

GROUND-WATER DATA
FOR
McKENZIE COUNTY,
NORTH DAKOTA

By

M. G. Croft

U.S. Geological Survey

COUNTY GROUND-WATER STUDIES 37 — PART II
North Dakota State Water Commission
Vernon Fahy, State Engineer

BULLETIN 80 — PART II
North Dakota Geological Survey
Don L. Halvorson, State Geologist

Prepared by the U.S. Geological Survey
in cooperation with the North Dakota State Water Commission,
North Dakota Geological Survey,
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Water Resource
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Bismarck, North Dakota

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SELECTED FACTORS FOR CONVERTING
INCH-POUND UNITS TO THE INTERNATIONAL SYSTEM
OF UNITS (SI)

A dual system of measurements--inch-pound units and the International System of Units (SI)--is given in this report. SI is an organized system of units adopted by the 11th General Conference of Weights and Measures in 1960. Selected factors for converting inch-pound units to SI units are given below.

<u>Multiply inch-pound unit</u>	<u>By</u>	<u>To obtain SI unit</u>
Acre	0.4047	hectare (ha)
Cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)
Foot (ft)	0.3048	meter (m)
Inch (in.)	25.4	millimeter (mm)

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INTRODUCTION

The investigation of the geology and occurrence of ground water in McKenzie County (fig. 1) was made cooperatively by the U.S. Geological Survey, North Dakota State Water Commission, North Dakota Geological Survey, and McKenzie County Water Resource District. The results of the investigation will be published in three separate parts. Part I is an interpretive report describing the geology of the study area, part II (this report) is a compilation of the ground-water data, and part III is an interpretive report describing the ground-water resources. Part II makes available geologic and hydrologic data collected during the county investigation and functions as a reference for the other reports.

Purpose and Objectives

The purpose of the investigation was to provide detailed geologic and hydrologic information needed for the orderly development of water supplies for municipal, domestic, livestock, irrigation, industrial, and similar uses. Specifically, the objectives were to (1) determine the location, extent, and nature of the major aquifers and confining beds; (2) evaluate the occurrence and movement of ground water, including the sources of recharge and discharge; (3) estimate the quantities of water stored in the aquifers; (4) estimate the potential yields to wells tapping the major aquifers; (5) determine the chemical quality of the ground water; and (6) identify current and potential use of the ground water.

