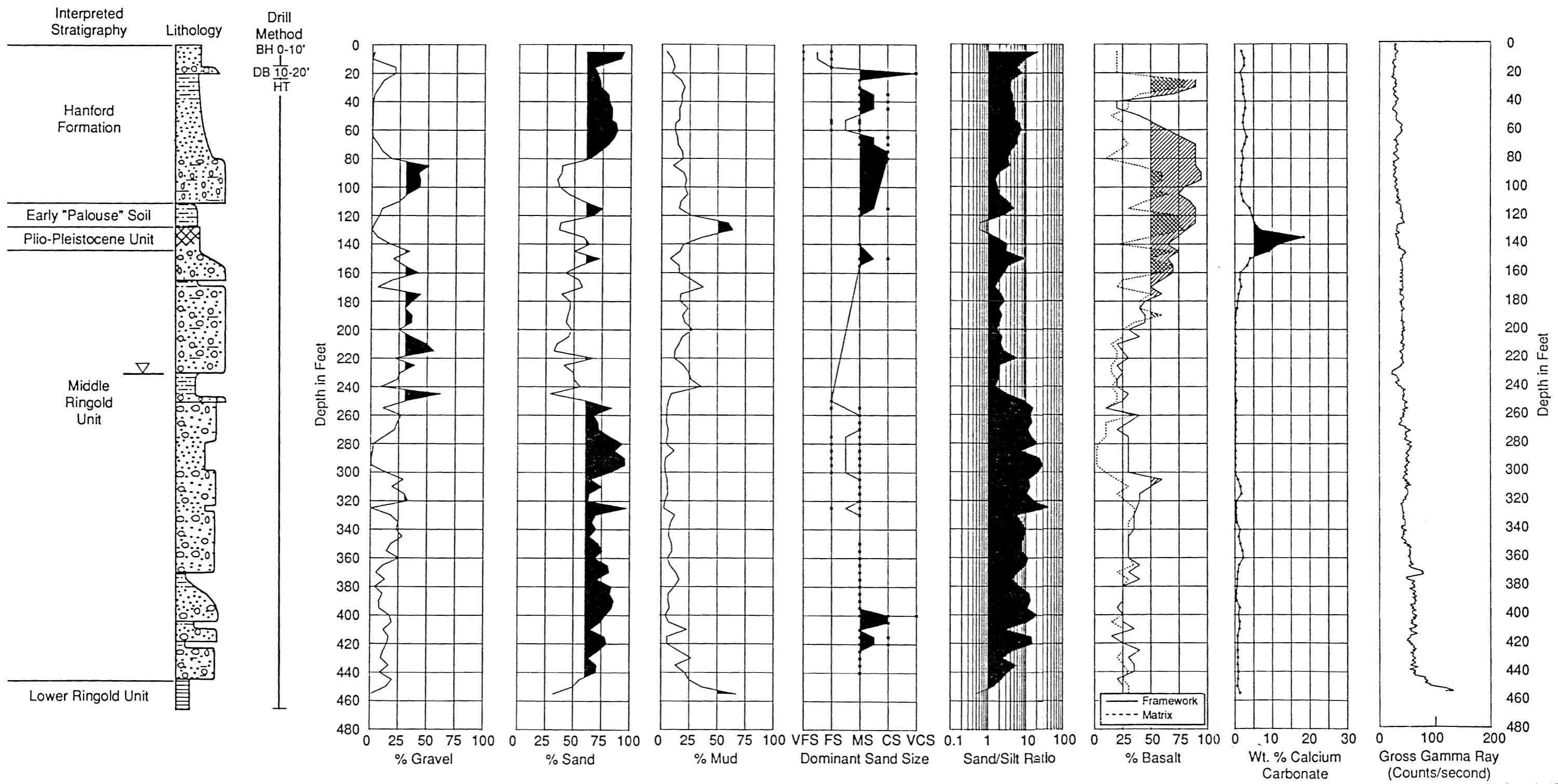
299-W9-1



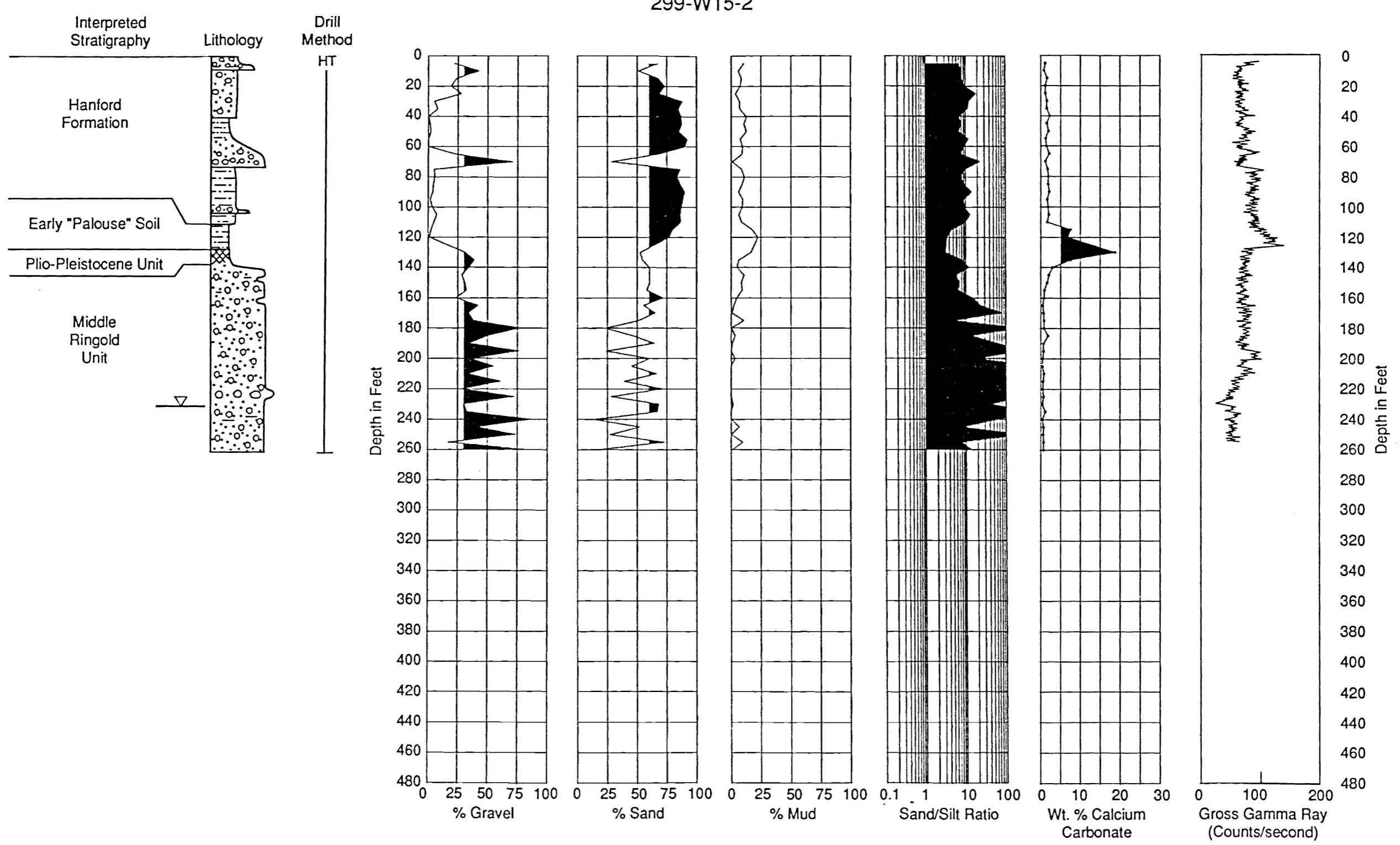
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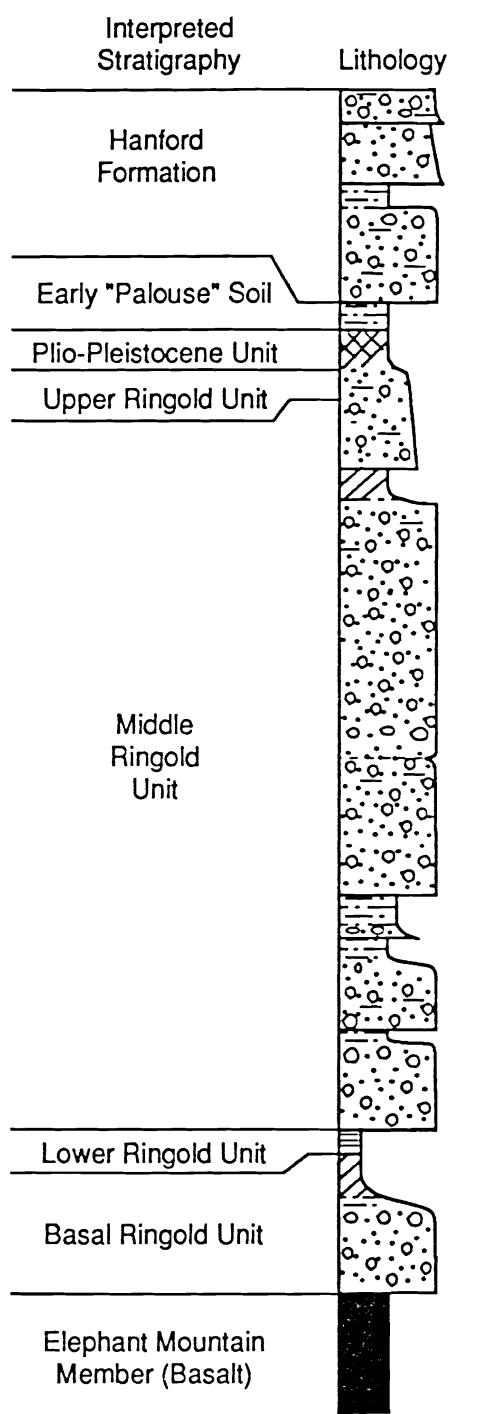
299-W10-14



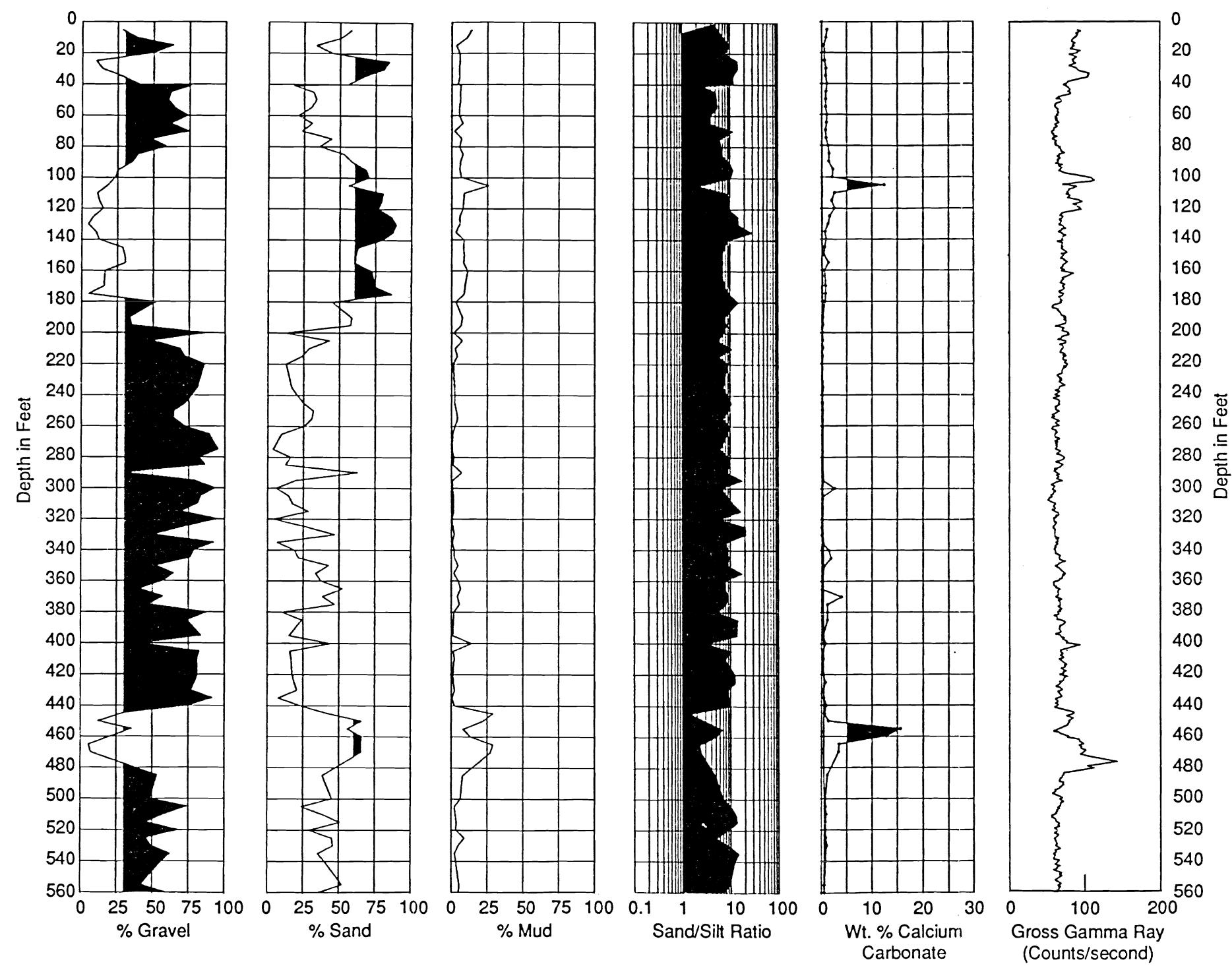
S8912118.3base



S8912118.2base



699-45-78



S8912118.1base

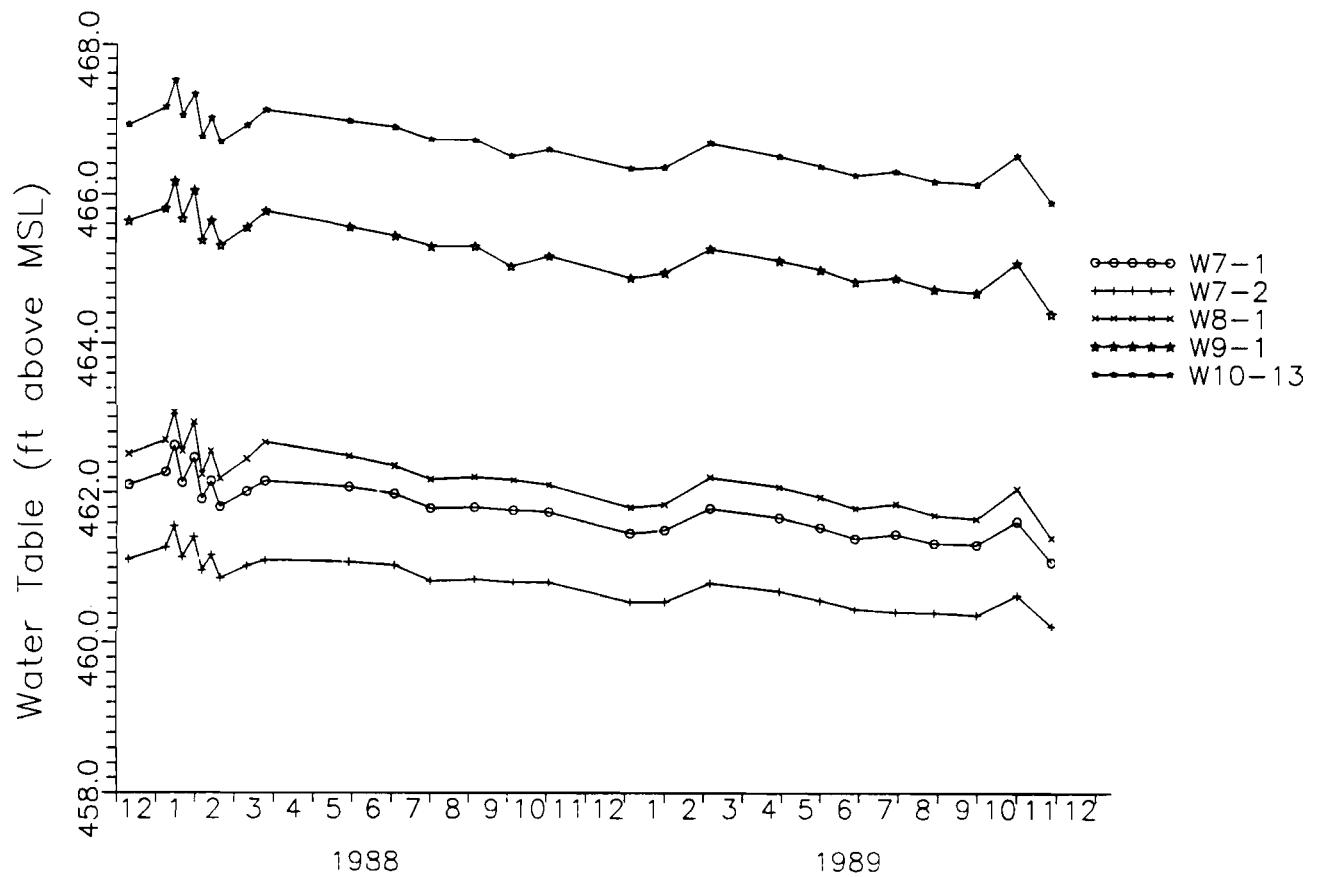
APPENDIX B
HYDROGRAPHS

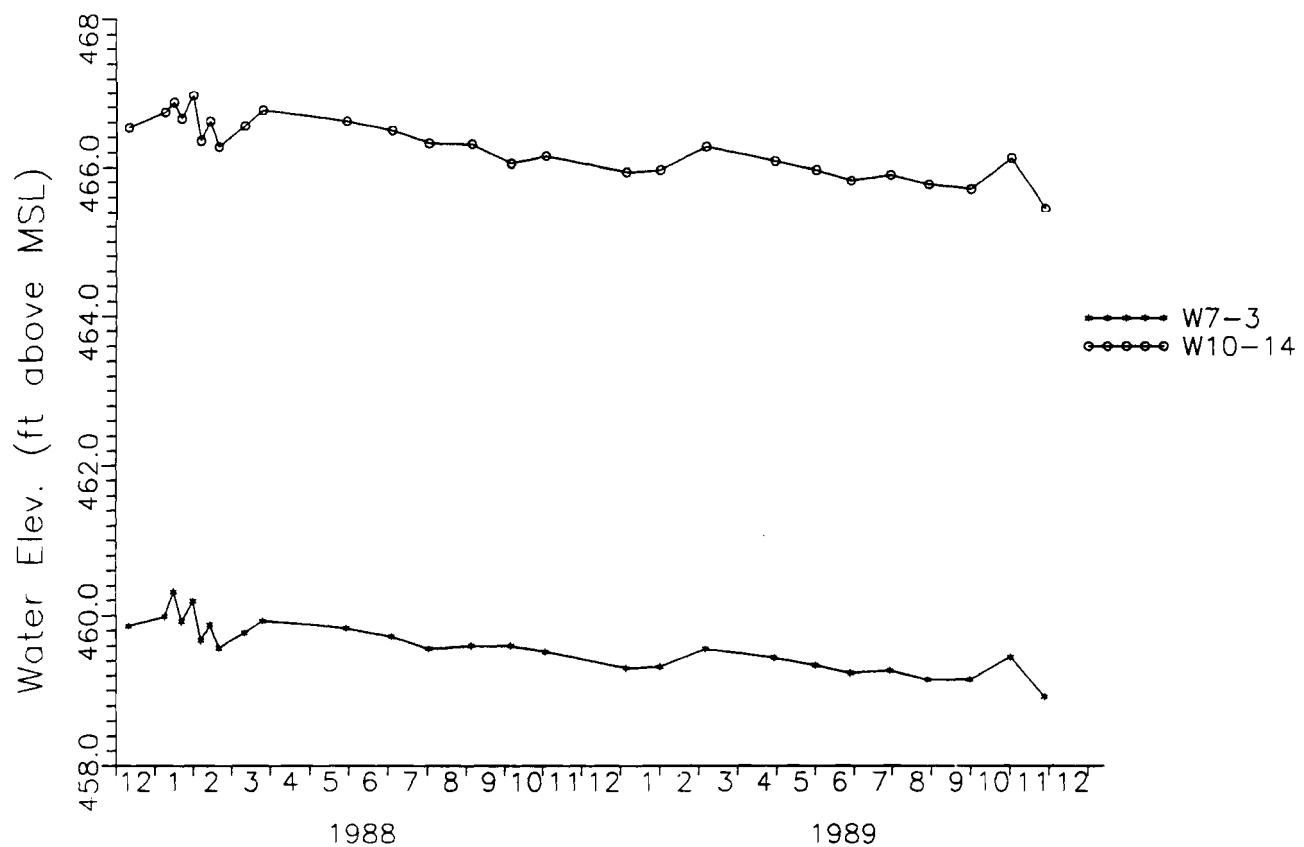
APPENDIX B

HYDROGRAPHS

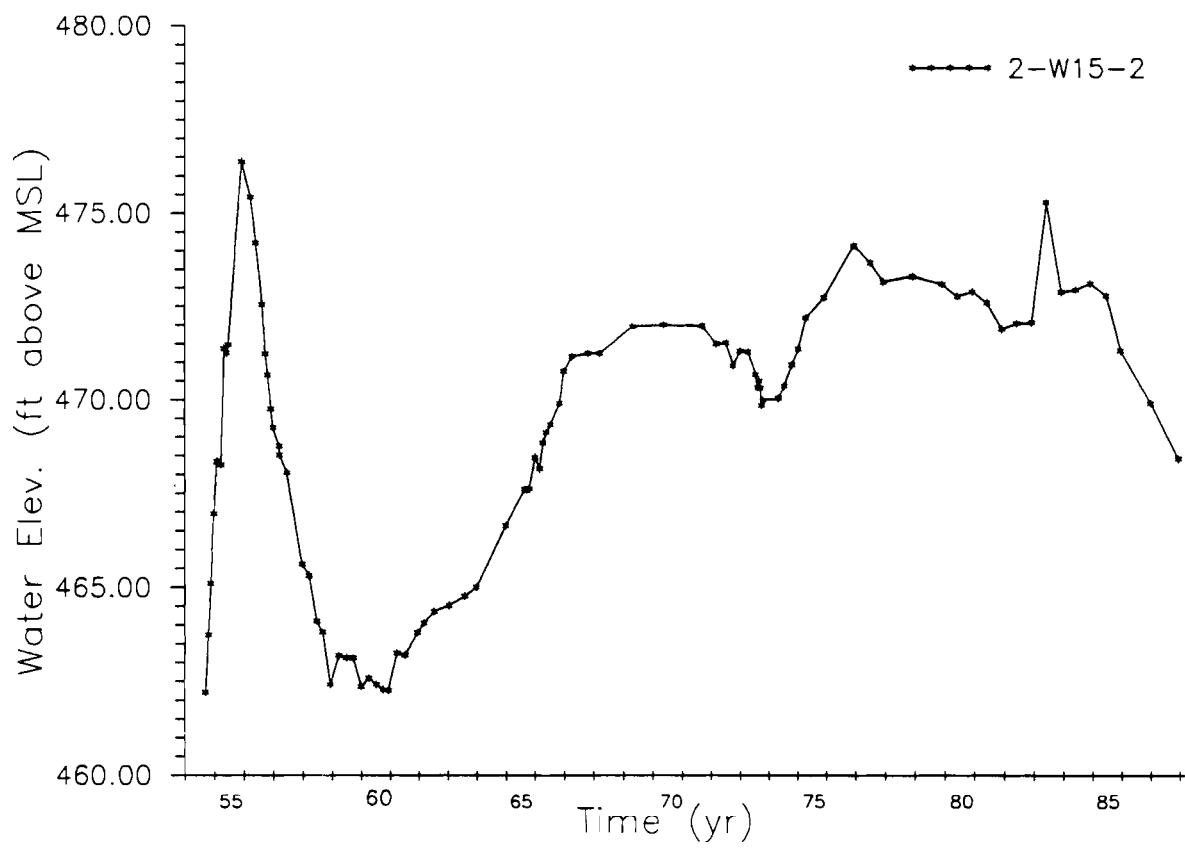
This appendix presents hydrographs from eight wells located within 1000 ft of W5 where water-level measurements have been collected. The first two hydrograph plots are from RCRA wells that penetrate the top (page B.2) and bottom (page B.3) of the unconfined aquifer, respectively. Because RCRA wells are relatively new, there are only about two years of water-level data available.

The last figure (page B.4), on the other hand, is a hydrograph plot from well 299-W15-2, where water levels have been measured over the last 35 years (1954 to present).





B.3



APPENDIX C
PARTICLE-SIZE DISTRIBUTION/CACO₃ ANALYSES

APPENDIX C

PARTICLE-SIZE DISTRIBUTION/CaCO₃ ANALYSES

This appendix presents particle-size and calcium carbonate data available for samples collected from boreholes within 1000 ft of W-5. These data were output from the ROCSAN computer program.

The headings on the output have the following meanings:

% CaCO₃ indicates that calcium carbonate is expressed in weight percent.

DM stands for drill method (H = hard tool; C = drive barrel; S = split barrel).

CLASS indicates the Folk classification symbol, which is an abbreviated form of the grain-size distribution. According to the Fold classification system, M = mud; S = sand; G = gravel; m = muddy; s = sandy; g = gravelly; () = slightly. Using this system, all sediment samples can be described as one of the 19 Folk classification types shown in Figure 7.

The nine grain-size classes (fine peb, vfine peb, very coars, coars, med, fine, very fine, silt, and pan) are expressed in phi units (in parentheses), which correspond respectively to 4.0-, 2.0-, 1.0-, 0.5-, 0.25-, 0.125-, 0.063-, 0.037-, and <0.037-mm sieve openings.

In the table below the headings, the phrases SORT (for sorting), MEDIAN, MODE, and MEAN refer to calculated statistical parameters.

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
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**** REPORT ON WELL 0299-W07-001 ****

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEB (<--2)		VFINE PEB (-1)		VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)		
							WT	N/A	WT	N/A									
5	1.1	C	6.7	29.0	64.3	msG					519.3	68.5	40.5	24.3	41.9	59.3	N/A	53.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	64.3	8.5	5.0	3.0	5.2	7.3	N/A	6.7
SPLIT WT=	807.7						CUM WT %	N/A	CUM WT %	N/A	64.3	72.8	77.8	80.8	86.0	93.3	N/A	100.0	
10	1.3	C	2.1	18.7	79.2	msG					689.7	68.9	52.0	16.0	10.7	14.9	N/A	18.1	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	79.3	7.9	6.0	1.8	1.2	1.7	N/A	2.1
SPLIT WT=	870.2						CUM WT %	N/A	CUM WT %	N/A	79.3	87.2	93.1	95.0	96.2	97.9	N/A	100.0	
15	0.6	H	25.2	42.4	32.4	msG					148.0	53.8	47.3	35.8	32.9	23.5	N/A	114.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	32.4	11.0	10.4	7.9	7.2	5.2	N/A	25.2
SPLIT WT=	456.2						CUM WT I	N/A	CUM WT I	N/A	32.4	44.2	54.6	62.5	69.7	74.8	N/A	100.0	
20	0.9	H	22.3	52.6	25.1	gmS					109.4	92.8	60.4	34.0	25.9	16.1	N/A	97.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	25.1	21.3	13.9	7.8	5.9	3.7	N/A	22.3
SPLIT WT=	436.1						CUM WT I	N/A	CUM WT I	N/A	25.1	46.4	60.2	68.0	74.0	77.7	N/A	100.0	
25	0.8	H	13.6	38.0	48.4	msG					146.5	36.9	27.2	21.5	18.2	11.1	N/A	41.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	48.4	12.2	9.0	7.1	6.0	3.7	N/A	13.6
SPLIT WT=	302.6						CUM WT I	N/A	CUM WT I	N/A	48.4	60.6	69.6	76.7	82.7	86.4	N/A	100.0	
30	0.9	H	17.7	44.0	38.3	msG					148.7	57.4	40.9	28.0	25.8	18.9	N/A	68.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	38.3	14.8	10.5	7.2	6.6	4.9	N/A	17.7
SPLIT WT=	388.5						CUM WT I	N/A	CUM WT I	N/A	38.3	53.0	63.6	70.8	77.4	82.3	N/A	100.0	
35	1.1	H	24.6	38.6	36.8	msG					149.8	50.5	36.3	27.2	25.3	17.8	N/A	99.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	36.8	12.4	8.9	6.7	6.2	4.4	N/A	24.6
SPLIT WT=	406.8						CUM WT %	N/A	CUM WT %	N/A	36.8	49.2	58.2	64.8	71.1	75.4	N/A	100.0	
40	1.3	H	19.6	39.2	41.1	msG					150.5	48.7	33.7	25.6	21.3	14.3	N/A	71.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	41.1	13.3	9.2	7.0	5.8	3.9	N/A	19.6
SPLIT WT=	366.0						CUM WT I	N/A	CUM WT I	N/A	41.1	54.4	63.6	70.6	76.5	80.4	N/A	100.0	
45	1.3	H	19.5	39.7	40.8	msG					150.9	47.5	32.0	26.9	24.4	16.0	N/A	71.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	40.8	12.9	8.7	7.3	6.6	4.3	N/A	19.5
SPLIT WT=	369.7						CUM WT %	N/A	CUM WT %	N/A	40.8	53.7	62.3	69.6	76.2	80.6	N/A	100.0	
50	2.7	H	13.4	53.5	33.1	msG					106.4	50.8	49.4	32.8	24.2	14.9	N/A	43.1	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	33.1	15.8	15.4	10.2	7.5	4.6	N/A	13.4
SPLIT WT=	321.7						CUM WT I	N/A	CUM WT I	N/A	33.1	48.9	64.2	74.4	82.0	86.6	N/A	100.0	
55	2.9	H	12.2	52.3	35.5	msG					141.8	69.3	56.5	39.2	27.8	16.1	N/A	48.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT I	N/A	35.5	17.3	14.1	9.8	7.0	4.0	N/A	12.2
SPLIT WT=	399.6						CUM WT I	N/A	CUM WT I	N/A	35.5	52.8	67.0	76.8	83.7	87.8	N/A	100.0	

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DEPTH	CAC03	DM	MUD	%SAND	%GRAVEL	CLASS	PINE	VFINE	VERY	COMS	MED	FINE	VERY	SILT	PAN		
							(<--2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	(4)	(4.75)	[>4.75]		
60	2.9	H	1.0	54.6	34.9	msG	WT	N/A	130.8	48.9	64.3	48.6	28.6	14.2	N/A	39.3	
SORT-	N/A	MEDIAN-	1.00	HODE-	-1.00	MEAN-	N/A	WT	N/A	34.9	13.1	17.2	13.0	7.6	3.8	N/A	10.5
SPLIT	WT-	374.8					CUM WT	N/A	34.9	48.0	65.1	78.1	85.7	89.5	N/A	100.0	
65	4.4	H	23.3	43.1	33.6	msG	WT	N/A	135.6	53.6	41.2	39.1	24.5	15.3	N/A	93.7	
SORT-	N/A	HEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	33.7	13.3	10.2	9.7	6.1	3.8	N/A	23.3
SPLIT	WT-	403.0					CUM WT	N/A	33.7	47.0	57.2	66.9	73.0	76.8	N/A	100.0	
70	3.7	H	63.2	26.3	10.6	gmS	WT	N/A	35.1	19.6	12.1	9.3	17.5	28.8	N/A	210.1	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT	N/A	10.6	5.9	3.6	2.8	5.3	0.7	N/A	63.2
SPLIT	WT-	332.6					CUM WT	N/A	10.6	16.5	20.1	22.9	28.2	36.8	N/A	100.0	
75	20.8	H	33.9	52.0	14.1	gmS	WT	N/A	45.2	22.7	22.3	24.8	43.3	53.3	N/A	108.6	
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT	N/A	14.1	7.1	7.0	7.8	13.5	16.7	N/A	33.9
SPLIT	WT-	320.3					CUM WT	N/A	14.1	21.2	28.2	35.9	49.4	66.1	N/A	100.0	
80	13.7	H	25.6	59.4	15.0	gmS	WT	N/A	58.4	43.5	59.3	36.1	51.7	41.2	N/A	100.1	
SORT-	N/A	HEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	N/A	15.0	11.2	15.2	9.3	13.3	10.6	N/A	25.7
SPLIT	WT-	390.3					CUM WT	N/A	15.0	26.1	41.3	50.6	63.8	74.4	N/A	100.0	
85	7.7	H	17.3	61.7	21.0	gmS	WT	N/A	80.2	46.6	52.4	47.8	49.4	40.0	N/A	66.3	
SORT-	N/A	HEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	21.0	12.2	13.7	12.5	12.9	10.5	N/A	17.3
SPLIT	WT-	302.7					CUM WT	N/A	21.0	33.1	46.0	59.3	72.2	82.7	N/A	100.0	
90	5.2	H	16.6	77.4	6.0	(gm)S	WT	N/A	21.4	22.8	65.6	79.5	57.7	51.3	N/A	59.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	6.0	6.4	18.3	22.2	16.1	14.3	N/A	16.6
SPLIT	WT-	357.8					CUM WT	N/A	6.0	12.4	30.7	52.9	69.1	83.4	N/A	100.0	
95	5.0	H	15.2	75.8	9.0	(gm)S	WT	N/A	33.2	36.5	75.9	77.5	53.7	37.0	N/A	56.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	9.0	9.9	20.5	20.9	14.5	10.0	N/A	15.2
SPLIT	WT-	370.2					CUM WT	N/A	9.0	18.8	39.3	60.3	74.8	84.0	N/A	100.0	
100	6.5	H	12.0	70.8	9.2	(gm)S	WT	N/A	32.6	45.2	105.3	68.2	37.1	23.6	N/A	42.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	N/A	9.2	12.8	29.7	19.2	10.5	6.7	N/A	12.0
SPLIT	WT-	354.5					CUM WT	N/A	9.2	21.9	51.6	70.9	81.3	90.0	N/A	100.0	
105	3.1	H	13.2	76.1	10.7	(m)gs	WT	N/A	37.0	51.2	107.1	62.1	27.2	15.4	N/A	45.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	N/A	10.7	14.8	31.0	18.0	7.9	4.5	N/A	13.2
SPLIT	WT-	345.7					CUM WT	N/A	10.7	25.5	56.5	74.4	82.3	86.0	N/A	100.0	
110	2.3	H	12.1	83.6	4.3	(m)S	WT	N/A	14.1	23.8	92.1	104.1	38.5	14.8	N/A	39.5	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	4.3	7.3	28.2	31.8	11.8	4.5	N/A	12.1
SPLIT	WT-	326.9					CUM WT	N/A	4.3	11.6	39.8	71.6	83.4	87.9	N/A	100.0	

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DEPTH	%CACO ₃	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<--2)	PEB (-1)	COARS (0)								
115	1.2	H	9.9	88.5	1.6	(m)s	WT	N/A	5.2	9.5	74.0	129.7	51.2	15.8	N/A	31.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.6	3.0	23.4	41.0	16.2	5.0	N/A	9.9
SPLIT	WT-	316.6					CUM WT %	N/A	1.6	4.6	28.0	69.0	85.1	90.1	N/A	100.0	
120	0.8	H	9.4	89.4	1.1	s	WT	N/A	3.8	3.0	56.5	172.6	45.1	19.0	N/A	31.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.2	0.9	17.1	52.1	13.6	5.7	N/A	9.4
SPLIT	WT-	331.2					CUM WT %	N/A	1.2	2.1	19.1	71.2	84.9	90.6	N/A	100.0	
125	0.8	H	4.9	93.4	1.7	s	WT	N/A	4.2	13.0	70.0	111.1	28.9	7.3	N/A	12.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.7	5.3	28.4	45.1	11.7	3.0	N/A	4.9
SPLIT	WT-	246.3					CUM WT %	N/A	1.7	7.0	35.4	80.4	92.2	95.1	N/A	100.0	
130	0.6	C	7.7	80.8	11.5	gs	WT	N/A	92.9	177.9	243.9	121.8	71.1	36.7	N/A	62.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	11.5	22.1	30.3	15.1	8.8	4.6	N/A	7.7
SPLIT	WT-	806.3					CUM WT %	N/A	11.5	33.6	63.8	78.9	87.8	92.3	N/A	100.0	
135	5.5	C	17.7	73.9	8.4	(gm)s	WT	N/A	28.7	31.4	128.6	49.1	28.6	13.8	N/A	60.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	8.4	9.2	37.8	14.4	8.4	4.1	N/A	17.7
SPLIT	WT-	340.3					CUM WT %	N/A	8.4	17.7	55.5	69.9	78.3	82.3	N/A	100.0	
140	1.1	C	5.3	91.9	2.8	s	WT	N/A	20.1	72.3	329.1	187.6	56.9	23.8	N/A	38.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	2.8	9.9	45.2	25.8	7.8	3.3	N/A	5.3
SPLIT	WT-	728.7					CUM WT %	N/A	2.8	12.7	57.9	83.6	91.4	94.7	N/A	100.0	
145	0.5	H	12.4	39.9	47.7	msg	WT	N/A	221.4	43.9	47.5	44.0	31.7	17.9	N/A	57.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	47.8	9.5	10.2	9.5	6.8	3.9	N/A	12.4
SPLIT	WT-	463.8					CUM WT %	N/A	47.8	57.2	67.5	77.0	83.8	87.7	N/A	100.0	
150	0.8	H	19.0	41.0	40.0	msg	WT	N/A	185.9	46.1	46.3	43.0	33.8	21.2	N/A	88.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.0	9.9	10.0	9.3	7.3	4.6	N/A	19.0
SPLIT	WT-	464.6					CUM WT %	N/A	40.0	49.9	59.9	69.1	76.4	81.0	N/A	100.0	
155	0.4	H	15.1	39.8	45.1	msg	WT	N/A	189.3	39.3	41.9	42.4	27.4	16.1	N/A	63.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.1	9.4	10.0	10.1	6.5	3.8	N/A	15.1
SPLIT	WT-	419.6					CUM WT %	N/A	45.1	54.5	64.4	74.5	81.1	84.9	N/A	100.0	
160	0.2	H	21.4	48.0	30.6	msg	WT	N/A	133.1	45.8	47.3	56.8	36.1	23.0	N/A	93.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	30.6	10.5	10.9	13.1	8.3	5.3	N/A	21.4
SPLIT	WT-	435.1					CUM WT %	N/A	30.6	41.1	52.0	65.0	73.3	78.6	N/A	100.0	
165	0.2	H	11.0	35.2	53.0	msg	WT	N/A	197.1	35.6	27.4	30.5	23.8	13.4	N/A	43.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	53.0	9.6	7.4	8.2	6.4	3.6	N/A	11.8
SPLIT	WT-	371.5					CUM WT %	N/A	53.0	62.6	70.0	78.2	84.6	88.2	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

* * * REPORT ON WELL 0299-W07-001 * * *

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	COARS	MED	FINE	VERY	SILT	PAN	
							PEB (<-2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)		
170	0.2	H	20.7	46.1	33.2	msg	WT	N/A	123.8	40.9	44.0	35.6	31.4	20.3	N/A	77.2	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	33.2	11.0	11.8	9.5	0.4	5.4	N/A	20.7
SPLIT WT-	373.2						CUM WT %	N/A	33.2	44.1	55.9	65.5	73.9	79.3	N/A	100.0	
175	0.2	H	15.2	39.2	45.6	msg	WT	N/A	181.1	46.8	34.3	31.0	26.3	17.0	N/A	60.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.6	11.8	8.6	7.8	6.6	4.3	N/A	15.2
SPLIT WT-	396.9						CUM WT %	N/A	45.6	57.4	66.1	73.9	80.5	84.8	N/A	100.0	
180	0.4	H	17.8	37.5	44.7	msg	WT	N/A	224.7	45.6	36.0	39.3	43.4	24.3	N/A	89.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	44.7	9.1	7.2	7.8	8.6	4.8	N/A	17.9
SPLIT WT-	503.2						CUM WT %	N/A	44.7	53.7	60.9	68.7	77.3	82.2	N/A	100.0	
185	0.3	H	20.3	47.4	32.3	msg	WT	N/A	129.5	41.9	33.4	42.7	48.3	23.7	N/A	81.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	32.3	10.5	8.3	10.7	12.0	5.9	N/A	20.3
SPLIT WT-	401.0						CUM WT %	N/A	32.3	42.7	51.1	61.7	73.8	79.7	N/A	100.0	
190	0.3	H	22.7	48.4	28.9	gms	WT	N/A	126.9	44.7	34.6	46.0	52.3	34.9	N/A	99.7	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	WAN-	N/A	WT %	N/A	28.9	10.2	7.9	10.5	11.9	8.0	N/A	22.7
SPLIT WT-	439.1						CUM WT %	N/A	28.9	39.1	47.0	57.4	69.4	77.3	N/A	100.0	
195	0.2	H	20.6	46.5	32.9	msg	WT	N/A	131.2	44.3	29.7	45.2	43.3	22.8	N/A	82.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	32.9	11.1	7.5	11.3	10.9	5.7	N/A	20.6
SPLIT WT-	398.7						CUM WT %	N/A	32.9	44.0	51.5	62.8	73.7	79.4	N/A	100.0	
200	0.3	H	21.0	53.5	25.5	gms	WT	N/A	89.2	46.1	31.4	44.4	44.3	21.1	N/A	73.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.5	13.2	9.0	12.7	12.7	6.0	N/A	21.0
SPLIT WT-	349.7						CUM WT %	N/A	25.5	38.7	47.7	60.4	73.0	79.0	N/A	100.0	
205	0.3	H	23.1	50.0	26.9	gms	WT	N/A	92.0	41.5	28.9	42.9	39.3	18.7	N/A	79.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	26.9	12.1	8.4	12.5	11.5	5.5	N/A	23.1
SPLIT WT-	342.4						CUM WT %	N/A	26.9	39.0	47.4	60.0	71.4	76.9	N/A	100.0	
210	2.6	H	19.9	45.3	34.8	msg	WT	N/A	131.9	45.1	29.7	39.8	38.0	18.9	N/A	75.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	34.8	11.9	7.8	10.5	10.0	5.0	N/A	19.9
SPLIT WT-	378.7						CUM WT %	N/A	34.8	46.7	54.6	65.1	75.1	80.1	N/A	100.0	
215	2.4	H	26.6	51.9	21.5	gms	WT	N/A	89.3	50.8	37.6	47.6	52.7	27.4	N/A	110.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	21.5	12.2	9.0	11.4	12.7	6.6	N/A	26.6
SPLIT WT-	416.5						CUM WT %	N/A	21.5	33.7	42.7	54.1	66.8	73.4	N/A	100.0	
220	1.3	H	23.6	51.1	25.4	gms	WT	N/A	90.4	49.6	33.1	42.3	36.0	20.9	N/A	84.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.4	13.9	9.3	11.9	10.1	5.9	N/A	23.6
SPLIT WT-	356.3						CUM WT %	N/A	25.4	39.3	48.6	60.5	70.6	76.4	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W07-001 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	\SAND	%GRAVEL	CLASS	FINE		WINE	VERY	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY	SILT	PAN
							PEB (<-2)	PEB (-1)	PEB	COARS (0)					FINE (4)	SILT (4.75)	PAN (>4.75)
225	3.9	H	24.0	46.9	29.1	gmS											
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	101.5	41.4	29.5	40.3	35.3	17.3	N/A	04.0
SPLIT WT=	349.4						WT %	N/A	29.1	11.9	0.5	11.5	10.1	5.0	N/A	24.1	
CUM WT %							CUM WT %	N/A	29.1	40.9	49.4	60.9	71.0	76.0	N/A	100.0	
230	2.3	H	19.0	44.4	36.6	msG											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	129.6	42.9	29.4	39.2	30.8	14.7	N/A	67.1
SPLIT WT=	353.6						WT %	N/A	36.6	12.1	8.3	11.1	0.7	4.2	N/A	19.0	
CUM WT Z							CUM WT Z	N/A	36.6	40.0	57.1	60.2	76.9	81.0	N/A	100.0	
235	0.8	H	10.6	45.0	35.6	msG											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	116.2	43.2	25.6	30.9	32.6	17.2	N/A	60.9
SPLIT WT=	326.6						WT %	N/A	35.6	13.2	7.8	9.5	10.0	5.3	N/A	18.7	
CUM WT %							CUM WT %	N/A	35.6	48.8	56.7	66.1	76.1	81.4	N/A	100.0	
240	N/A	H	21.0	46.0	32.2	msG											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	120.9	36.6	31.1	45.9	38.9	23.3	N/A	78.7
SPLIT WT=	375.6						WT %	N/A	32.2	9.8	8.3	12.2	10.4	6.2	N/A	21.0	
CUM WT %							CUM WT %	N/A	32.2	42.0	50.2	62.5	72.8	79.0	N/A	100.0	
245	N/A	H	20.2	60.3	19.4	gmS											
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	N/A	68.8	38.4	29.2	68.4	52.5	25.5	N/A	71.8
SPLIT WT=	354.6						WT %	N/A	19.4	10.8	8.2	19.3	14.8	7.2	N/A	20.3	
CUM WT %							CUM WT %	N/A	19.4	30.2	38.5	57.8	72.6	79.8	N/A	100.0	

**ROCKWELL HANFORD OPERATIONS SIEVE ANALYSIS
ROCKSAN REPORT**

***** REPORT ON WELL 0299-W07-002 *****

07/19/88

DEPTH	%CAC03	DM	MUD	CSAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<--2)	PEB (-1)	COARS (0)								
5	N/A	N/	8.4	36.5	55.1	msG	WT	N/A	346.5	59.2	51.9	34.9	44.4	39.1	N/A	53.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	1.00	MEAN-	N/A			WT %	N/A	55.1	9.4	8.3	5.6	7.1	N/A
SPLIT WT-	629.0						CUM WT	%	N/A	55.1	64.5	72.8	78.3	85.4	91.6	N/A	100.0
10	1.0	N/	15.3	34.2	50.5	msG	WT	N/A	237.3	40.7	45.5	34.0	23.4	17.3	N/A	72.1	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	50.5	8.7	9.7	7.2	5.0	N/A
SPLIT WT-	470.4						CUM WT	4	N/A	50.5	59.1	68.8	76.0	81.0	84.7	N/A	100.0
15	0.5	H	21.3	44.6	34.0	msG	WT	N/A	148.1	57.4	45.4	35.1	30.2	26.2	N/A	92.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	34.0	13.2	10.4	8.1	6.9	N/A
SPLIT WT-	435.2						CUM WT	%	N/A	34.0	47.2	57.7	65.7	72.7	78.7	N/A	100.0
25	2.0	H	23.3	36.9	39.8	msG	WT	N/A	187.6	52.4	39.4	31.5	27.0	23.7	N/A	109.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	39.8	11.1	8.4	6.7	5.7	N/A
SPLIT WT-	471.2						CUM WT	%	N/A	39.8	50.9	59.3	66.0	71.7	76.7	N/A	100.0
30	2.8	H	36.7	53.0	10.3	gms	WT	N/A	35.2	50.8	45.2	36.0	27.5	21.0	N/A	124.9	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A			WT %	N/A	10.3	14.9	13.3	10.6	8.1	N/A
SPLIT WT-	340.6						CUM WT	%	N/A	10.3	25.2	38.5	49.1	57.2	63.3	N/A	100.0
35	3.2	H	38.4	34.7	26.9	gsM	WT	N/A	102.6	42.4	30.4	25.1	18.4	15.9	N/A	146.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A			WT %	N/A	26.9	11.1	8.0	6.6	4.8	N/A
SPLIT WT-	381.4						CUM WT	%	N/A	26.9	38.0	46.0	52.6	57.4	61.6	N/A	100.0
40	4.0	H	70.7	23.3	6.0	(g)sM	WT	N/A	16.1	8.0	6.5	5.1	5.1	37.8	N/A	189.4	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A			WT %	N/A	6.0	3.0	2.4	1.9	1.9	N/A
SPLIT WT-	267.7						CUM WT	%	N/A	6.0	9.0	11.4	13.3	15.2	29.3	N/A	100.0
45	0.9	H	0.4	18.4	73.2	msG	WT	N/A	413.3	29.7	22.2	20.6	17.5	13.6	N/A	47.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	73.2	5.3	3.9	3.7	3.1	N/A
SPLIT WT-	564.3						CUM WT	%	N/A	73.2	78.5	82.4	86.1	89.2	91.6	N/A	100.0
50	27.5	H	28.1	43.2	28.7	gms	WT	N/A	100.4	38.6	38.4	24.8	23.4	26.1	N/A	98.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	28.7	11.0	11.0	7.1	6.7	N/A
SPLIT WT-	350.2						CUM WT	%	N/A	28.7	39.7	50.7	57.7	64.4	71.9	N/A	100.0
55	9.9	H	15.3	37.1	47.7	msG	HT	N/A	194.6	51.2	36.2	28.8	19.0	16.1	N/A	62.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	47.7	12.5	8.9	7.1	4.7	N/A
SPLIT WT-	400.3						CUM WT	4	N/A	47.7	60.2	69.1	76.1	80.8	84.7	N/A	100.0
60	5.3	H	15.5	58.3	26.2	gms	WT	N/A	109.7	53.6	78.7	63.5	30.0	18.4	N/A	65.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			HT %	N/A	26.2	12.8	18.8	15.2	7.2	N/A
SPLIT WT-	415.9						CUM WT	4	N/A	26.2	39.0	57.8	72.9	80.1	84.5	N/A	100.0

**ROCKWELL HANFORD OPERATIONS SIEVE ANALYSIS
ROCKSAN REPORT**

**** REPORT ON WELL 0299-W07-002 ****

07/19/88

DEPTH	%CAC03	DM	%MUD	%SAND	.%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	COARS	MED	FINE	VERY	SILT	PAN	
							(<-2)	(-1)	(0)			(1)	(2)	(3)	(4)	(4.75)	(>4.75)
65	7.0	H	15.9	49.4	34.7	msG	WT	N/A	140.3	49.5	53.9	50.7	26.7	10.9	A	64.2	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	34.7	12.3	13.3	12.5	6.6	4.7	N/A	15.9
SPLIT WT-	404.2						CUM WT %	N/A	34.7	47.0	60.3	72.8	79.4	04.1	N/A	100.0	
70	8.7	H	14.0	69.5	16.5	(m) gS	WT	N/A	61.9	38.4	91.8	71.2	38.2	21.0	N/A	52.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	16.5	10.2	24.5	19.0	10.2	5.6	N/A	14.0
SPLIT WT-	375.1						CUM WT %	N/A	16.5	26.7	51.2	70.2	80.4	86.0	N/A	100.0	
75	6.9	H	9.8	81.9	0.3	(gm) S	WT	N/A	31.4	43.3	142.9	67.7	36.9	19.7	N/A	37.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	8.3	11.4	37.7	17.9	9.7	5.2	N/A	9.8
SPLIT WT-	379.2						CUM WT %	N/A	8.3	19.7	57.4	75.2	85.0	90.2	N/A	100.0	
80	3.2	H	16.6	77.5	5.9	(gm) S	WT	N/A	21.2	26.9	137.6	74.9	24.1	15.3	N/A	59.7	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	5.9	7.5	38.3	20.8	6.7	4.3	N/A	16.6
SPLIT WT-	359.7						CUM WT %	N/A	5.9	13.4	51.6	72.4	79.1	83.4	N/A	100.0	
85	1.6	H	13.3	03.0	2.9	(m) S	WT	N/A	10.7	19.4	139.8	109.6	26.3	15.0	N/A	49.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	2.9	5.2	37.8	29.6	7.1	4.1	N/A	13.3
SPLIT WT-	370.2						CUM WT %	N/A	2.9	0.1	45.9	75.5	82.6	86.7	N/A	100.0	
95	1.4	H	5.0	46.2	47.9	msG	WT	N/A	190.9	13.4	61.6	80.7	18.9	9.5	N/A	23.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	47.9	3.4	15.5	20.3	4.8	2.4	N/A	5.9
SPLIT WT-	390.2						CUM WT %	N/A	47.9	51.3	66.8	87.0	91.8	94.2	N/A	100.0	
100	1.3	H	9.9	73.5	16.6	(m) gS	WT	N/A	57.6	7.8	32.0	154.9	46.5	13.8	N/A	34.5	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	16.6	2.3	9.2	44.6	13.4	4.0	N/A	9.9
SPLIT WT-	347.0						CUM WT %	N/A	16.6	10.8	28.1	72.7	86.1	90.1	N/A	100.0	
105	0.0	H	13.5	30.4	40.0	msG	WT	N/A	226.4	49.8	43.8	43.8	26.0	17.8	N/A	63.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	40.0	10.6	9.3	9.3	5.5	3.8	N/A	13.5
SPLIT WT-	471.4						CUM WT %	N/A	40.0	50.6	67.9	77.2	82.7	86.5	N/A	100.0	
113	0.3	H	13.6	86.2	0.2	(m) S	WT	N/A	0.6	9.0	57.8	147.0	61.5	18.7	N/A	46.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.2	2.6	17.0	43.1	18.0	5.5	N/A	13.6
SPLIT WT-	341.0						CUM WT %	N/A	0.2	2.0	19.8	62.9	80.9	86.4	N/A	100.0	
115	0.8	H	9.5	47.6	42.9	msG	WT	N/A	191.3	46.3	59.2	68.1	24.2	14.6	N/A	42.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	42.9	10.4	13.3	15.3	5.4	3.3	N/A	9.5
SPLIT WT-	446.3						CUM WT %	N/A	42.9	53.3	66.5	81.8	87.2	90.5	N/A	100.0	
120	1.1	H	10.5	51.0	30.5	msG	WT	N/A	132.7	34.0	58.4	71.7	35.9	21.4	N/A	80.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	30.5	0.0	13.4	16.5	8.2	4.9	N/A	18.5
SPLIT WT-	435.6						CUM WT %	N/A	30.5	30.5	51.9	68.3	76.6	81.5	N/A	100.0	

**ROCKWELL HANFORD OPERATIONS SIEVE ANALYSIS
ROCKSAN REPORT**

***** REPORT ON WELL 0299-W07-002 *****

07/19/88

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN
							(<--2)	(-1)	(0)	(1)	(2)	(3)	(4)	(4.75)	(>4.75)
125	1.0	H	10.5	42.7	46.8	msG									
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	189.3	37.5	34.9	54.0	31.1	14.9
SPLIT WT-	404.2						CUM	WT %	N/A	46.8	9.3	8.6	13.4	7.7	3.7
								N/A	46.8	56.1	64.7	78.1	85.8	89.5	N/A
130	1.1	H	14.9	53.0	32.1	msG									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	137.5	34.4	45.3	77.2	46.5	23.5
SPLIT WT-	428.1						CUM	WT %	N/A	32.1	8.0	10.6	18.0	10.9	5.5
								N/A	32.1	40.2	50.8	68.8	79.7	85.1	N/A
135	0.8	H	15.7	41.1	43.3	msG									
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	157.4	32.2	33.2	41.6	25.6	16.8
SPLIT WT-	363.9						CUM	WT %	N/A	43.3	8.9	9.1	11.4	7.0	4.6
								N/A	43.3	52.1	61.2	72.7	79.7	84.3	N/A
140	0.4	H	19.2	40.2	40.6	msG									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	173.4	40.0	38.6	37.4	30.9	24.7
SPLIT WT-	426.7						CUM	WT %	N/A	40.6	9.4	9.0	8.8	7.2	5.8
								N/A	40.6	50.0	59.0	67.8	75.0	80.8	N/A
145	0.4	H	10.3	70.2	19.5	(m) gS									
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	N/A	83.1	74.7	101.1	82.5	26.0	14.7
SPLIT WT-	426.3						CUM	WT %	N/A	19.5	17.5	23.7	19.4	6.1	3.5
								N/A	19.5	37.0	60.8	80.1	86.2	89.7	N/A
150	0.3	H	20.3	49.6	30.1	msG									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	107.2	28.9	44.9	46.1	32.0	24.7
SPLIT WT-	356.0						CUM	WT %	N/A	30.1	8.1	12.6	13.0	9.0	6.9
								N/A	30.1	38.2	50.8	63.8	72.8	79.7	N/A
155	0.2	H	17.0	51.1	31.8	msG									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	153.3	55.8	68.2	51.8	40.8	29.7
SPLIT WT-	481.6						CUM	WT %	N/A	31.8	11.6	14.2	10.8	8.5	6.2
								N/A	31.8	43.4	57.6	68.3	76.8	83.0	N/A
160	0.1	H	16.6	44.2	39.2	msG									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	174.4	42.0	36.9	45.2	39.6	33.3
SPLIT WT-	445.2						CUM	WT %	N/A	39.2	9.4	8.3	10.2	8.9	7.5
								N/A	39.2	48.6	56.9	67.0	75.9	83.4	N/A
165	0.2	H	10.0	35.4	54.6	msG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	221.9	37.0	26.3	39.6	25.9	15.1
SPLIT WT-	406.4						CUM	WT %	N/A	54.6	9.1	6.5	9.7	6.4	3.7
								N/A	54.6	63.7	70.2	79.9	86.3	90.0	N/A
170	0.1	H	20.5	51.9	27.5	gmS									
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	108.2	40.1	39.4	62.6	37.6	24.4
SPLIT WT-	392.9						CUM	WT %	N/A	27.5	10.2	10.0	15.9	9.6	6.2
								N/A	27.5	37.8	47.8	63.7	73.3	79.5	N/A
175	0.2	H	29.2	46.2	24.5	gmS									
SORT-	N/A	HEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	N/A	108.2	40.1	39.4	62.6	37.6	24.4
SPLIT WT-	441.4						CUM	WT %	N/A	24.5	9.1	8.9	14.2	8.5	5.5
								N/A	24.5	33.6	42.5	56.7	65.2	70.8	N/A

**ROCKWELL HANFORD OPERATIONS SIEVE ANALYSIS
ROCKSAN REPORT**

**** REPORT ON WELL 0299-W07-002 ****

07/19/88

DEPTH	%CAC03	DM	%MUD	%SAND	\$GRAVEL	CLASS	FINE	VFINE	VERY	COARS	COARS	MED	FINE	VERY	SILT	PAN	
							PEB (<=2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)		
185	1.6	H	25.5	52.2	22.3	gmS	WT	N/A	66.9	32.9	31.3	44.0	29.3	19.1	N/A	76.5	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	22.3	11.0	10.4	14.7	9.8	6.4	N/A	25.5
SPLIT WT-	300.0						CUM WT %	N/A	22.3	33.3	43.7	58.4	68.1	74.5	N/A	100.0	
190	0.3	H	22.1	58.3	19.6	gmS	WT	N/A	73.7	59.6	46.7	48.5	39.1	25.6	N/A	83.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	19.6	15.8	12.4	12.9	10.4	6.8	N/A	22.1
SPLIT WT-	376.2						CUM WT %	N/A	19.6	35.4	47.8	60.7	71.1	77.9	N/A	100.0	
195	0.6	H	10.7	64.9	24.3	(m)gS	WT	N/A	80.5	40.9	42.0	67.2	38.4	26.2	N/A	35.5	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.3	12.4	12.7	20.3	11.6	7.9	N/A	10.7
SPLIT WT-	334.4						CUM WT %	N/A	24.3	36.7	49.4	69.7	81.3	89.3	N/A	100.0	
210	3.4	H	11.6	63.5	24.9	(m)gS	WT	N/A	77.4	42.5	30.6	57.2	41.0	25.6	N/A	36.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.9	13.7	9.9	18.4	13.2	8.3	N/A	11.6
SPLIT WT-	311.6						CUM WT %	N/A	24.9	38.6	48.5	66.9	80.1	88.4	N/A	100.0	
215	3.5	H	9.2	80.2	10.6	(m)gS	WT	N/A	67.8	135.2	111.9	113.4	93.0	61.1	N/A	59.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	0.00	MEAN-	N/A	WT %	N/A	10.6	21.1	17.5	17.7	14.5	9.5	N/A	9.2
SPLIT WT-	646.8						CUM WT %	N/A	10.6	31.7	49.1	66.8	81.3	90.8	N/A	100.0	
220	3.7	H	7.5	53.3	39.2	msG	WT	N/A	319.2	95.7	76.0	115.8	98.6	47.4	N/A	61.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.2	11.8	9.3	14.2	12.1	5.8	N/A	7.5
SPLIT WT-	814.6						CUM WT %	N/A	39.2	51.0	60.3	74.6	86.7	92.5	N/A	100.0	
225	1.6	H	5.4	64.4	30.2	sG	WT	N/A	212.1	38.7	38.1	260.2	81.7	34.3	N/A	38.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	30.2	5.5	5.4	37.0	11.6	4.9	N/A	5.4
SPLIT WT-	704.7						CUM WT %	N/A	30.2	35.7	41.1	78.1	89.7	94.6	N/A	100.0	
230	0.1	H	2.1	56.9	41.0	sG	WT	N/A	329.4	49.2	57.7	262.2	70.1	17.6	N/A	16.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	41.0	6.1	7.2	32.7	6.7	2.2	N/A	2.1
SPLIT WT-	804.7						CUM WT %	N/A	41.0	47.2	54.3	87.0	95.7	97.9	N/A	100.0	
235	0.3	H	7.3	73.3	19.4	gS	WT	N/A	105.0	39.8	40.5	190.3	87.5	39.3	N/A	39.8	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	19.4	7.3	7.5	35.1	16.1	7.3	N/A	7.3
SPLIT WT-	547.1						CUM WT %	N/A	19.4	26.7	34.2	69.3	85.4	92.7	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W07-003 ****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY	SILT	PAN	
							PEB (<-2)	PEB (-1)	COARS (0)					FINE (4)	(4.75)	(>4.75)	
5	0.8	N/	N/A	12.9	87.1	N/A	WT	N/A	719.9	51.0	39.1	10.3	3.9	2.1	H/A	N/A	
SORT-	N/A	MEDIAN-	-1.00	MODE-	N/A	MEAN-	N/A	WT %	N/A	87.1	6.2	4.7	1.3	0.5	0.3	N/A	N/A
SPLIT WT=	832.3						CUM WT %	N/A	87.1	93.3	98.0	99.3	99.7	100.0	N/A	N/A	
10	0.4	H	14.4	28.1	57.5	msG	WT	N/A	285.2	42.8	30.0	24.9	22.0	19.7	N/A	71.3	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	57.5	8.6	6.1	5.0	4.4	4.0	N/A	14.4
SPLIT WT=	495.8						CUM WT %	N/A	57.5	66.1	72.2	77.2	81.7	85.6	N/A	100.0	
15	0.5	H	16.2	31.5	52.3	msG	WT	N/A	263.2	41.1	37.6	30.2	26.8	22.6	N/A	81.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	52.3	8.2	7.5	6.0	5.3	4.5	N/A	16.2
SPLIT WT=	502.8						CUM WT %	N/A	52.3	60.5	68.0	74.0	79.3	83.8	N/A	100.0	
20	1.7	H	18.4	35.0	46.6	msG	WT	N/A	196.3	40.6	36.0	28.8	23.0	19.0	N/A	77.7	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	46.6	9.6	8.5	6.8	5.5	4.5	N/A	18.4
SPLIT WT=	421.4						CUM WT %	N/A	46.6	56.2	64.8	71.6	77.0	81.6	N/A	100.0	
25	1.5	H	24.7	39.2	36.1	msG	WT	N/A	145.5	44.7	37.3	30.2	23.9	21.6	N/A	99.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	36.2	11.1	9.3	7.5	5.9	5.4	N/A	24.7
SPLIT WT=	402.5						CUM WT %	N/A	36.2	47.3	56.5	64.0	70.0	75.3	N/A	100.0	
30	2.7	H	13.0	22.3	64.7	msG	WT	N/A	291.4	34.0	21.8	18.1	14.4	12.0	N/A	58.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	64.7	7.6	4.8	4.0	3.2	2.7	N/A	13.0
SPLIT WT=	450.2						CUM WT %	N/A	64.7	72.3	77.1	81.2	84.4	87.0	N/A	100.0	
35	1.8	H	58.0	20.4	21.6	gsM	WT	N/A	82.5	18.0	17.2	13.9	11.6	17.3	N/A	221.8	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	21.6	4.7	4.5	3.6	3.0	4.5	N/A	58.0
SPLIT WT=	382.3						CUM WT %	N/A	21.6	26.3	30.8	34.4	37.5	42.0	N/A	100.0	
40	3.2	H	74.3	22.3	3.4	sM	WT	N/A	10.6	3.9	4.0	3.2	5.5	52.4	N/A	229.6	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	3.4	1.3	1.3	1.0	1.8	17.0	N/A	74.3
SPLIT WT=	309.2						CUM WT %	N/A	3.4	4.7	6.0	7.0	8.8	25.7	N/A	100.0	
45	26.1	H	41.8	35.3	23.0	gsM	WT	N/A	61.3	18.7	13.6	12.9	17.0	31.9	N/A	111.4	
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	23.0	7.0	5.1	4.8	6.4	12.0	N/A	41.8
SPLIT WT=	267.0						CUM WT %	N/A	23.0	30.0	35.1	39.9	46.3	58.3	N/A	100.0	
50	13.1	H	20.3	44.7	35.0	msG	WT	N/A	127.5	51.8	44.2	23.4	21.3	21.8	N/A	73.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	35.0	14.2	12.2	6.4	5.9	6.0	N/A	20.3
SPLIT WT=	363.8						CUM WT %	N/A	35.0	49.3	61.4	67.9	73.7	79.7	N/A	100.0	
55	8.7	H	21.2	38.1	40.7	msG	WT	N/A	160.3	56.0	42.4	20.8	16.3	14.8	N/A	83.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.7	14.2	10.8	5.3	4.1	3.8	N/A	21.2
SPLIT WT=	394.1						CUM WT %	N/A	40.7	54.9	65.6	70.9	75.0	78.8	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS **SIEVE** ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W07-003 ****

12/11/89

C.12

DEPTH	%CACO3	IM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN				
							(<--2)	PEB	PEB										
60	4.7	H	21.5	51.0	27.5	gms				WT	N/A	121.4	61.3	57.7	45.2	28.1	32.5	N/A	95.0
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	27.5	13.9	13.1	10.2	6.4	7.4	N/A	21.5	
SPLIT	WT-	441.2					CUM	WT	%	N/A	27.5	41.4	54.5	64.7	71.1	78.5	N/A	100.0	
65	5.2	H	21.9	70.4	7.7	(g)ms				WT	N/A	8.7	10.7	21.8	25.5	10.0	11.7	N/A	24.8
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	%	A	7.7	9.5	19.3	22.5	8.8	10.3	N/A	21.9	
SPLIT	WT-	113.4					CUM	WT	%	N/A	7.7	17.1	36.4	58.9	67.8	78.1	N/A	100.0	
70	2.4	H	15.1	80.0	4.8	(m)s				WT	N/A	17.8	39.7	117.4	81.6	32.4	23.5	N/A	55.7
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT	%	N/A	4.8	10.8	31.9	22.2	8.8	6.4	N/A	15.1	
SPLIT	WT-	368.0					CUM	WT	%	N/A	4.8	15.6	47.5	69.7	78.5	84.9	N/A	100.0	
75	11.1	H	14.8	77.5	7.7	(gm)s				WT	N/A	27.1	38.1	115.2	60.4	31.6	26.3	N/A	51.9
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	%	N/A	7.7	10.9	32.9	17.2	9.0	7.5	N/A	14.8	
SPLIT	WT-	350.6					CUM	WT	%	N/A	7.7	18.6	51.5	68.7	77.7	85.2	N/A	100.0	
85	0.5	H	4.4	77.7	17.9	gs				WT	N/A	68.4	33.5	140.6	93.7	18.7	9.8	N/A	16.6
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	%	N/A	17.9	0.8	36.9	24.6	4.9	2.6	N/A	4.4	
SPLIT	WT-	381.1					CUM	WT	%	N/A	17.9	26.7	63.6	88.2	93.1	95.6	N/A	100.0	
87	N/A	H	0.5	89.3	2.2	s				WT	N/A	7.3	20.9	172.4	66.6	10.9	11.8	N/A	28.3
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	%	N/A	2.2	8.7	51.6	19.9	5.7	3.5	N/A	8.5	
SPLIT	WT-	334.1					CUM	WT	%	N/A	2.2	10.8	62.4	82.4	88.0	91.5	N/A	100.0	
90	0.5	H	4.5	91.7	3.8	s				WT	N/A	12.3	22.1	129.7	106.2	23.5	13.6	N/A	14.5
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT	%	N/A	3.8	6.9	40.3	33.0	7.3	4.2	A	4.5	
SPLIT	WT-	321.9					CUM	WT	%	N/A	3.8	10.7	51.0	84.0	91.3	95.5	N/A	100.0	
95	0.8	H	7.4	92.0	0.6	S				WT	N/A	2.1	4.3	128.3	150.7	24.0	15.0	N/A	25.9
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	%	N/A	0.6	1.2	36.6	43.0	6.9	4.3	N/A	7.4	
SPLIT	WT-	350.3					CUM	WT	%	N/A	0.6	1.8	38.5	81.5	88.3	92.6	N/A	100.0	
105	0.8	H	11.4	49.0	39.6	msg				WT	N/A	146.6	20.6	28.2	85.1	32.3	15.1	N/A	42.0
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	39.6	5.6	7.6	23.0	8.7	4.1	N/A	11.4	
SPLIT	WT-	371.8					CUM	WT	%	N/A	39.6	45.2	52.8	75.8	84.6	88.6	N/A	100.0	
110	24.1	H	38.4	43.9	17.6	gms				WT	N/A	61.6	26.6	24.0	23.3	31.3	48.4	N/A	134.3
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	17.6	7.6	6.9	6.7	9.0	13.9	N/A	38.4	
SPLIT	WT-	349.3					CUM	WT	%	R/A	17.6	25.2	32.1	38.0	47.7	61.6	N/A	100.0	
115	0.4	H	17.2	49.2	33.6	msg				WT	N/A	157.6	78.7	81.7	33.0	21.4	16.1	N/A	80.6
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	33.6	16.8	17.4	7.0	4.6	3.4	N/A	17.2	
SPLIT	WT-	469.1					CUM	WT	%	N/A	33.6	50.4	67.8	74.8	79.4	82.8	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (1)	COARS (2)	MED (2)	FINE (3)	VERY	FINE (4)	SILT (4.75)	PAN (>4.75)
							PEB (<-2)	PEB (-1)	COARS (0)								
120	0.9	H	15.0	57.0	27.2	gmS	WT	N/A	103.5	20.9	39.0	112.0	31.9	15.2	N/A	56.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	27.2	5.5	10.5	29.5	0.4	4.0	A	15.0
SPLIT WT-	300.1						CUM WT %	N/A	27.2	32.7	43.2	72.7	81.0	05.0	N/A	100.0	
125	0.0	H	12.9	40.3	46.0	msG	WT	N/A	190.1	27.4	31.2	52.9	34.3	17.9	N/A	52.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	46.0	6.0	7.7	13.0	0.4	4.4	N/A	12.9
SPLIT WT-	406.2						CUM WT %	N/A	46.0	53.6	61.2	74.3	82.7	07.1	N/A	100.0	
130	0.7	H	12.6	40.9	30.5	msG	WT	N/A	171.3	30.7	36.5	86.4	44.5	19.4	N/A	56.2	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	30.5	6.9	0.2	19.4	10.0	4.4	N/A	12.6
SPLIT WT-	444.9						CUM WT %	N/A	30.5	45.4	53.6	73.0	03.0	07.4	N/A	100.0	
135	0.5	H	16.0	43.0	40.3	msG	WT	N/A	100.4	39.1	40.5	49.8	35.0	22.0	N/A	71.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.3	0.7	10.0	11.1	8.0	5.1	N/A	16.0
SPLIT WT-	447.9						CUM WT %	N/A	40.3	49.0	59.0	71.0	79.0	04.0	N/A	100.0	
140	0.5	H	16.1	34.0	49.1	msG	WT	N/A	220.0	42.4	31.6	32.8	27.4	21.5	N/A	72.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	49.1	9.5	7.1	7.3	6.1	4.0	N/A	16.1
SPLIT WT-	447.9						CUM WT %	N/A	49.1	50.6	65.7	73.0	79.1	03.9	N/A	100.0	
145	0.1	H	10.1	42.6	39.3	msG	WT	N/A	163.0	40.9	45.9	42.6	26.0	21.2	N/A	75.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.3	9.0	11.0	10.2	6.4	5.1	N/A	18.1
SPLIT WT-	416.0						CUM WT %	N/A	39.3	49.1	60.1	70.3	76.0	01.9	N/A	100.0	
150	0.2	H	10.0	43.8	30.2	msG	WT	N/A	162.6	35.2	45.5	49.7	33.1	23.3	N/A	76.7	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	30.2	0.3	10.7	11.7	7.0	5.5	N/A	18.0
SPLIT WT-	425.9						CUM WT %	N/A	30.2	46.4	57.1	68.8	76.5	02.0	N/A	100.0	
155	0.1	H	13.2	41.0	45.0	msG	WT	N/A	203.7	36.2	42.7	40.0	36.9	26.5	N/A	58.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.0	0.1	9.6	9.0	8.3	6.0	N/A	13.2
SPLIT WT-	444.3						CUM WT %	N/A	45.0	54.0	63.6	72.6	00.9	06.0	N/A	100.0	
160	0.1	H	16.6	44.4	39.0	msG	WT	N/A	160.3	33.3	34.6	37.6	41.4	44.7	N/A	71.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.0	7.7	0.0	8.7	9.6	10.4	N/A	16.6
SPLIT WT-	431.3						CUM WT %	N/A	39.0	46.7	54.0	63.5	73.1	03.4	N/A	100.0	
165	0.1	H	19.0	43.9	36.3	msG	WT	N/A	157.0	43.4	34.7	45.9	37.5	29.4	N/A	86.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	36.3	10.0	0.0	10.6	0.6	6.0	N/A	19.8
SPLIT WT-	434.7						CUM WT %	N/A	36.3	46.3	54.3	64.8	73.5	00.2	N/A	100.0	
170	0.1	H	12.0	27.4	60.7	msG	WT	N/A	299.6	29.1	20.1	36.6	24.6	16.7	N/A	59.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	60.7	5.9	5.7	7.4	5.0	3.4	N/A	12.0
SPLIT WT-	493.7						CUM WT %	N/A	60.7	66.6	72.3	79.7	04.7	80.0	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<-2)	PEB (-1)	COARS (0)								
175	0.1	H	19.2	43.0	37.8	msG	WT	N/A	165.9	38.6	38.5	55.2	33.3	22.9	N/A	84.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	37.8	8.8	8.8	12.6	7.6	5.2	N/A	19.2
SPLIT WT-	438.4						CUM WT %	N/A	37.8	46.6	55.4	68.0	75.6	80.8	N/A	100.0	
180	0.1	H	11.0	30.8	58.1	msG	WT	N/A	255.8	24.6	23.8	48.4	23.1	15.7	N/A	48.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	58.1	5.6	5.4	11.0	5.3	3.6	N/A	11.1
SPLIT WT-	440.0						CUM WT %	N/A	58.1	63.7	69.1	80.1	85.4	89.0	N/A	100.0	
215	0.1	H	11.1	59.0	29.9	(m)gs	WT	N/A	200.8	91.5	61.6	89.5	97.5	55.5	N/A	74.4	
SORT-	N/A	MEDIAN-	1.00	NODE-	-1.00	MEAN-	N/A	WT %	N/A	29.9	13.6	9.2	13.3	14.5	8.3	N/A	11.1
SPLIT WT-	673.2						CUM WT %	N/A	29.9	43.6	52.8	66.1	80.6	88.9	N/A	100.0	
220	0.4	H	5.1	32.8	62.1	msG	WT	N/A	489.6	42.9	33.1	65.6	82.8	34.6	N/A	39.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	62.1	5.4	4.2	8.3	10.5	4.4	N/A	5.1
SPLIT WT-	793.2						CUM WT %	N/A	62.1	67.5	71.7	80.1	90.6	94.9	N/A	100.0	
225	0.2	H	10.3	58.7	31.0	msG	WT	N/A	217.6	68.9	50.2	99.6	131.6	62.2	N/A	72.1	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	31.0	9.8	7.2	14.2	18.7	8.9	N/A	10.3
SPLIT WT-	706.3						CUM WT %	N/A	31.0	40.8	48.0	62.1	80.9	89.7	N/A	100.0	
230	0.1	H	1.8	58.8	39.4	sG	WT	N/A	315.9	96.3	63.6	214.1	79.7	17.0	N/A	14.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.5	12.0	7.9	26.7	10.0	2.1	N/A	1.8
SPLIT WT-	802.9						CUM WT %	N/A	39.5	51.5	59.4	86.2	96.1	98.2	N/A	100.0	
235	0.1	H	3.8	92.9	3.2	S	WT	N/A	21.3	34.1	85.8	228.2	208.6	57.3	N/A	25.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	3.2	5.2	13.0	34.5	31.6	8.7	N/A	3.8
SPLIT WT-	661.4						CUM WT %	N/A	3.2	8.4	21.4	55.9	87.5	96.2	N/A	100.0	
240	0.1	H	5.3	66.7	28.0	gS	WT	N/A	155.9	75.9	50.5	142.0	73.5	29.8	N/A	29.7	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	28.0	13.6	9.1	25.5	13.2	5.4	N/A	5.3
SPLIT WT-	560.7						CUM WT %	N/A	28.0	41.6	50.7	76.1	89.3	94.7	N/A	100.0	
245	0.1	H	4.9	61.9	33.1	sG	WT	N/A	174.3	31.4	24.7	134.7	106.4	28.7	N/A	26.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	33.1	6.0	4.7	25.6	20.2	5.5	N/A	4.9
SPLIT WT-	533.3						CUM WT %	N/A	33.1	39.1	43.8	69.4	89.6	95.1	N/A	100.0	
250	0.1	H	4.1	79.0	16.9	gS	WT	N/A	101.0	44.3	31.9	239.1	126.3	30.6	N/A	24.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	16.9	7.4	5.3	40.0	21.1	5.1	N/A	4.1
SPLIT WT-	600.5						CUM WT %	N/A	16.9	24.3	29.7	69.7	90.8	95.9	N/A	100.0	
255	0.1	H	6.2	85.3	8.5	(g)s	WT	N/A	37.4	33.9	32.7	164.2	104.2	38.8	N/A	27.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	8.5	7.7	7.5	37.5	23.8	8.9	N/A	6.2
SPLIT WT-	443.3						CUM WT %	N/A	8.5	16.3	23.7	61.2	84.9	93.8	N/A	100.0	

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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	WINE	VERY	MED	FINE	VERY	SILT	PAN	
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	(2)	(3)	(4)	(4.75)	(>4.75)
260	0.1	H	4.1	95.7	0.2	s									
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	1.1	4.4	26.8	334.6	189.8	39.4
SPLIT WT	623.1						WT %	N/A	0.2	0.7	4.3	53.8	30.5	6.3	H/A 25.6
							CUM WT %	N/A	0.2	0.9	5.2	59.0	89.6	95.9	N/A 4.1
265	0.6	H	1.7	25.8	72.5	gG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	556.8	64.2	30.7	55.7	33.6	14.0
SPLIT WT	770.1						WT %	N/A	72.5	8.4	4.0	7.3	4.4	1.8	N/A 13.4
							CUM WT %	N/A	72.5	80.8	84.8	92.1	96.4	98.3	N/A 1.7
270	0.4	H	2.5	38.2	59.3	gG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	496.5	119.8	59.2	78.0	43.8	19.6
SPLIT WT	840.2						WT %	N/A	59.3	14.3	7.1	9.3	5.2	2.3	N/A 21.0
							CUM WT %	N/A	59.3	73.6	80.6	89.9	95.2	97.5	N/A 2.5
275	1.0	H	2.3	29.8	67.9	gG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	524.9	75.6	34.3	67.9	36.7	15.9
SPLIT WT	774.2						WT %	N/A	67.9	9.0	4.4	8.8	4.8	2.1	N/A 17.5
							CUM WT %	N/A	67.9	77.7	82.1	90.9	95.7	97.7	N/A 2.3
280	1.1	H	11.5	74.2	14.3	(m) gS									
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	82.2	31.4	49.2	158.4	114.6	71.9
SPLIT WT	578.6						WT %	N/A	14.3	5.5	8.6	27.6	20.0	12.5	N/A 66.0
							CUM WT %	N/A	14.3	19.8	28.4	56.0	76.0	88.5	N/A 11.5
285	0.6	H	3.1	30.5	66.4	gG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	553.3	92.0	41.9	59.9	38.6	22.0
SPLIT WT	837.9						WT %	N/A	66.4	11.0	5.0	7.2	4.6	2.6	N/A 26.1
							CUM WT %	N/A	66.4	77.4	82.4	89.6	94.2	96.9	M/A 3.1
290	0.5	H	7.8	55.3	36.9	mgS									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	186.3	45.2	35.2	94.8	66.0	37.8
SPLIT WT	508.0						WT %	N/A	36.9	9.0	7.0	18.8	13.1	7.5	N/A 39.2
							CUM WT %	N/A	36.9	45.9	52.9	71.7	84.7	92.2	N/A 7.8
295	0.4	H	5.0	67.1	27.9	gS									
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	223.8	118.3	89.2	201.8	85.8	42.4
SPLIT WT	808.2						WT %	N/A	27.9	14.8	11.1	25.2	10.7	5.3	N/A 40.1
							CUM WT %	N/A	27.9	42.7	53.8	79.0	89.7	95.0	N/A 5.0
300	0.4	H	6.2	38.8	55.0	mgS									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	345.8	59.3	40.1	70.0	44.8	29.7
SPLIT WT	634.4						WT %	N/A	55.0	9.4	6.4	11.1	7.1	4.7	N/A 38.7
							CUM WT %	N/A	55.0	64.5	70.9	82.0	89.1	93.9	N/A 6.2
305	0.3	H	6.6	71.4	22.0	gS									
SORT-	N/A	MEDIAN-	1.00	MODE-	0.00	MEAN-	N/A	WT	N/A	120.8	121.7	69.2	117.1	56.7	28.0
SPLIT WT	550.4						WT %	N/A	22.0	22.1	12.6	21.3	10.3	5.1	N/A 36.4
							CUM WT %	N/A	22.0	44.1	56.7	78.0	88.3	93.4	N/A 6.6
310	0.2	H	1.8	31.2	66.9	gG									
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	497.1	74.1	41.1	77.0	26.7	12.9
SPLIT WT	750.2						WT %	N/A	66.9	10.0	5.5	10.4	3.6	1.7	N/A 36.4
							CUM WT %	N/A	66.9	76.9	82.5	92.8	96.4	98.2	N/A 1.8
															N/A 100.0