Location-Numbering System

The location-numbering system used in this report is based on the

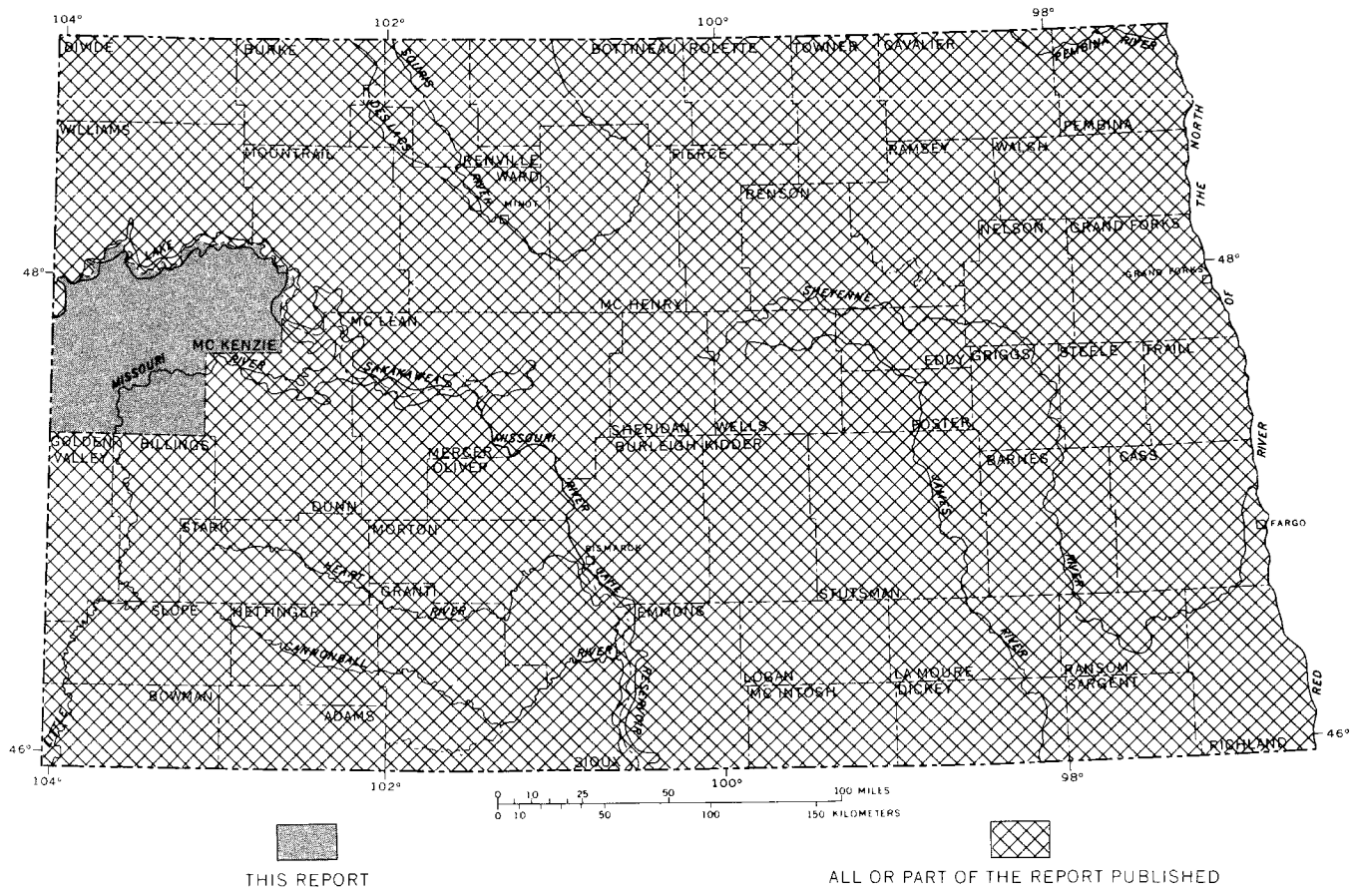


FIGURE 1.—County ground-water studies in North Dakota.

public land classification system used by the U.S. Bureau of Land Management. The system is illustrated in figure 2. The first numeral denotes the township north of a base line, the second numeral denotes the range west of the fifth principal meridian, and the third numeral denotes the section in which the well is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10-acre or 4-ha tract). For example, well 150-104-15ADC is in the SW1/4SE1/4NE1/4 sec. 15, T. 150 N., R. 104 W. Consecutive terminal numerals are added if more than one well or test hole is recorded within a 10-acre (4-ha) tract. The location of each well and test hole in the tables is shown on plate 1 (in pocket).

Acknowledgments

The collection of data for this report was made possible by the cooperation of residents and officials of McKenzie County, who furnished essential information on wells and permitted water-level measurements and the collection of water samples. Particular recognition is due to the following North Dakota State Water Commission personnel: Alan Comeskey and Alan Wanek for logging of test holes, G. O. Muri for chemical analyses of water samples, and M. O. Lindvig for scheduling of drilling activities. Thanks are due to the private well drillers and drilling companies that furnished drillers' logs and other information in this report.