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEE		VFINE PEB	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)	
							(<-2)	(-1)	(-1)	(0)	(1)	(2)	(3)	(4)	(4.75)	(>4.75)	
315	0.2	H	14.5	80.7	4.8	(m) S	WT	N/A	17.3	8.2	7.4	108.0	112.8	55.2	A	52.4	
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	4.8	2.3	2.1	29.9	31.2	15.3	N/A	14.5
SPLIT	WT=	365.9					CUM WT %	N/A	4.8	7.1	9.1	39.0	70.2	85.5	N/A	100.0	
320	0.4	H	1.3	35.9	62.8	sG	WT	N/A	423.3	78.4	22.9	83.7	45.6	11.4	N/A	9.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	62.8	11.6	3.4	12.4	6.8	1.7	N/A	1.3
SPLIT	WT=	679.2					CUM WT %	N/A	62.8	74.4	77.8	90.2	97.0	98.7	N/A	100.0	
325	0.3	H	2.0	39.7	58.3	sG	WT	N/A	416.3	58.8	22.7	120.1	67.2	14.6	N/A	14.3	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	58.3	8.2	3.2	16.8	9.4	2.0	N/A	2.0
SPLIT	WT=	717.3					CUM WT %	N/A	58.3	66.6	69.7	86.6	96.0	98.0	N/A	100.0	
330	0.9	H	5.3	67.6	27.1	gS	WT	N/A	114.1	49.2	32.0	119.2	62.8	21.5	N/A	22.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	27.1	11.7	7.6	28.3	14.9	5.1	N/A	5.3
SPLIT	WT=	421.8					CUM WT %	N/A	27.1	38.8	46.4	74.7	89.6	94.7	N/A	100.0	
335	0.8	H	9.2	72.7	18.1	(m) gS	WT	N/A	73.2	39.4	65.6	97.3	60.2	32.3	N/A	37.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	18.1	9.7	16.2	24.0	14.9	8.0	N/A	9.2
SPLIT	WT=	408.6					CUM WT %	N/A	18.1	27.8	44.0	68.0	82.8	90.8	N/A	100.0	
340	0.4	H	4.6	58.7	36.7	sG	WT	N/A	238.1	94.9	60.4	126.1	70.5	28.7	N/A	29.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	36.7	14.6	9.3	19.5	10.9	4.4	N/A	4.6
SPLIT	WT=	647.2					CUM WT %	N/A	36.7	51.4	60.7	80.1	91.0	95.4	N/A	100.0	
345	0.5	H	4.1	83.6	12.4	gS	WT	N/A	80.3	51.7	62.5	248.0	144.1	35.2	N/A	26.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	12.4	8.0	9.6	38.3	22.2	5.4	N/A	4.1
SPLIT	WT=	651.9					CUM WT %	N/A	12.4	20.4	30.0	68.3	90.5	95.9	N/A	100.0	
350	0.5	H	6.4	68.7	24.8	gS	WT	N/A	131.9	55.1	37.9	152.3	85.6	34.7	N/A	34.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	24.8	10.4	7.1	28.6	16.1	6.5	N/A	6.5
SPLIT	WT=	529.5					CUM WT %	N/A	24.8	35.2	42.3	70.9	87.0	93.6	N/A	100.0	
355	0.6	H	7.5	77.3	15.3	gS	WT	N/A	85.3	74.7	52.1	163.3	100.8	41.2	N/A	41.8	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	15.3	13.4	9.3	29.2	18.0	7.4	N/A	7.5
SPLIT	WT=	557.5					CUM WT %	N/A	15.3	28.6	37.9	67.1	85.2	92.5	N/A	100.0	
360	0.3	H	7.9	82.9	9.2	(g) S	WT	N/A	39.3	32.5	42.5	152.6	92.0	35.7	N/A	34.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	9.2	7.6	9.9	35.6	21.5	8.3	N/A	7.9
SPLIT	WT=	429.0					CUM WT %	N/A	9.2	16.8	26.7	62.3	83.7	92.1	N/A	100.0	
365	0.2	H	7.2	84.8	8.0	(g) S	WT	N/A	38.7	34.0	52.5	205.2	80.4	35.7	N/A	34.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	8.0	7.1	10.9	42.7	16.7	7.4	N/A	7.2
SPLIT	WT=	484.0					CUM WT %	N/A	8.0	15.1	26.0	68.7	85.4	92.0	N/A	100.0	

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**** REPORT ON WELD 0299-W07-003 ****

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS

ROCSAN REPORT

DEPTH	ACACO3 DM % ~ u \$ ~ w a	GRAVEL CLASS	VERY FINE P88	FINE COARDS (1)	FINE (2)	FINE (3)	SILT (4)	PAN (4,75) (4,75)	
385 OZ H 3.4 49.4 D7.2 3G	0.00 MODE= -1.00 MEAN= N/A	WT N/Q	316.1	68.0	42.2	133.4	66.7	20.2 N/A 22.9	
380 OZ H 4.5 71.2 Z7.3 3G	2.00 MODE= 2.00 MEAN= N/Q	WT N/Q	158.3	65.3	45.2	217.2	106.7	28.1 N/A 29.1	
375 OZ H 11.9 84.6 3.5 (m) S	2.00 MODE= 2.00 MEAN= N/A	WT N/Q	16.5	20.0	37.9	151.2	127.2	4.3 N/A 4.5	
SPLIT WT= 469.2	SORT- N/A MEDIAN= 3.00 MODE= 2.00 MEAN= N/A	CUM WT 4	N/A	3.5	4.3	8.1	13.3	55.4 N/Q 111.0	
SPLIT WT= 652.1	SORT- N/A MEDIAN= 4.5 71.2 Z7.3 3G	WT N/Q	101.6	24.4	34.4	41.4	41.4	74.8 91.2 N/Q 100.0	
SPLIT WT= 652.1	SORT- N/A MEDIAN= 4.5 71.2 Z7.3 3G	WT N/Q	17.0	33.4	16.4	4.3	4.3	N/Q 4.5 N/A 100.0	
SPLIT WT= 670.3	SORT- N/A MEDIAN= 0.1 H 8.3 83.7 8.0 (g) S	WT N/Q	41.0	46.5	182.9	111.9	47.8	82.4 91.7 N/Q 100.0	
SPLIT WT= 520.2	SORT- N/A MEDIAN= 0.2 H 4.7 85.2 10.2 gS	WT N/Q	51.2	35.0	38.8	231.6	95.8	27.3 N/A 23.5	
SPLIT WT= 520.2	SORT- N/A MEDIAN= 0.2 H 8.7 88.9 2.4 S	WT N/Q	24.3	30.1	36.2	120.7	97.3	56.0 N/Q 39.7	
SPLIT WT= 409.6	SORT- N/Q MEDIAN= 0.1 H 9.8 84.2 6.0 (gm) S	WT N/Q	6.0	9.0	7.4	120.7	97.3	56.0 N/Q 39.7	
SPLIT WT= 542.4	SORT- N/A MEDIAN= 0.1 H 8.7 88.9 2.4 S	WT N/Q	12.8	47.9	185.2	122.7	62.9	N/A 46.9	
SPLIT WT= 484.4	SORT- N/A MEDIAN= 0.1 H 7.1 80.8 12.2 gS	WT N/A	63.6	40.3	52.6	107.3	67.7	36.1 N/Q 29.8	
SPLIT WT= 405.3	SORT- N/A MEDIAN= 0.1 H 7.5 76.5 16.0 gS	WT N/A	63.6	40.3	52.6	107.3	67.7	36.1 N/Q 29.8	
SPLIT WT= 484.4	SORT- N/A MEDIAN= 0.1 H 7.1 80.8 12.2 gS	WT N/A	58.0	52.5	80.6	137.3	75.7	39.0 N/Q 33.8	
SPLIT WT= 520.9	SORT- N/A MEDIAN= 0.4 H 7.5 84.1 8.5 (g) S	WT N/A	43.7	46.4	60.2	173.3	109.0	44.5 N/Q 38.6	
SPLIT WT= 664.4	SORT- N/Q MEDIAN= 0.2 H 5.3 72.7 22.0 gS	WT N/Q	145.1	132.5	109.0	134.0	68.7	35.1 N/Q 35.0	
SPLIT WT= 100.0	SORT- N/Q MEDIAN= 1.00 MODE= -1.00 MEAN= N/Q	WT N/Q	16.6	20.1	16.6	22.0	10.4	5.3 N/A 5.3	
SPLIT WT= 100.0	SPLIT WT= 100.0	CUM WT 4	N/Q	58.7	42.1	58.7	79.0	89.4	94.7 M/W

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W07-003 *****

12/11/89

DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (1)	MED (2)	FINE (3)	VERY	SILT (4.75)	PAN (>4.75)		
							PEB (<-2)	PEB (-1)	COARS (0)								
455	0.3	H	5.7	68.1	26.2	gS	WT	N/A	168.6	162.2	85.0	95.8	63.6	30.9	N/A	36.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	26.2	25.3	13.2	14.9	9.9	4.8	N/A	5.7
SPLIT WT-	WT	649.0					CUM WT %	N/A	26.2	51.5	64.7	79.6	89.5	94.3	N/A	100.0	
460	0.1	H	5.2	05.3	9.6	(g)s	WT	N/A	65.0	97.2	124.7	197.9	118.9	41.5	N/A	35.1	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	9.6	14.3	18.3	29.1	17.5	6.1	N/A	5.2
SPLIT WT-	WT	604.6					CUM WT %	N/A	9.6	23.8	42.2	71.3	88.7	94.8	N/A	100.0	
465	0.1	H	8.3	90.2	1.5	S	WT	N/A	10.6	57.0	162.5	241.2	136.1	61.1	N/A	60.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.5	7.8	22.3	33.1	18.7	8.4	N/A	8.3
SPLIT WT-	WT	732.8					CUM WT %	N/A	1.5	9.3	31.6	64.6	03.3	91.7	N/A	100.0	
470	0.2	H	5.5	60.8	33.7	sG	WT	N/A	195.2	104.2	82.4	91.2	46.7	28.3	N/A	31.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	33.7	18.0	14.2	15.7	8.1	4.9	N/A	5.5
SPLIT WT-	WT	587.6					CUM WT %	N/A	33.7	51.6	65.9	01.6	89.6	94.5	A	100.0	
475	0.2	H	6.1	84.3	9.6	(g)s	WT	N/A	46.0	80.7	136.9	120.4	51.6	23.6	N/A	30.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	9.6	16.5	27.9	24.6	10.5	4.8	N/A	6.1
SPLIT WT-	WT	497.7					CUM WT %	N/A	9.6	26.0	54.0	78.5	89.1	93.9	N/A	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W07-009 *****

12/05/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY			VERY	SILT	PAN			
							PEB (<=2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
4	4.0	S	39.4	41.8	18.9	gmS	WT	41.8	13.3	12.9	7.8	16.5	43.3	41.7	34.9	80.2	
SORT-	3.24	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT %	14.3	4.5	4.4	2.7	5.6	14.8	14.3	12.0	27.4
SPLIT	WT=	292.2					CUM WT %	14.3	18.9	23.3	25.9	31.6	46.4	60.6	72.6	100.0	
7	2.0	S	3.3	18.5	78.1	msG	WT	551.3	75.4	55.5	51.3	16.9	13.7	11.5	4.9	21.8	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	68.7	9.4	6.9	6.4	2.1	1.7	1.4	0.6	2.7
SPLIT	WT=	800.5					CUM WT %	68.7	78.1	85.0	91.4	93.5	95.2	96.7	97.3	100.0	
12	1.7	C	5.5	34.3	60.2	msG	WT	375.6	103.4	105.2	86.4	36.7	24.5	20.1	8.8	34.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	47.2	13.0	13.2	10.9	4.6	3.1	2.5	1.1	4.4
SPLIT	WT=	795.6					CUM WT %	47.2	60.2	73.4	84.3	88.9	92.0	94.5	95.6	100.0	
15	2.9	C	8.6	27.4	63.9	msG	WT	398.6	44.1	55.8	48.0	31.7	26.3	28.0	12.4	47.5	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	57.6	6.4	8.1	6.9	4.6	3.8	4.1	1.8	6.9
SPLIT	WT=	693.0					CUM WT %	57.6	63.9	72.0	78.9	83.5	87.3	91.3	93.1	100.0	
20	1.0	C	5.7	40.1	54.1	msG	WT	322.1	107.7	125.1	87.2	46.9	34.4	24.9	9.3	36.2	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	40.6	13.6	15.8	11.0	5.9	4.3	3.1	1.2	4.6
SPLIT	WT=	794.0					CUM WT %	40.6	54.2	69.9	80.9	86.8	91.1	94.3	95.5	100.0	
25	1.4	C	11.4	34.5	54.1	msG	WT	323.4	52.7	62.1	55.3	41.9	41.2	39.8	16.0	63.1	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	46.5	7.6	8.9	8.0	6.0	5.9	5.7	2.3	9.1
SPLIT	WT=	694.5					CUM WT %	46.5	54.1	63.0	71.0	77.0	82.9	88.6	90.9	100.0	
30	1.3	C	10.9	49.3	39.9	msG	WT	177.7	63.7	89.7	85.0	49.1	42.0	32.5	13.1	52.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	29.4	10.5	14.8	14.0	8.1	6.9	5.4	2.2	8.7
SPLIT	WT=	605.9					CUM WT %	29.4	39.9	54.7	68.7	76.8	83.8	89.1	91.3	100.0	
35	3.1	C	7.8	35.4	56.8	msG	WT	265.0	51.9	54.1	52.0	36.3	30.4	24.6	10.7	32.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	47.5	9.3	9.7	9.3	6.5	5.5	4.4	1.9	5.9
SPLIT	WT=	557.0					CUM WT %	47.5	56.8	66.5	75.8	82.3	87.8	92.2	94.1	100.0	
40	6.4	C	2.0	33.4	64.6	sG	WT	274.0	126.9	90.8	63.0	28.6	14.8	9.8	3.1	9.3	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	44.2	20.5	14.6	10.2	4.6	2.4	1.6	0.5	1.5
SPLIT	WT=	619.2					CUM WT %	44.2	64.6	79.3	89.4	94.0	96.4	98.0	98.5	100.0	
45	3.0	C	2.3	35.3	62.3	sG	WT	286.2	95.0	62.7	62.1	56.6	22.9	11.9	3.6	10.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	46.8	15.5	10.2	10.2	9.3	3.7	2.0	0.6	1.7
SPLIT	WT=	612.7					CUM WT %	46.8	62.3	72.6	82.7	92.0	95.7	97.7	98.3	100.0	
50	3.0	C	2.1	33.4	64.4	sG	WT	231.8	129.5	55.0	40.6	54.6	26.1	11.0	3.4	8.5	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	41.3	23.1	9.8	7.2	9.7	4.7	2.0	0.6	1.5
SPLIT	WT=	560.0					CUM WT %	41.3	64.4	74.3	81.5	91.2	95.9	97.9	98.5	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W07-009 *****

12/05/89

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEB (<-2)		VFINE PEB (-1)	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
							WT	%	WT	%	WT	%	WT	%	WT	%
55	5.8	C	5.2	37.0	57.8	mgG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	616.8						WT	276.1	81.5	51.4	58.9	56.1	35.9	26.5	9.2	22.8
							WT %	44.7	13.2	8.3	9.5	9.1	5.8	4.3	1.5	3.7
							CUM WT	44.7	57.8	66.1	75.7	84.7	90.5	94.8	96.3	100.0
60	10.1	C	2.2	43.2	54.7	sG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	550.9						WT	154.0	147.8	106.3	75.8	31.3	15.1	9.7	3.3	8.7
							WT %	27.9	26.8	19.3	13.7	5.7	2.7	1.8	0.6	1.6
							CUM WT	27.9	54.7	74.0	87.7	93.4	96.1	97.8	98.4	100.0
65	3.6	C	22.0	67.1	10.9	gmS										
SORT-	2.29	MEDIAN-	3.00	MODE-	4.00	MEAN-	2.42									
SPLIT WT-	547.6						WT	36.7	22.7	30.5	54.5	68.6	72.2	141.7	48.7	71.7
							WT %	6.7	4.1	5.6	10.0	12.5	13.2	25.9	8.9	13.1
							CUM WT	6.7	10.9	16.4	26.4	38.9	52.1	78.0	86.9	100.0
69	2.9	S	72.0	27.9	0.2	sM										
SORT-	0.68	MEDIAN-	4.75	MODE-	5.00	MEAN-	4.34									
SPLIT WT-	388.3						WT	0.0	0.6	0.6	0.0	0.0	6.7	100.5	109.9	168.2
							WT %	0.0	0.2	0.2	0.0	0.0	1.7	26.0	28.4	43.5
							CUM WT	0.0	0.2	0.3	0.3	0.3	2.0	28.0	56.5	100.0
75	25.4	S	5.4	49.4	45.1	sG										
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	431.0						WT	149.1	45.9	43.4	39.1	34.5	50.7	45.8	9.3	14.2
							WT %	34.5	10.6	10.1	9.1	8.0	11.8	10.6	2.2	3.3
							CUM WT	34.5	45.1	55.2	64.2	72.2	84.0	94.6	96.7	100.0
80	34.4	C	14.2	74.2	11.6	(m)gS										
SORT-	2.17	MEDIAN-	3.00	MODE-	3.00	MEAN-	1.86									
SPLIT WT-	519.3						WT	31.9	28.3	41.9	66.2	75.6	116.4	85.7	23.4	50.3
							WT %	6.1	5.5	8.1	12.7	14.6	22.4	16.5	4.5	9.7
							CUM WT	6.1	11.6	19.7	32.4	46.9	69.3	85.8	90.3	100.0
86	0.8	S	3.1	23.3	73.7	msG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	405.6						WT	191.8	107.3	42.6	24.9	13.7	8.0	5.1	1.6	10.8
							WT %	47.2	26.4	10.5	6.1	3.4	2.0	1.3	0.4	2.7
							CUM WT	47.2	73.7	84.2	90.3	93.7	95.7	96.9	97.3	100.0
90	8.7	S	14.0	81.7	4.3	(m)s										
SORT-	1.69	MEDIAN-	2.00	MODE-	2.00	MEAN-	2.08									
SPLIT WT-	173.5						WT	3.1	4.3	7.4	26.8	51.1	28.3	27.6	10.0	14.2
							WT %	1.8	2.5	4.3	15.5	29.6	16.4	16.0	5.8	8.2
							CUM WT	1.8	4.3	8.6	24.1	53.6	70.0	86.0	91.8	100.0
96	22.0	S	35.5	64.3	0.2	mS										
SORT-	1.66	MEDIAN-	4.00	MODE-	5.00	MEAN-	3.17									
SPLIT WT-	150.2						WT	0.0	0.3	0.5	7.4	29.1	34.5	24.4	8.9	44.0
							WT %	0.0	0.2	0.3	5.0	19.5	23.2	16.4	6.0	29.5
							CUM WT	0.0	0.2	0.6	5.5	25.0	48.2	64.5	70.5	100.0
102	14.7	C	3.4	88.8	7.8	(g)s										
SORT-	1.28	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.43									
SPLIT WT-	557.1						WT	32.3	10.6	21.5	139.2	189.8	93.9	45.4	10.7	7.9
							WT %	5.9	1.9	3.9	25.3	34.4	17.0	8.2	2.0	1.4
							CUM WT	5.9	7.8	11.7	36.9	71.4	88.4	96.6	98.6	100.0
106	3.7	C	9.1	90.6	0.3	S										
SORT-	1.25	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.84									
SPLIT WT-	492.1						WT	0.9	0.7	3.2	105.1	223.3	70.6	42.0	12.4	32.3
							WT %	0.2	0.1	0.7	21.4	45.5	14.4	8.6	2.5	6.6
							CUM WT	0.2	0.3	1.0	22.4	67.9	82.3	90.9	93.4	100.0

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W07-009 ****

12/05/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY								
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)		
110	1.5	C	7.4	91.9	0.0	S	WT	1.2	2.7	6.4	136.1	234.0	59.2	32.6	10.4	27.2	
SORT-	1.14	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.60	WT %	0.2	0.5	1.3	26.7	46.0	11.6	6.4	2.0	5.3
SPLIT WT-	511.7						CUM WT %	0.2	0.8	2.0	28.7	74.7	86.3	92.6	94.7	100.0	
114	0.8	S	10.3	89.6	0.1	(m) S	WT	0.0	0.6	1.3	92.3	256.9	74.2	40.9	13.0	40.4	
SORT-	1.19	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.93	WT %	0.0	0.1	0.3	17.8	49.5	14.3	7.9	2.5	7.8
SPLIT WT-	519.9						CUM WT %	0.0	0.1	0.4	18.1	67.6	81.9	89.7	92.2	100.0	
120	1.0	C	6.1	93.3	0.6	S	WT	0.9	2.5	7.4	96.5	288.1	84.4	27.4	8.7	24.4	
SORT-	0.95	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.68	WT %	0.2	0.5	1.4	17.9	53.3	15.6	5.1	1.6	4.5
SPLIT WT-	540.0						CUM WT %	0.2	0.6	2.0	19.9	73.2	88.8	93.9	95.5	100.0	
124	0.7	C	6.5	93.4	0.1	S	WT	0.2	0.2	0.7	44.4	220.6	179.7	41.9	10.5	23.4	
SORT-	0.89	MEDIAN-	2.00	MODE-	2.00	MEAN-	2.04	WT %	0.0	0.0	0.1	8.5	42.3	34.5	8.0	2.0	4.5
SPLIT WT-	521.7						CUM WT %	0.0	0.1	0.2	0.7	51.0	85.5	93.5	95.5	100.0	
130	1.3	C	4.2	03.9	11.8	gS	WT	36.2	44.4	100.3	221.8	167.1	56.3	25.5	7.0	21.7	
SORT-	1.38	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.68	WT %	5.3	6.5	14.8	32.6	24.6	8.3	3.8	1.0	3.2
SPLIT WT-	601.6						CUM WT %	5.3	11.9	26.6	59.2	83.8	92.0	95.8	96.8	100.0	
134	2.2	C	5.2	94.8	0.0	S	WT	0.0	0.1	0.7	29.2	295.6	56.1	18.6	5.7	16.2	
SORT-	0.69	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.75	WT %	0.0	0.0	0.2	6.9	70.0	13.3	4.4	1.4	3.8
SPLIT WT-	421.2						CUM WT %	0.0	0.0	0.2	7.1	77.1	90.4	94.6	96.2	100.0	
138	2.6	C	5.0	94.9	0.1	S	WT	0.0	0.3	0.8	28.3	247.8	94.8	17.0	5.2	15.3	
SORT-	0.77	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.85	WT %	0.0	0.1	0.2	6.9	60.5	23.2	4.2	1.3	3.7
SPLIT WT-	410.2						CUM WT %	0.0	0.1	0.3	7.2	67.7	90.8	95.0	96.3	100.0	
142	2.2	C	0.6	91.3	0.0	S	WT	0.0	0.1	0.4	0.5	222.3	119.1	31.2	9.2	26.9	
SORT-	0.88	MEDIAN-	2.00	MODE-	2.00	MEAN-	2.06	WT %	0.0	0.0	0.1	2.0	53.2	28.5	7.5	2.2	6.4
SPLIT WT-	418.2						CUM WT %	0.0	0.0	0.1	2.1	55.4	83.9	91.4	93.6	100.0	
145	0.8	H	3.7	69.5	26.7	gS	WT	88.6	70.1	70.9	139.3	137.5	46.7	18.5	6.2	16.0	
SORT-	1.92	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.17	WT %	14.9	11.8	11.9	23.5	23.2	7.9	3.1	1.1	2.7
SPLIT WT-	593.4						CUM WT %	14.9	26.7	38.7	62.1	85.3	93.2	96.3	97.3	100.0	
150	1.0	H	1.0	23.0	76.0	gG	WT	433.3	116.3	44.0	56.2	45.8	14.3	6.0	1.8	5.6	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	59.9	16.1	6.1	7.8	6.3	2.0	0.8	0.2	0.8
SPLIT WT-	724.4						CUM WT %	59.9	76.0	82.1	89.9	96.2	98.2	99.0	99.3	100.0	
155	0.7	H	3.3	76.6	20.1	gS	WT	79.1	39.3	47.5	126.7	183.5	68.2	25.2	6.6	12.9	
SORT-	1.94	MEDIAN-	2.00	MODE-	2.00	MEAN-	0.56	WT %	13.4	6.7	8.1	21.5	31.2	11.6	4.3	1.1	2.2
SPLIT WT-	591.1						CUM WT %	13.4	20.1	20.2	49.7	80.8	92.4	96.7	97.8	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W07-009 *****

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (1)	MED (2)	FIRE (3)	VERY	SILT (4.75)	PAN		
							PEB (<--2)	PEB (-1)	COARS (0)						(>4.75)		
160	0.4	H	2.3	37.3	60.4	SG	WT	202.9	81.7	44.3	48.2	56.2	17.9	8.9	2.9	8.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	43.1	17.4	9.4	10.2	11.9	3.8	1.9	0.6	1.7
SPLIT	WT=	472.1					CUM WT %	43.1	60.4	69.8	80.1	92.0	95.8	97.7	98.3	100.0	
165	0.4	H	9.0	66.9	24.1	(m)gs	WT	99.9	94.7	76.2	158.8	153.7	97.8	54.4	31.7	41.3	
SORT-	2.33	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.71	WT %	12.4	11.7	9.4	19.7	19.0	12.1	6.7	3.9	5.1
SPLIT	WT=	810.1					CUM WT %	12.4	24.1	33.5	53.1	72.2	84.3	91.0	94.9	100.0	
170	0.2	H	0.8	9.2	89.9	G	WT	493.9	121.5	30.9	13.1	10.2	5.2	3.8	1.0	4.7	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	72.2	17.8	4.5	1.9	1.5	0.8	0.6	0.2	0.7
SPLIT	WT=	685.7					CUM WT %	72.2	89.9	94.5	96.4	97.8	98.6	99.2	99.3	100.0	
175	0.0	H	1.9	38.4	59.7	SG	WT	270.1	177.2	121.3	90.3	51.9	15.3	8.9	3.4	10.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	36.1	23.7	16.2	12.1	6.9	2.0	1.2	0.5	1.4
SPLIT	WT=	750.4					CUM WT %	36.1	59.7	75.9	88.0	94.9	96.9	98.1	98.6	100.0	
180	0.1	H	2.3	43.8	53.8	SG	WT	286.3	144.3	87.5	57.6	99.2	79.5	26.7	6.0	12.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	35.8	18.0	10.9	7.2	12.4	9.9	3.3	0.8	1.6
SPLIT	WT=	802.0					CUM WT %	35.8	53.8	64.8	72.0	84.4	94.3	97.7	98.4	100.0	
185	0.3	H	2.6	37.1	60.3	SG	WT	301.8	123.7	73.6	46.7	51.2	58.3	31.8	7.2	11.2	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	42.8	17.5	10.4	6.6	7.3	8.3	4.5	1.0	1.6
SPLIT	WT=	706.2					CUM WT %	42.8	60.3	70.8	77.4	84.6	92.9	97.4	98.4	100.0	
190	0.2	H	2.8	61.1	36.1	SG	WT	104.2	111.7	143.1	91.2	64.4	48.2	18.2	4.6	12.1	
SORT-	N/A	MEDIAN-	0.00	MODE-	0.00	MEAN-	N/A	WT %	17.4	18.7	24.0	15.3	10.8	8.1	3.1	0.8	2.0
SPLIT	WT=	598.9					CUM WT %	17.4	36.1	60.1	75.3	86.1	94.2	97.2	98.0	100.0	
195	0.3	H	1.8	51.4	46.7	SG	WT	273.0	62.7	69.7	73.0	106.2	100.2	21.0	3.9	9.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	38.0	8.7	9.7	10.1	14.8	13.9	2.9	0.5	1.3
SPLIT	WT=	722.1					CUM WT %	38.0	46.8	56.4	66.6	81.3	95.3	98.2	98.7	100.0	
200	0.2	H	2.3	32.5	65.2	SG	WT	368.5	202.9	104.4	53.8	64.1	45.2	17.3	5.4	15.2	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	42.0	23.1	11.9	6.1	7.3	5.2	2.0	0.6	1.7
SPLIT	WT=	878.6					CUM WT %	42.0	65.2	77.1	83.2	90.5	95.7	97.7	98.3	100.0	
205	3.0	H	3.6	29.5	66.9	msg	WT	265.0	255.6	99.7	44.2	38.9	28.1	18.4	7.3	20.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	34.1	32.9	12.8	5.7	5.0	3.6	2.4	0.9	2.7
SPLIT	WT=	779.7					CUM WT %	34.1	66.9	79.7	85.4	90.4	94.0	96.4	97.3	100.0	
210	0.8	H	2.8	43.8	53.4	SG	WT	236.7	151.3	89.8	77.2	94.6	41.1	15.5	4.5	15.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	32.6	20.8	12.4	10.6	13.0	5.7	2.1	0.6	2.2
SPLIT	WT=	728.3					CUM WT %	32.6	53.4	65.8	76.4	89.4	95.1	97.2	97.8	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W07-009 ****

12/05/89

DEPTH	%CACO3	DM	%MUD	%SAND	OGRAVEL	CLASS	FINE	VFINE	VERY			VERY					
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	SILT (4.75)	PAN (>4.75)		
215	0.7	H	3.2	58.8	38.1	sG	WT	61.4	204.8	162.3	111.1	77.0	41.2	19.3	6.3	15.9	
SORT-	1.68	MEDIAN-	0.00	MODE-	-1.00	MEAN-	WT %	8.8	29.3	23.2	15.9	11.0	5.9	2.8	0.9	2.3	
SPLIT WT-	699.6						CUM WT %	8.8	38.1	61.3	77.2	88.2	94.1	96.8	97.7	100.0	
220	1.9	H	2.4	42.7	54.8	sG	WT	454.6	26.6	70.0	65.0	65.0	118.1	56.8	9.6	11.9	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	51.8	3.0	8.0	7.4	7.4	13.5	6.5	1.1	1.4
SPLIT WT-	879.1						CUM WT %	51.8	54.8	62.8	70.2	77.6	91.1	97.6	98.7	100.0	
225	1.7	H	2.1	44.0	53.9	sG	WT	252.3	167.1	106.6	66.5	90.7	59.3	19.1	4.4	11.7	
SORT-	M/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	32.4	21.5	13.7	0.5	11.7	7.6	2.5	0.6	1.5
SPLIT WT-	780.0						CUM WT %	32.4	53.9	67.6	76.2	87.8	95.5	97.9	98.5	100.0	
230	1.1	H	2.4	48.3	49.3	sG	WT	223.3	181.3	114.6	93.1	117.2	53.8	17.7	5.0	14.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	27.2	22.1	14.0	11.3	14.3	6.6	2.2	0.6	1.8
SPLIT WT-	821.8						CUM WT %	27.2	49.3	63.3	74.6	88.9	95.5	97.6	98.2	100.0	
235	0.8	H	2.7	60.5	36.8	sG	WT	215.1	87.3	97.2	101.1	135.8	117.4	45.6	11.1	10.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A	WT %	26.2	10.6	11.8	12.3	16.5	14.3	5.6	1.4	1.3
SPLIT WT-	819.9						CUM WT %	26.2	36.8	48.7	61.0	77.5	91.8	97.4	98.7	100.0	
240	5.4	H	2.0	36.1	61.9	sG	WT	436.9	41.4	68.8	71.0	86.5	37.3	14.9	4.0	11.4	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	56.6	5.4	8.9	9.2	11.2	4.8	1.9	0.5	1.5
SPLIT WT-	757.9						CUM WT %	56.6	62.0	70.9	80.1	91.3	96.1	98.0	98.5	100.0	
244	0.6	H	1.0	35.5	63.4	sG	WT	451.4	81.0	69.0	62.6	118.2	39.5	8.9	2.1	6.6	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	53.8	9.7	8.2	7.5	14.1	4.7	1.1	0.3	0.8
SPLIT WT-	840.3						CUM WT %	53.8	63.4	71.7	79.1	93.2	97.9	99.0	99.2	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W08-001 *****

12/11/89

DEPTH	%CACO3	IM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEB		WINE PEB	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)	
							(<-2)	(-1)	(-1)	(0)	(1)	(2)	(3)	(4)	(4.75)	(>4.75)	
5	1.3	H	18.8	43.0	38.2	msg	WT	N/A	156.7	37.9	34.1	24.4	47.3	32.4	M/A	77.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	38.2	9.3	8.3	6.0	11.5	7.9	N/A	18.8
SPLIT	WT=	409.8					CUM WT	I	N/A	38.2	47.5	55.8	61.8	73.3	81.2	N/A	100.0
10	0.8	H	17.9	41.4	40.8	msg	WT	N/A	167.2	46.8	44.1	24.0	31.5	23.2	N/A	73.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.8	11.4	10.8	5.9	7.7	5.7	N/A	17.9
SPLIT	WT=	410.0					CUM WT	I	N/A	40.8	52.2	63.0	68.8	76.5	82.1	N/A	100.0
15	0.5	H	21.7	41.3	37.0	msg	WT	N/A	149.6	56.1	41.8	25.5	24.6	18.9	N/A	87.7	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	37.0	13.9	10.3	6.3	6.1	4.7	N/A	21.7
SPLIT	WT=	404.2					CUM WT	I	N/A	37.0	50.9	61.2	67.5	73.6	78.3	N/A	100.0
20	0.6	H	21.6	37.4	41.0	msg	WT	N/A	219.9	64.2	48.0	33.4	31.3	23.3	N/A	115.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	41.1	12.0	9.0	6.2	5.8	4.4	N/A	21.6
SPLIT	WT=	535.7					CUM WT	I	N/A	41.1	53.0	62.0	68.2	74.1	78.4	N/A	100.0
25	1.2	H	18.6	40.6	40.9	msg	WT	N/A	108.9	35.5	28.9	17.5	15.4	10.8	N/A	49.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.9	13.3	10.8	6.6	5.8	4.1	H/A	18.6
SPLIT	WT=	266.4					CUM WT	I	N/A	40.9	54.2	65.0	71.6	77.4	81.4	N/A	100.0
30	1.	H	30.1	28.9	40.9	mg	WT	N/A	143.7	40.4	N/A	22.7	21.8	16.7	N/A	105.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.9	11.5	N/A	6.5	6.2	4.8	N/A	30.1
SPLIT	WT=	351.1					CUM WT	I	N/A	40.9	52.4	N/A	58.9	65.1	69.9	N/A	100.0
35	0.6	H	17.3	37.0	45.7	msg	WT	N/A	142.6	34.7	27.3	19.7	19.5	14.4	N/A	53.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.1	11.1	8.8	6.3	6.3	4.6	N/A	17.3
SPLIT	WT=	312.1					CUM WT	I	N/A	45.7	56.8	65.6	71.9	78.1	82.7	N/A	100.0
40	0.6	H	20.5	37.3	42.1	msg	WT	N/A	208.3	55.7	42.9	31.7	30.7	23.5	N/A	101.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	42.2	11.3	8.7	6.4	6.2	4.8	N/A	20.5
SPLIT	WT=	494.1					CUM WT	I	N/A	42.2	53.4	62.1	68.5	74.7	79.5	N/A	100.0
45	0.8	H	20.8	37.2	42.1	msg	WT	N/A	186.2	50.0	38.1	27.9	27.4	21.2	N/A	92.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	42.1	11.3	8.6	6.3	6.2	4.8	N/A	20.8
SPLIT	WT=	442.8					CUM WT	I	N/A	42.1	53.3	61.9	68.2	74.4	79.2	N/A	100.0
50	0.9	H	24.8	40.5	34.7	msg	WT	N/A	157.2	52.8	42.3	32.4	31.6	23.9	N/A	112.2	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	34.8	11.7	9.4	7.2	7.0	5.3	N/A	24.8
SPLIT	WT=	452.5					CUM WT	I	N/A	34.8	46.4	55.8	62.9	69.9	75.2	N/A	100.0
55	1.	H	19.8	33.2	47.1	msg	WT	N/A	215.1	51.1	35.1	24.8	23.1	17.4	N/A	90.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	47.1	11.2	7.7	5.4	5.1	3.8	N/A	19.8
SPLIT	WT=	457.0					CUM WT	I	N/A	47.1	58.3	65.9	71.4	76.4	80.2	N/A	100.0

WESTINGLIOUSE HANFORD OPERATIONS SIEVE ANALYSIS
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**** REPORT ON WELL 0299-W08-001 ****

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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	WINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)		
60	1.3	H	25.3	39.0	35.7	msg	WT	N/A	158.1	59.3	40.6	28.5	25.2	19.2	N/A	111.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	35.7	13.4	9.2	6.4	5.7	4.3	N/A	25.3
SPLIT WT-	442.8						CUM WT %	N/A	35.7	49.1	58.3	64.7	70.4	74.7	N/A	100.0	
65	1.4	H	24.8	39.8	35.4	msg	WT	N/A	157.6	55.8	41.2	30.9	28.0	21.0	N/A	110.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN*	N/A	WT %	N/A	35.5	12.6	9.3	7.0	6.3	4.7	H/A	24.8
SPLIT WT-	444.5						CUM WT %	N/A	35.5	48.0	57.3	64.2	70.5	75.2	N/A	100.0	
70	1.5	H	19.7	38.7	41.6	msg	WT	N/A	187.0	60.6	40.4	29.7	25.4	18.1	N/A	88.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	41.6	13.5	9.0	6.6	5.7	4.0	A	19.7
SPLIT WT-	449.7						CUM WT %	N/A	41.6	55.1	64.1	70.7	76.3	80.4	N/A	100.0	
75	2.6	H	25.0	33.2	41.9	msg	WT	N/A	185.5	58.2	16.2	31.6	24.9	15.9	N/A	110.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	41.9	13.1	3.7	7.1	5.6	3.6	H/A	25.0
SPLIT WT-	442.9						CUM WT %	N/A	41.9	55.0	58.7	65.8	71.5	75.0	N/A	100.0	
80	5.0	H	52.8	26.4	20.8	gsm	WT	N/A	75.0	28.7	16.8	12.5	17.5	20.0	N/A	190.8	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	20.8	7.9	4.7	3.5	4.8	5.5	H/A	52.8
SPLIT WT-	361.4						CUM WT %	N/A	20.8	28.7	33.4	36.8	41.7	47.2	N/A	100.0	
86	3.8	H	76.9	15.5	7.6	(g)M	WT	N/A	23.8	8.8	5.1	4.6	11.4	18.8	N/A	241.1	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	7.6	2.8	1.6	1.5	3.6	6.0	H/A	76.9
SPLIT WT-	313.5						CUM WT %	N/A	7.6	10.4	12.0	13.5	17.1	23.1	N/A	100.0	
91	20.8	H	39.6	26.4	34.1	mg	WT	N/A	124.2	15.8	10.6	10.9	23.4	35.4	N/A	144.4	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	34.1	4.3	2.9	3.0	6.4	9.7	N/A	39.6
SPLIT WT-	364.7						CUM WT %	N/A	34.1	38.4	41.3	44.3	50.7	60.4	N/A	100.0	
95	21.1	H	26.0	41.9	30.2	msg	WT	N/A	126.7	41.8	29.6	32.7	40.0	31.8	N/A	117.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	30.2	10.0	7.0	7.8	9.5	7.6	N/A	28.0
SPLIT WT-	420.3						CUM WT %	N/A	30.2	40.1	47.1	54.9	64.4	72.0	N/A	100.0	
100	12.9	H	21.6	36.4	42.0	msg	WT	N/A	179.1	57.5	32.8	20.4	26.1	18.4	N/A	92.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	42.0	13.5	7.1	4.8	6.1	4.3	N/A	21.6
SPLIT WT-	426.2						CUM WT %	N/A	42.0	55.5	63.2	68.0	74.1	78.4	N/A	100.0	
105	8.4	H	29.5	51.2	19.4	gms	WT	N/A	79.9	37.8	46.0	49.5	38.8	39.1	N/A	121.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	19.4	9.2	11.2	12.0	9.4	9.5	N/A	29.5
SPLIT WT-	412.8						CUM WT %	N/A	19.4	28.5	39.7	51.7	61.1	70.5	N/A	100.0	
110	9.1	H	38.0	56.1	5.9	(g)mS	WT	N/A	21.9	21.8	42.3	51.3	48.1	44.1	N/A	140.8	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	5.9	5.9	11.4	13.9	13.0	11.9	N/A	38.0
SPLIT WT-	370.2						CUM WT %	N/A	5.9	11.8	23.2	37.1	50.1	62.0	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	OSAND	%GRAVEL	CLASS	FINE PEB (<--2)		VFINE PEB (-1)		VERY COARS (0)		COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
							WT	N/A	WT %	N/A	WT %	N/A	CUM WT %	N/A	CUM WT %	N/A	CUM WT %	N/A
115	13.2	H	30.0	60.0	10.0	gmS												
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT	N/A	33.9	22.6	41.7	55.3	44.1	40.0	N/A	102.0	
SPLIT WT	339.6						WT %	N/A	10.0	6.7	12.3	16.3	13.0	11.8	N/A	30.0		
							CUM WT %	N/A	10.0	16.6	28.9	45.2	58.2	70.0	N/A	100.0		
120	5.1	H	18.8	76.8	4.4	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	15.0	13.4	58.7	115.2	48.4	25.9	N/A	64.1	
SPLIT WT	340.8						WT %	N/A	4.4	3.9	17.2	33.8	14.2	7.6	N/A	18.8		
							CUM WT %	N/A	4.4	8.3	25.6	59.4	73.6	81.2	N/A	100.0		
125	2.9	H	12.8	86.2	1.0	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	3.7	14.5	112.0	130.4	45.0	19.7	N/A	47.7	
SPLIT WT	373.1						WT %	N/A	1.0	3.9	30.0	35.0	12.1	5.3	N/A	12.8		
							CUM WT %	N/A	1.0	4.9	34.9	69.9	81.9	87.2	N/A	100.0		
130	2.7	H	16.2	82.9	0.9	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	3.2	8.1	67.5	160.3	49.2	20.7	N/A	59.8	
SPLIT WT	369.0						WT %	N/A	0.9	2.2	18.3	43.5	13.3	5.6	N/A	16.2		
							CUM WT %	N/A	0.9	3.1	21.4	64.8	78.2	83.8	N/A	100.0		
135	1.7	H	9.3	89.8	0.8	S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	3.4	1.8	36.5	208.6	95.7	18.5	N/A	37.5	
SPLIT WT	401.9						WT %	N/A	0.9	0.5	9.1	51.9	23.8	4.6	N/A	9.3		
							CUM WT %	N/A	0.9	1.3	10.4	62.3	86.1	90.7	N/A	100.0		
140	1.6	H	15.9	84.1	0.0	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	0.0	2.0	54.2	179.6	63.2	17.2	N/A	59.6	
SPLIT WT	375.7						WT %	N/A	0.0	0.5	14.4	47.8	16.8	4.6	N/A	15.9		
							CUM WT %	N/A	0.0	0.5	15.0	62.7	79.6	84.1	N/A	100.0		
145	1.3	H	14.4	03.4	2.2	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	9.5	17.2	85.4	172.4	59.4	18.5	N/A	60.0	
SPLIT WT	423.2						WT %	N/A	2.2	4.1	20.2	40.7	14.0	4.4	N/A	14.4		
							CUM WT %	N/A	2.2	6.3	26.5	67.2	81.3	85.6	N/A	100.0		
150	1.7	H	19.7	79.1	1.2	(m) S												
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	4.7	6.4	37.3	155.5	79.3	19.8	N/A	74.2	
SPLIT WT	377.3						WT %	N/A	1.3	1.7	9.9	41.2	21.0	5.3	N/A	19.7		
							CUM WT %	N/A	1.3	3.0	12.8	54.1	75.1	80.3	N/A	100.0		
155	1.1	H	16.1	50.7	33.2	mgS												
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	157.0	37.3	68.1	74.5	41.0	19.0	N/A	76.4	
SPLIT WT	473.4						WT %	N/A	33.2	7.9	14.4	15.7	8.7	4.0	N/A	16.1		
							CUM WT %	N/A	33.2	41.1	55.4	71.2	79.8	83.9	N/A	100.0		
160	0.8	H	18.2	47.2	34.6	mgS												
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	160.8	47.7	61.7	52.2	36.6	21.0	N/A	84.3	
SPLIT WT	464.3						WT %	N/A	34.6	10.3	13.3	11.2	7.9	4.5	N/A	18.2		
							CUM WT %	N/A	34.6	44.9	58.2	69.4	77.3	81.0	N/A	100.0		
165	0.7	H	16.0	47.5	36.5	mgS												
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	177.3	44.3	66.6	65.2	35.1	19.7	N/A	77.6	
SPLIT WT	485.8						WT %	N/A	36.5	9.1	13.7	13.4	7.2	4.1	N/A	16.0		
							CUM WT %	N/A	36.5	45.6	59.3	72.0	80.0	84.0	N/A	100.0		

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***** REPORT ON WELL 0299-WOO-001 *****

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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY			VERY	SILT	PAN			
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
170	0.4	H	16.1	40.2	43.7	msg	WT N/A	198.5	42.5	51.1	42.1	29.5	17.3	N/A	73.0		
SORT-	N/A	MEDIAN-	0.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	43.7	9.4	11.3	9.3	6.5	3.8	N/A	16.1
SPLIT	WT-	454.0					CUM WT %	N/A	43.7	53.1	64.3	73.6	80.1	83.9	N/A	100.0	
175	0.2	H	16.5	35.5	48.0	msg	WT N/A	225.2	45.6	37.6	37.1	28.5	18.0	N/A	77.2		
SORT-	N/A	MEDIAN-	0.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	48.0	9.7	8.0	7.9	6.1	3.8	N/A	16.5
SPLIT	WT-	469.2					CUM WT %	N/A	48.0	57.7	65.7	73.6	79.7	83.6	N/A	100.0	
180	0.2	H	22.6	46.6	30.9	msg	WT N/A	154.1	63.1	53.5	50.9	38.9	25.9	N/A	112.6		
SORT-	N/A	MEDIAN-	1.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	30.9	12.7	10.7	10.2	7.8	5.2	N/A	22.6
SPLIT	WT-	499.0					CUM WT %	N/A	30.9	43.5	54.3	64.5	72.3	77.4	N/A	100.0	
185	0.2	H	24.5	44.7	30.8	msg	WT N/A	147.8	54.1	49.1	49.3	38.5	23.1	N/A	117.6		
SORT-	N/A	MEDIAN-	1.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	30.8	11.3	10.2	10.3	8.0	4.8	N/A	24.5
SPLIT	WT-	479.4					CUM WT %	N/A	30.8	42.1	52.3	62.6	70.7	75.5	N/A	100.0	
190	0.2	H	22.1	41.5	36.5	msg	WT N/A	161.0	46.9	36.5	38.5	37.6	23.5	N/A	97.4		
SORT-	N/A	MEDIAN-	1.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	36.5	10.6	8.3	8.7	8.5	5.3	N/A	22.1
SPLIT	WT-	441.4					CUM WT %	N/A	36.5	47.1	55.4	64.1	72.6	77.9	N/A	100.0	
195	0.2	H	27.3	49.8	22.9	gms	WT N/A	91.8	58.6	40.3	40.4	37.5	23.0	N/A	109.6		
SORT-	N/A	MEDIAN-	2.00	MODE=	5.00	MEAN-	N/A	WT %	N/A	22.9	14.6	10.0	10.1	9.4	5.7	N/A	27.3
SPLIT	WT-	401.2					CUM WT %	N/A	22.9	37.5	47.5	57.6	67.0	72.7	N/A	100.0	
200	0.2	H	14.9	53.5	31.6	msg	WT N/A	122.7	13.8	11.6	114.5	53.9	14.4	N/A	57.9		
SORT-	N/A	MEDIAN-	2.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	31.6	3.6	3.0	29.5	13.9	3.7	N/A	14.9
SPLIT	WT-	388.8					CUM WT %	N/A	31.6	35.1	38.1	67.5	81.4	85.1	N/A	100.0	
205	0.3	H	19.1	55.9	25.0	gms	WT N/A	103.2	39.5	27.0	90.3	54.2	19.5	N/A	78.9		
SORT-	N/A	MEDIAN-	2.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	25.0	9.6	6.5	21.9	13.1	4.7	N/A	19.1
SPLIT	WT-	412.5					CUM WT %	N/A	25.0	34.6	41.1	63.0	76.2	80.9	N/A	100.0	
210	0.2	H	22.6	54.4	23.0	gms	WT N/A	88.9	43.5	29.5	66.6	49.5	21.3	N/A	87.6		
SORT-	N/A	MEDIAN-	2.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	23.0	11.2	7.6	17.2	12.8	5.5	N/A	22.6
SPLIT	WT-	386.7					CUM WT %	H/A	23.0	34.2	41.8	59.1	71.8	77.4	N/A	100.0	
215	0.1	H	20.0	44.4	35.5	msg	WT N/A	147.3	38.5	29.2	57.8	38.8	19.8	N/A	83.0		
SORT-	N/A	MEDIAN-	1.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	35.6	9.3	7.1	14.0	9.4	4.8	N/A	20.0
SPLIT	WT-	414.4					CUM WT %	N/A	35.6	44.8	51.9	65.8	75.2	80.0	N/A	100.0	
220	0.8	H	11.3	46.5	42.2	msg	WT N/A	154.2	45.1	29.9	40.1	35.1	19.5	N/A	41.3		
SORT-	N/A	MEDIAN-	0.00	MODE=	-1.00	MEAN-	N/A	WT %	N/A	42.2	12.4	8.2	11.0	9.6	5.3	N/A	11.3
SPLIT	WT-	365.3					CUM WT %	H/A	42.2	54.6	62.8	73.7	83.4	88.7	N/A	100.0	

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***** REPORT ON WELL 0299-W08-001 *****

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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE		VFINE		VERY		COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
							PEB (<-2)	PEB (-1)	PEB (-1)	COARS (0)	COARS (1)	MED (2)							
225	2.4	H	22.7	41.2	36.1	msG		WT	N/A	135.3	37.3	27.8	36.9	33.5	18.7	N/A	85.0		
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	36.1	10.0	7.4	9.9	9.0	5.0	N/A	22.7		
SPLIT WT-	374.6						CUM WT %	N/A	36.1	46.1	53.5	63.4	72.3	77.3	N/A	100.0			
230	1.8	H	23.4	43.1	33.5	msG		WT	N/A	130.1	41.4	30.4	38.8	37.4	19.3	N/A	90.9		
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	33.5	10.7	7.8	10.0	9.6	5.0	N/A	23.4		
SPLIT WT-	388.2						CUM WT %	N/A	33.5	44.2	52.0	62.0	71.6	76.6	N/A	100.0			
235	0.9	H	21.6	39.3	39.2	msG		WT	N/A	162.3	42.6	30.9	36.7	32.7	19.8	N/A	89.3		
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.2	10.3	7.5	8.9	7.9	4.8	N/A	21.6		
SPLIT WT-	414.3						CUM WT %	N/A	39.2	49.5	56.9	65.8	73.7	78.4	N/A	100.0			
240	1.4	H	37.4	50.6	12.0	gms		WT	N/A	43.3	45.4	35.2	37.8	38.0	26.2	N/A	134.9		
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	12.0	12.6	9.8	10.5	10.5	7.3	N/A	37.4		
SPLIT WT-	360.8						CUM WT %	N/A	12.0	24.6	34.3	44.8	55.4	62.6	N/A	100.0			
248	1.0	H	30.8	32.0	37.2	msG		WT	N/A	139.5	37.8	22.9	20.8	24.0	14.5	N/A	115.6		
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	37.2	10.1	6.1	5.6	6.4	3.9	N/A	30.8		
SPLIT WT-	375.0						CUM WT %	N/A	37.2	47.3	53.4	58.9	65.3	69.2	N/A	100.0			
250	0.8	H	29.6	46.3	24.1	gms		WT	N/A	74.2	37.6	26.8	28.5	30.9	18.7	N/A	91.2		
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	24.1	12.2	8.7	9.3	10.0	6.1	N/A	29.6		
SPLIT WT-	307.9						CUM WT %	N/A	24.1	36.3	45.0	54.3	64.3	70.4	N/A	100.0			
255	0.9	H	21.2	46.8	32.1	msG		WT	N/A	128.3	30.0	26.4	63.0	46.5	21.4	N/A	84.7		
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	32.1	7.5	6.6	15.7	11.6	5.4	N/A	21.2		
SPLIT WT-	400.1						CUM WT %	N/A	32.1	39.5	46.1	61.9	73.5	78.9	N/A	100.0			
260	1.2	H	25.1	47.8	27.0	gms		WT	N/A	100.4	39.7	31.6	45.9	38.0	22.5	N/A	93.4		
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	27.0	10.7	8.5	12.4	10.2	6.1	N/A	25.1		
SPLIT WT-	371.5						CUM WT %	N/A	27.0	37.7	46.2	58.6	68.8	74.9	N/A	100.0			
265	0.7	H	20.7	47.1	32.1	msG		WT	N/A	122.0	41.0	30.5	49.1	38.9	19.4	N/A	78.6		
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	H/A	WT %	N/A	32.2	10.8	8.0	12.9	10.3	5.1	N/A	20.7		
SPLIT WT-	379.9						CUM WT %	N/A	32.2	43.0	51.0	63.9	74.2	79.3	N/A	100.0			
270	0.7	H	26.7	39.8	33.6	msG		WT	N/A	121.8	2.3	27.4	57.1	39.2	18.2	N/A	96.7		
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	33.6	0.6	7.6	15.7	10.8	5.0	N/A	26.7		
SPLIT WT-	362.7						CUM WT %	N/A	33.6	34.2	41.8	57.5	68.3	73.3	N/A	100.0			

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	COARS	MED	FINE	VERY	SILT	PAN			
							(<-2)	PEB	PEB			(0)	(1)	(2)	(3)	(4)	(4.75)		
5	0.2	C	0.1	91.5	0.4	S				WT	N/A	1.5	3.3	27.0	54.3	84.4	141.7	N/A	27.6
SORT-	N/A	MEDIAN-	3.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.4	1.0	0.2	15.9	24.0	41.6	N/A	8.1
SPLIT WT-	346.5						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.4	1.4	9.6	25.5	50.3	91.9	N/A	100.0
10	1.4	C	3.0	97.0	0.0	S				WT	N/A	0.1	1.0	10.0	76.6	94.8	88.8	N/A	8.6
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.0	0.4	6.5	26.5	32.8	30.8	N/A	3.0
SPLIT WT-	294.4						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.0	0.4	6.9	33.4	66.3	97.0	N/A	100.0
15	2.7	C	47.9	52.0	0.1	ms				WT	N/A	0.3	0.8	1.6	6.5	63.2	71.7	N/A	132.6
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.1	0.3	0.6	2.4	22.8	25.9	N/A	47.9
SPLIT WT-	275.9						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.1	0.4	1.0	3.3	26.2	52.1	N/A	100.0
20	1.1	C	1.8	55.6	42.6	sg				WT	N/A	305.7	149.9	152.5	58.7	24.5	13.9	N/A	13.1
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	42.6	20.9	21.2	8.2	3.4	1.9	N/A	1.8
SPLIT WT-	720.0						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	42.6	63.4	84.7	92.8	96.2	98.2	N/A	100.0
25	0.6	C	0.6	96.0	3.3	S				WT	N/A	21.7	126.2	331.8	127.6	28.7	10.0	N/A	4.2
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	3.3	19.4	51.0	19.6	4.4	1.5	N/A	0.7
SPLIT WT-	656.2						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	3.3	22.8	73.8	93.4	97.8	99.4	N/A	100.0
30	0.6	C	2.6	92.1	5.2	(g) S				WT	N/A	36.2	150.0	379.2	67.0	25.4	14.1	N/A	18.0
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	5.3	21.7	55.0	9.7	3.7	2.0	N/A	2.6
SPLIT WT-	689.0						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	5.3	27.0	82.0	91.7	95.3	97.4	N/A	100.0
35	0.6	C	0.5	99.3	0.2	S				WT	N/A	1.1	7.1	246.0	328.6	40.1	10.1	N/A	3.2
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.2	1.1	38.7	51.7	6.3	1.6	N/A	0.5
SPLIT WT-	641.6						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.2	1.3	40.0	91.6	97.9	99.5	N/A	100.0
40	1.6	C	10.1	09.4	0.4	(m) S				WT	N/A	2.4	15.3	53.8	115.5	147.5	168.7	N/A	56.8
SORT-	N/A	MEDIAN-	3.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.4	2.7	9.6	20.6	26.3	30.1	N/A	10.1
SPLIT WT-	550.9						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.4	3.2	12.8	33.4	59.7	89.9	N/A	100.0
45	0.9	C	13.2	06.3	0.5	(m) S				WT	N/A	1.5	7.3	35.1	61.2	80.4	80.7	N/A	40.4
SORT-	N/A	MEDIAN-	3.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.5	2.4	11.5	20.0	26.2	26.3	N/A	13.2
SPLIT WT-	312.7						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.5	2.9	14.3	34.3	60.5	86.8	N/A	100.0
50	1.8	C	7.9	91.9	0.2	S				WT	N/A	0.9	3.3	4.7	30.5	296.3	197.1	N/A	45.8
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	WT %	N/A	0.2	0.6	0.0	5.3	51.2	34.1	N/A	7.9
SPLIT WT-	581.1						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	0.2	0.7	1.5	6.8	58.0	92.1	N/A	100.0
55	1.4	C	6.1	60.6	33.3	sg				WT	N/A	290.1	172.6	181.0	84.6	51.6	37.5	N/A	53.1
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	WT %	N/A	33.3	19.0	20.9	9.7	5.9	4.3	N/A	6.1
SPLIT WT-	877.2						CUM WT %	N/A	CUM WT %	N/A	CUM WT %	33.3	53.1	74.0	83.7	89.6	93.9	N/A	100.0

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<-2)	PEB (-1)	COARS (0)								
60	1.0	H	8.0	60.3	31.7	msg	WT	N/A	238.3	169.2	138.9	66.3	45.5	33.3	A	60.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	31.7	22.5	18.5	8.8	6.1	4.4	N/A	8.0
SPLIT	WT=	757.2					CUM WT %	N/A	31.7	54.2	72.7	81.5	87.6	92.0	N/A	100.0	
65	1	.	H	9.5	64.7	25.8 (m) gS	WT	N/A	182.6	158.1	144.2	72.3	51.0	32.8	N/A	67.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.8	22.3	20.4	10.2	7.2	4.6	N/A	9.5
SPLIT	WT=	708.9					CUM WT %	N/A	25.8	48.1	68.5	78.7	85.9	90.5	N/A	100.0	
70	1.0	H	11.2	54.0	34.8	msg	WT	N/A	280.9	136.6	114.5	80.2	58.9	45.8	N/A	90.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	34.8	16.9	14.2	9.9	7.3	5.7	N/A	11.2
SPLIT	WT=	810.4					CUM WT %	N/A	34.8	51.7	65.9	75.9	83.2	88.9	N/A	100.0	
80	1.3	H	6.0	68.9	25.2	gS	WT	N/A	212.8	124.1	192.1	150.7	81.6	33.6	N/A	50.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.2	14.7	22.7	17.8	9.7	4.0	N/A	6.0
SPLIT	WT=	846.7					CUM WT %	N/A	25.2	39.9	62.6	80.4	90.1	94.0	N/A	100.0	
85	N/A	H	4.6	83.5	11.9	gS	WT	N/A	93.2	92.9	273.3	175.2	88.5	25.8	N/A	35.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	11.9	11.8	34.8	22.3	11.3	3.3	N/A	4.6
SPLIT	WT=	786.9					CUM WT %	N/A	11.9	23.7	58.5	80.9	92.1	95.4	N/A	100.0	
90	1.8	H	6.3	83.7	10.0	gS	WT	N/A	80.7	118.9	254.9	182.6	79.7	36.2	N/A	50.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	10.0	14.8	31.7	22.7	9.9	4.5	N/A	6.3
SPLIT	WT=	803.1					CUM WT %	N/A	10.0	24.8	56.6	79.3	89.2	93.7	N/A	100.0	
95	1.2	H	5.3	79.9	14.8	gS	WT	N/A	120.3	102.9	253.5	175.0	81.8	36.9	N/A	43.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	14.8	12.6	31.2	21.5	10.1	4.5	N/A	5.3
SPLIT	WT=	815.4					CUM WT %	N/A	14.8	27.4	58.6	80.1	90.1	94.7	N/A	100.0	
100	3.3	H	7.3	72.1	20.6	gS	WT	N/A	156.7	120.9	172.3	144.2	69.2	41.7	N/A	55.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	20.6	15.9	22.7	19.0	9.1	5.5	N/A	7.3
SPLIT	WT=	762.8					CUM WT %	N/A	20.6	36.5	59.2	78.1	87.2	92.7	N/A	100.0	
105	1.3	H	1.9	87.2	10.9	gS	WT	N/A	87.8	153.2	287.0	136.9	68.8	56.9	N/A	15.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	10.9	19.0	35.6	17.0	8.5	7.1	N/A	1.9
SPLIT	WT=	804.6					CUM WT %	N/A	10.9	29.9	65.6	82.5	91.1	98.1	N/A	100.0	
110	1.5	H	5.2	81.4	13.3	gS	WT	N/A	112.0	125.3	223.6	197.1	98.0	40.0	N/A	43.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	13.3	14.9	26.6	23.5	11.7	4.8	N/A	5.2
SPLIT	WT=	840.5					CUM WT %	N/A	13.3	28.3	54.9	78.4	90.0	94.8	N/A	100.0	
115	1.6	H	6.4	86.6	7.0	(g)S	WT	N/A	57.2	107.6	231.6	221.8	107.4	38.7	N/A	52.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	7.0	13.2	28.4	27.2	13.2	4.7	N/A	6.4
SPLIT	WT=	820.1					CUM WT %	N/A	7.0	20.2	48.6	75.7	88.9	93.6	N/A	100.0	

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DEPTH	CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	WINE	VERY		VERY	SILT	PAN		
							(<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75) (>4.75)	
120	1.2	H	5.1	84.2	10.7	gS	WT N/A	85.8	82.6	227.2	221.7	98.5	43.0	N/A 40.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	10.7	10.3	28.4	27.7	12.3	5.4	N/A 5.1
SPLIT	WT-	795.3					CUM WT %	N/A	10.7	21.1	49.5	77.3	89.6	95.0	N/A 100.0
125	1.3	H	6.5	88.3	5.2	(g)S	WT N/A	37.0	71.8	174.3	223.4	105.8	50.8	N/A 46.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	5.2	10.1	24.6	31.5	14.9	7.2	N/A 6.5
SPLIT	WT-	711.8					CUMWT %	N/A	5.2	15.3	39.9	71.4	86.3	93.5	N/A 100.0
130	1.3	H	5.9	89.8	4.3	S	WT N/A	33.6	96.3	223.6	222.7	104.0	47.4	N/A 45.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	4.4	12.5	28.9	28.8	13.5	6.1	N/A 5.9
SPLIT	WT-	776.4					CUM WT %	N/A	4.4	16.8	45.7	74.5	88.0	94.1	N/A 100.0
135	1.6	H	5.3	68.5	26.2	gS	WT N/A	218.5	114.6	161.0	169.7	90.7	34.9	N/A 44.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	26.2	13.8	19.3	20.4	10.9	4.2	N/A 5.3
SPLIT	WT-	837.0					CUM WT %	N/A	26.2	40.0	59.3	79.6	90.5	94.7	N/A 100.0
140	1.8	H	5.8	64.5	29.7	gS	WT N/A	246.7	134.8	147.1	142.2	75.6	36.2	N/A 47.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	29.7	16.2	17.7	17.1	9.1	4.4	N/A 5.8
SPLIT	WT-	831.5					CUM WT %	N/A	29.7	45.9	63.6	80.8	89.9	94.2	N/A 100.0
145	3.0	H	6.8	70.1	23.1	gS	WT N/A	186.7	110.4	178.3	159.0	72.9	46.3	N/A 55.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	23.1	13.7	22.0	19.7	9.0	5.7	N/A 6.8
SPLIT	WT-	814.8					CUM WT %	N/A	23.1	36.7	58.8	78.4	87.4	93.2	N/A 100.0
150	1.2	H	4.9	89.3	5.8	(g)S	WT N/A	45.0	109.0	247.6	226.4	78.9	37.1	N/A 38.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	5.9	13.9	31.6	28.9	10.1	4.7	N/A 4.9
SPLIT	WT-	772.4					CUM WT %	N/A	5.9	19.8	51.4	80.3	90.4	95.1	N/A 100.0
155	3.6	H	9.7	73.1	17.1	(m)gS	WT N/A	131.4	108.5	179.4	144.3	73.9	55.9	N/A 74.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	17.1	14.1	23.4	18.8	9.6	7.3	N/A 9.8
SPLIT	WT-	774.1					CUM WT %	N/A	17.1	31.2	54.6	73.4	83.0	90.3	N/A 100.0
160	4.1	H	21.9	67.6	10.5	gmS	WT N/A	76.2	66.4	91.5	119.7	83.2	131.2	N/A 159.2	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT %	10.5	9.1	12.6	16.5	11.4	18.0	N/A 21.9
SPLIT	WT-	729.7					CUM WT %	N/A	10.5	19.6	32.2	48.7	60.1	78.1	N/A 100.0
165	17.9	H	9.3	79.9	10.8	(m)gS	WT N/A	79.1	82.9	109.2	142.9	154.4	94.1	N/A 67.8	
SORT-	N/A	MEDIAN-	2.00	MODE-	3.00	MEAN-	N/A	WT %	10.8	11.4	15.0	19.6	21.1	12.9	N/A 9.3
SPLIT	WT-	732.3					CUM WT %	N/A	10.8	22.2	37.1	56.7	77.8	90.7	N/A 100.0
170	12.7	H	10.1	82.9	7.0	(gm)S	WT N/A	52.6	66.9	208.4	162.0	121.1	63.0	N/A 75.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	7.0	8.9	27.8	21.6	16.2	8.4	N/A 10.1
SPLIT	WT-	754.1					CUM WT %	N/A	7.0	16.0	43.8	65.4	81.5	90.0	N/A 100.0

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W09-001 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY								
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)		
175	N/A	H	8.6	86.8	4.6	S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	34.3	38.1	166.6	239.0	136.1	67.7	N/A	63.8
SPLIT WT	746.9						CUM WT %	N/A	4.6	5.1	22.3	32.1	18.3	9.1	N/A	8.6	
180	5.9	H	7.8	90.6	1.6	S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	10.0	12.6	41.6	328.8	129.0	38.1	N/A	47.1
SPLIT WT	610.4						CUM WT %	N/A	1.7	2.1	6.9	54.2	21.3	6.3	N/A	7.8	
185	1.7	H	6.4	93.4	0.2	S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.1	1.4	27.0	430.1	170.6	45.8	N/A	46.3
SPLIT WT	723.9						CUM WT %	N/A	0.2	0.2	3.7	59.6	23.6	6.3	N/A	6.4	
190	1.7	H	7.0	92.9	0.1	S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.7	0.8	42.9	400.0	175.0	45.9	N/A	50.4
SPLIT WT	719.0						CUM WT %	N/A	0.1	0.1	6.0	55.9	24.5	6.4	N/A	7.0	
195	1.4	H	5.7	74.3	20.0	gs											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	171.5	43.8	76.8	324.4	130.1	61.6	N/A	49.0
SPLIT WT	863.4						CUM WT %	N/A	20.0	5.1	9.0	37.8	15.2	7.2	N/A	5.7	
200	0.5	H	7.6	65.1	27.3	(m)gs											
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	232.7	83.6	103.7	217.3	102.3	48.3	N/A	65.1
SPLIT WT	857.9						CUM WT %	N/A	27.3	9.8	12.2	25.5	12.0	5.7	N/A	7.6	
205	0.6	H	9.8	74.9	15.3	(m)gs											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	129.5	104.5	119.0	236.6	112.0	59.7	N/A	82.4
SPLIT WT	845.5						CUM WT %	N/A	15.4	12.4	14.1	28.0	13.3	7.1	N/A	9.8	
210	0.4	H	11.4	60.5	28.1	(m)gs											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	258.0	99.2	161.1	157.8	93.1	43.7	N/A	104.4
SPLIT WT	919.2						CUM WT %	N/A	28.1	10.8	17.6	17.2	10.2	4.8	N/A	11.4	
215	0.2	H	11.9	65.8	22.3	(m)gs											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	180.8	88.4	137.1	142.2	122.9	42.0	N/A	96.6
SPLIT WT	814.8						CUM WT %	N/A	22.3	10.9	16.9	17.6	15.2	5.2	N/A	11.9	
220	0.1	H	12.6	58.1	29.3	(m)gs											
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	170.9	54.5	64.6	94.1	68.8	57.1	N/A	73.7
SPLIT WT	590.0						CUM WT %	N/A	29.3	9.3	11.1	16.1	11.8	9.8	N/A	12.6	
225	0.0	H	9.8	59.9	30.3	msG											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	263.2	94.7	100.4	153.5	124.2	47.2	N/A	85.5
SPLIT WT	871.6						CUM WT %	N/A	30.3	10.9	11.6	17.7	14.3	5.4	N/A	9.8	
								N/A	30.3	49.7	65.8	77.6	87.4	90.2	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W09-001 ****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY			VERY	SILT	PAN			
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
230	0.1	H	8.1	31.0	60.9	msG	WT	N/A	456.3	74.5	44.1	38.9	41.3	33.7	N/A	60.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	60.9	9.9	5.9	5.2	5.5	4.5	N/A	8.1
SPLIT WT-	753.0						CUM WT %	N/A	60.9	70.8	76.7	81.9	87.4	91.9	M/A	100.0	
235	0.0	H	6.7	40.1	53.2	msG	WT	N/A	493.1	135.0	77.1	63.6	57.5	38.9	N/A	62.5	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	53.2	14.6	8.3	6.9	6.2	4.2	N/A	6.7
SPLIT WT-	927.3						CUM WT %	N/A	53.2	67.7	76.0	82.9	89.1	93.3	N/A	100.0	
240	0.1	H	10.2	64.2	25.6	(m)gs	WT	N/A	207.4	95.1	111.1	137.8	105.0	71.8	N/A	83.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.6	11.7	13.7	17.0	12.9	8.9	N/A	10.2
SPLIT WT-	811.8						CUM WT %	N/A	25.6	37.3	51.0	68.0	80.9	89.0	N/A	100.0	
245	0.1	H	8.0	64.5	27.6	(m)gs	WT	N/A	211.0	107.3	01.2	144.8	97.7	61.9	N/A	60.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	27.6	14.0	10.6	18.9	12.8	8.1	N/A	8.0
SPLIT WT-	766.8						CUM WT %	N/A	27.6	41.6	52.2	71.2	84.0	92.1	N/A	100.0	
250	0.1	H	9.3	66.0	24.7	(m)gs	WT	N/A	193.7	138.0	115.9	104.5	93.2	66.3	N/A	72.7	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.7	17.6	14.8	13.3	11.9	8.5	N/A	9.3
SPLIT WT-	783.6						CUM WT %	N/A	24.7	42.3	57.1	70.4	82.3	90.7	N/A	100.0	
255	0.1	H	12.2	73.9	13.9	(m)gs	WT	N/A	95.5	111.3	124.9	108.7	104.6	58.1	N/A	83.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	13.9	16.2	18.2	15.8	15.2	8.5	N/A	12.2
SPLIT WT-	691.1						CUM WT %	N/A	13.9	30.1	48.3	64.1	79.3	87.8	N/A	100.0	
260	0.3	H	9.8	67.6	22.6	(m)gs	WT	N/A	173.5	124.7	120.8	105.0	103.2	65.5	N/A	75.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	22.6	16.2	15.7	13.7	13.4	8.5	N/A	9.8
SPLIT WT-	773.5						CUM WT %	N/A	22.6	38.8	54.6	68.3	81.7	90.2	N/A	100.0	
265	1.2	H	10.2	64.9	24.9	(m)gs	WT	N/A	189.5	87.3	84.2	130.8	112.3	78.5	N/A	77.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.9	11.5	11.1	17.2	14.8	10.3	N/A	10.2
SPLIT WT-	766.2						CUM WT %	N/A	24.9	36.4	47.5	64.7	79.5	89.8	N/A	100.0	
270	1.4	H	10.8	65.3	23.9	(m)gs	WT	N/A	166.7	90.8	74.5	119.1	101.8	69.5	N/A	75.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	23.9	13.0	10.7	17.1	14.6	10.0	N/A	10.8
SPLIT WT-	699.5						CUM WT %	N/A	23.9	36.9	47.6	64.7	79.3	89.2	N/A	100.0	
275	0.9	H	10.8	75.2	14.0	(m)gs	WT	N/A	87.1	74.9	85.7	134.2	103.8	70.3	N/A	67.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	14.0	12.0	13.8	21.5	16.7	11.3	N/A	10.8
SPLIT WT-	629.8						CUM WT %	N/A	14.0	26.0	39.7	61.3	77.9	89.2	N/A	100.0	
280	0.5	H	8.1	42.0	50.0	msG	WT	N/A	360.9	66.3	53.5	75.6	65.2	42.6	N/A	58.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	50.0	9.2	7.4	10.5	9.0	5.9	N/A	8.1
SPLIT WT-	727.5						CUM WT %	N/A	50.0	59.1	66.6	77.0	86.1	92.0	N/A	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W09-001 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY								
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)		
285	0.8	H	7.9	51.7	40.4	msg	WT	N/A	263.9	50.2	59.5	109.4	75.5	43.5	N/A	51.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.4	7.7	9.1	16.7	11.6	6.7	N/A	7.9
SPLIT WT-	658.0						CUM WT %	N/A	40.4	48.1	57.2	73.9	85.5	92.1	N/A	100.0	
295	1.6	H	7.8	48.2	44.0	msg	WT	N/A	310.8	74.0	62.0	88.2	73.7	42.1	N/A	55.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	44.0	10.6	8.8	12.5	10.4	6.0	N/A	7.8
SPLIT WT-	710.8						CUM WT %	N/A	44.0	54.6	63.3	75.0	86.2	92.2	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W10-013 ****

12/11/89

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY	SILT (4.75)	PAN (>4.75)	
							PEB (<-2)	PEB (-1)	(0)								
5	0.9	N/	0.9	91.1	0.0	S	WT	N/A	0.2	4.3	41.0	06.5	114.7	229.3	N/A	46.5	
SORT-	N/A	MEDIAN-	4.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	0.0	0.0	8.0	16.5	21.9	43.0	N/A	0.9
SPLIT WT-	523.4						CUM WT %	N/A	0.0	0.9	0.9	25.4	47.3	91.1	N/A	100.0	
10	1.6	N/	10.3	00.9	0.0	(m) S	WT	N/A	3.8	2.5	17.9	61.3	170.7	179.7	N/A	50.1	
SORT-	N/A	MEDIAN-	3.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	0.8	0.5	3.7	12.6	35.1	37.0	N/A	10.3
SPLIT WT-	486.0						CUM WT %	N/A	0.8	1.3	5.0	17.6	52.7	09.7	N/A	100.0	
15	1.6	C	10.9	01.5	7.6	(gm) S	WT	N/A	42.3	7.5	24.1	63.0	103.3	176.2	N/A	60.5	
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	7.6	1.4	4.3	11.3	32.9	31.6	N/A	10.9
SPLIT WT-	557.2						CUM WT %	N/A	7.6	9.0	13.3	24.6	57.5	09.1	N/A	100.0	
20	0.4	C	2.8	67.7	29.5	gS	WT	N/A	200.4	152.7	100.3	105.6	74.3	26.3	N/A	18.7	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	29.5	22.5	14.0	15.6	11.0	3.9	N/A	2.8
SPLIT WT-	670.6						CUM WT %	N/A	29.5	52.1	66.0	02.4	93.4	97.2	N/A	100.0	
25	0.9	C	3.1	74.7	22.2	gS	WT	N/A	165.3	129.0	215.3	135.0	54.9	20.9	N/A	22.7	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	22.2	17.3	20.9	10.3	7.4	2.0	N/A	3.1
SPLIT WT-	744.7						CUM WT %	N/A	22.2	39.6	60.5	06.0	94.1	97.0	N/A	100.0	
30	0.0	C	13.4	46.3	40.3	msG	WT	N/A	354.6	102.2	70.0	04.2	104.0	38.0	N/A	117.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.3	11.6	9.0	9.6	11.0	4.3	N/A	13.4
SPLIT WT-	080.6						CUM WT %	N/A	40.3	51.9	60.9	70.5	02.3	06.6	N/A	100.0	
35	1.1	C	6.9	91.3	1.0	S	WT	N/A	10.3	35.4	124.7	179.7	117.4	65.2	N/A	39.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.8	6.2	21.0	31.4	20.5	11.4	N/A	6.9
SPLIT WT-	572.7						CUM WT %	N/A	1.8	0.0	29.8	61.2	81.7	93.1	N/A	100.0	
40	1.5	C	4.5	95.0	0.4	S	WT	N/A	3.1	73.3	337.0	120.6	60.1	66.5	N/A	31.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	0.5	10.6	40.7	17.4	0.7	9.6	N/A	4.5
SPLIT WT-	691.9						CUM WT %	N/A	0.5	11.0	59.7	77.2	05.9	95.5	N/A	100.0	
45	1.7	C	5.3	94.7	N/A	G	WT	N/A	2.4	06.6	270.7	129.5	64.1	N/A	31.2		
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.4	14.0	46.3	22.2	11.0	N/A	5.3	
SPLIT WT-	504.0						CUM WT %	N/A	0.4	15.2	61.5	03.7	94.7	N/A	100.0		
50	1.2	C	9.0	90.4	0.7	S	WT	N/A	4.0	11.1	20.0	70.4	313.0	124.7	N/A	54.2	
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	0.7	1.0	4.6	11.6	51.7	20.6	N/A	9.0
SPLIT WT-	604.9						CUM WT %	N/A	0.7	2.5	7.1	10.0	70.5	91.1	N/A	100.0	
55	1.3	C	4.7	94.4	0.9	S	WT	N/A	4.4	27.9	95.4	160.7	149.5	40.0	N/A	24.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.9	5.5	10.7	31.5	29.3	9.6	N/A	4.7
SPLIT WT-	510.2						CUM WT %	N/A	0.9	6.3	25.0	56.4	05.7	95.3	N/A	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W10-013 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE		VFINE		VERY		FINE		VERY		
							PEB (<=2)	PEB (-1)	PEB (0)	COARS (1)	COARS (2)	MED (3)	FINE (4)	SILT (4.75)	PAN (>4.75)		
60	2.0	C	4.9	94.0	0.3	S	WT	N/A	1.8	55.2	202.0	115.6	60.1	56.2	N/A	25.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	0.3	10.5	30.5	22.0	13.0	10.7	N/A	4.9
SPLIT WT-	526.3						CUM WT %	N/A	0.3	10.9	49.4	71.4	04.4	95.1	N/A	100.0	
65	1.9	C	5.4	94.2	0.4	S	WT	N/A	2.2	9.1	122.7	226.1	105.2	58.9	N/A	29.8	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.4	1.6	22.2	40.8	19.0	10.6	N/A	5.4
SPLIT WT-	552.0						CUM WT %	N/A	0.4	2.0	24.2	65.0	84.0	94.6	N/A	100.0	
70	0.8	C	1.7	57.6	40.6	sG	WT	N/A	200.9	93.2	194.4	75.3	23.0	12.6	N/A	12.1	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.6	13.5	28.1	10.9	3.3	N/A	1.8	
SPLIT WT-	695.7						CUM WT %	N/A	40.6	54.1	02.2	93.1	96.4	98.3	N/A	100.0	
75	0.9	C	2.5	79.3	10.1	gS	WT	N/A	124.2	134.0	205.7	83.3	26.4	14.3	N/A	17.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	18.1	19.6	41.7	12.2	3.9	N/A	2.5	
SPLIT WT-	606.0						CUM WT %	N/A	10.1	37.7	79.4	91.6	95.4	97.5	N/A	100.0	
80	1.5	C	4.0	31.6	63.5	msG	WT	N/A	401.2	69.4	09.2	38.9	24.7	17.2	N/A	36.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	63.5	9.2	11.8	5.1	3.3	N/A	4.9	
SPLIT WT-	759.4						CUM WT %	N/A	63.5	72.7	04.5	89.6	92.9	95.2	N/A	100.0	
85	1.1	H	18.8	43.6	37.7	msG	WT	N/A	140.3	50.4	50.2	32.8	22.0	16.1	N/A	73.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	37.7	12.0	12.8	8.3	5.6	N/A	18.8	
SPLIT WT-	395.9						CUM WT %	N/A	37.7	50.5	63.2	71.6	77.1	81.2	N/A	100.0	
90	1.0	H	23.4	46.9	29.7	gmS	WT	N/A	112.7	51.0	43.2	35.1	26.2	21.9	N/A	89.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	29.7	13.6	11.4	9.2	6.9	N/A	23.4	
SPLIT WT-	379.9						CUM WT %	N/A	29.7	43.3	54.7	63.9	70.8	76.6	N/A	100.0	
95	0.9	H	24.3	49.3	26.4	gmS	WT	N/A	99.0	40.5	49.2	37.4	27.7	21.8	N/A	90.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	26.4	13.0	13.1	10.0	7.4	N/A	24.3	
SPLIT WT-	374.3						CUM WT %	N/A	26.4	39.4	52.5	62.5	69.9	75.7	N/A	100.0	
100	0.0	H	17.1	35.2	47.7	msG	WT	N/A	204.9	51.2	36.9	25.7	20.0	17.2	N/A	73.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	47.7	11.9	0.6	6.0	4.7	N/A	17.1	
SPLIT WT-	429.0						CUM WT %	N/A	47.7	59.7	60.3	74.3	78.9	82.9	N/A	100.0	
105	0.6	H	13.7	40.7	45.6	msG	WT	N/A	196.7	60.2	49.9	25.8	17.6	14.0	N/A	59.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.6	15.0	11.6	6.0	4.1	N/A	13.7	
SPLIT WT-	431.4						CUM WT %	N/A	45.6	61.4	73.0	79.0	83.0	86.3	N/A	100.0	
110	1.9	H	14.9	70.0	15.2	(m)gS	WT	N/A	60.0	46.7	85.7	98.3	30.0	16.3	N/A	58.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	15.2	11.8	21.7	24.8	7.6	N/A	14.9	
SPLIT WT-	396.0						CUM WT %	N/A	15.2	27.0	40.6	73.4	81.0	85.1	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							(<-2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	(4)	(4.75)	(>4.75)		
115	1.9	H	17.0	75.8	7.2	(gm) S	WT	N/A	26.4	20.0	64.0	123.0	48.1	21.9	N/A	62.1	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	7.2	5.5	17.5	33.7	13.2	6.0	N/A	17.0
SPLIT	WT-	365.4					CUM WT %	N/A	7.2	12.7	30.2	63.9	77.0	83.0	A	100.0	
120	3.0	H	27.0	70.8	2.2	mS	WT	N/A	7.9	10.4	34.6	93.1	68.3	49.4	N/A	97.4	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	2.2	2.9	9.6	25.8	18.9	13.7	N/A	27.0
SPLIT	WT-	361.1					CUM WT %	N/A	2.2	5.1	14.7	40.4	59.3	73.0	N/A	100.0	
125	3.0	H	55.9	43.5	0.7	sM	WT	N/A	2.1	4.3	16.6	42.3	34.8	39.4	N/A	176.6	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	0.7	1.4	5.3	13.4	11.0	12.5	N/A	55.9
SPLIT	WT-	316.2					CUM WT %	N/A	0.7	2.0	7.3	20.7	31.7	44.1	N/A	100.0	
130	8.1	H	59.1	38.6	2.3	sM	WT	N/A	6.6	6.2	12.9	27.2	28.0	34.4	N/A	166.5	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	EIEAN-	N/A	WT %	N/A	2.3	2.2	4.6	9.7	9.9	12.2	N/A	59.1
SPLIT	WT-	281.5					CUM WT %	N/A	2.3	4.5	9.1	18.8	28.7	40.9	N/A	100.0	
135	16.4	H	45.1	48.7	6.2	(g)mS	WT	N/A	18.2	13.3	26.5	39.4	32.5	31.8	N/A	132.8	
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT %	N/A	6.2	4.5	9.0	13.4	11.0	10.8	N/A	45.1
SPLIT	WT-	294.6					CUM WT %	N/A	6.2	10.7	19.7	33.1	44.1	54.9	N/A	100.0	
140	6.4	H	21.5	52.9	25.5	gmS	WT	N/A	91.0	32.6	39.5	62.7	31.9	21.8	N/A	76.7	
SORT*	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	25.6	9.2	11.1	17.6	9.0	6.1	N/A	21.5
SPLIT	WT-	356.2					CUM WT %	N/A	25.6	34.7	45.8	63.4	72.4	78.5	N/A	100.0	
145	2.4	H	15.2	55.7	29.1	gmS	WT	N/A	123.5	30.9	52.5	95.5	37.8	19.7	N/A	64.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	29.1	7.3	12.4	22.5	8.9	4.6	N/A	15.2
SPLIT	WT-	424.3					CUM WT %	N/A	29.1	36.4	48.8	71.3	80.2	84.8	N/A	100.0	
150	0.9	H	9.8	51.2	39.0	msg	WT	N/A	176.2	70.6	54.9	63.8	28.5	13.6	N/A	44.3	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.0	15.6	12.2	14.1	6.3	3.0	N/A	9.8
SPLIT	WT-	451.8					CUM WT %	N/A	39.0	54.6	66.8	80.9	87.2	90.2	N/A	100.0	
155	0.3	H	7.0	61.7	31.2	msG	WT	N/A	265.5	105.3	120.6	171.1	92.6	35.0	N/A	59.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	31.2	12.4	14.2	20.1	10.9	4.1	N/A	7.1
SPLIT	WT-	849.3					CUM WT %	N/A	31.2	43.6	57.8	78.0	88.8	93.0	N/A	100.0	
160	0.2	H	7.3	47.6	45.1	msg	WT	N/A	403.1	104.6	109.5	110.5	70.4	29.9	N/A	65.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	45.1	11.7	12.3	12.4	7.9	3.4	N/A	7.3
SPLIT	WT-	896.5					CUM WT %	N/A	45.1	56.9	69.1	81.5	89.4	92.7	N/A	100.0	
165	0.2	H	8.4	55.5	36.2	msg	WT	N/A	327.0	132.9	130.2	132.2	67.5	38.7	N/A	75.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	36.2	14.7	14.4	14.6	7.5	4.3	N/A	8.4
SPLIT	WT-	905.2					CUM WT %	N/A	36.2	50.9	65.3	79.9	87.4	91.6	N/A	100.0	