EXPLANATION OF TABLES AND METHODS OF DATA COLLECTION

The data in this report, which were collected chiefly between 1976 and 1981, are listed in tables 1-7. Points of collection are shown on plate 1. The data consist of the following: (1) Geologic and hydrologic records of wells and test holes, (2) water-level measurements in observation wells, (3) lithologic and geophysical logs of test holes and wells, (4) chemical analyses of ground water, (5) chemical analyses of water from streams, (6) hydraulic conductivity and porosity values determined by laboratory tests, and (7) analyses of selected gases from ground water. The data provided are useful for

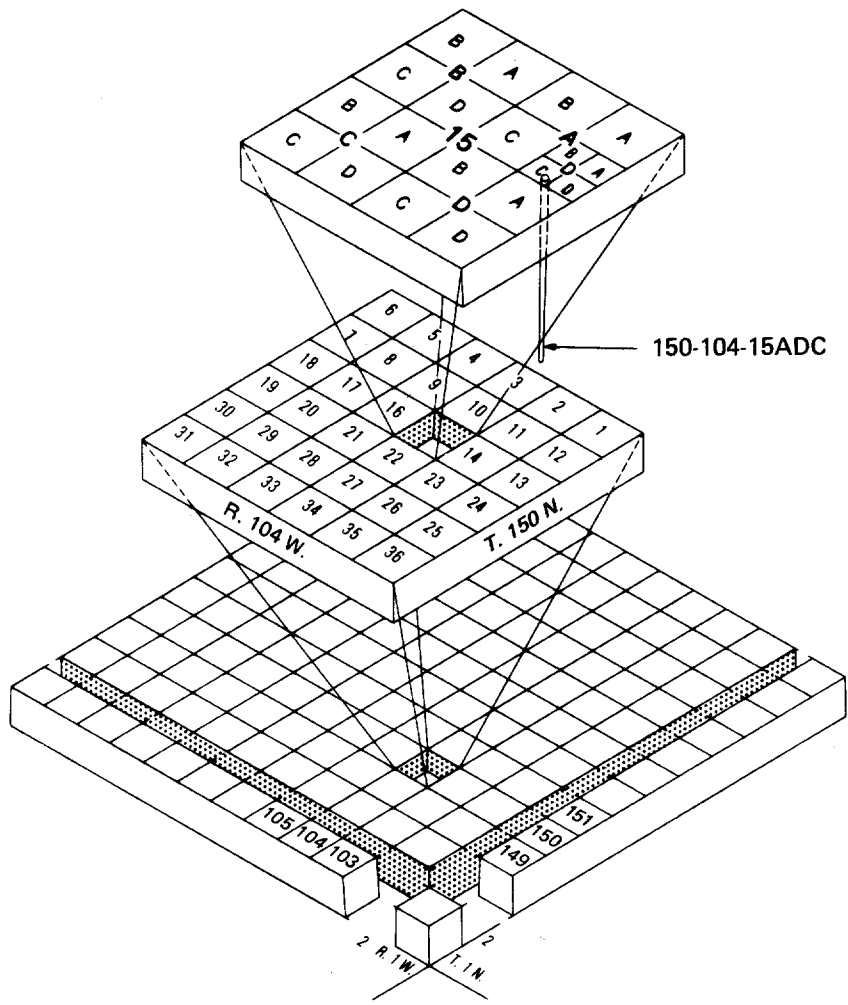


FIGURE 2.—Location-numbering system.

evaluating geologic and ground-water conditions in McKenzie County. For example, a person considering the construction of a new well can locate the proposed site on plate 1. Depths, water quality, lithologies, and water levels of nearby wells and test holes tapping the different aquifers can be determined from the tables. However, use of the data as a guide to conditions at different sites should be made with caution because of the lenticular character of the water-bearing rocks and varying water quality in some aquifers.

Records of Wells and Test Holes

Records of selected wells and test holes are given in table 1. Well depth is the depth of casing for open-bottom wells or the base of the deepest well screen for screened wells. Many test holes were converted to observation wells for periodic water-level measurements and water-quality sampling. At some sites two or three observation wells were drilled in order to obtain water levels and water samples from several aquifers. The observation wells were constructed of 1-1/4-inch (32-mm) plastic casing or 2-inch (51-mm) steel casing. Several 6- or 12-foot (1.8- or 3.7-m) screens were set in the aquifer. The observation wells were developed by backwashing and were pumped a minimum of 5 hours before water samples were collected for analysis. Many of the deep bedrock wells were pumped 20 to 30 hours before sampling.