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DEPTH	%CAC03	DM	\$MUD	%SAND	%GRAVEL	CLASS	FINE		VFINE		VERY		FINE		VERY		
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	SILT (4.75)	PAN (>4.75)		
170	0.4	H	10.9	59.7	29.4	(m) gS	WT	N/A	216.8	84.4	67.8	132.8	97.8	57.2	N/A	80.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	H/A	WT %	N/A	29.4	11.5	9.2	18.0	13.3	7.8	H/A	10.9
SPLIT WT-	737.3						CUM WT %	N/A	29.4	40.9	50.1	68.1	81.4	89.1	H/A	100.0	
175	0.2	H	9.1	53.0	37.9	msG	WT	N/A	333.9	92.5	122.3	128.6	77.2	45.9	N/A	80.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	37.9	10.5	13.9	14.6	8.0	5.2	N/A	9.1
SPLIT WT-	879.5						CUM WT %	N/A	37.9	40.4	62.3	76.9	85.7	90.9	N/A	100.0	
180	0.2	H	10.3	65.2	24.5	(m) gS	WT	N/A	209.4	92.0	159.9	122.7	124.3	58.2	N/A	87.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.5	10.8	18.7	14.4	14.6	6.8	N/A	10.3
SPLIT WT-	855.6						CUM WT %	N/A	24.5	35.3	54.0	60.4	02.9	89.7	N/A	100.0	
185	0.3	H	10.2	61.6	28.2	(m) gS	WT	N/A	121.8	53.5	76.2	58.3	43.1	35.0	N/A	44.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	28.2	12.4	17.6	13.5	10.0	8.1	N/A	10.2
SPLIT WT-	431.9						CUM WT %	N/A	28.2	40.6	58.2	71.7	81.7	89.8	N/A	100.0	
190	0.2	H	10.8	55.1	34.1	msG	WT	N/A	134.2	41.3	40.1	57.7	47.8	29.7	N/A	42.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	H/A	WT %	N/A	34.1	10.5	10.2	14.7	12.2	7.6	N/A	10.8
SPLIT WT-	394.3						CUM WT %	N/A	34.1	44.6	54.8	69.5	81.7	89.2	N/A	100.0	
195	0.2	H	7.8	42.9	49.3	msG	WT	N/A	153.3	32.2	35.3	26.0	22.1	17.9	N/A	24.2	
SORT-	M/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	49.3	10.4	11.4	8.4	7.1	5.8	N/A	7.8
SPLIT WT-	314.0						CUM WT %	N/A	49.3	59.6	71.0	79.4	86.5	92.2	N/A	100.0	
200	0.2	H	10.1	38.5	51.5	msG	WT	N/A	79.8	19.5	12.5	10.1	9.5	8.1	N/A	15.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	51.5	12.6	8.1	6.5	6.1	5.2	N/A	10.1
SPLIT WT-	154.9						CUM WT %	N/A	51.5	64.0	72.1	78.6	84.7	89.9	N/A	100.0	
205	0.2	H	10.5	44.9	44.6	msG	WT	N/A	121.3	25.2	18.3	32.4	28.9	17.5	N/A	28.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	44.6	9.3	6.7	11.9	10.6	6.4	N/A	10.5
SPLIT WT-	271.5						CUM WT %	N/A	44.6	53.8	60.5	72.4	83.1	89.5	N/A	100.0	
210	0.2	H	9.0	50.4	40.6	msG	WT	N/A	139.2	28.3	21.7	52.4	47.3	22.8	N/A	30.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	40.6	8.3	6.3	15.3	13.8	6.7	N/A	9.0
SPLIT WT-	343.3						CUM WT %	N/A	40.6	48.9	55.2	70.5	84.4	91.0	N/A	100.0	
215	0.2	H	7.2	43.9	48.9	msG	WT	N/A	170.5	29.5	23.0	42.5	30.8	19.4	N/A	25.1	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	48.9	8.5	6.6	12.2	11.1	5.6	N/A	7.2
SPLIT WT-	352.3						CUM WT %	N/A	48.9	57.3	63.9	76.1	07.2	92.0	N/A	100.0	
220	0.2	H	8.5	48.8	42.7	msG	WT	N/A	154.7	34.6	23.9	52.8	42.9	22.5	N/A	30.7	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	42.7	9.6	6.6	14.6	11.9	6.2	N/A	0.5
SPLIT WT-	361.4						CUM WT %	N/A	42.7	52.3	58.9	73.5	85.3	91.5	N/A	100.0	

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DEPTH	%CACO3	PM %	~U%	~W%	%GRAVEL	CLASS	FINE	VFINE	VERY			VERY	SILT	PAN			
							PEB (<--2)	P8 (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
--ZS	0.2	H	20.7	50.2	29.2	gms	WT	N/A	54.6	22.5	15.8	19.6	22.8	13.3	N/A	38.7	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	29.2	12.0	8.4	10.5	12.2	7.1	N/A	20.7
SPLIT WT-	187.3						CUM WT %	N/M	29.2	41.2	49.6	60.1	72.2	79.3	N/A	100.0	
ZEO	0.2	H	8.9	63.6	27.5	(m) gS	WT	N/A	67.4	36.7	30.1	38.9	30.9	19.2	N/A	21.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	27.5	15.0	12.3	15.9	12.6	7.8	N/A	8.9
SPLIT WT	247.8						CUM WT %	N/A	ZT.S	42.5	54.8	70.7	83.3	91.1	N/M	100.0	
ZES	O.Z	H	22.6	48.2	29.2	gms	WT	N/M	43.4	15.0	12.6	15.3	16.8	11.9	N/A	33.6	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	29.2	10.1	8.5	10.3	11.3	8.0	N/A	22.2
SPLIT WT-	148.6						CUM WT %	N/A	29.2	39.3	47.8	58.1	69.4	77.4	N/A	100.0	
ZdO	0.2	H	7.3	53.2	39.5	msg	WT	N/A	245.6	41.9	43.6	134.6	72.7	37.6	N/A	45.4	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	39.5	6.7	7.0	21.7	11.7	6.1	N/A	7.3
SPLIT WT-	622.5						CUM WT %	N/M	39.5	46.3	53.3	74.9	86.6	92.7	N/A	100.0	
245	0.2	H	Z.Z	96.4	1.4	S	WT	N/A	3.3	1.5	3.7	122.4	91.6	9.3	N/A	5.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.4	0.6	1.6	51.6	38.6	3.9	N/A	2.2
SPLIT WT-	241.4						CUM WT %	N/M	1.4	2.0	3.6	55.2	93.8	97.8	N/A	100.0	
ZSO	O.Z	H	2.1	97.9	0.0	S	WT	N/A	0.0	1.0	2.0	171.6	88.8	7.3	N/A	5.7	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.0	0.4	0.7	62.1	32.1	2.6	N/A	2.1
SPLIT WT-	275.8						CUM WT %	N/A	0.0	0.4	1.1	63.2	95.3	97.9	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY								
							PEB (<=2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)				
5	1.1	N/	4.2	93.7	2.1	S	WT	N/A	9.9	7.3	29.4	70.0	156.1	174.9	N/A	19.6	
SORT-	N/A	MEDIAN-	3.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	2.1	1.6	6.3	15.0	33.4	37.4	N/A	4.2
SPLIT WT	471.0						CUM WT %	N/A	2.1	3.7	10.0	25.0	58.4	95.0	N/A	100.0	
10	1.5	N/	9.1	90.9	0.0	S	WT	N/A	0.0	1.0	6.6	35.9	157.2	172.7	N/A	37.3	
SORT-	N/A	MEDIAN-	4.00	MODE-	4.00	MEAN-	N/A	WT %	N/A	0.0	0.2	1.6	8.7	38.3	42.1	N/A	9.1
SPLIT WT	410.1						CUM WT %	N/A	0.0	0.2	1.9	10.6	48.9	90.9	N/A	100.0	
15	1.5	C	11.6	67.6	20.7	(m)gS	WT	N/A	42.2	32.4	17.3	23.0	46.3	18.8	N/A	23.7	
SORT-	N/A	MEDIAN-	2.00	MODE-	3.00	MEAN-	N/A	WT %	N/A	20.7	15.9	8.5	11.3	22.7	9.2	N/A	11.6
SPLIT WT	203.7						CUM WT %	N/A	20.7	36.6	45.1	56.4	79.1	88.4	N/A	100.0	
20	0.9	C	0.9	70.1	21.0	(m)gS	WT	N/A	56.1	76.9	40.0	22.5	26.0	14.2	N/A	23.9	
SORT-	N/A	MEDIAN-	1.00	MODE-	0.00	MEAN-	N/A	WT %	N/A	21.0	20.7	17.9	8.4	9.7	5.3	N/A	8.9
SPLIT WT	267.4						CUM WT %	N/A	21.0	49.7	67.6	76.1	85.8	91.1	N/A	100.0	
25	1.2	H	17.0	72.5	10.4	(m)gs	WT	N/A	26.3	31.5	47.1	55.8	32.4	15.8	N/A	42.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	10.4	12.5	18.7	22.2	12.9	6.3	N/A	17.0
SPLIT WT	251.8						CUM WT %	N/A	10.4	23.0	41.7	63.8	76.7	83.0	N/A	100.0	
30	1.3	H	20.4	73.4	6.1	(g)mS	WT	N/A	24.2	34.3	79.3	84.4	52.8	40.2	N/A	81.0	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	6.1	8.7	20.0	21.3	13.3	10.2	N/A	20.4
SPLIT WT	396.2						CUM WT %	N/A	6.1	14.8	34.8	56.1	69.4	79.6	N/A	100.0	
35	1.3	H	17.9	00.1	2.0	(m)s	WT	N/A	7.5	18.0	03.3	101.6	61.8	39.3	N/A	67.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	2.0	4.7	22.0	26.8	16.3	10.4	N/A	17.9
SPLIT WT	379.5						CUM WT %	N/A	2.0	6.7	28.7	55.5	71.8	82.1	N/A	100.0	
40	1.6	H	10.1	80.0	1.1	(m)s	WT	N/A	4.2	17.4	00.3	90.0	66.7	50.4	N/A	69.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	1.1	4.5	22.8	23.3	17.2	13.0	N/A	18.1
SPLIT WT	387.0						CUM WT %	N/A	1.1	5.6	20.4	51.7	68.9	81.9	N/A	100.0	
45	1.6	H	15.0	83.5	0.7	(m)s	WT	N/A	2.8	10.1	00.8	119.5	64.4	43.1	N/A	60.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.7	2.7	21.2	31.4	16.9	11.3	N/A	15.8
SPLIT WT	300.8						CUM WT %	N/A	0.7	3.4	24.6	56.0	72.9	84.2	N/A	100.0	
53	N/A	H	16.0	03.1	0.9	(m)s	WT	N/A	3.4	13.4	62.6	95.1	87.2	53.1	N/A	60.1	
SORT-	N/A	MEDIAN-	3.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.9	3.6	16.7	25.4	23.3	14.2	N/A	16.0
SPLIT WT	374.9						CUM WT %	N/A	0.9	4.5	21.2	46.6	69.8	84.0	N/A	100.0	
55	1.3	H	12.5	86.8	0.7	(m)s	WT	N/A	2.4	10.4	57.4	120.7	71.1	33.4	N/A	42.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.7	3.1	17.0	35.7	21.1	9.9	N/A	12.5
SPLIT WT	337.7						CUM WT %	N/A	0.7	3.0	20.0	56.5	77.6	87.5	N/A	100.0	

**WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
60	1.5	H	11.8	88.1	0.2	(m)s	WT	N/A	0.6	6.0	55.4	124.1	78.8	30.7	N/A	39.4	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.2	1.8	16.5	37.0	23.5	9.2	N/A	11.8
SPLIT	WT-	335.0					CUM WT %	N/A	0.2	2.0	18.5	55.6	79.1	88.2	N/A	100.0	
65	1.9	H	13.9	85.3	0.8	(m)s	WT	N/A	2.7	6.0	79.8	117.8	52.2	33.3	N/A	47.2	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT %	N/A	0.8	1.8	23.5	34.8	15.4	9.8	N/A	13.9
SPLIT	WT-	339.0					CUM WT %	N/A	0.8	2.6	26.1	60.9	76.3	86.1	N/A	100.0	
70	151.0	H	14.4	80.2	5.4	(gm)s	WT	N/A	21.3	24.0	102.3	97.8	54.3	35.6	N/A	56.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	5.4	6.1	26.1	25.0	13.9	9.1	N/A	14.4
SPLIT	WT-	391.6					CUM WT %	N/A	5.4	11.6	37.7	62.7	76.5	85.6	N/A	100.0	
75	1.1	H	18.2	72.3	9.6	(g)mS	WT	N/A	17.9	18.6	65.3	28.3	13.8	9.3	N/A	34.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	9.6	9.9	34.9	15.1	7.4	5.0	A	18.2
SPLIT	WT-	187.0					CUM WT %	N/A	9.6	19.5	54.4	69.5	76.9	81.8	N/A	100.0	
80	1.3	H	18.9	63.5	17.6	gmS	WT	N/A	63.0	40.4	95.3	48.3	25.3	18.1	N/A	67.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A	WT %	N/A	17.6	11.3	26.6	13.5	7.1	5.1	N/A	18.9
SPLIT	WT-	357.9					CUM WT %	N/A	17.6	28.9	55.5	69.0	76.1	81.1	N/A	100.0	
85	1	H	10.5	39.0	50.6	msG	WT	N/A	224.8	45.0	59.1	33.0	21.9	14.2	N/A	46.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	50.6	10.1	13.3	7.4	4.9	3.2	N/A	10.5
SPLIT	WT-	444.6					CUM WT %	N/A	50.6	60.7	74.0	81.4	86.3	89.5	N/A	100.0	
90	1.2	H	19.7	38.5	41.8	msG	WT	N/A	166.6	46.4	47.2	25.8	19.4	14.4	N/A	78.6	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	41.8	11.7	11.9	6.5	4.9	3.6	N/A	19.7
SPLIT	WT-	398.4					CUM WT %	N/A	41.8	53.5	65.3	71.8	76.7	80.3	N/A	100.0	
95	1.1	H	22.0	34.5	43.5	msG	WT	N/A	203.4	49.1	45.7	25.7	22.0	18.6	N/A	102.9	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	43.5	10.5	9.8	5.5	4.7	4.0	N/A	22.0
SPLIT	WT-	467.4					CUM WT %	N/A	43.5	54.0	63.8	69.3	74.0	78.0	N/A	100.0	
100	0.8	H	20.5	36.7	42.8	msG	WT	N/A	208.3	57.7	51.0	28.8	23.1	17.8	N/A	99.8	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	42.8	11.9	10.5	5.9	4.8	3.7	N/A	20.5
SPLIT	WT-	486.6					CUM WT %	N/A	42.8	54.7	65.2	71.1	75.8	79.5	N/A	100.0	
105	1.1	H	23.1	45.0	31.8	msG	WT	N/A	153.0	54.3	61.6	47.8	30.1	22.7	N/A	111.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	31.8	11.3	12.8	9.9	6.3	4.7	N/A	23.2
SPLIT	WT-	480.8					CUM WT %	N/A	31.8	43.1	55.9	65.9	72.1	76.8	N/A	100.0	
110	1.3	H	17.2	58.1	24.7	gmS	WT	N/A	85.6	34.7	62.3	64.1	25.4	15.2	N/A	59.6	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT %	N/A	24.7	10.0	18.0	18.5	7.3	4.4	N/A	17.2
SPLIT	WT-	346.8					CUM WT %	N/A	24.7	34.7	52.6	71.1	78.4	82.8	N/A	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	OGRAVEL	CLASS		FINE	VFINE	VERY		VERY	SILT	PAN				
								PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)		
115	2.3	H	15.8	74.8	9.4	(gm) S		WT	N/A	19.6	14.1	42.6	68.0	21.2	9.6	N/A	32.9	
SORT-	N/A	MEDIAN-	2.00	MODE*	2.00	MEAN-	N/A	WT	N/A	9.4	6.8	20.5	32.7	10.2	4.6	N/A	15.8	
SPLIT	WT-	208.0						CUM WT	%	N/A	9.4	16.2	36.7	69.4	79.6	84.2	N/A	100.0
120	2.6	H	26.6	66.6	6.9	(g)mS		WT	N/A	20.4	11.8	34.4	75.0	46.5	30.1	N/A	79.0	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	6.9	4.0	11.6	25.2	15.7	10.1	N/A	26.6
SPLIT	WT-	297.1						CUM WT	%	N/A	6.9	10.8	22.4	47.6	63.3	73.4	N/A	100.0
125	3.0	H	59.5	37.6	2.9	sM		WT	N/A	8.5	5.5	13.2	31.1	26.6	35.2	N/A	176.4	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	2.9	1.9	4.5	10.5	9.0	11.9	N/A	59.5
SPLIT	WT-	296.6						CUM WT	%	N/A	2.9	4.7	9.2	19.7	28.6	40.5	N/A	100.0
130	4.0	H	63.5	36.4	0.2	sM		WT	N/A	0.3	1.3	4.3	11.0	17.3	23.4	N/A	100.0	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	0.2	0.8	2.7	7.0	11.0	14.9	N/A	63.5
SPLIT	WT-	157.6						CUM WT	%	N/A	0.2	1.0	3.7	10.7	21.7	36.6	N/A	100.0
135	10.7	H	36.8	58.0	5.3	(g)mS		WT	N/A	11.2	9.6	22.3	27.6	31.6	32.0	N/A	78.1	
SORT-	N/A	MEDIAN-	4.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	5.3	4.5	10.5	13.0	14.9	15.1	N/A	36.8
SPLIT	WT-	212.4						CUM WT	%	N/A	5.3	9.8	20.3	33.3	48.2	63.2	N/A	100.0
140	6.9	H	19.7	63.5	16.8	gmS		WT	N/A	58.6	25.7	53.5	80.3	38.2	23.0	N/A	68.5	
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	%	N/A	16.9	7.4	15.4	23.1	11.0	6.6	N/A	19.7
SPLIT	WT-	347.6						CUM WT	%	N/A	16.9	24.2	39.6	62.7	73.7	80.3	N/A	100.0
145	5.3	H	16.5	49.8	33.7	msG		WT	N/A	107.1	29.1	34.3	51.5	26.6	16.5	N/A	52.3	
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	33.7	9.2	10.8	16.2	8.4	5.2	N/A	16.5
SPLIT	WT-	317.6						CUM WT	%	N/A	33.7	42.9	53.7	69.9	78.3	83.5	N/A	100.0
150	2.4	H	7.9	72.4	19.7	gS		WT	N/A	64.5	39.1	70.6	96.6	22.3	7.7	N/A	25.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	2.00	MEAN-	N/A	WT	%	N/A	19.8	12.0	21.6	29.6	6.8	2.4	N/A	7.9
SPLIT	WT-	326.5						CUM WT	%	N/A	19.8	31.7	53.3	82.9	89.8	92.1	N/A	100.0
155	1.9	H	15.7	55.0	29.3	gmS		WT	N/A	119.6	39.2	43.1	82.7	38.7	20.7	N/A	64.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	29.3	9.6	10.6	20.3	9.5	5.1	N/A	15.8
SPLIT	WT-	408.3						CUM WT	%	N/A	29.3	38.9	49.5	69.7	79.2	84.3	N/A	100.0
160	0.9	H	15.9	42.1	42.0	msG		WT	N/A	192.0	41.7	43.6	55.5	31.1	20.4	N/A	72.7	
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A	WT	%	N/A	42.0	9.1	9.5	12.1	6.8	4.5	N/A	15.9
SPLIT	WT-	457.0						CUM WT	%	N/A	42.0	51.1	60.7	72.8	79.6	84.1	N/A	100.0
165	0.8	H	26.9	54.1	19.0	gmS		WT	N/A	76.7	45.3	44.0	58.9	39.4	30.5	N/A	108.3	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	%	N/A	19.0	11.2	10.9	14.6	9.8	7.6	N/A	26.9
SPLIT	WT-	403.0						CUM WT	%	N/A	19.0	30.3	41.2	55.8	65.6	73.1	N/A	100.0

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**** REPORT ON WELL 0299-W10-014 ****

12/11/89

DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	W/V	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY	SILT	PP.N			
							PEB (<--2)	PEB (-1)	COARS (0)					FINE (4)	(4.75) (>~,73)	PP.N			
170	1.0	H	37.1	S7.3	5.6	(g)mS				WT	N/A	16.1	26.5	40.7	42.7	30.2	ZG.7	N/A	106.7
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A			WT %	N/A	8.6	9.2	14.2	14.9	10.5	8.6	N/A	37.1
SPLIT	WT=	287.5					CUM WT %	N/A	5.6	14.8	29.0	43.8	54.3	62.9		N/A	100.0		
175	0.6	H	17.3	38.8	43.9	msg				WT	N/A	101.1	42.8	37.6	37.3	24.0	18.5	N/A	71.4
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	43.9	10.4	9.1	9.0	5.8	4.5	N/A	17.3
SPLIT	WT=	412.7					CUM WT %	N/A	43.9	54.3	63.4	72.4	78.2	82.7		N/A	100.0		
180	0.5	H	16.7	46.4	36.8	msg				WT	N/A	160.0	56.0	54.2	45.9	26.6	19.0	N/A	72.6
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	36.8	12.9	12.5	10.6	6.1	4.4	N/A	16.7
SPLIT	WT=	434.2					CUM WT %	N/A	36.8	49.7	62.2	72.8	78.9	83.3		N/A	100.0		
185	0.4	H	23.6	46.3	30.1	msg				WT	N/A	115.5	42.9	43.8	39.9	28.5	22.6	N/A	90.8
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	30.1	11.2	11.4	10.4	7.4	5.9	N/A	23.7
SPLIT	WT=	384.0					CUM WT %	N/A	30.1	41.3	52.7	63.1	70.5	76.4		N/A	100.0		
190	0.1	H	18.9	44.4	36.7	msg				WT	N/A	170.4	44.5	55.8	49.6	32.2	24.5	N/A	87.9
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	36.7	9.6	12.0	10.7	6.9	5.3	N/A	18.9
SPLIT	WT=	464.9					CUM WT %	N/A	36.7	46.2	58.2	68.9	75.8	81.1		N/A	100.0		
195	0.1	H	20.9	43.0	36.1	msg				WT	N/A	160.9	43.2	43.4	42.3	9	28.1	N/A	93.1
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	36.1	9.7	9.7	9.5	7.8	6.3	N/A	20.9
SPLIT	WT=	445.8					CUM WT %	N/A	36.1	45.8	55.5	65.0	72.8	79.1		N/A	100.0		
200	0.1	H	27.7	47.9	24.4	gms				WT	N/A	84.8	39.9	34.3	33.9	32.2	26.5	N/A	96.6
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A			WT %	N/A	24.4	11.5	9.9	9.7	9.3	7.6	N/A	27.7
SPLIT	WT=	348.3					CUM WT %	N/A	24.4	35.8	45.7	55.4	64.7	72.3		N/A	100.0		
205	0.1	H	18.8	44.9	36.3	msg				WT	N/A	162.7	45.9	39.0	50.9	41.4	23.9	N/A	84.5
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	36.3	10.2	8.7	11.4	9.2	5.3	N/A	18.9
SPLIT	WT=	448.2					CUM WT %	N/A	36.3	46.5	55.2	66.6	75.8	81.1		N/A	100.0		
210	0.1	H	15.8	43.7	49.5	msg				WT	N/A	226.6	32.3	29.8	41.9	35.1	20.1	N/A	72.4
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	49.5	7.1	6.5	9.1	7.7	4.4	N/A	15.8
SPLIT	WT=	458.3					CUM WT %	N/A	49.5	56.5	63.0	72.1	79.8	84.2		N/A	100.0		
215	0.1	H	12.2	32.0	55.8	msg				WT	N/A	245.1	33.5	19.6	33.8	37.0	16.7	N/A	53.8
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	55.8	7.6	4.5	7.7	8.4	3.8	N/A	12.2
SPLIT	WT=	439.5					CUM WT %	N/A	55.8	63.4	67.9	75.5	84.0	87.8		N/A	100.0		
220	0.1	H	11.6	67.2	21.2	(m)gs				WT	N/A	92.6	81.8	86.8	69.8	40.1	14.8	N/A	50.5
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A			WT %	N/A	21.2	18.7	19.9	16.0	9.2	3.4	N/A	11.6
SPLIT	WT=	436.3					CUM WT %	N/A	21.2	40.0	59.9	75.8	85.0	88.4		N/A	100.0		

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DEPTH	CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE		VFINE PEB (-1)	VERY COARS (0)	COARS (1)	MD (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)	
							PEB (<-2)	WT									
225	0.2	H	19.7	41.2	39.0	msG			N/A	174.5	36.9	31.7	42.4	47.0	26.3	N/A	88.2
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	39.0	8.3	7.1	9.5	10.5	5.9	N/A	19.7
SPLIT	WT=	447.0					CUM	WT	N/A	39.0	47.3	54.4	63.9	74.4	80.3	N/A	100.0
230	0.2	H	24.2	49.5	26.3	gmS			N/A	102.1	47.3	32.5	37.3	46.6	28.4	N/A	93.9
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	26.3	12.2	8.4	9.6	12.0	7.3	N/A	24.2
SPLIT	WT=	388.1					CUM	WT	N/A	26.3	38.5	46.9	56.5	68.5	75.8	N/A	100.0
235	0.1	H	26.4	50.3	23.3	gmS			N/A	66.2	32.7	26.8	28.3	32.6	22.9	N/A	75.2
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	N/A	23.3	11.5	9.4	9.9	11.5	8.0	N/A	26.4
SPLIT	WT=	284.7					CUM	WT	N/A	23.3	34.7	44.2	54.1	65.5	73.6	N/A	100.0
240	0.1	H	35.6	55.7	8.8	(g)mS			N/A	25.1	31.5	28.7	34.5	38.0	26.8	N/A	101.9
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT	N/A	8.8	11.0	10.0	12.0	13.3	9.4	N/A	35.6
SPLIT	WT=	286.5					CUM	WT	N/A	8.8	19.8	29.8	41.8	55.1	64.4	N/A	100.0
245	0.1	H	9.1	28.8	62.1	msG			N/A	271.2	23.0	15.8	26.1	46.3	14.7	N/A	39.7
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	62.1	5.3	3.6	6.0	10.6	3.4	N/A	9.1
SPLIT	WT=	436.8					CUM	WT	N/A	62.1	67.4	71.0	77.0	87.6	90.9	N/A	100.0
250	0.3	H	6.7	62.0	31.3	gG			N/A	119.2	33.6	34.4	51.9	90.3	26.0	N/A	25.4
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	31.3	8.8	9.0	13.6	23.7	6.8	N/A	6.7
SPLIT	WT=	375.5					CUM	WT	N/A	31.3	40.1	49.2	62.8	86.5	93.3	N/A	100.0
255	0.1	H	5.3	83.8	10.9	gs			N/A	72.6	21.9	15.3	286.4	194.4	41.9	N/A	35.3
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	10.9	3.3	2.3	42.9	29.1	6.3	N/A	5.3
SPLIT	WT=	664.2					CUM	WT	N/A	10.9	14.2	16.4	59.3	88.4	94.7	N/A	100.0
260	0.2	H	5.1	67.8	27.1	gs			N/A	190.8	61.8	46.6	211.3	118.4	38.6	N/A	35.8
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	27.1	8.8	6.6	30.0	16.8	5.5	N/A	5.1
SPLIT	WT=	700.5					CUM	WT	N/A	27.1	35.9	42.6	72.6	89.4	94.9	N/A	100.0
265	0.2	H	4.8	71.6	23.6	gs			N/A	168.4	69.1	55.4	226.2	117.4	43.5	N/A	34.2
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	23.6	9.7	7.8	31.7	16.4	6.1	N/A	4.8
SPLIT	WT=	717.1					CUM	WT	N/A	23.6	33.3	41.0	72.7	89.1	95.2	N/A	100.0
270	0.2	H	6.3	72.3	21.4	gs			N/A	132.2	56.9	46.4	194.3	104.2	44.1	N/A	38.9
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	21.4	9.2	7.5	31.5	16.9	7.2	N/A	6.3
SPLIT	WT=	612.6					CUM	WT	N/A	21.4	30.7	38.2	69.7	86.6	93.7	N/A	100.0
275	0.1	H	5.8	82.4	11.7	gs			N/A	77.0	38.6	27.5	149.3	279.2	46.5	N/A	38.3
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT	N/A	11.7	5.9	4.2	22.8	42.5	7.1	N/A	5.8
SPLIT	WT=	653.5					CUM	WT	N/A	11.7	17.6	21.8	44.6	87.1	94.2	N/A	100.0

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DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	MED	FINE	VERY	SILT	PAN			
							(<-2)	PEB (-1)	COARS (0)	COARS (1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)		
280	0.1	H	4.4	93.3	2.3	S											
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT	N/A	14.1	10.4	53.8	145.9	58.7	N/A	26.9	
SPLIT WT-	WT	607.3						WT %	N/A	2.3	1.7	8.8	23.9	9.6	N/A	4.4	
								CUM WT %	N/A	2.3	4.0	12.8	36.8	86.0	95.6	N/A	100.0
285	0.1	H	11.7	86.5	1.8	(m) S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	5.9	7.2	5.7	153.9	91.3	N/A	38.5	
SPLIT WT-	WT	327.6						WT %	N/A	1.8	2.2	1.7	47.0	27.9	7.7	N/A	11.8
								CUM WT %	N/A	1.8	4.0	5.7	52.7	80.6	88.3	N/A	100.0
290	0.1	H	4.0	95.4	0.6	S											
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT	N/A	2.6	1.8	16.5	108.5	252.5	N/A	17.5	
SPLIT WT-	WT	430.5						WT %	N/A	0.6	0.4	3.8	24.9	57.9	8.4	N/A	4.0
								CUM WT %	N/A	0.6	1.0	4.0	29.7	87.6	96.0	N/A	100.0
295	0.1	H	3.3	96.0	0.6	S											
SORT-	N/A	MEDIAN-	3.00	MODE-	3.00	MEAN-	N/A	WT	N/A	4.2	3.0	26.7	183.0	358.8	N/A	21.5	
SPLIT WT-	WT	647.1						WT %	N/A	0.7	0.5	4.1	28.3	55.4	7.7	N/A	3.3
								CUM WT %	N/A	0.7	1.1	5.2	33.5	88.9	96.7	N/A	100.0
300	0.1	H	3.8	82.6	13.6	gS											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	95.8	32.0	54.4	289.9	168.1	N/A	26.8	
SPLIT WT-	WT	696.0						WT %	N/A	13.6	4.6	7.7	41.2	23.9	5.2	N/A	3.8
								CUM WT %	N/A	13.6	18.2	25.9	67.1	91.0	96.2	N/A	100.0
305	0.5	H	5.4	65.4	29.2	gS											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	169.5	73.6	68.0	120.9	84.1	N/A	31.4	
SPLIT WT-	WT	574.3						WT %	N/A	29.2	12.7	11.7	20.8	14.5	5.8	N/A	5.4
								CUM WT %	N/A	29.2	41.9	53.6	74.4	88.9	94.6	N/A	100.0
310	0.9	H	5.7	75.1	19.2	gS											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	121.0	67.1	51.0	213.1	106.5	N/A	36.3	
SPLIT WT-	WT	629.1						WT %	N/A	19.2	10.6	8.1	33.8	16.9	5.8	N/A	5.8
								CUM WT %	N/A	19.2	29.0	37.9	71.6	88.5	94.3	N/A	100.0
315	1.1	H	6.0	64.1	29.9	gS											
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	209.3	89.5	68.5	167.9	81.9	N/A	42.0	
SPLIT WT-	WT	704.5						WT %	N/A	29.9	12.8	9.8	24.0	11.7	5.8	N/A	6.0
								CUM WT %	N/A	29.9	42.7	52.5	76.5	88.2	94.0	N/A	100.0
320	0.3	H	3.7	63.0	33.3	sG											
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A	WT	N/A	195.6	53.4	32.7	169.3	90.4	N/A	21.8	
SPLIT WT-	WT	581.4						WT %	N/A	33.3	9.1	5.6	28.9	15.4	4.0	N/A	3.7
								CUM WT %	N/A	33.3	42.4	48.0	76.9	92.3	96.3	N/A	100.0
325	0.2	H	2.3	97.3	0.4	S											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	2.3	12.5	80.6	283.1	192.3	N/A	14.2	
SPLIT WT-	WT	619.1						WT %	N/A	0.4	2.0	13.0	45.5	30.9	6.0	N/A	2.3
								CUM WT %	N/A	0.4	2.4	15.3	60.9	91.8	97.7	N/A	100.0
330	0.2	H	12.2	69.9	17.9	(m) gS											
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A	WT	N/A	98.1	65.8	62.7	112.6	86.3	N/A	67.2	
SPLIT WT-	WT	553.6						WT %	N/A	17.9	12.0	11.4	20.5	15.7	10.3	N/A	12.2
								CUM WT %	N/A	17.9	29.8	41.2	61.7	77.4	87.8	N/A	100.0

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEB (<-2)		VFINE PEB (-1)		VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)	
							WT	N/A	WT %	A								
335	0.4	H	8.7	66.5	24.9	(m)gs					51.2	132.1	127.4	59.3	N/A	59.4		
SORT-	N/A	MEDIAN-	2.00	MODE-	-1.00	MEAN-	N/A				24.9	12.4	7.5	19.3	18.6	8.7	N/A	8.7
SPLIT WT-	680.4						CUM WT %	N/A	CUM WT %	N/A	37.3	44.7	64.0	82.7	91.3	N/A	100.0	
340	0.8	H	7.1	70.1	22.9	gs					167.5	133.0	107.5	115.2	111.2	45.7	N/A	51.8
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A				22.9	18.3	14.7	15.7	15.2	6.2	N/A	7.1
SPLIT WT-	729.9						CUM WT %	N/A	CUM WT %	N/A	41.1	55.8	71.5	86.7	92.9	N/A	100.0	
345	0.6	H	7.0	64.4	28.5	gs					190.6	102.4	128.0	95.7	65.1	39.2	N/A	46.9
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A				28.5	15.3	19.2	14.3	9.8	5.9	N/A	7.0
SPLIT WT-	661.5						CUM WT %	N/A	CUM WT %	N/A	43.9	63.0	77.4	87.1	93.0	N/A	100.0	
350	0.8	H	9.4	72.2	18.4	(m)gs					132.0	123.1	84.9	154.6	94.2	61.2	N/A	67.7
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				18.4	17.2	11.8	21.5	13.1	8.5	N/A	9.4
SPLIT WT-	717.6						CUM WT %	N/A	CUM WT %	N/A	35.5	47.4	68.9	82.0	90.6	N/A	100.0	
355	1.2	H	9.8	75.8	14.4	(m)gs					65.7	68.9	67.4	111.2	63.7	35.7	N/A	44.8
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				14.4	15.1	14.7	24.3	13.9	7.8	N/A	9.8
SPLIT WT-	454.0						CUM WT %	N/A	CUM WT %	N/A	29.4	44.2	68.5	82.4	90.2	N/A	100.0	
360	1.3	H	5.9	60.8	25.4	gs					171.4	97.9	74.5	155.7	97.5	39.1	N/A	39.8
SORT-	N/A	MEDIAN-	1.00	MODE-	-1.00	MEAN-	N/A				25.4	14.5	11.0	23.0	14.4	5.8	N/A	5.9
SPLIT WT-	673.6						CUM WT %	N/A	CUM WT %	N/A	39.8	50.9	73.9	88.3	94.1	N/A	100.0	
365	0.6	H	8.0	80.6	11.4	gs					57.7	95.4	90.1	119.9	69.8	33.8	N/A	40.6
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				11.4	18.8	17.8	23.6	13.8	6.7	N/A	8.0
SPLIT WT-	504.6						CUM WT %	N/A	CUM WT %	N/A	30.2	47.9	71.6	85.3	92.0	N/A	100.0	
370	0.5	H	13.1	81.8	5.1	(gm)s					24.1	49.0	73.9	133.7	79.2	48.8	N/A	61.7
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				5.1	10.4	15.7	28.4	16.8	10.4	N/A	13.1
SPLIT WT-	473.8						CUM WT %	N/A	CUM WT %	N/A	15.5	31.3	59.7	76.5	86.9	N/A	100.0	
375	0.4	H	16.2	70.7	13.1	(m)gs					63.8	42.0	55.0	122.4	75.1	48.8	N/A	78.6
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				13.1	8.7	11.3	25.2	15.5	10.1	N/A	16.2
SPLIT WT-	483.1						CUM WT %	N/A	CUM WT %	N/A	21.8	33.1	58.3	73.8	83.8	N/A	100.0	
380	0.4	H	12.1	83.9	4.0	(m)s					14.6	26.4	39.1	147.9	59.5	30.5	N/A	43.6
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A				4.0	7.3	10.8	40.9	16.5	8.4	N/A	12.1
SPLIT WT-	355.5						CUM WT %	N/A	CUM WT %	N/A	11.3	22.2	63.1	79.5	87.9	N/A	100.0	
385	0.2	H	6.6	82.4	11.0	gs					52.2	52.4	76.7	179.6	59.0	24.5	N/A	31.6
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	M/A				11.0	11.0	16.1	37.7	12.4	5.2	N/A	6.6
SPLIT WT-	473.0						CUM WT %	N/A	CUM WT %	N/A	22.0	38.1	75.8	88.2	93.4	N/A	100.0	

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DEPTH	CACO3	DM	\$MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN	
							PEB (<= -2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)	
390	0.2	H	6.4	85.9	7.7	(g)S										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	441.9					WT	N/A	33.7	46.4	69.1	172.9	59.6	27.9	N/A	27.9
							WT %	N/A	7.7	10.6	15.8	39.5	13.6	6.4	N/A	6.4
							CUM WT %	N/A	7.7	18.3	34.1	73.6	07.2	93.6	A	100.0
395	0.8	H	7.6	84.2	8.2	(g)S										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	EIEAN-	M/A									
SPLIT	WT-	394.3					WT	N/A	32.7	57.6	52.2	141.2	57.2	28.2	N/A	30.5
							WT %	N/A	0.2	14.4	13.1	35.3	14.3	7.1	N/A	7.6
							CUM WT %	N/A	0.2	22.6	35.7	71.0	05.3	92.4	N/A	100.0
400	0.5	H	3.9	78.0	17.2	gS										
SORT-	N/A	MEDIAN-	1.00	MODE-	0.00	MEAN-	N/A									
SPLIT	WT-	372.4					WT	N/A	63.7	80.5	77.4	78.2	36.6	18.5	N/A	14.5
							WT %	N/A	17.2	21.8	21.0	21.2	9.9	5.0	N/A	3.9
							CUM WT %	N/A	17.2	39.0	60.0	81.2	91.1	96.1	N/A	100.0
405	0.8	H	6.9	74.0	19.1	gS										
SORT-	N/A	MEDIAN-	1.00	MODE-	1.00	MEAN-	N/A									
SPLIT	WT-	574.7					WT	N/A	110.1	90.7	135.0	111.7	59.0	31.3	N/A	40.0
							WT %	H/A	19.1	15.7	23.4	19.3	10.2	5.4	N/A	6.9
							CUM WT %	N/A	19.1	34.8	50.1	77.5	87.7	93.1	N/A	100.0
410	0.7	H	22.9	65.2	11.9	gmS										
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A									
SPLIT	WT-	317.5					WT	N/A	37.9	42.2	29.2	65.6	48.8	21.1	N/A	72.7
							WT %	N/A	11.9	13.3	9.2	20.7	15.4	6.7	N/A	22.9
							CUM WT %	N/A	11.9	25.2	34.4	55.1	70.5	77.1	N/A	100.0
415	0.7	H	5.5	78.0	16.5	gS										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	460.8					WT	N/A	77.0	39.9	106.1	138.7	53.7	25.6	N/A	25.6
							WT %	N/A	16.5	8.6	22.7	29.7	11.5	5.5	N/A	5.5
							CUM WT %	N/A	16.5	25.1	47.8	77.5	89.0	94.5	N/A	100.0
420	0.4	H	5.3	79.7	15.0	gS										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	413.4					WT	N/A	62.1	56.4	85.0	118.9	47.6	22.5	N/A	22.0
							WT %	N/A	15.0	13.6	20.7	28.6	11.5	5.4	N/A	5.3
							CUM WT %	N/A	15.0	20.5	49.2	77.8	89.3	94.7	N/A	100.0
425	0.4	H	15.9	72.4	11.7	(m)gS										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	341.8					WT	N/A	40.0	29.0	27.6	118.4	56.3	15.4	N/A	54.4
							WT %	N/A	11.7	0.7	8.1	34.6	16.5	4.5	N/A	15.9
							CUM WT %	N/A	11.7	20.4	20.5	63.1	79.6	84.1	N/A	100.0
430	0.5	H	26.7	63.6	9.7	(g)mS										
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	NEW-	N/A									
SPLIT	WT-	256.6					WT	N/A	24.9	21.2	31.5	63.1	32.9	14.5	N/A	68.6
							WT %	N/A	9.7	0.3	12.3	24.6	12.8	5.7	N/A	26.7
							CUM WT %	N/A	9.7	10.0	30.2	54.8	67.6	73.3	N/A	100.0
435	0.5	H	12.6	70.9	16.6	(m)gS										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	305.9					WT	N/A	50.7	40.8	40.0	79.1	36.7	12.2	N/A	38.4
							WT %	N/A	16.6	16.0	13.1	25.9	12.0	4.0	N/A	12.6
							CUM WT %	N/A	16.6	32.5	45.6	71.5	83.5	87.5	N/A	100.0
440	0.5	H	21.1	70.2	8.7	(g)mS										
SORT-	N/A	MEDIAN-	2.00	MODE-	2.00	MEAN-	N/A									
SPLIT	WT-	245.6					WT	M/A	21.3	28.1	26.7	61.7	38.9	16.9	N/A	51.8
							WT %	N/A	0.7	11.5	10.9	25.1	15.9	6.9	N/A	21.1
							CUM WT %	N/A	8.7	20.1	31.0	56.2	72.0	78.9	N/A	100.0

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT 011 WELL 0299-W10-014 ****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MD	FINE	VERY	SILT	PAN		
							PEB (<-2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)		
445	0.5	H	24.8	55.6	19.6	gmS	WT	N/A	51.2	36.6	22.1	35.3	31.3	19.8	N/A	64.9	
SORT-	N/A	MEDIAN-	2.00	MODE-	5.00	MEAN-	N/A	WT	N/A	19.6	14.0	8.5	13.5	12.0	7.6	A	24.9
SPLIT	WL-	261.3					CUM	WT	N/A	19.6	33.6	42.1	55.6	67.6	75.1	N/A	100.0
450	0.4	H	36.0	49.6	14.4	gmS	WT	N/A	37.2	30.2	22.1	38.2	25.1	12.8	N/A	93.3	
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A	WT	N/A	14.4	11.7	8.5	14.8	9.7	4.9	N/A	36.0
SPLIT	WL-	258.8					CUM	WT	N/A	14.4	26.0	34.6	49.3	59.0	64.0	N/A	100.0
455	0.8	H	66.9	31.9	1.1	SM	WT	N/A	2.6	5.8	7.0	23.7	22.7	14.6	N/A	156.3	
SORT-	N/A	MEDIAN-	5.00	MODE-	5.00	MEAN-	N/A	WT	N/A	1.1	2.5	3.3	10.2	9.7	6.3	N/A	66.9
SPLIT	WL-	233.5					CUM	WT	N/A	1.1	3.6	6.9	17.1	26.8	33.1	N/A	100.0

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W15-002 ****

12/11/89

DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	WINE	VERY		VERY						
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	SILT (4.75)	PAN 		
5	1.1	C	10.5	67.5	22.0	(m)gs	WT	6.5	24.0	31.0	22.2	14.0	13.6	13.0	7.6	7.0	
SORT-	2.38	MEDIAN-	1.00	MODE-	0.00	MEAN-	WT %	4.7	17.3	22.3	16.0	10.1	9.0	9.4	5.5	5.0	
SPLIT WT-	139.9						CUM WT %	4.7	22.0	44.3	60.3	70.3	80.1	89.5	95.0	100.0	
10	0.8	C	6.2	51.2	42.6	msG	WT	17.5	42.4	30.2	15.1	8.5	7.7	10.6	4.5	4.2	
SORT-	2.23	MEDIAN-	0.00	MODE-	-1.00	MEAN-	WT %	12.4	30.1	21.5	10.7	6.0	5.5	7.5	3.2	3.0	
SPLIT WT-	141.3						CUM WT %	12.4	42.6	64.0	74.8	80.8	86.3	93.8	97.0	100.0	
15	1.6	C	0.5	67.9	23.6	(m)gs	WT	10.4	17.9	25.7	20.9	11.0	9.7	14.3	4.1	6.1	
SORT-	2.44	MEDIAN-	1.00	MODE-	0.00	MEAN-	WT %	0.7	14.9	21.4	17.4	9.2	8.1	11.9	3.4	5.1	
SPLIT WT-	121.1						CUM WT %	0.7	23.6	45.0	62.4	71.5	79.6	91.5	94.9	100.0	
20	1.1	C	7.7	73.2	19.1	gs	WT	8.0	20.5	31.3	42.4	18.4	10.8	6.2	4.9	6.6	
SORT-	1.83	MEDIAN-	1.00	MODE-	1.00	MEAN-	WT %	5.4	13.8	21.0	28.4	12.3	7.2	4.2	3.3	4.4	
SPLIT WT-	149.7						CUM WT %	5.4	19.1	40.1	68.6	80.9	88.1	92.3	95.6	100.0	
25	1.1	C	3.7	68.5	27.8	gs	WT	22.1	12.9	28.0	29.9	17.5	6.4	4.3	2.2	2.4	
SORT-	N/A	MEDIAN-	0.00	MODE-	1.00	MEAN-	N/A	WT %	17.6	10.3	22.3	23.8	13.9	5.1	3.4	1.8	1.9
SPLIT WT-	126.5						CUM WT %	17.6	27.8	50.1	73.9	87.8	92.9	96.3	98.1	100.0	
30	1.5	C	7.1	87.9	5.0	(g)s	WT	2.0	4.7	24.0	48.1	25.3	11.8	9.1	3.8	5.8	
SORT-	1.57	MEDIAN-	1.00	MODE-	1.00	MEAN-	WT %	1.5	3.5	17.0	35.7	18.8	8.8	6.8	2.8	4.3	
SPLIT WT-	136.0						CUM WT %	1.5	5.0	22.8	58.6	77.4	86.1	92.9	95.7	100.0	
35	1.5	C	7.4	84.7	7.9	(g)s	WT	3.9	5.2	16.0	34.0	30.6	11.5	5.5	3.5	5.0	
SORT-	1.52	MEDIAN-	1.00	MODE-	1.00	MEAN-	WT %	3.4	4.5	13.9	29.5	26.6	10.0	4.8	3.0	4.3	
SPLIT WT-	116.1						CUM WT %	3.4	7.9	21.8	51.3	77.9	87.8	92.6	95.7	100.0	
40	2.2	C	12.8	07.0	0.2	(m)s	WT	0.0	0.2	1.7	11.3	40.6	25.5	15.0	6.3	7.5	
SORT-	1.33	MEDIAN-	3.00	MODE-	2.00	MEAN-	WT %	0.0	0.2	1.6	10.5	37.6	23.6	13.9	5.8	6.9	
SPLIT WT-	108.8						CUM WT %	0.0	0.2	1.8	12.2	49.8	73.4	87.2	93.1	100.0	
45	1.5	C	10.9	87.6	1.5	(m)s	WT	0.4	2.2	7.8	37.0	49.0	35.1	25.8	9.6	9.6	
SORT-	1.50	MEDIAN-	2.00	MODE-	2.00	MEAN-	WT %	0.2	1.3	4.4	21.0	27.8	19.9	14.6	5.4	5.4	
SPLIT WT-	170.0						CUM WT %	0.2	1.5	5.9	26.9	54.6	74.5	89.1	94.6	100.0	
50	1.9	C	12.7	85.1	2.2	(m)s	WT	0.6	2.3	6.0	27.2	35.2	27.2	16.8	8.8	8.0	
SORT-	1.64	MEDIAN-	2.00	MODE-	2.00	MEAN-	WT %	0.5	1.7	4.5	20.6	26.7	20.6	12.7	6.7	6.1	
SPLIT WT-	132.2						CUM WT %	0.5	2.2	6.7	27.3	54.0	74.6	87.3	93.9	100.0	
55	1.2	C	7.7	92.1	0.2	S	WT	0.0	0.2	2.6	17.1	56.3	32.2	13.5	4.8	5.4	
SORT-	1.08	MEDIAN-	2.00	MODE-	2.00	MEAN-	WT %	0.0	0.2	2.0	12.9	42.6	24.4	10.2	3.6	4.1	
SPLIT WT-	132.5						CUM WT %	0.0	0.2	2.1	15.1	57.7	82.1	92.3	95.9	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0299-W15-002 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE		VFINE	VERY	COARS (0)	MED (1)	FINE (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
							PEB (<-2)	PEB (-1)	PEB (-1)	COARS (0)							
60	1.4	C	9.7	90.2	0.1	S	WT	0.0	0.2	1.1	9.0	62.5	50.1	21.1	7.0	8.4	
SORT-	1.14	MEDIAN-	3.00	MODE-	2.00	MEAN-	2.30	WT %	0.0	0.1	0.7	5.7	39.2	31.4	13.2	4.4	5.3
SPLIT WT-	159.7						CUM WT I	0.0	0.1	0.8	6.5	45.7	77.1	90.4	94.7	100.0	
65	2.1	C	9.1	67.6	23.2	(m)gs	WT	15.0	11.7	13.9	20.1	17.4	15.1	11.2	5.1	5.4	
SORT-	2.50	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.81	WT %	13.1	10.2	12.1	17.5	15.1	13.1	9.8	4.4	4.7
SPLIT WT-	115.7						CUM WT %	13.1	23.2	35.3	52.8	68.0	81.1	90.9	95.3	100.0	
70	1.1	C	1.2	28.1	70.8	gG	WT	66.5	29.1	17.6	9.6	5.6	3.0	2.1	0.9	0.7	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	49.2	21.5	13.0	7.1	4.2	2.2	1.6	0.7	0.5
SPLIT WT-	134.5						CUM WT I	49.2	70.8	83.8	90.9	95.1	97.3	98.8	99.5	100.0	
75	1.7	C	8.9	86.1	5.0	(g)s	WT	0.8	4.5	12.0	23.6	30.0	14.3	11.5	3.5	6.0	
SORT-	1.69	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.50	WT %	0.8	4.2	11.3	22.2	28.3	13.5	10.8	3.3	5.7
SPLIT WT-	106.9						CUM WT %	0.8	5.0	16.3	38.5	66.8	80.2	91.1	94.4	100.0	
80	1.9	C	11.1	83.4	5.4	(gm)s	WT	1.2	5.2	11.2	26.9	34.1	15.8	10.8	6.5	6.7	
SORT-	1.71	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.65	WT %	1.0	4.4	9.5	22.7	28.8	13.3	9.1	5.5	5.7
SPLIT WT-	120.2						CUM WT %	1.0	5.4	14.9	37.6	66.4	79.7	88.8	94.3	100.0	
85	1.8	C	9.3	86.4	4.4	S	WT	2.0	3.8	11.0	29.3	42.5	19.2	12.6	5.5	6.8	
SORT-	1.57	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.64	WT %	1.5	2.9	8.3	22.1	32.0	14.5	9.5	4.1	5.1
SPLIT WT-	134.4						CUM WT %	1.5	4.4	12.7	34.7	66.8	81.2	90.7	94.9	100.0	
90	2.1	C	6.3	90.0	3.7	S	WT	0.5	5.0	11.5	35.2	51.6	19.7	14.8	4.2	5.1	
SORT-	1.42	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.55	WT I	0.3	3.4	7.8	23.9	35.0	13.4	10.0	2.9	3.5
SPLIT WT-	148.7						CUM WT I	0.3	3.7	11.5	35.4	70.3	83.7	93.7	96.6	100.0	
95	1.6	C	9.9	88.5	1.6	(m)s	WT	0.0	2.6	11.1	36.1	54.8	28.4	14.4	8.0	8.2	
SORT-	1.48	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.75	WT I	0.0	1.6	6.8	22.1	33.5	17.4	8.8	4.9	5.0
SPLIT WT-	164.0						CUM WT %	0.0	1.6	8.4	30.4	63.9	81.3	90.1	95.0	100.0	
100	1.8	C	9.3	87.2	3.5	S	WT	1.1	4.2	11.5	30.7	51.6	25.6	13.4	6.0	8.2	
SORT-	1.49	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.68	WT %	0.7	2.8	7.6	20.2	33.9	16.8	8.8	3.9	5.4
SPLIT WT-	152.5						CUM WT I	0.7	3.5	11.0	31.2	65.1	81.9	90.7	94.6	100.0	
105	2.0	C	6.6	86.3	7.1	(g)s	WT	2.0	8.6	14.8	34.5	52.1	18.2	9.4	4.7	5.2	
SORT-	1.42	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.31	WT %	1.3	5.0	9.9	23.1	34.9	12.2	6.3	3.1	3.5
SPLIT WT-	150.0						CUM WT %	1.3	7.1	17.0	40.1	74.9	87.1	93.4	96.5	100.0	
110	1.6	C	8.8	86.6	4.6	S	WT	0.0	7.8	11.9	32.0	65.0	25.3	11.2	7.5	7.2	
SORT-	1.37	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.56	WT %	0.0	4.7	7.1	19.1	38.7	15.1	6.7	4.5	4.3
SPLIT WT-	167.2						CUM WT %	0.0	4.7	11.7	30.8	69.5	84.6	91.3	95.7	100.0	

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**WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT**

**** REPORT ON WELL 0299-W15-002 ****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN
							PEB (<--2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	>4.75)
115	7.5	C	17.8	79.8	2.4	(m)s	WT 0.5	3.6	9.2	22.3	45.5	28.9	30.5	15.4	15.0
SORT-	1.76	MEDIAN-	3.00	MODE-	2.00	MEAN- 2.31	WT % 0.3	2.1	5.4	13.1	26.6	16.9	17.9	9.0	8.8
SPLIT	WT= 171.0						CUM WT % 0.3	2.4	7.8	20.8	47.5	64.4	82.2	91.2	100.0
120	6.8	C	22.4	76.6	0.9	mS	WT 0.0	1.3	4.8	16.5	38.6	16.3	29.5	13.9	17.0
SORT-	1.75	MEDIAN-	3.00	MODE-	2.00	MEAN- 2.64	WT % 0.0	0.9	3.5	12.0	28.0	11.8	21.4	10.1	12.3
SPLIT	WT= 139.0						CUM WT % 0.0	0.9	4.4	16.4	44.4	56.2	77.6	87.7	100.0
130	18.7	C	16.7	52.4	31.0	msG	WT 26.5	24.0	14.7	12.0	20.0	17.7	21.0	16.2	11.0
SORT-	N/A	MEDIAN-	2.00	MODE-	-2.00	MEAN- N/A	WT % 16.3	14.7	9.0	7.4	12.3	10.9	12.9	9.9	6.7
SPLIT	WT= 164.1						CUM WT % 16.3	31.0	40.0	47.3	59.6	70.4	83.3	93.3	100.0
135	7.5	C	6.5	54.6	38.9	msG	WT 30.0	29.5	25.3	16.2	15.0	10.0	16.9	4.6	5.3
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN- N/A	WT % 19.6	19.3	16.6	10.6	9.8	6.5	11.1	3.0	3.5
SPLIT	WT= 152.3						CUM WTO 19.6	38.9	55.5	66.1	75.9	82.5	93.5	96.5	100.0
140	2.9	C	5.1	60.5	34.4	sG	WT 23.9	29.1	29.6	25.1	22.0	9.6	6.9	4.2	3.6
SORT-	1.97	MEDIAN-	0.00	MODE-	0.00	MEAN- -0.06	WT % 15.5	18.9	19.2	16.3	14.3	6.2	4.5	2.7	2.3
SPLIT	WT= 153.5						CUM WTO 15.5	34.4	53.6	69.9	84.2	90.5	94.9	97.7	100.0
145	2.0	C	10.8	60.8	28.4	(m)gs	WT 21.2	23.2	22.2	22.5	25.7	15.2	9.4	6.8	10.1
SORT-	2.49	MEDIAN-	1.00	MODE-	2.00	MEAN- 0.60	WT % 13.6	14.8	14.2	14.4	16.4	9.7	6.0	4.4	6.5
SPLIT	WT= 156.8						CUM WTO 13.6	28.4	42.6	57.0	73.4	83.2	89.2	93.5	100.0
150	1.6	C	8.6	60.5	30.9	msG	WT 23.0	24.2	18.9	20.0	23.8	15.6	14.0	5.4	7.7
SORT-	2.56	MEDIAN-	1.00	MODE-	-1.00	MEAN- 0.59	WT % 15.1	15.9	12.4	13.1	15.6	10.2	9.2	3.5	5.1
SPLIT	WT= 153.0						CUM WT % 15.1	30.9	43.3	56.4	72.0	82.3	91.4	95.0	100.0
155	0.9	C	9.3	58.3	32.4	msG	WT 21.8	23.4	17.9	21.6	20.2	12.9	8.9	6.0	7.0
SORT-	2.47	MEDIAN-	1.00	MODE-	-1.00	MEAN- 0.43	WT % 15.6	16.8	12.8	15.5	14.5	9.2	6.4	4.3	5.0
SPLIT	WT= 139.7						CUM WT % 15.6	32.4	45.2	60.6	75.1	84.3	90.7	95.0	100.0
160	0.8	C	4.8	71.8	23.4	gs*	WT 14.4	17.9	23.2	30.8	26.8	11.0	7.1	3.5	3.1
SORT-	1.90	MEDIAN-	1.00	MODE-	1.00	MEAN- 0.37	WT % 10.5	13.0	16.8	22.4	19.5	8.0	5.2	2.5	2.3
SPLIT	WT= 137.8						CUM WT % 10.5	23.4	40.3	62.6	82.1	90.1	95.2	97.8	100.0
165	0.5	C	2.4	55.5	42.0	sG	WT 31.7	36.9	26.1	27.6	22.3	10.0	4.7	2.2	1.8
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN- N/A	WT % 19.4	22.6	16.0	16.9	13.7	6.1	2.9	1.4	1.1
SPLIT	WT= 163.2						CUM WTO 19.4	42.0	58.0	74.9	88.6	94.7	97.6	98.9	100.0
170	0.7	C	0.8	65.2	34.0	sG	WT 14.9	36.9	50.5	29.5	12.3	5.5	1.6	0.7	0.5
SORT-	1.30	MEDIAN-	0.00	MODE-	0.00	MEAN- -0.46	WT % 9.8	24.2	33.1	19.4	8.1	3.6	1.1	0.5	0.3
SPLIT	WT= 155.0						CUM WT % 9.8	34.0	67.1	86.5	94.6	98.2	99.2	99.7	100.0

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W15-002 ****

12/11/89

C52

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN			
							PEB (<--2)	PEB (-1)	COARS (0)									
175	0.8	C	10.6	51.0	38.4	msg				WT 30.9	21.7	14.5	12.0	16.9	14.5	12.0	7.0	7.5
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A			WT % 22.6	15.8	10.6	8.8	12.3	10.6	8.8	5.1	5.5
SPLIT	WT-	137.0					CUM WT %	22.6	38.4	49.0	57.7	70.1	80.7	89.4	94.5	100.0		
180	0.8	C	0.0	22.7	77.3	sG				WT 73.0	30.6	17.5	8.0	3.7	1.1	0.2	0.0	0.0
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A			WT % 54.4	22.8	13.1	6.0	2.8	0.8	0.2	0.0	0.0
SPLIT	WT-	135.0					CUM WT %	54.4	77.3	90.3	96.3	99.0	99.9	100.0	100.0	100.0		
185	1.8	C	3.5	46.2	50.3	sG				WT 29.1	44.4	31.4	17.5	10.6	5.6	2.5	2.6	2.5
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT % 19.9	30.4	21.5	12.0	7.3	3.8	1.7	1.8	1.7
SPLIT	WT-	145.5					CUM WT %	19.9	50.3	71.8	83.7	91.0	94.8	96.5	98.3	100.0		
190	0.7	C	1.1	64.5	34.4	sG				WT 11.6	40.1	41.1	26.0	18.9	8.1	3.0	0.9	0.8
SORT-	1.54	MEDIAN-	0.00	MODE-	0.00	MEAN-	-0.24			WT % 7.7	26.6	27.3	17.3	12.6	5.4	2.0	0.6	0.5
SPLIT	WT-	150.8					CUM WT %	7.7	34.4	61.7	78.9	91.5	96.9	98.9	99.5	100.0		
195	0.7	C	0.0	23.7	76.3	sG				WT 70.7	39.1	21.2	8.7	3.0	0.9	0.3	0.0	0.0
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A			WT % 49.1	27.2	14.7	6.1	2.1	0.6	0.2	0.0	0.0
SPLIT	WT-	144.4					CUM WT %	49.1	76.3	91.0	97.1	99.2	99.8	100.0	100.0	100.0		
200	0.5	C	3.3	60.7	36.0	sG				WT 18.2	37.5	30.6	19.2	21.8	17.1	4.9	2.5	2.6
SORT-	1.98	MEDIAN-	0.00	MODE-	-1.00	MEAN-	0.00			WT % 11.8	24.3	19.9	12.4	14.1	11.1	3.2	1.6	1.7
SPLIT	WT-	154.4					CUM WT %	11.8	36.0	56.0	68.4	82.5	93.5	96.7	98.3	100.0		
205	0.4	C	0.0	45.2	54.8	sG				WT 25.0	57.0	37.8	19.8	8.2	1.7	0.2	0.0	0.0
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT % 16.7	38.1	25.3	13.2	5.5	1.1	0.1	0.0	0.0
SPLIT	WT-	149.5					CUM WT %	16.7	54.8	80.0	93.3	98.7	99.9	100.0	100.0	100.0		
210	0.8	C	0.1	66.4	33.4	sG				WT 19.3	29.0	28.2	23.1	30.9	11.9	1.8	0.2	0.0
SORT-	1.78	MEDIAN-	0.00	MODE-	2.00	MEAN-	-0.11			WT % 13.4	20.1	19.5	16.0	21.4	8.2	1.3	0.1	0.0
SPLIT	WT-	145.2					CUM WT %	13.4	33.5	53.0	69.0	90.4	98.6	99.9	100.0	100.0		
215	0.6	C	0.1	39.0	60.9	sG				WT 38.0	55.5	37.0	15.3	5.3	2.1	0.2	0.1	0.0
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A			WT % 24.8	36.2	24.1	10.0	3.5	1.4	0.1	0.1	0.0
SPLIT	WT-	153.6					CUM WT %	24.8	60.9	85.0	95.0	98.4	99.8	99.9	100.0	100.0		
220	0.5	C	0.1	71.7	28.2	gS				WT 3.0	40.1	51.0	31.1	18.7	7.6	1.3	0.0	0.2
SORT-	1.32	MEDIAN-	0.00	MODE-	0.00	MEAN-	-0.21			WT % 2.0	26.2	33.3	20.3	12.2	5.0	0.9	0.0	0.1
SPLIT	WT-	153.1					CUM WT %	2.0	28.2	61.5	81.8	94.1	99.0	99.9	99.9	100.0		
225	0.7	C	0.0	27.8	72.2	sG				WT 82.1	33.9	26.0	13.0	4.2	1.2	0.2	0.0	0.0
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A			WT % 51.1	21.1	16.2	8.1	2.6	0.8	0.1	0.0	0.0
SPLIT	WT-	160.2					CUM WT %	51.1	72.2	88.4	96.5	99.1	99.9	100.0	100.0	100.0		

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0299-W15-002 ****

12/11/89

DEPTH	%CACO3	DM	%NUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	COARS	MED	FINE	VERY	SILT	PAN	
							PEB (<=2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	COARS (d)	(4.75)	(>4.75)		
230	0.4	E	1.7	68.2	30.2	sG	WT	10.1	29.9	28.5	24.8	24.9	10.1	2.0	1.2	1.0	
SORT-	1.67	MEDIAN-	0.00	MODE-	-1.00	MEAN-	0.00	WT %	7.6	22.6	21.5	18.7	18.8	7.6	1.5	0.9	0.8
SPLIT WT-	132.0						CUM WT %	7.6	30.2	51.7	70.4	89.2	96.0	98.3	99.3	100.0	
Z35	1.1	E	0.2	66.9	32.9	sG	WT	12.6	37.2	42.9	ZZ.S	31.1	4.1	0.7	0.3	0.0	
SORT-	1.54	MEDIAN-	0.00	MODE-	0.00	MEAN-	-0.23	WT %	8.3	24.6	28.3	14.9	Z.O.S	2.7	O.S	0.2	0.0
SPLIT WT-	150.7						CUM WT %	8.3	32.9	61.2	76.1	96.6	99.3	99.8	100.0	100.0	
240	0.4	E	0.2	13.0	86.8	G	WT	97.2	7.1	1.8	1.8	9.4	Z.O	0.6	0.3	0.0	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	80.9	5.9	1.5	1.5	7.8	1.7	O.S	0.3	0.0
SPLIT WT-	119.7						CUM WT %	80.9	86.8	88.3	89.8	97.6	99.3	99.0	100.0	100.0	
Z45	0.7	E	6.8	SZ.I	41.0	msG	WT	54.5	19.2	15.3	14.9	35.7	18.7	9.1	6.1	6.2	
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A	WT %	30.3	10.7	8.5	8.3	19.9	10.4	5.1	3.4	3.S
SPLIT WT-	179.2						CUM WT %	30.3	41.0	49.5	57.8	77.7	88.1	93.2	96.5	100.0	
250	0.6	C	0.0	26.6	73.4	sG	WT	69.7	47.0	22.5	9.1	8.8	1.6	0.3	0.0	0.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	43.8	29.6	14.2	5.7	5.5	1.0	0.2	0.0	0.0
SPLIT WT-	159.0						CUM WT %	43.8	73.4	87.6	93.3	98.8	99.0	100.0	100.0	100.0	
Z55	0.7	E	9.8	72.9	17.3	(m)gs	WT	6.4	22.0	18.0	13.6	51.1	22.9	13.8	7.9	8.1	
SORT-	2.18	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.20	WT %	3.9	13.4	11.0	8.3	31.2	14.0	8.4	4.8	5.0
SPLIT WT-	164.7						CUM WT %	3.9	17.3	28.3	36.6	67.8	81.8	90.2	95.1	100.0	
Z60	0.7	E	1.2	16.2	82.6	G	WT	97.0	37.2	8.6	3.Z	9.6	3.7	1.2	1.0	1.0	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	59.7	22.9	S.Z	2.0	5.9	Z.Z	0.7	0.6	0.6
SPLIT WT-	162.0						CUM WT %	59.7	82.6	87.9	89.8	95.8	98.0	98.8	99.4	100.0	

**WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT**

**** REPORT ON WELL 0699-045-078 ****

12/11/89

DEPTH	%CAC03	IM	%MUD	CSAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN	
							(<-2)	PEB (-1)	COARS (0)	COARS (1)	(2)	(3)	FINE (4)	(4.75)	(>4.75)	
5	1.1	C	14.0	57.8	28.2	(m) gS	WT 29.5	16.7	15.5	28.0	20.1	16.5	14.8	2.5	20.5	
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A	WT % 18.0	10.2	9.5	17.1	12.3	10.1	9.0	1.5	12.5
SPLIT WT-	163.3						CUM WT % 18.0	28.2	37.6	54.7	66.9	77.0	86.0	87.5	100.0	
10	0.9	C	10.8	50.8	38.5	msG	WT 39.7	21.3	15.4	23.9	16.8	13.4	11.0	1.0	16.1	
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A	WT % 25.0	13.4	9.7	15.1	10.6	8.5	6.9	0.6	10.2
SPLIT WT-	158.5						CUM WT % 25.0	38.5	48.2	63.2	73.8	82.3	89.2	89.9	100.0	
15	0.5	C	3.3	33.2	63.5	sG	WT 70.1	33.2	19.3	17.5	9.2	5.0	3.0	1.1	4.3	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT % 43.1	20.4	11.9	10.8	5.7	3.1	1.8	0.7	2.6
SPLIT WT-	163.3						CUM WT % 43.1	63.5	75.4	86.1	91.8	94.8	96.7	97.4	100.0	
20	0.6	C	5.7	44.8	49.4	msG	WT 61.4	19.2	13.2	16.7	15.1	16.9	11.2	3.3	6.0	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT % 37.7	11.8	8.1	10.3	9.3	10.4	6.9	2.0	3.7
SPLIT WT-	163.7						CUM WT % 37.7	49.5	57.6	67.8	77.1	87.4	94.3	96.3	100.0	
25	0.6	C	5.8	84.3	9.9	(g) S	WT 5.2	9.9	26.9	53.5	30.4	11.5	6.1	2.7	6.2	
SORT-	1.41	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.72	WT % 3.4	6.5	17.7	35.1	20.0	7.6	4.0	1.8	4.1
SPLIT WT-	151.5						CUM WT % 3.4	9.9	27.6	62.7	82.6	90.2	94.2	95.9	100.0	
30	0.9	C	5.4	80.7	14.0	gS	WT 6.0	14.6	28.9	45.5	25.9	12.5	6.1	2.5	5.4	
SORT-	1.56	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.62	WT % 4.1	9.9	19.6	30.9	17.6	8.5	4.1	1.7	3.7
SPLIT WT-	148.6						CUM WT % 4.1	14.0	33.6	64.5	82.0	90.5	94.7	96.4	100.0	
35	0.8	C	5.6	66.0	28.4	gS	WT 30.8	15.0	15.8	33.2	35.6	14.5	7.3	1.3	7.8	
SORT-	N/A	MEDIAN-	1.00	MODE-	2.00	MEAN-	N/A	WT % 19.1	9.3	9.8	20.6	22.1	9.0	4.5	0.8	4.8
SPLIT WT-	161.4						CUM WT % 19.1	28.4	38.2	58.8	80.8	89.8	94.4	95.2	100.0	
40	1.1	C	4.6	55.4	40.1	sG	WT 54.9	13.8	16.7	30.5	30.2	11.7	5.8	2.8	5.0	
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A	WT % 32.0	8.1	9.7	17.8	17.6	6.8	3.4	1.6	2.9
SPLIT WT-	171.0						CUM WT % 32.0	40.1	49.8	67.6	85.2	92.1	95.4	97.1	100.0	
41	0.0	C	6.6	17.6	75.8	msG	WT 98.7	18.7	10.1	6.9	4.3	3.2	2.8	1.9	8.3	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT % 63.7	12.1	6.5	4.5	2.8	2.1	1.8	1.2	5.4
SPLIT WT-	154.4						CUM WT % 63.7	75.8	82.3	86.8	89.5	91.6	93.4	94.7	100.0	
45	0.9	C	6.1	31.5	62.4	msG	WT 80.8	24.5	20.5	13.7	8.2	5.8	5.0	0.8	9.5	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT % 47.9	14.5	12.1	8.1	4.9	3.4	3.0	0.5	5.6
SPLIT WT-	168.2						CUM WT % 47.9	62.4	74.5	82.6	87.5	90.9	93.9	94.4	100.0	
50	0.8	C	6.2	33.4	60.4	msG	WT 70.0	27.7	19.9	13.8	8.7	6.3	5.4	2.5	7.5	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT % 43.3	17.1	12.3	8.5	5.4	3.9	3.3	1.6	4.6
SPLIT WT-	162.7						CUM WT % 43.3	60.4	72.7	81.2	86.6	90.5	93.8	95.4	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0699-045-078 ****

12/11/89

DEPTH	%CAC03	IM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY		VERY						
							(<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	SILT (4.75)	PAN (>4.75)		
55	0.8	C	5.4	29.8	64.8	msG	WT %	91.4	21.7	19.1	14.8	9.0	5.2	3.9	4.6	4.9	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	52.4	12.4	10.9	8.5	5.2	3.0	2.2	2.6	2.8
SPLIT	WT-	173.9					CUM WT %	52.4	64.8	75.7	84.2	89.4	92.3	94.6	97.2	100.0	
60	1.1	C	5.3	20.7	73.9	msG	WT %	90.6	34.3	16.4	7.1	4.2	3.8	3.5	3.3	5.7	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	53.6	20.3	9.7	4.2	2.5	2.3	2.1	2.0	3.4
SPLIT	WT-	168.1					CUM WT %	53.6	74.0	83.7	87.9	90.4	92.6	94.7	96.6	100.0	
65	1.0	R	7.8	30.4	61.8	msG	WT %	86.5	20.3	17.2	13.5	9.2	7.0	5.7	4.2	9.3	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	50.0	11.7	10.0	7.8	5.3	4.1	3.3	2.4	5.4
SPLIT	WT-	172.0					CUM WT %	50.0	61.8	71.7	79.5	84.9	88.9	92.2	94.6	100.0	
70	0.8	R	2.0	23.3	74.7	sG	WT %	97.6	30.4	17.4	9.0	6.2	4.2	3.1	1.4	2.1	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	56.9	17.7	10.2	5.3	3.6	2.5	1.8	0.8	1.2
SPLIT	WT-	172.7					CUM WT %	56.9	74.7	84.8	90.1	93.7	96.2	98.0	98.8	100.0	
75	0.9	R	7.1	44.2	48.7	msG	WT %	58.5	25.2	25.2	22.7	13.7	8.5	5.9	5.1	7.1	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	34.0	14.7	14.7	13.2	8.0	4.9	3.4	3.0	4.1
SPLIT	WT-	171.9					CUM WT %	34.0	48.7	63.4	76.6	84.5	89.5	92.9	95.9	100.0	
80	1.3	R	5.4	35.3	59.3	msG	WT %	73.8	26.1	20.5	14.3	11.8	7.8	5.1	3.7	5.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	43.8	15.5	12.2	8.5	7.0	4.6	3.0	2.2	3.2
SPLIT	WT-	168.5					CUM WT %	43.8	59.3	71.5	80.0	87.0	91.6	94.6	96.8	100.0	
85	1.5	R	7.9	52.7	39.4	msG	WT %	38.8	27.5	24.9	25.0	17.6	12.3	8.8	6.0	7.2	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	23.1	16.4	14.8	14.9	10.5	7.3	5.2	3.6	4.3
SPLIT	WT-	166.9					CUM WT %	23.1	39.4	54.3	69.1	79.6	86.9	92.1	95.7	100.0	
90	1.4	R	6.0	58.7	35.3	sG	WT %	24.6	32.2	31.9	31.7	17.6	8.1	5.2	3.5	6.2	
SORT-	1.90	MEDIAN-	0.00	MODE-	-1.00	MEAN-	-0.13	WT %	15.3	20.0	19.8	19.7	10.9	5.0	3.2	2.2	3.9
SPLIT	WT-	160.8					CUM WT %	15.3	35.3	55.1	74.8	85.7	90.7	94.0	96.1	100.0	
95	2.3	R	5.8	68.6	25.5	gS	WT %	14.1	29.6	34.2	42.2	22.1	11.8	7.1	5.8	4.2	
SORT-	1.84	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.25	WT %	8.2	17.3	20.0	24.7	12.9	6.9	4.2	3.4	2.5
SPLIT	WT-	170.4					CUM WT %	8.2	25.5	45.5	70.2	83.1	90.0	94.2	97.6	100.0	
100	2.1	R	6.8	70.3	22.9	gS	WT %	8.7	28.7	36.4	39.2	21.2	11.2	6.8	3.9	7.2	
SORT-	1.83	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.36	WT %	5.3	17.6	22.3	24.0	13.0	6.9	4.2	2.4	4.4
SPLIT	WT-	162.1					CUM WT %	5.3	22.9	45.2	69.2	82.2	89.0	93.2	95.6	100.0	
105	12.4	R	25.9	56.1	18.1	gMS	WT %	11.6	17.2	19.3	22.2	16.8	13.7	17.3	15.5	25.7	
SORT-	2.97	MEDIAN-	2.00	MODE-	5.00	MEAN-	1.71	WT %	7.3	10.8	12.1	13.9	10.6	8.6	10.9	9.7	16.1
SPLIT	WT-	158.8					CUM WT %	7.3	18.1	30.2	44.1	54.7	63.3	74.2	83.9	100.0	

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY	SILT (4.75)	PAN (>4.75)	
							PEB (<-2)	PEB (-1)	COARS (0)					FINE (4)			
110	2.6	R	0.9	80.3	10.9	gS	WT	9.1	9.1	15.3	49.0	45.8	14.9	9.5	5.3	9.6	
SORT-	1.64	MEDIAN-	2.00	MODE-	1.00	MEAN-	1.14	WT %	5.4	5.4	9.1	29.2	27.3	8.9	5.7	3.2	5.7
SPLIT	WT-	168.2					CUM WT %	5.4	10.9	20.0	49.2	76.6	05.5	91.1	94.3	100.0	
115	2.0	R	8.4	79.3	12.3	gS	WT	4.5	12.7	12.9	31.9	32.7	21.0	12.8	4.8	7.0	
SORT-	1.00	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.28	WT %	3.2	9.1	9.2	22.7	23.3	15.0	9.1	3.4	5.0
SPLIT	WT-	139.8					CUM WT %	3.2	12.3	21.5	44.2	67.5	82.5	91.6	95.0	100.0	
120	2.6	R	8.1	76.9	15.0	gS	WT	6.0	14.1	12.0	31.0	30.5	18.2	10.6	4.2	6.6	
SORT-	1.95	MEDIAN-	2.00	MODE-	1.00	MEAN-	1.07	WT %	4.5	10.5	9.6	23.1	22.8	13.6	7.9	3.1	4.9
SPLIT	WT-	134.5					CUM WT %	4.5	15.0	24.6	47.7	70.4	84.0	91.9	95.1	100.0	
125	1.6	R	5.0	85.9	8.3	(g)S	WT	1.0	9.6	14.0	37.5	34.0	16.2	7.5	2.9	4.5	
SORT-	1.49	MEDIAN-	2.00	MODE-	1.00	MEAN-	1.12	WT %	0.8	7.5	11.6	29.3	26.6	12.7	5.9	2.3	3.5
SPLIT	WT-	128.0					CUM WT %	0.8	8.3	19.8	49.1	75.7	88.4	94.2	96.5	100.0	
130	1.3	R	5.9	89.5	4.6	S	WT	0.7	5.8	16.0	43.5	39.7	17.9	8.3	3.2	5.0	
SORT-	1.34	MEDIAN-	2.00	MODE-	1.00	MEAN-	1.25	WT %	0.5	4.1	11.4	31.1	20.3	12.8	5.9	2.3	3.6
SPLIT	WT-	139.4					CUM WT %	0.5	4.6	16.1	47.1	75.5	88.2	94.2	96.4	100.0	
135	0.7	R	3.0	87.0	10.1	gS	WT	3.0	12.1	21.3	62.0	32.3	10.7	4.3	1.7	2.8	
SORT-	1.22	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.63	WT %	2.0	8.1	14.2	41.3	21.5	7.1	2.9	1.1	1.9
SPLIT	WT-	149.0					CUM WT %	2.0	10.	24.2	65.5	07.0	94.1	97.0	98.1	100.0	
140	0.9	R	0.7	79.2	12.1	gS	WT	3.2	15.2	34.0	35.0	26.7	15.0	8.5	4.6	8.6	
SORT-	1.83	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.00	WT %	2.1	10.0	22.4	23.6	17.6	9.9	5.6	3.0	5.7
SPLIT	WT-	151.2					CUM WTZ	2.1	12.1	34.6	58.2	75.0	85.7	91.3	94.3	100.0	
145	0.6	R	8.3	63.1	20.6	(m)gS	WT	19.9	25.5	32.6	30.7	18.4	11.3	7.2	4.0	9.1	
SORT-	2.16	MEDIAN-	1.00	MODE-	0.00	MEAN-	0.27	WT %	12.5	16.1	20.5	19.3	11.6	7.1	4.5	2.5	5.7
SPLIT	WT-	158.2					CUM WT %	12.5	20.6	49.2	68.5	80.1	87.2	91.7	94.3	100.0	
150	0.5	R	0.9	61.1	30.1	msG	WT	21.0	29.6	30.0	31.6	20.7	12.5	8.0	4.2	10.7	
SORT-	2.24	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.33	WT %	12.5	17.6	17.8	10.0	12.3	7.4	4.8	2.5	6.4
SPLIT	WT-	167.8					CUM WT %	12.5	30.1	47.9	66.7	79.0	86.4	91.2	93.7	100.0	
155	1.4	R	0.4	61.0	30.6	msG	WT	20.0	28.1	25.9	29.7	20.0	12.0	7.5	4.1	9.1	
SORT-	2.22	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.32	WT %	12.7	17.9	16.5	10.9	13.2	7.6	4.8	2.6	5.8
SPLIT	WT-	157.6					CUM WT %	12.7	30.6	47.1	66.0	79.2	86.8	91.6	94.2	100.0	
160	0.6	R	11.2	72.4	16.3	(m)gS	WT	6.9	16.4	21.5	29.4	26.3	16.3	9.8	5.0	11.0	
SORT-	2.16	MEDIAN-	1.00	MODE-	1.00	MEAN-	1.06	WT %	4.8	11.5	15.1	20.6	18.4	11.4	6.9	3.5	7.7
SPLIT	WT-	142.1					CUM WT %	4.0	16.3	31.4	52.0	70.5	81.9	88.8	92.3	100.0	

**WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
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***** REPORT ON WELL 0699-045-078 *****

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS (0)	COARS (1)	MED	FINE	VERY	SILT	PAN	
							PEB (<-2)	PEB (-1)	COARS (0)			(2)	(3)	FINE (4)	(4.75)	(>4.75)	
170	0.8	R	9.5	74.8	15.7	(m)gs	WT	10.8	14.1	18.5	35.6	27.3	20.1	17.0	6.1	9.0	
SORT-	2.19	MEDIAN-	2.00	MODE-	1.00	MEAN-	WT %	6.8	8.9	11.7	22.5	17.2	12.7	10.7	3.9	5.7	
SPLIT WT-	158.0						CUM WT %	6.8	15.7	27.4	49.8	67.1	79.7	90.5	94.3	100.0	
175	0.8	R	8.8	86.3	4.9	S	WT	0.1	6.6	20.9	41.4	29.7	17.0	10.0	4.1	8.1	
SORT-	1.64	MEDIAN-	1.00	NODE-	1.00	MEAN-	WT %	0.1	4.8	15.2	30.0	21.5	12.3	7.3	3.0	5.9	
SPLIT WT-	138.5						CUM WT %	0.1	4.9	20.0	50.0	71.6	83.9	91.2	94.1	100.0	
180	0.7	R	3.0	44.6	52.4	sG	WT	17.4	63.6	29.5	17.5	11.6	6.8	3.5	1.6	3.1	
SORT-	1.52	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	WT %	11.3	41.1	19.1	11.3	7.5	4.4	2.3	1.0	2.0	
SPLIT WT-	154.3						CUM WT %	11.3	52.4	71.5	82.8	90.3	94.7	97.0	98.0	100.0	
190	0.3	R	7.7	58.3	34.0	msG	WT	5.2	47.6	39.3	15.8	17.9	10.5	7.2	3.9	8.1	
SORT-	2.02	MEDIAN-	0.00	MODE-	-1.00	MEAN-	WT %	3.3	30.6	25.3	10.2	11.5	6.8	4.6	2.5	5.2	
SPLIT WT-	155.3						CUM WT %	3.3	34.0	59.2	69.4	80.9	87.6	92.3	94.8	100.0	
195	0.3	R	6.8	57.7	35.4	msG	WT	4.1	53.5	39.0	18.9	18.6	10.3	7.0	3.7	7.4	
SORT-	1.91	MEDIAN-	0.00	MODE-	-1.00	MEAN-	WT %	2.5	32.9	24.0	11.6	11.5	6.3	4.3	2.3	4.6	
SPLIT WT-	162.0						CUM WT %	2.5	35.4	59.4	71.1	82.5	88.9	93.2	95.5	100.0	
200	0.2	R	1.6	11.5	86.9	G	WT	54.2	86.1	8.1	3.6	3.1	2.3	1.4	0.8	1.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	33.6	53.4	5.0	2.2	1.9	1.4	0.9	0.5	1.1
SPLIT WT-	161.7						CUM WT %	33.6	86.9	92.0	94.2	96.1	97.5	98.4	98.9	100.0	
205	0.2	R	7.6	42.9	49.5	msG	WT	16.1	56.6	13.6	13.5	12.0	11.2	12.7	4.7	6.5	
SORT-	2.45	MEDIAN-	0.00	MODE-	-1.00	MEAN-	WT %	11.0	38.5	9.3	9.2	8.2	7.6	8.7	3.2	4.4	
SPLIT WT-	147.1						CUM WT %	11.0	49.5	58.8	67.9	76.1	83.7	92.4	95.6	100.0	
210	0.3	R	2.6	28.7	68.7	sG	WT	42.7	68.4	19.9	12.6	7.7	3.7	2.4	1.3	2.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	26.4	42.3	12.3	7.8	4.8	2.3	1.5	0.8	1.8
SPLIT WT-	159.5						CUM WT %	26.4	68.8	81.1	88.9	93.6	95.9	97.4	98.2	100.0	
215	0.2	R	4.1	24.0	72.0	msG	WT	65.9	44.0	14.1	8.8	6.5	4.4	2.8	1.9	4.3	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	43.2	28.8	9.2	5.8	4.3	2.9	1.8	1.2	2.8
SPLIT WT-	153.5						CUM WT %	43.2	72.0	81.2	87.0	91.2	94.1	95.9	97.2	100.0	
220	0.2	R	1.4	12.7	85.9	G	WT	51.6	16.5	4.7	1.9	1.6	1.2	0.7	0.4	0.7	
SORT-	H/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	65.1	20.8	5.9	2.4	2.0	1.5	0.9	0.5	0.9
SPLIT WT-	78.9						CUM WT %	65.1	85.9	91.8	94.2	96.2	97.7	98.6	99.1	100.0	
235	0.3	R	2.3	16.5	81.2	G	WT	50.7	74.6	7.6	4.8	4.9	4.1	4.0	1.6	2.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	32.9	48.4	4.9	3.1	3.2	2.7	2.6	1.0	1.3
SPLIT WT-	154.6						CUM WT %	32.9	81.2	86.1	89.3	92.4	95.1	97.7	98.7	100.0	

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**** REPORT ON WELL 0699-045-078 ****

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN	
							PEB (<-2)	PEB (-1)	COARS (0)	(1)	(2)	(3)	(4)	(4.75)	(>4.75)	
245	0.2	R	2.3	24.7	72.9	sG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A									
SPLIT WT-	136.4						WT	43.7	55.7	13.5	8.0	7.0	3.3	1.9	1.0	2.2
							WT %	32.1	40.9	9.9	5.9	5.1	2.4	1.4	0.7	1.6
							CUM WT %	32.1	72.9	82.0	80.7	93.0	96.3	97.7	98.4	100.0
250	0.2	R	3.5	31.0	64.0	sG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	166.5						WT	58.0	50.6	18.7	12.2	11.9	6.8	3.7	1.9	3.9
							WT %	34.6	30.2	11.2	7.3	7.1	4.1	2.2	1.1	2.3
							CUM WT %	34.6	64.8	75.9	83.2	90.3	94.3	96.5	97.7	100.0
255	0.0	R	4.4	30.8	64.0	msG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	165.2						WT	63.8	43.1	17.7	10.8	12.0	6.4	3.9	2.3	5.0
							WT %	38.7	26.1	10.7	6.6	7.3	3.9	2.4	1.4	3.0
							CUM WT %	38.7	64.8	75.5	82.1	89.3	93.2	95.6	97.0	100.0
260	0.1	R	2.6	25.4	72.1	sG										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	158.2						WT	64.6	50.4	19.6	7.7	6.5	4.0	2.7	1.4	2.7
							WT %	40.5	31.6	12.3	4.8	4.1	2.5	1.7	0.9	1.7
							CUM WT %	40.5	72.1	84.3	89.2	93.2	95.7	97.4	98.3	100.0
265	0.0	R	1.1	9.6	09.3	G										
SORT-	N/A	HEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	82.5						WT	61.3	12.5	2.9	1.4	1.7	1.3	0.6	0.3	0.6
							WT %	74.2	15.1	3.5	1.7	2.1	1.6	0.7	0.4	0.7
							CUM WT %	74.2	89.3	92.9	94.5	96.6	98.2	98.9	99.3	100.0
275	0.0	R	0.6	3.7	95.6	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	79.9						WT	73.5	3.2	0.8	0.7	0.7	0.5	0.3	0.2	0.3
							WT %	91.7	4.0	1.0	0.9	0.9	0.6	0.4	0.3	0.4
							CUM WT %	91.7	95.6	96.6	97.5	98.4	99.0	99.4	99.6	100.0
280	0.0	R	1.7	16.0	82.3	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	77.7						WT	53.2	11.6	5.2	2.6	2.2	1.6	1.0	0.5	0.8
							WT %	67.6	14.7	6.6	3.3	2.8	2.0	1.3	0.6	1.0
							CUM WT %	67.6	82.3	89.0	92.3	95.1	97.1	98.4	99.0	100.0
285	0.0	R	1.3	12.4	86.3	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	164.5						WT	97.7	44.7	7.7	4.0	4.1	3.1	1.5	0.0	1.4
							WT %	59.2	27.1	4.7	2.4	2.5	1.9	0.9	0.5	0.9
							CUM WT %	59.2	86.3	91.0	93.4	95.9	97.8	98.7	99.1	100.0
290	0.0	R	7.2	62.8	30.0	msG										
SORT-	N/A	MEDIAN-	1.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	160.3						WT	34.7	13.5	27.5	22.0	26.3	17.6	7.4	3.7	7.8
							WT %	21.6	8.4	17.1	13.7	16.4	11.0	4.6	2.3	4.9
							CUM WT %	21.6	30.0	47.2	60.9	77.3	88.2	92.0	95.2	100.0
295	0.4	R	1.1	19.7	79.1	sG										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	164.7						WT	96.4	34.4	11.5	0.3	0.0	3.5	1.3	0.7	1.2
							WT %	58.3	20.8	7.0	5.0	4.0	2.1	0.8	0.4	0.7
							CUM WT %	50.3	79.1	86.1	91.1	96.0	90.1	98.9	99.3	100.0
300	2.7	R	0.9	5.7	93.4	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	77.8						WT	71.5	2.0	1.1	1.0	1.2	0.7	0.5	0.3	0.4
							WT %	90.9	2.5	1.4	1.3	1.5	0.9	0.6	0.4	0.5
							CUM WT %	90.9	93.4	94.8	96.1	97.6	90.5	99.1	99.5	100.0

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***** REPORT ON WELL 0699-045-078 *****

12/11/89

DEPTH	%CACO3	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							(<-2)	PEB	PEB			(3)	(4)	(4.75)	(>4.75)		
305	0.4	R	1.7	14.7	83.7	G	WT	89.9	34.6	8.3	4.7	4.6	2.6	1.6	1.0	1.5	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT	60.4	23.3	5.6	3.2	3.1	1.8	1.1	0.7	1.0
SPLIT	WT-	149.4					CUM WT %	60.4	83.7	89.3	92.4	95.5	97.3	98.3	99.0	100.0	
310	0.0	R	1.5	17.2	01.4	G	WT	65.1	55.8	10.8	6.1	4.9	2.4	1.3	0.8	1.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	43.8	37.6	7.3	4.1	3.3	1.6	0.9	0.5	0.9
SPLIT	WT-	147.6					CUM WT %	43.8	81.4	88.6	92.7	96.0	97.7	98.5	99.1	100.0	
315	0.0	R	1.7	28.4	69.9	SG	WT	35.3	66.4	19.2	9.1	8.3	3.1	1.6	0.9	1.6	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	24.3	45.6	13.2	6.3	5.7	2.1	1.1	0.6	1.1
SPLIT	WT-	144.7					CUM WT %	24.3	69.9	83.1	89.4	95.1	97.2	98.3	98.9	100.0	
320	0.0	R	0.7	4.0	95.4	G	WT	64.1	5.8	1.0	0.6	0.7	0.4	0.2	0.2	0.3	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	07.5	7.9	1.4	0.8	1.0	0.6	0.3	0.3	0.4
SPLIT	WT-	73.1					CUM WTO	87.5	95.4	96.7	97.5	98.5	99.0	99.3	99.6	100.0	
325	0.1	R	1.3	26.9	71.9	SG	WT	47.6	60.7	15.9	8.6	11.0	3.6	1.4	0.7	1.2	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	31.6	40.3	10.6	5.7	7.3	2.4	0.9	0.5	0.8
SPLIT	WT-	150.3					CUM WT %	31.6	71.9	02.4	08.1	95.4	97.8	90.8	99.2	100.0	
330	0.1	R	2.2	46.8	51.0	SG	WT	10.5	59.5	26.7	16.7	10.9	6.9	2.3	1.1	2.2	
SORT-	1.63	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	12.1	38.9	17.5	10.9	12.4	4.5	1.5	0.7	1.4
SPLIT	WT-	151.4					CUM WT %	12.1	51.1	68.5	79.5	91.8	96.3	97.9	98.6	100.0	
335	0.3	R	0.8	6.5	92.7	G	WT	67.6	5.3	1.0	1.2	1.1	0.6	0.4	0.3	0.3	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	M/A	WT %	86.0	6.7	2.3	1.5	1.4	0.8	0.5	0.4	0.4
SPLIT	WT-	77.6					CUM WT %	86.0	92.8	95.0	96.6	98.0	98.7	99.2	99.6	100.0	
340	1.5	R	2.2	18.9	78.9	msG	WT	89.1	24.2	11.8	5.1	5.5	3.0	1.8	1.0	2.1	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	62.1	16.9	8.2	3.6	3.0	2.1	1.3	0.7	1.5
SPLIT	WT-	142.9					CUM WT %	62.1	78.9	87.1	90.7	94.5	96.6	97.8	90.5	100.0	
345	1.9	R	2.3	21.5	76.2	SG	WT	64.6	37.6	10.2	4.5	7.5	4.3	2.3	1.1	2.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	48.2	20.0	7.6	3.4	5.6	3.2	1.7	0.8	1.5
SPLIT	WT-	133.6					CUM WTS	40.2	76.2	83.8	07.2	92.8	96.0	97.7	98.5	100.0	
350	0.6	R	4.0	42.6	52.6	msG	WT	49.5	23.2	11.3	7.0	23.5	11.4	4.9	2.2	4.4	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	35.0	16.8	8.2	5.6	17.0	8.3	3.6	1.6	3.2
SPLIT	WT-	137.8					CUM WT %	35.0	52.6	60.0	66.4	03.4	91.7	95.2	96.8	100.0	
355	0.3	R	1.9	33.5	64.5	SG	WT	55.2	41.0	18.0	13.1	11.1	5.5	2.3	1.0	1.9	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	37.0	27.5	12.1	8.8	7.4	3.7	1.5	0.7	1.3
SPLIT	WT-	149.5					CUM WT %	37.0	64.5	76.6	85.4	92.8	96.5	98.1	98.7	100.0	

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0699-045-078 *****

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DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY		VERY	SILT	PAN			
							PEB (<-2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	(4.75)	(>4.75)	
360	0.1	R	5.0	37.4	57.5	msG	WT	47.3	23.5	13.6	5.9	14.0	8.1	4.5	2.3	3.9
							WT %	30.4	19.1	11.1	4.8	11.4	6.6	3.7	1.9	3.2
							CUM WT %	30.4	57.5	60.6	73.4	04.7	91.3	95.0	96.0	100.0
365	0.1	R	6.6	52.4	40.9	msG	WT	32.2	20.8	12.8	10.9	32.9	14.3	7.2	3.5	6.4
							WT %	21.6	19.3	0.6	7.3	22.1	9.6	4.0	2.4	4.3
							CUM WT %	21.6	40.9	49.5	56.9	70.9	08.5	93.4	95.7	100.0
370	4.0	R	4.3	30.4	57.3	msG	WT	35.9	50.1	13.6	14.0	17.1	8.0	4.2	2.2	4.3
							WT %	23.9	33.4	9.1	9.9	11.4	5.3	2.8	1.5	2.9
							CUM WT %	23.9	57.3	66.3	76.2	07.5	92.9	95.7	97.1	100.0
375	1.2	R	5.0	46.9	47.4	msG	WT	24.2	48.2	17.7	14.2	24.4	10.1	5.3	3.7	5.1
							WT %	15.8	31.5	11.6	9.3	16.0	6.6	3.5	2.4	3.3
							CUM WT %	15.8	47.4	58.9	68.2	84.2	90.8	94.3	96.7	100.0
380	1.2	R	1.9	10.1	87.9	G	WT	58.2	10.4	2.1	1.8	2.2	1.1	0.7	0.8	0.7
							WT %	74.6	13.3	2.7	2.3	2.8	1.4	0.9	1.0	0.9
							CUM WT %	74.6	88.0	90.6	93.0	95.8	97.2	98.1	99.1	100.0
305	1.2	R	1.7	24.0	74.2	sg	WT	74.2	27.7	10.2	7.6	9.9	3.6	1.7	0.9	1.5
							WT %	54.0	20.2	7.4	5.5	7.2	2.6	1.2	0.7	1.1
							CUM WT %	54.0	74.2	81.6	87.2	94.4	97.0	98.3	98.9	100.0
395	0.4	R	1.1	15.1	03.0	G	WT	52.6	7.8	3.7	2.7	2.7	1.2	0.6	0.3	0.5
							WT %	73.0	10.8	5.1	3.7	3.7	1.7	0.8	0.4	0.7
							CUM WT %	73.0	03.0	00.9	92.6	96.4	90.0	90.9	99.3	100.0
400	0.9	R	14.2	44.2	41.6	msG	WT	50.3	9.4	4.5	21.3	15.6	11.5	10.6	6.4	14.0
							WT %	35.0	6.6	3.1	14.0	10.9	8.0	7.4	4.5	9.0
							CUM WT %	35.0	41.6	44.7	59.5	70.4	70.4	05.0	90.3	100.0
405	0.3	R	1.5	15.7	02.0	G	WT	96.0	23.2	9.9	5.1	4.1	2.2	1.3	0.7	1.4
							WT %	66.7	16.1	6.9	3.5	2.9	1.5	0.9	0.5	1.0
							CUM WT %	66.7	82.8	89.7	93.3	96.1	97.6	98.5	99.0	100.0
410	0.4	R	2.2	16.7	01.2	G	WT	55.4	4.5	3.8	3.3	2.8	1.5	0.9	0.5	1.1
							WT %	75.1	6.1	5.2	4.5	3.8	2.0	1.2	0.7	1.5
							CUM WT %	75.1	81.2	86.3	90.8	94.6	96.6	97.8	98.5	100.0
415	0.3	R	1.7	16.0	81.5	G	WT	93.0	18.1	8.5	5.6	4.9	2.5	1.4	0.8	1.5
							WT %	68.2	13.3	6.2	4.1	3.6	1.8	1.0	0.6	1.1
							CUM WT %	68.2	81.5	87.8	91.9	95.5	97.3	98.3	98.9	100.0

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**** REPORT ON WELL 0699-045-078 ****

12/11/89

DEPTH	%CAC03	IM	MUD	%SAND	%GRAVEL	CLASS	FINE PEB (<-2)		VFINE PEB (-1)	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
							WT	%	WT	%	WT	%	WT	%	WT	%
420	0.4	R	1.4	17.3	81.4	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	152.9						WT	92.8	32.1	10.0	6.7	5.5	2.8	1.5	0.7	1.4
							WT %	60.5	20.9	6.5	4.4	3.6	1.8	1.0	0.5	0.9
							CUM WT %	60.5	81.4	87.9	92.2	95.8	97.6	98.6	99.1	100.0
425	0.8	R	1.5	18.9	79.6	sG										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	72.7						WT	50.1	8.2	4.5	3.5	3.2	1.7	0.9	0.4	0.7
							WT %	68.4	11.2	6.2	4.8	4.4	2.3	1.2	0.6	1.0
							CUM WT %	68.4	79.6	85.8	90.6	94.9	97.3	98.5	99.0	100.0
430	0.4	R	2.4	20.6	77.0	msG										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	84.2						WT	52.5	12.5	5.0	4.1	3.6	2.4	2.3	0.9	1.1
							WT %	62.2	14.8	5.9	4.9	4.3	2.8	2.7	1.1	1.3
							CUM WT %	62.2	77.0	82.9	87.8	92.1	94.9	97.6	98.7	100.0
435	0.5	R	0.8	7.5	91.8	G										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	77.2						WT	68.9	2.5	2.3	1.4	1.1	0.6	0.4	0.2	0.4
							WT %	88.6	3.2	3.0	1.8	1.4	0.8	0.5	0.3	0.5
							CUM WT %	88.6	91.8	94.7	96.5	97.9	98.7	99.2	99.5	100.0
440	1.0	R	2.3	23.0	74.7	sG										
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A									
SPLIT WT-	158.9						WT	92.5	26.9	12.1	9.2	8.6	4.3	2.5	1.4	2.3
							WT %	57.9	16.8	7.6	5.8	5.4	2.7	1.6	0.9	1.4
							CUM WT %	57.9	74.7	82.3	88.0	93.4	96.1	97.7	98.6	100.0
445	0.6	R	29.0	41.5	29.5	gmS										
SORT-	N/A	MEDIAN-	3.00	MODE-	5.00	MEAN-	N/A									
SPLIT WT-	163.7						WT	32.7	15.5	6.4	10.2	15.4	18.7	17.0	11.6	35.8
							WT %	20.0	9.5	3.9	6.3	9.4	11.5	10.4	7.1	21.9
							CUM WT %	20.0	29.5	33.4	39.7	49.1	60.6	71.0	78.1	100.0
450	1.4	R	21.9	65.8	12.3	gmS										
SORT-	2.26	MEDIAN-	3.00	MODE-	2.00	MEAN-	2.33									
SPLIT WT-	149.5						WT	9.5	8.9	3.5	16.7	29.7	28.5	20.0	10.4	22.4
							WT %	6.4	6.0	2.3	11.2	19.9	19.1	13.4	7.0	15.0
							CUM WT %	6.4	12.3	14.6	25.8	45.7	64.7	78.1	85.0	100.0
455	15.6	R	8.3	55.8	35.8	msG										
SORT-	N/A	MEDIAN-	0.00	MODE-	-1.00	MEAN-	N/A									
SPLIT WT-	151.0						WT	24.7	29.6	22.6	15.3	23.0	14.1	9.6	4.5	8.1
							WT %	16.3	19.5	14.9	10.1	15.2	9.3	6.3	3.0	5.4
							CUM WT %	16.3	35.8	50.8	60.9	76.0	85.4	91.7	94.7	100.0
460	12.8	R	13.5	65.9	20.6	(m)gs										
SORT-	2.53	MEDIAN-	2.00	MODE-	2.00	MEAN-	1.21									
SPLIT WT-	162.8						WT	11.4	22.1	13.6	26.6	30.4	21.3	15.4	7.7	14.2
							WT %	7.0	13.6	8.4	16.4	18.7	13.1	9.5	4.7	8.7
							CUM WT %	7.0	20.6	29.0	45.3	64.0	77.1	86.5	91.3	100.0
465	3.5	R	29.0	65.4	5.6	(g)mS										
SORT-	2.14	MEDIAN-	3.00	MODE-	4.00	MEAN-	2.73									
SPLIT WT-	148.7						WT	1.4	6.9	8.1	14.9	21.2	23.2	29.4	16.1	26.9
							WT %	1.0	4.7	5.5	10.1	14.3	15.7	19.9	10.9	18.2
							CUM WT %	1.0	5.6	11.1	21.1	35.5	51.1	71.0	81.8	100.0
470	3.4	R	27.2	65.6	7.2	(g)mS										
SORT-	2.44	MEDIAN-	3.00	MODE-	4.00	MEAN-	2.42									
SPLIT WT-	167.5						WT	4.4	7.7	16.5	21.4	21.2	20.3	30.2	16.2	29.3
							WT %	2.6	4.6	9.9	12.8	12.7	12.1	18.1	9.7	17.5
							CUM WT %	2.6	7.2	17.1	29.9	42.6	54.7	72.8	82.5	100.0

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

**** REPORT ON WELL 0699-045-078 ****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY	COARS	MED	FINE	VERY	SILT	PAN		
							(<-2)	PEB	PEB								
485	1.2	R	8.0	38.5	53.5	msG	WT	39.5	50.4	12.5	14.9	18.5	11.2	7.6	4.0	9.5	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	23.5	30.0	7.4	8.9	11.0	6.7	4.5	2.4	5.7
SPLIT WT-	168.2						CUM WT %	23.5	53.5	60.9	69.8	80.8	87.5	92.0	94.4	100.0	
500	0.8	R	6.4	45.0	48.6	msG	WT	49.5	34.3	15.7	18.7	24.2	12.1	7.0	3.6	7.5	
SORT-	N/A	MEDIAN-	0.00	MODE-	-2.00	MEAN-	N/A	WT %	28.7	19.9	9.1	10.8	14.0	7.0	4.1	2.1	4.4
SPLIT WT-	171.6						CUM WT %	28.7	48.6	57.7	68.5	82.5	89.5	93.6	95.7	100.0	
505	0.8	R	2.3	23.5	74.1	sG	WT	99.6	17.7	10.5	10.1	10.0	4.2	2.4	1.1	2.6	
SORT-	N/A	MEDIAN-	-2.00	MODE-	-2.00	MEAN-	N/A	WT %	63.0	11.2	6.6	6.4	6.3	2.7	1.5	0.7	1.6
SPLIT WT-	158.2						CUM WT %	63.0	74.2	80.8	87.2	93.5	96.1	97.7	98.4	100.0	
510	1.0	R	3.0	38.4	58.6	sG	WT	48.7	37.8	20.5	13.2	12.6	6.7	3.7	1.6	2.8	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT %	33.0	25.6	13.9	8.9	8.5	4.5	2.5	1.1	1.9
SPLIT WT-	147.5						CUM WT %	33.0	58.6	72.5	81.4	90.0	94.5	97.0	98.1	100.0	
515	0.8	R	3.7	50.7	45.6	sG	WT	2.7	63.7	45.9	13.1	7.5	4.5	2.7	1.6	3.8	
SORT-	1.22	MEDIAN-	0.00	MODE-	-1.00	MEAN-	-0.59	WT %	1.9	43.8	31.6	9.0	5.2	3.1	1.9	1.1	2.6
SPLIT WT-	145.4						CUM WT %	1.9	45.6	77.2	86.2	91.3	94.4	96.3	97.4	100.0	
520	0.9	R	3.3	28.8	68.0	msG	WT	15.0	80.9	22.8	8.0	4.7	3.1	2.0	1.3	3.3	
SORT-	0.95	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	-1.08	WT %	10.6	57.3	16.2	5.7	3.3	2.2	1.4	0.9	2.3
SPLIT WT-	141.8						CUM WT %	10.6	68.0	84.1	89.8	93.1	95.3	96.8	97.7	100.0	
525	0.9	R	9.2	45.1	45.7	msG	WT	2.8	60.9	28.1	14.9	8.8	6.3	4.8	4.1	8.8	
SORT-	1.97	MEDIAN-	0.00	MODE-	-1.00	MEAN-	-0.07	WT %	2.0	43.7	20.1	10.7	6.3	4.5	3.4	2.9	6.3
SPLIT WT-	139.4						CUM WT %	2.0	45.7	65.8	76.5	82.8	87.3	90.8	93.7	100.0	
530	1.1	R	5.0	45.8	49.2	sG	WT	0.8	76.0	42.9	11.5	7.6	5.6	4.0	2.4	5.4	
SORT-	1.34	MEDIAN-	0.00	MODE-	-1.00	MEAN-	-0.55	WT %	0.5	48.7	27.5	7.4	4.9	3.6	2.6	1.5	3.5
SPLIT WT-	155.7						CUM WT %	0.5	49.2	76.6	84.0	88.9	92.5	95.0	96.6	100.0	
535	0.8	R	2.4	35.3	62.3	sG	WT	7.9	89.1	33.9	10.7	5.2	3.0	2.1	1.3	2.5	
SORT-	0.90	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	-1.01	WT %	5.1	57.2	21.8	6.9	3.3	1.9	1.4	0.8	1.6
SPLIT WT-	155.6						CUM WT %	5.1	62.3	84.1	90.9	94.3	96.2	97.6	98.4	100.0	
540	0.9	R	3.3	40.0	56.7	sG	WT	3.7	77.7	31.7	11.9	6.7	4.3	2.8	1.5	3.3	
SORT-	1.19	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	-0.75	WT %	2.6	54.1	22.1	8.3	4.7	3.0	2.0	1.0	2.3
SPLIT WT-	144.0						CUM WT %	2.6	56.7	78.8	87.1	91.7	94.7	96.7	97.7	100.0	
555	0.6	R	5.5	52.1	42.3	sG	WT	9.8	50.6	42.5	14.6	7.6	5.7	4.0	2.3	5.6	
SORT-	1.52	MEDIAN-	0.00	MODE-	-1.00	MEAN-	-0.39	WT %	6.9	35.5	29.8	10.2	5.3	4.0	2.8	1.6	3.9
SPLIT WT-	142.7						CUM WT %	6.9	42.3	72.1	82.3	87.7	91.7	94.5	96.1	100.0	

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WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS
ROCSAN REPORT

***** REPORT ON WELL 0699-045-078 *****

12/11/89

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE	VFINE	VERY			VERY					
							(<=2)	PEB (-1)	COARS (0)	COARS (1)	MED (2)	FINE (3)	FINE (4)	SILT (4.75)	PAN (>4.75)		
560	0.6	R	5.2	35.5	59.4	msG	WT	29.7	56.3	24.4	10.3	7.1	5.5	4.1	2.5	5.0	
SORT-	N/A	MEDIAN-	-1.00	MODE-	-1.00	MEAN-	N/A	WT %	20.5	38.9	16.8	7.1	4.9	3.8	2.8	1.7	3.5
SPLIT	WT-	144.8					CUM WT %	20.5	59.4	76.2	83.3	88.2	92.0	94.8	96.6	100.0	
565	0.4	R	5.6	58.4	36.0	sG	WT	8.7	47.1	52.8	19.4	8.5	5.8	4.1	2.5	6.2	
SORT-	1.46	MEDIAN-	0.00	MODE-	0.00	MEAN-	-0.33	WT %	5.6	30.4	34.0	12.5	5.5	3.7	2.6	1.6	4.0
SPLIT	WT-	155.3					CUM WT %	5.6	36.0	70.0	82.5	88.0	91.8	94.4	96.0	100.0	

APPENDIX D
MOISTURE CHARACTERISTIC CURVES

APPENDIX D

MOISTURE CHARACTERISTIC CURVES

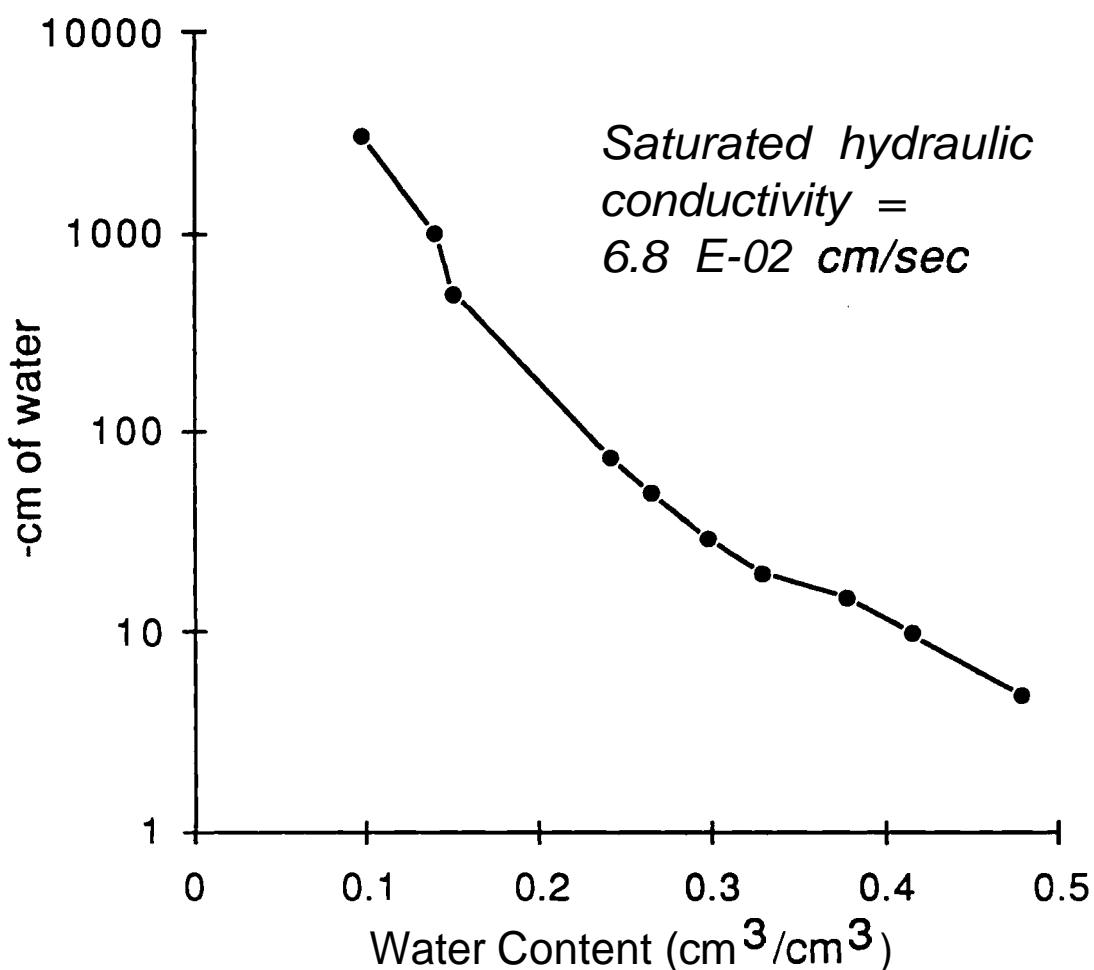
This appendix presents moisture-characteristic curves for 15 samples collected from the 200 Areas reported by Last et al. (1989). The characteristic curves are based on water-retention data presented in Table 10. Four of these samples are from the Hanford formation in the 200-East Area. The remaining 11 samples are from 200-West Area wells: seven of these are from the Hanford formation, two are from the middle Ringold, one is from the upper Ringold unit, and one is from the Plio-Pleistocene unit. Only two of the wells sampled (299-W7-2 and 299-W10-13) are within 1000 ft of W-5. Samples from the other wells are all from the Hanford formation; these may not be representative of conditions at W-5, but they are included here to indicate the variable nature inherent to the Hanford formation.

Well #: 299-W7-2

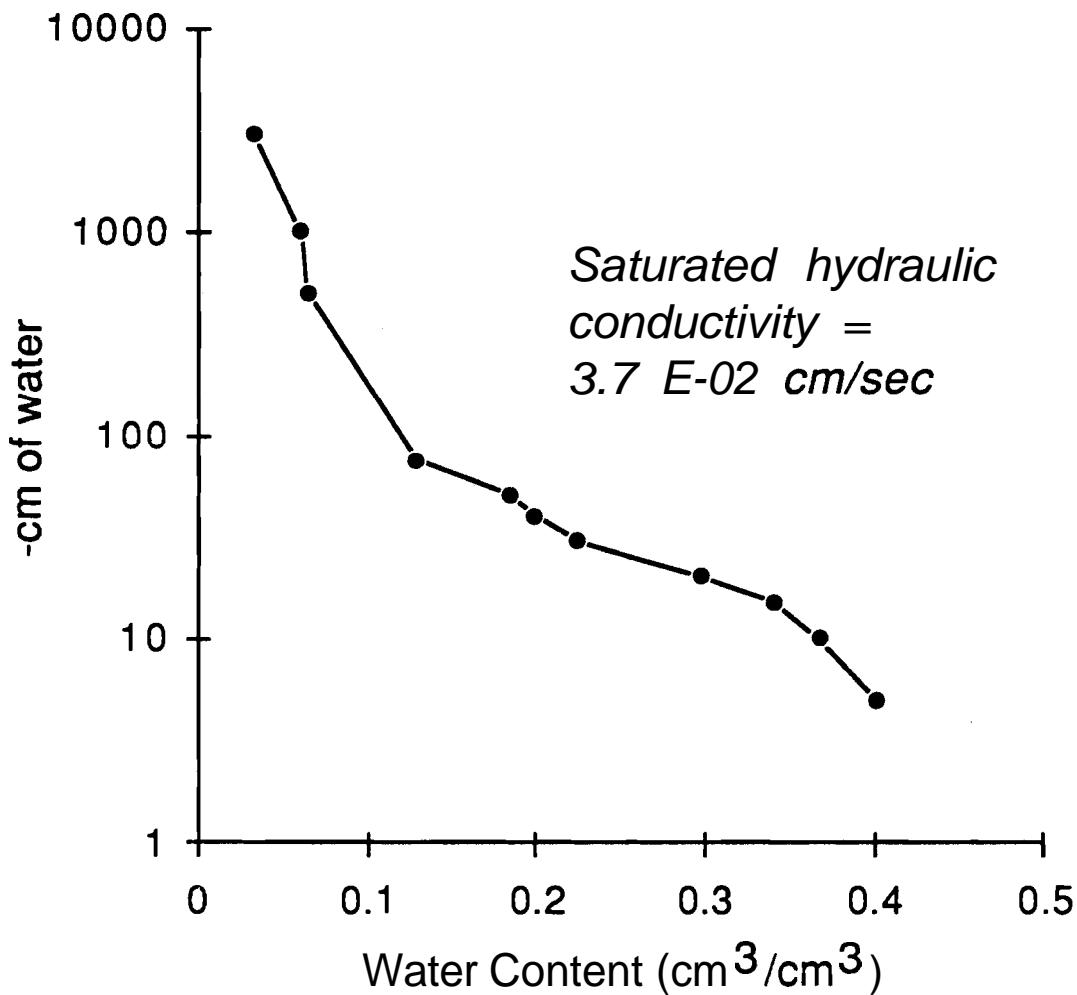
Depth: 65 ft

Stratigraphic Unit: Plio-Pleistocene Unit

Lithofacies: Calcic Soil



Well #: 299-W7-2
Depth: 94-95 ft
Stratigraphic Unit: Upper Ringold
Lithofacies: ms G (Muddy Sandy Gravel)

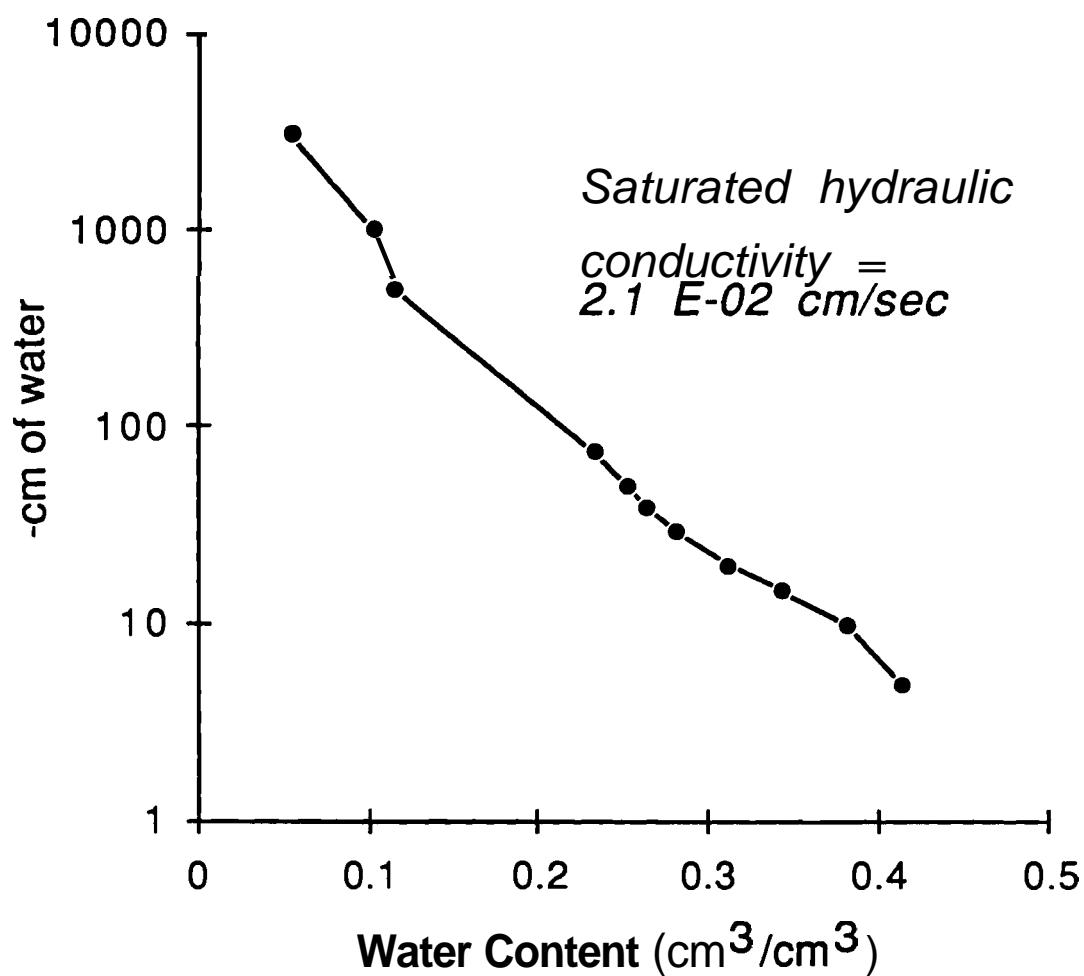


Well #: 299-W7-2

Depth: 154-155 ft

Stratigraphic Unit: Middle Ringold

Lithofacies: ms G (Muddy Sandy Gravel)