Water Levels in Selected Wells

Table 2 lists the monthly and intermittent water levels in selected wells, in feet below or above (+) land surface, that tap major aquifers in McKenzie County. Water-level measurements taken as part of this study began in 1979 and extended through December 1983. Measurements will continue to be made in several wells as part of the statewide observation-well network to monitor changes in water levels as the ground-water resources of the area are developed.

Logs of Wells and Test Holes

Logs collected from water-well drillers and other sources and logs

of test holes drilled as part of this project are included in table 3. Minor changes in word order have been made on some of the drillers' logs and logs from test holes drilled during previous investigations. Logs from test holes drilled during previous unpublished investigations have dates before 1976. Logs of test holes drilled as part of this project have dates after 1976. Most test holes drilled during this project and some municipal and industrial wells have a graphic, electric, and gamma-ray log in addition to a description of the materials penetrated. The electric logs are extremely useful for correlation of geologic units. Grain-size determinations refer to the Wentworth (1922) size scale. The color descriptions were determined by comparing fresh samples with the Geological Society of America's rock color chart (1963).

Water Quality

The chemical composition and physical properties of water are reported in the tables of analyses (tables 4 and 5). Water for samples was obtained from privately owned wells by using the existing pumps and from the North Dakota State Water Commission observation wells by airlift. Generally enough water was pumped to clear the well column and plumbing, then the sample was collected in a polyethylene bottle. For those metals considered unstable, a separate sample was filtered and acidified before transport to the laboratory. Most of the samples were analyzed by the North Dakota State Water Commission, Bismarck, N. Dak. Methods of analyses generally were those described by Brown and others (1970). The results are expressed in milligrams per liter (mg/L) or micrograms per liter (ug/L). A microgram per liter is one-thousandth of a milligram per liter. Due to the difficulty and expense associated with development of many bedrock test wells, water-sample analyses are marginal, particularly the pH.

Drinking-water standards were established for interstate carriers by the U.S. Public Health Service (1962) and generally were accepted as applicable to public water supplies. The Federal Water Quality Act of 1965 provided for the establishment of water-quality standards for all interstate waters. Water-quality criteria for public supplies,

farmsteads, industrial, and agricultural uses were established by the U.S. Federal Water Pollution Control Administration (1968). The North Dakota State Department of Health (1970) adopted a set of water-quality standards within the framework of the national guidelines for interstate streams. The latest criteria for primary drinking-water standards were published by the U.S. Environmental Protection Agency (1976).

According to the 1976 standards, the following are the maximum contaminant levels for inorganic chemicals other than fluoride.

<u>Substance</u>	<u>Concentration (mg/L)</u>
Arsenic (As)-----	0.05
Barium (Ba)-----	1.0
Cadmium (Cd)-----	.01
Chromium (hexavalent, as Cr)-----	.05
Lead (Pb)-----	.05
Mercury (Hg)-----	.002
Nitrate (as N)-----	10
Selenium (Se)-----	.01
Silver (Ag)-----	.05

The concentration of fluoride is determined by the annual average of the maximum daily air temperature for the locality. The maximum concentration limit for McKenzie County is about 2.4 mg/L.

The differences between mandatory and desirable standards can be illustrated by the discussion on page 33 of the 1962 U.S. Public Health Standards. It is as follows:

"It should be emphasized that there may be a great difference between a detectable concentration and an objectionable concentration of the neutral salts. The factor of acclimatization is particularly important. More than 100 public supplies in the United States provide water with more than 2,000 mg/L of dissolved solids. Newcomers and casual visitors would certainly find these waters almost intolerable and, although some of the residents use other supplies for drinking, many are able to tolerate if not enjoy these highly mineralized waters.

"Relatively little information is available on consumer attitudes toward mineralized water. In this connection, the findings of a survey made by the California State Department of Public Health... showed that in five communities where the public supplies were highly mineralized, about 40 percent of the families surveyed purchased

bottled water and about 50 percent stated they were dissatisfied with the water. These supplies had dissolved-solids contents in the range of 500 to 1,760 mg/L. Calcium, sulfate, and magnesium were the dominant ions present, with sulfate concentrations in the range of 300 to 700 mg/L.