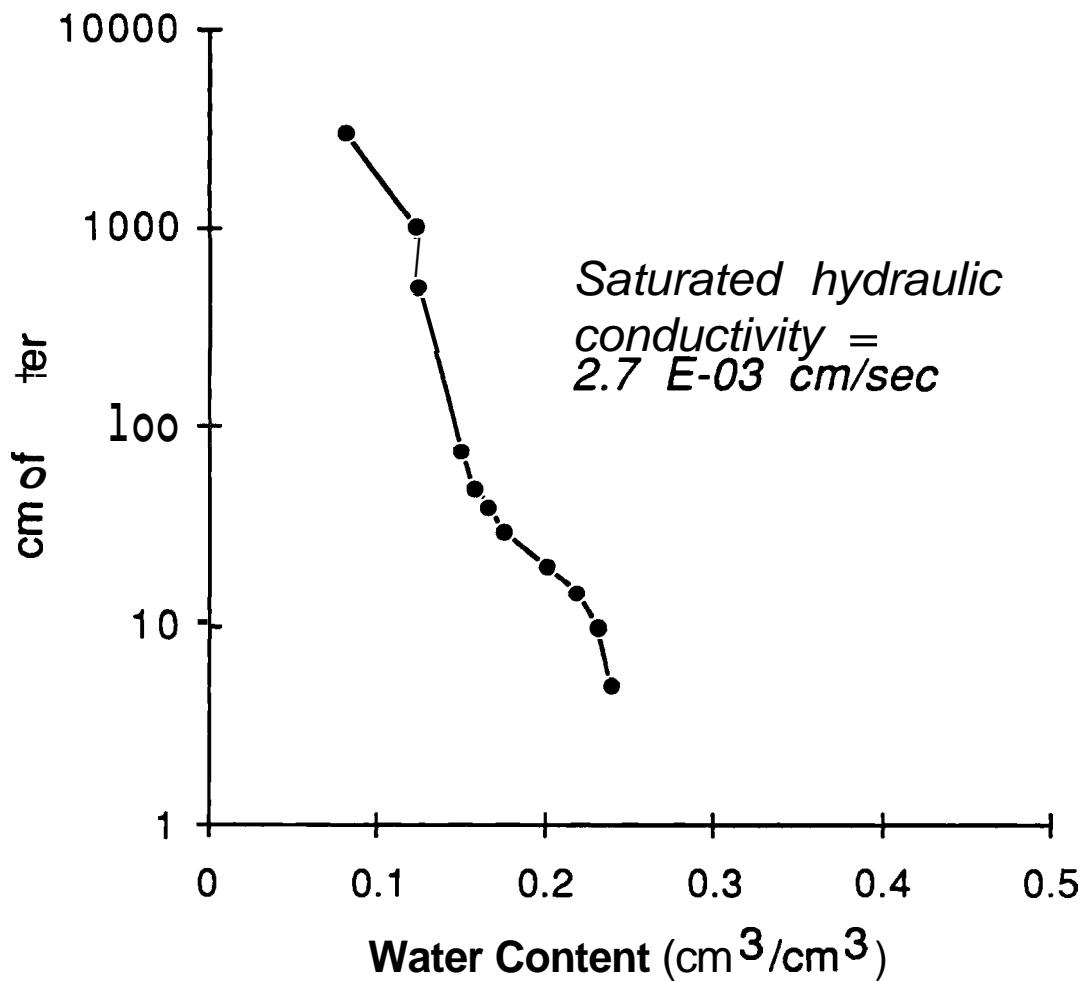


Well #: 299-W7-2

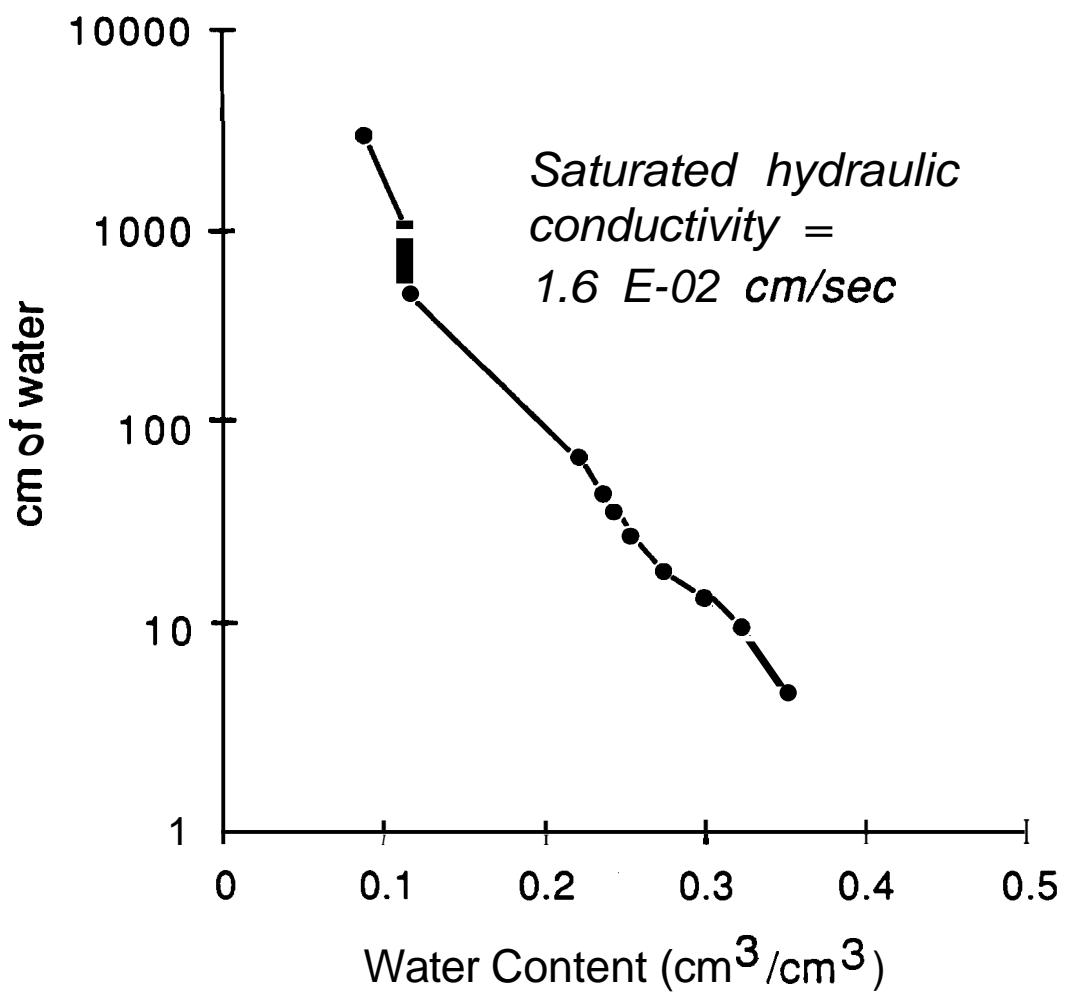
Depth: 219-220 ft

Stratigraphic Unit: Middle Ringold

Lithofacies: ms G (Muddy Sandy Gravel)



Well #: 299-W7-5
Depth: 10 ft
Stratigraphic Unit: Hanford Formation
Lithofacies: G (Gravel)

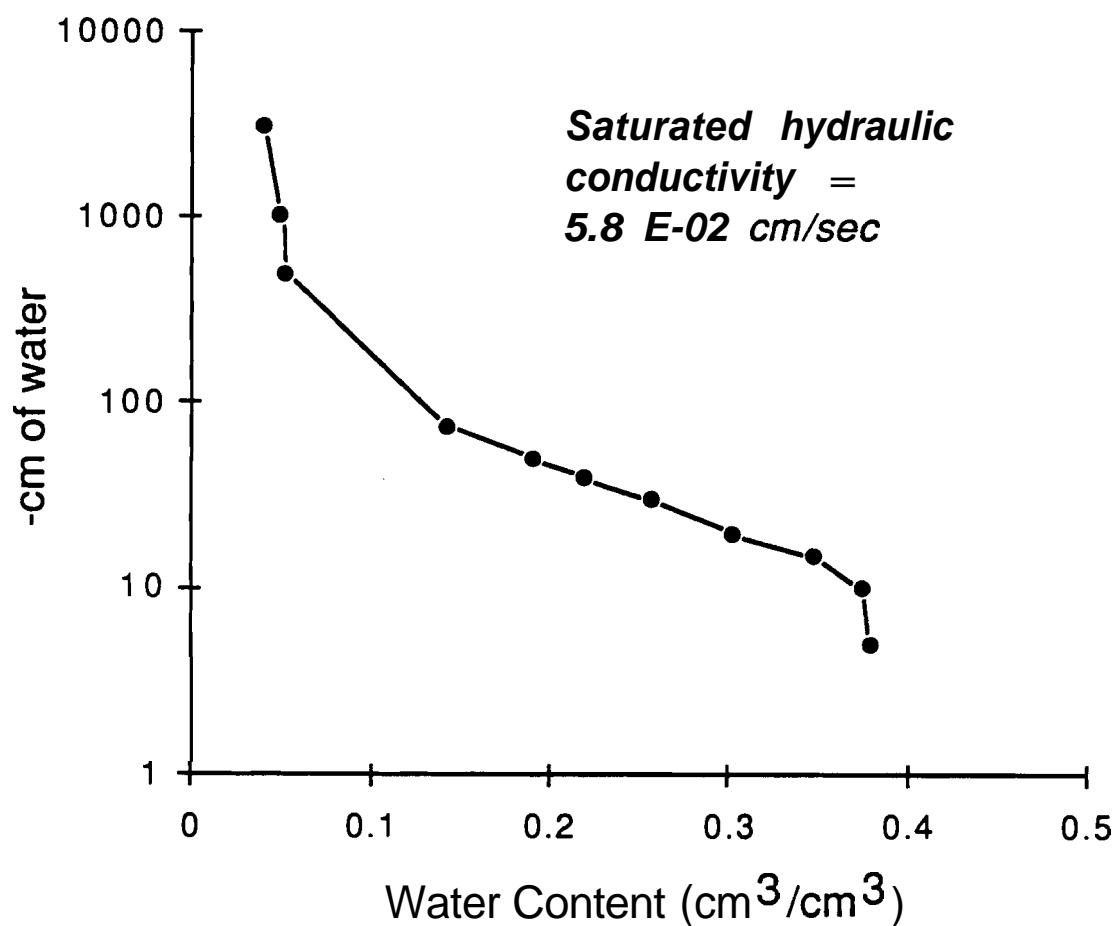


Well #: 299-W10-13

Depth: 45 ft

Stratigraphic Unit: Hanford Formation

Lithofacies: G (Gravel)

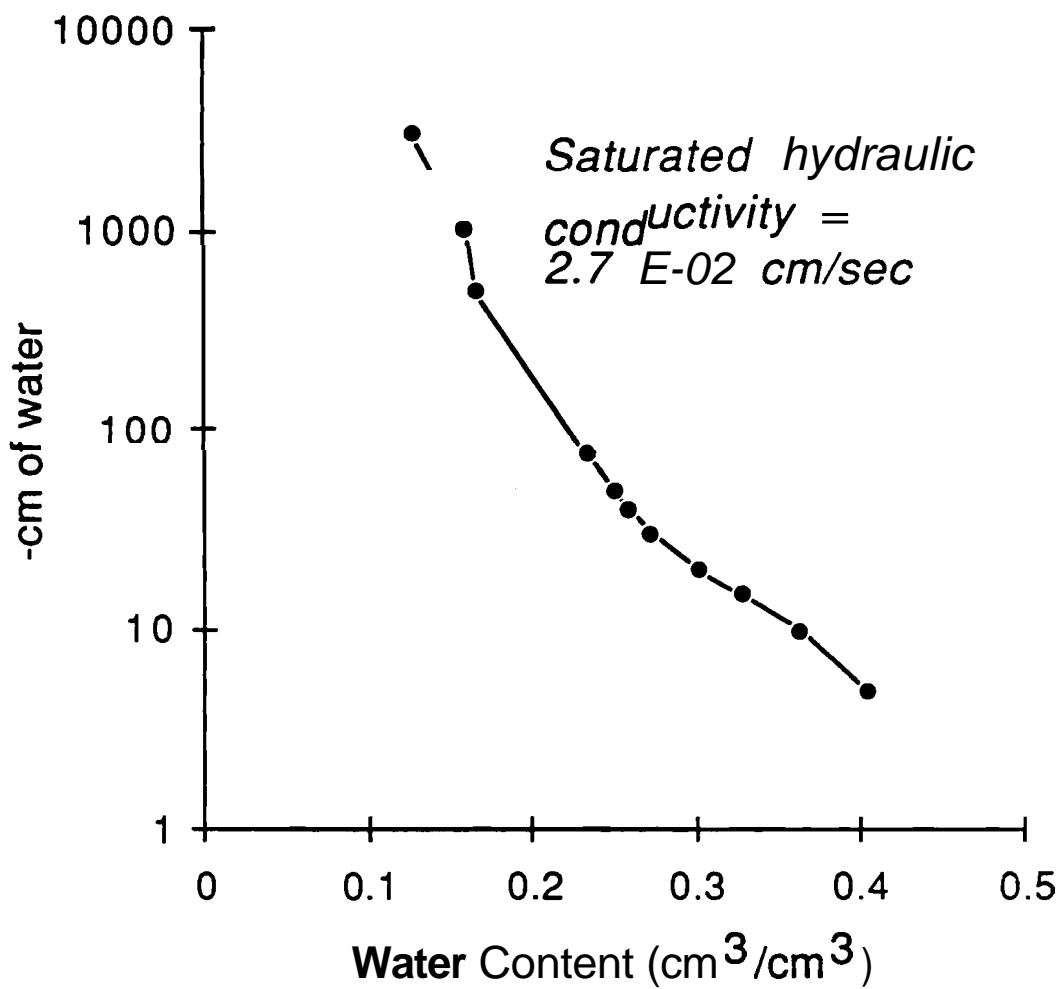


Well #: 299-W10-13

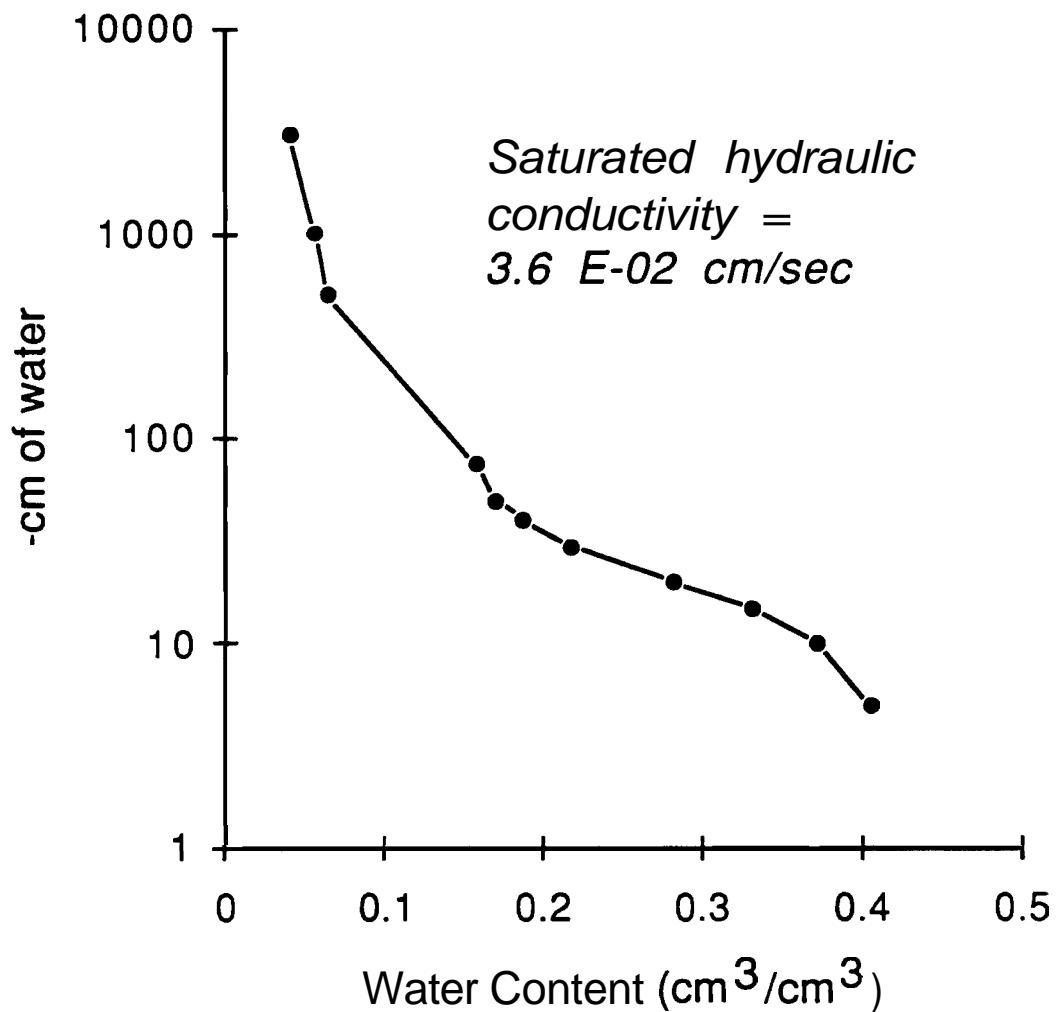
Depth: 80 ft

Stratigraphic Unit: Hanford Formation

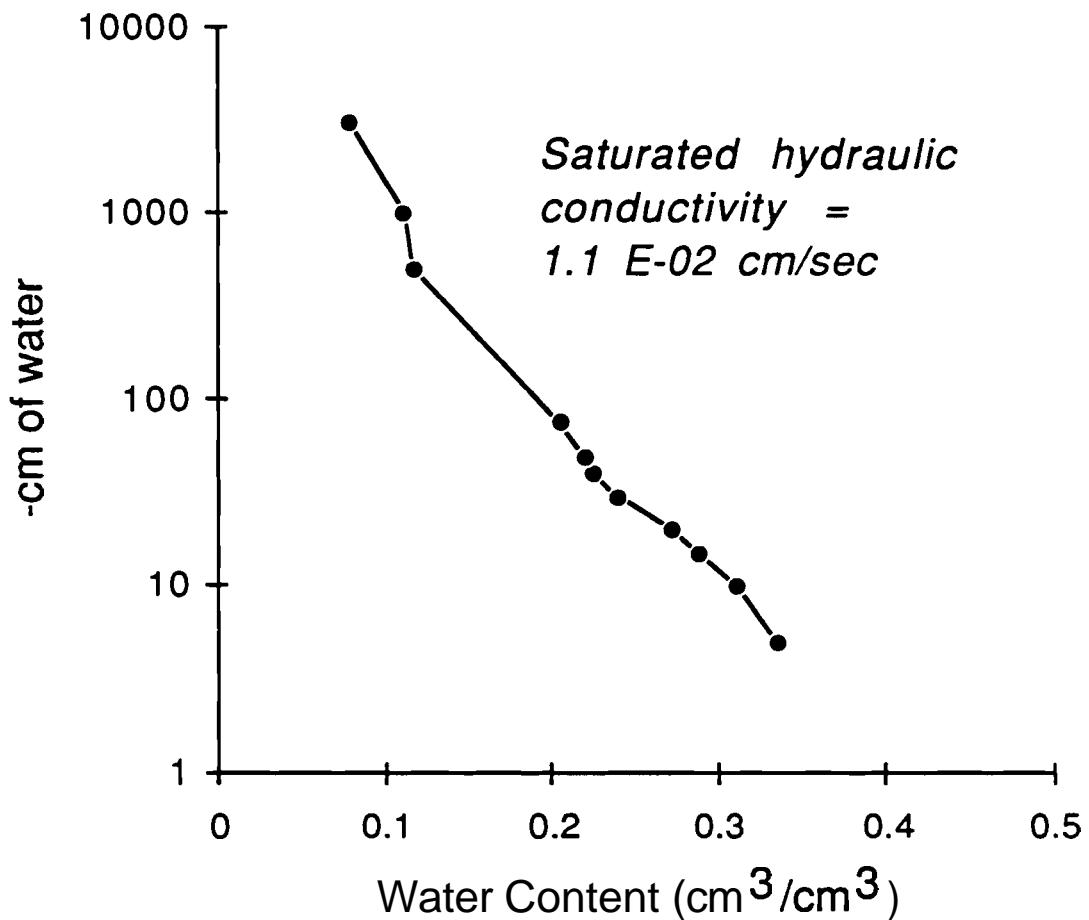
Lithofacies: ms G (Muddy Sandy Gravel)



Well #: 299-W15-16
Depth: 40 ft
Stratigraphic Unit: Hanford Formation
Lithofacies: S (Sand)



Well #: 299-W15-16
Depth: 110 ft
Stratigraphic Unit: Hanford Formation
Lithofacies: ms G (Muddy Sandy Gravel)

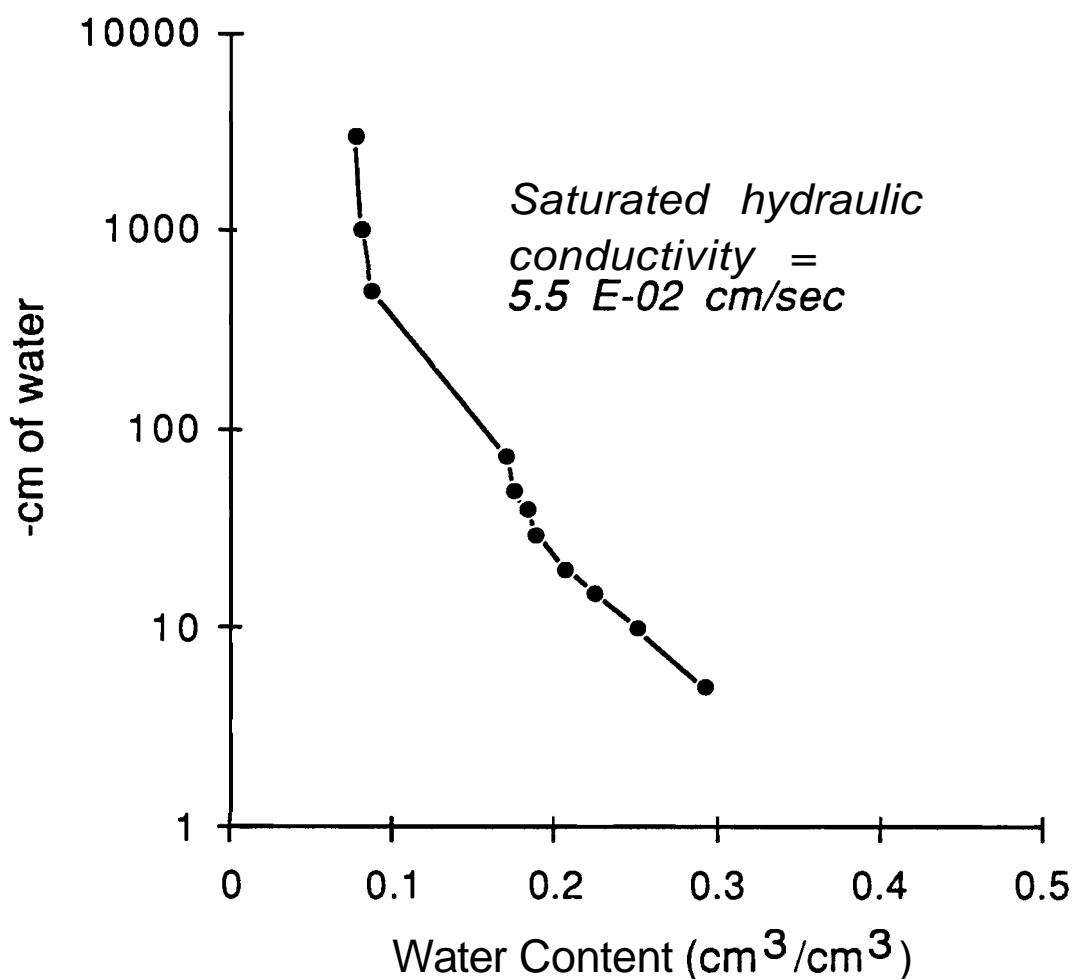


Well #: 299-W18-21

Depth: 25 ft

Stratigraphic Unit: Hanford Formation

Lithofacies: (m)g S (Slightly Muddy Gravelly Sand)

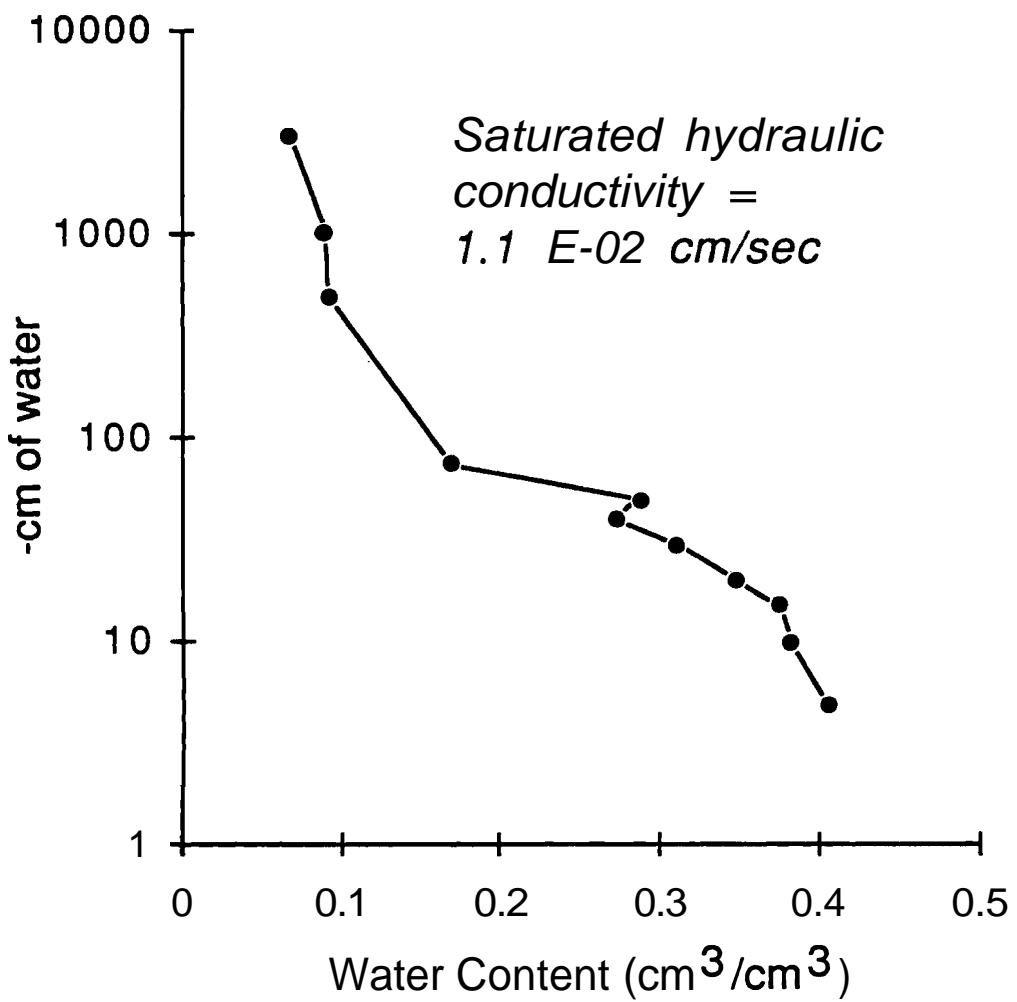


Well #: 299-W18-21

Depth: 40 ft

Stratigraphic Unit: Hanford Formation

Lithofacies: (g) S (Slightly Gravelly Sand)

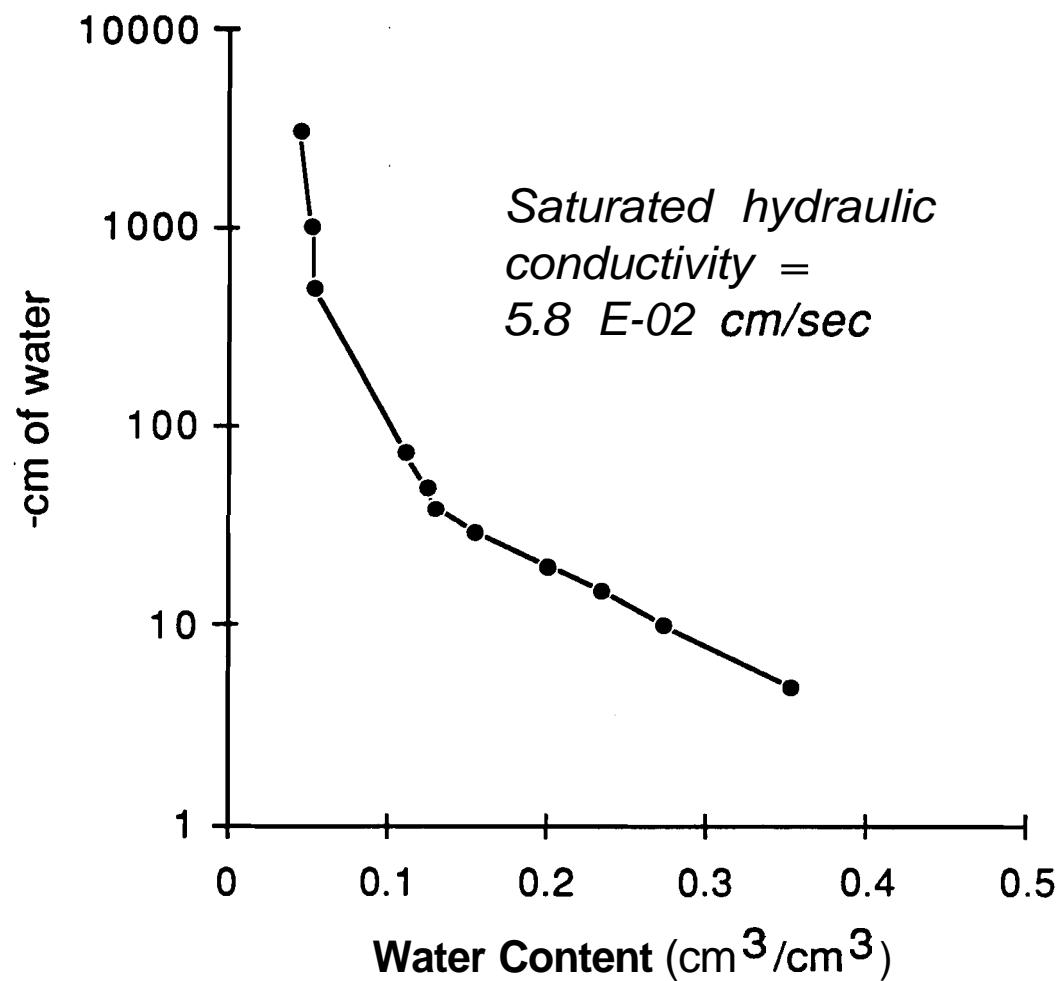


Well #: 299-E28-26

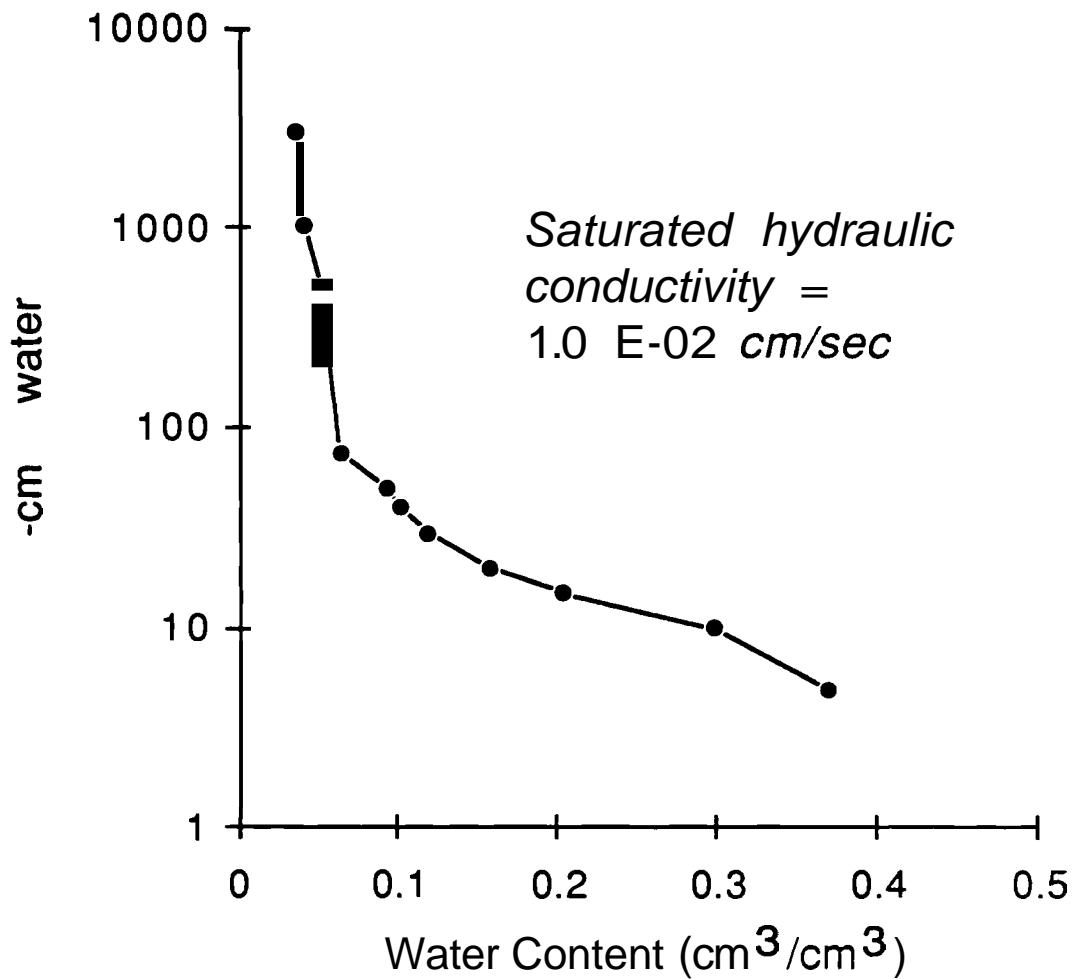
Depth: 129-130 ft

Stratigraphic Unit: Hanford Formation

Lithofacies: (g) S (Slightly Gravelly Sand)



Well #: 299-E28-26
Depth: 230 ft
Stratigraphic Unit: Hanford Formation
Lithofacies: s G (Sandy Gravel)

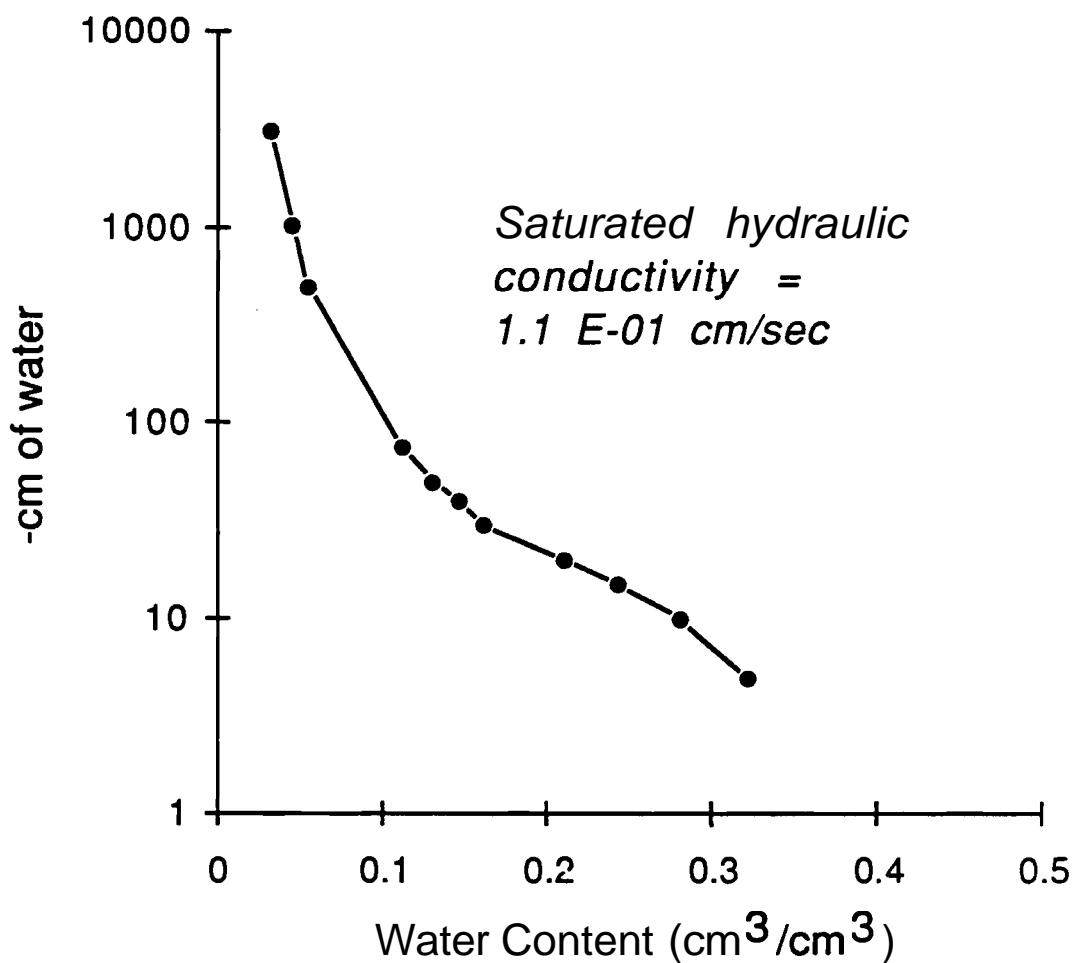


Well #: 299-E33-30

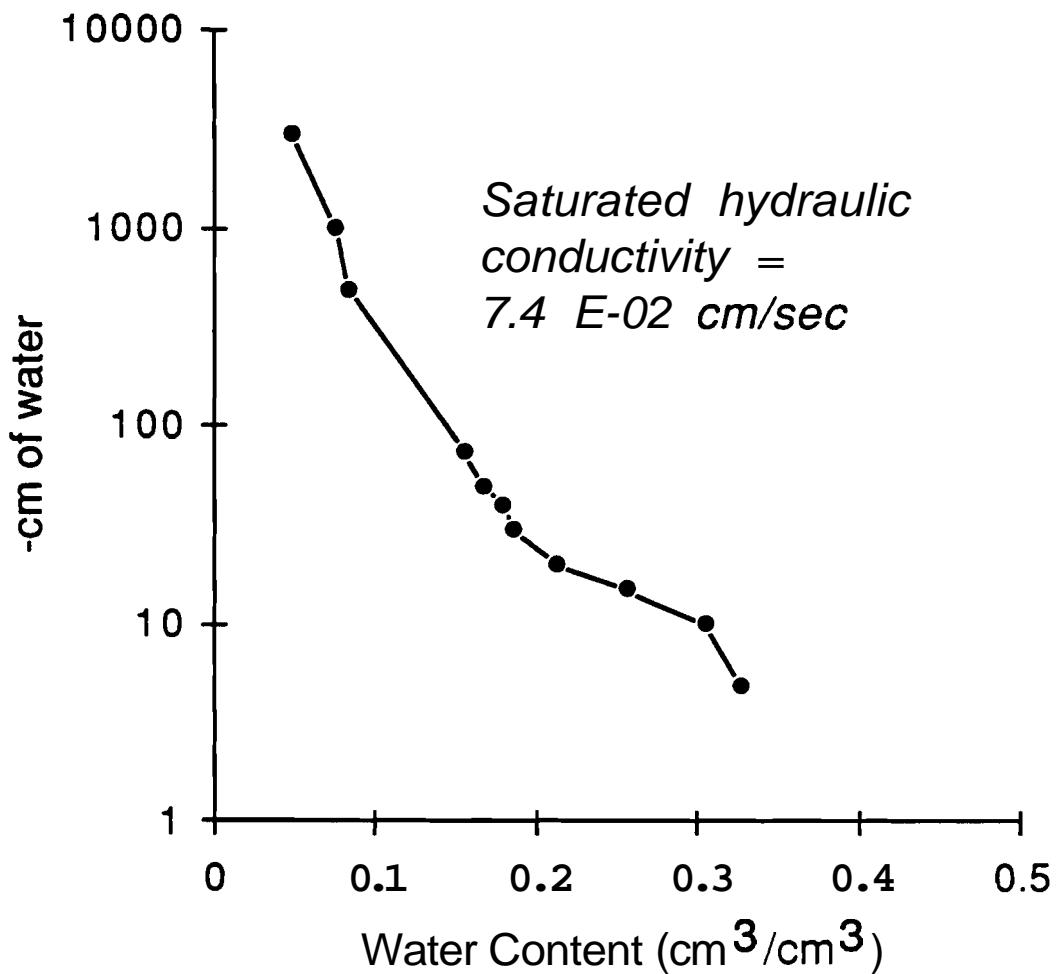
Depth: 139-140 ft

Stratigraphic Unit: Hanford Formation

Lithofacies: S (Sand)



Well #: 299-E33-30
Depth: 239-240 ft
Stratigraphic Unit: Hanford Formation
Lithofacies: ms G (Muddy Sandy Gravel)



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