"The taste threshold for magnesium is said to be 400-600 mg/L...."

The following sections on the origin and practical significance are adopted largely from Hem (1970) and Durfor and Becker (1964).

Chemical Constituents in Solution

Silica (SiO_2)

Weathering processes dissolve silica from practically all rocks. Silica affects the usefulness of water because it can contribute to the formation of scale in pipes, water heaters, and boilers in the presence of calcium and magnesium.

Iron (Fe)

Iron compounds are common in rocks and may be leached by acidic water. Water containing more than 300 ug/L of iron, after exposure to air, may become discolored. Reddish-brown stains on porcelain or enamelware and fixtures and on fabrics washed in the water result from the iron.

Manganese (Mn)

Manganese in concentrations as low as 200 ug/L may cause a dark-brown or black stain on fabrics and porcelain fixtures. Ground water that contains high concentrations of iron may also have considerable amounts of manganese.

Calcium and Magnesium (Ca and Mg)

Limestone and similar rocks are the principal source of calcium in natural water. Calcium and magnesium cause water hardness and, with anions, can form scale on utensils and in water heaters, boilers, and pipes.

Sodium and Potassium (Na and K)

Sodium and potassium are present in many igneous and sedimentary

rocks. Sodium dissolves readily and when brought into solution it tends to remain in solution. Potassium is dissolved with greater difficulty and exhibits a stronger tendency to be reincorporated into solid weathering products, especially clay minerals. In most natural water the concentration of potassium is much lower than the concentration of sodium. Water that contains a large proportion of sodium salts generally is unsatisfactory for irrigation. The presence of several hundred milligrams per liter of sodium in water can make it unsuitable for use in sodium-restricted diets (North Dakota State Department of Health, 1962).

Bicarbonate and Carbonate (HCO_3 and CO_3)

The carbon dioxide that is dissolved in naturally circulating water is the most common of the weak acids in natural water. The ability of the weak acids in natural water to neutralize acid is defined as alkalinity. Equivalent concentrations of bicarbonate and carbonate ions to specified pH's of the weak acids in a sample are expressed in this publication. High concentrations of these ions precipitate with available calcium and magnesium on the heating of the water. This scale-forming characteristic is considered undesirable.

Alkalinity can be calculated from the analyses by using the formula:

$$\text{Alkalinity (as CaCO}_3) = 0.82(\text{HCO}_3) + 1.67(\text{CO}_3)$$

Sulfate (SO_4)

Sulfate, an oxidation product of sulfur, is not a major constituent of the earth's crust but is widely distributed in sedimentary rocks as metallic sulfide. Pyrite is associated with deposits such as coal. Upon weathering or through bacterial action, metallic sulfide deposits yield sulfate to ground water. Large quantities of sulfate may also be dissolved from beds of gypsum and deposits of sodium sulfate. The laxative effects commonly experienced with water having sulfate concentrations exceeding 600 mg/L, particularly if much magnesium or sodium is present, make high concentrations undesirable.

Chloride (Cl)

The salty taste imparted by concentrations in excess of 400 mg/L

may impair the water's usefulness for drinking and some other purposes.

Fluoride (F)

Fluoride in ground water probably is derived from solution of fluorite, apatite, and hornblende minerals. High fluoride content (depending on annual average maximum daily air temperature) may cause mottling of tooth enamel in children's teeth during calcification.

Nitrate (NO₃)

The occurrence of high nitrate concentrations in shallow ground water has been attributed to leaching in feedlots or to fertilizer from irrigated fields where nitrogen compounds have been applied. High nitrate content is undesirable in drinking water because of its bitter taste and it has been reported to cause methemoglobinemia (blue babies) in infants (Comly, 1945).

Boron (B)

Boron is a constituent of the mineral tourmaline and may be present in biotite and amphiboles. In small quantities boron is essential for plant growth. Excessive concentrations in soil and in irrigation water are harmful for some plants.

Dissolved Solids

The reported quantity of dissolved solids (residue on evaporation at 180°C) consists mainly of the dissolved mineral constituents in the water. It may also include some organic matter and water of crystallization. The effect of salinity, or dissolved solids, on the osmotic pressure of the soil solution is one of the most important water-quality considerations. Water containing excessive dissolved solids should not be used for irrigation.

Properties and Characteristics of Water

Hardness

Calcium and magnesium are the principal cause of hardness. Hardness exhibits the characteristics of requiring greater quantities of soap to produce a lather as the hardness increases. Hard water

also can contribute to the formation of scale in boilers, water heaters, radiators, and pipes, with a resultant decrease in the rate of water flow and(or) heat transfer.

The hardness that is equivalent to the alkalinity is called carbonate hardness, and any excess is called noncarbonate hardness. The carbonate hardness is the quantity that will contribute scale on heating, and the noncarbonate hardness is the quantity of hardness that will remain after precipitation of the carbonate hardness. As a general reference, the U.S. Geological Survey often uses the following classification of water hardness.

<u>Calcium and magnesium hardness, as CaCO₃ (milligrams per liter)</u>	<u>Hardness description</u>
0-60	Soft
61-120	Moderately hard
121-180	Hard
More than 180	Very hard

Percent Sodium and Sodium-Adsorption Ratio (SAR)

The percent sodium is the percentage to all other major cations, expressed in milliequivalents per liter. The displacement of calcium and magnesium by sodium in soils is slight unless the percent sodium is considerably higher than 50.

The term SAR (sodium-adsorption ratio) was introduced by the U.S. Salinity Laboratory Staff (1954). Their experiments show that the SAR relates to the degree water enters into cation-exchange reactions with soil. Sodium-adsorption ratio is expressed by the equation:

$$SAR = \sqrt{\frac{Na^+}{\frac{[Ca^{++}] + [Mg^{++}]}{2}}}$$

where the concentrations of the ions are expressed in milliequivalents per liter. The U.S. Salinity Laboratory Staff (1954) divided water into 16 classes, depending upon the SAR and specific conductance. The classifications indicate the usefulness of water for irrigation of different crops on different types of soil.

Specific Conductance (micromhos per centimeter at 25°C)

Specific conductance is a measure of the ability of water to

conduct an electric current. Approximately 65 to 70 percent of the specific conductance (in micromhos) is an estimate of the amount of dissolved solids (in milligrams per liter) in water; however, this relation is not constant and will vary with the chemical composition of the water (Hem, 1970).

Hydrogen-Ion Concentration (pH)

Hydrogen-ion concentration (activity) is expressed in terms of pH units. The values of pH often are used as one measure of the solvent capacity of water.

The hydrogen-ion concentrations affect the corrosiveness of water. A pH of 7.0 indicates that the water is neutral, neither acidic nor basic. Readings progressively lower than 7.0 denote increasing acidity, and those progressively higher than 7.0 denote increasing alkalinity.

Temperature

Temperature is an important factor in evaluating the usefulness of water. For example, high temperature precludes its use as an industrial coolant. Temperature also is important for its influence upon concentrations of dissolved gases and mineral matter in water. Water temperatures given in the tables are expressed in degrees Celsius (Centigrade) except for well logs, which are given in degrees Fahrenheit. Degrees Celsius and the equivalent temperature in degrees Fahrenheit are given in the following table.

Degrees Celsius (°C)	Degrees Fahrenheit (°F)	Degrees Celsius (°C)	Degrees Fahrenheit (°F)	Degrees Celsius (°C)	Degrees Fahrenheit (°F)
3.5	38	12.5	54	21.5	71
4.0	39	13.0	55	22.0	72
4.5	40	13.5	56	22.5	72
5.0	41	14.0	57	23.0	73
5.5	42	14.5	58	23.5	74
6.0	43	15.0	59	24.0	75
6.5	44	15.5	60	24.5	76
7.0	45	16.0	61	25.0	77
7.5	45	16.5	62	25.5	78
8.0	46	17.0	63	26.0	79
8.5	47	17.5	63	26.5	80
9.0	48	18.0	64	27.0	81
9.5	49	18.5	65	27.5	81
10.0	50	19.0	66	28.0	82
10.5	51	19.5	67	28.5	83
11.0	52	20.0	68	29.0	84
11.5	53	20.5	69	29.5	85
12.0	54	21.0	70	30.0	86

Hydraulic Conductivity and Porosity Values

Values for hydraulic conductivity and porosity determined in the laboratory are listed in table 6. The values can be used to estimate the yield of wells.

Analyses of Selected Gases in Ground Water

Thirteen water samples were analyzed for major gases by Don W. Fisher, Reston, Va. The results are in table 7.

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TABLE 1.--Records of wells and test holes

<u>Owner</u>	<u>Principal aquifer</u>
FAA, Federal Aviation Administration	110, Quaternary 112, Pleistocene 125, Paleocene 211, Upper Cretaceous
NDSWC 5952, North Dakota State Water Commission, test hole number 5952	BNPR, Bennie Peer aquifer CRCK, Cherry Creek aquifer CRNB, Charbonneau aquifer HCFH, Hell Creek Formation-Fox Hills Sandstone
USFS, United States Forest Service	LDLW, Ludlow member of Fort Union Formation
USGS 16, United States Geological Survey, test hole number 16	LLMR, Little Missouri aquifer TBCG, Tobacco Garden aquifer TGRV, Tongue River member of Fort Union Formation
USNPS, United States National Park Service	YLMR, Yellowstone-Missouri aquifer

Water level (feet)

Water level, in feet below or above (+) land surface

D, dry
F, flowing
P, pumping

Use of water

C, commercial
H, domestic
I, irrigation
N, industrial
P, public supply
S, stock
U, unused

Specific conductance

Value shown is the field specific conductance measured at the well at the time of inventory unless otherwise indicated.

Altitude of land surface (feet)

Altitude of land surface is reported with respect to the National Geodetic Vertical Datum of 1929 (NGVD). NGVD is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

LOCAL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	DEPTH TO FIRST OPENING (FEET)	CASING DIAMETER (INCHES)	DATE COMPLETED	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED	USE OF WATER	PRINCIPAL AQUIFER	SPECIFIC CONDUCTANCE (UMMO/CM AT 25° C)	TEMPERATURE (DEGREES C)	ALTITUDE OF LAND SURFACE (FEET)
145-098-030001	NDSWC 5952	1720	1683	1659	2	08/14/1981	403.40	10/31/1983	U	12SLDLW	2950	16.0	2590
145-098-030002	NDSWC 5952A	895	864	840	2	08/14/1981	505.00	10/31/1983	U	12STGRV	2900	9.0	2590
145-098-04CD	ROYAL RESOURCES	10024	90	--	--	01/14/1970	--	--	--	--	--	--	2602
145-098-078CB	ZUSKE, GERALD	90	75	4	4	09/28/1972	65.00	09/28/1972	S	--	1500	10.5	2610
145-098-20CAA	JOST, RALPH	520	--	--	--	08/26/1972	--	--	U	--	--	--	2640
145-098-34DCA	GLOVATSKY, PETE	2013	2013	1933	4.75	09/01/1977	343.00	09/01/1977	H,S	211HCFH	1650	17.0	2585
145-099-018DD	KESSEL, PAUL	75	75	65	4	10/01/1972	46.00	10/01/1972	H,S	--	--	--	2640
145-099-03AB	HUNT OIL	10429	--	--	--	03/04/1961	--	--	--	--	--	--	2669
145-099-110DA	FLECK, WILLIAM	100	100	85	4	03/05/1977	75.00	03/05/1977	H	--	3900	10.8	2665
145-099-124DD	CHERNENKO, GEORGE	96	95	84	5	08/08/1975	55.00	08/08/1975	H	--	--	--	2625
145-099-12CA3	LEE, GEORGE	110	110	92	5	12/05/1977	78.00	12/05/1977	H	--	2600	11.5	2640
145-099-12CBA	CARSON, RAYMOND	94	90	90	5	07/29/1973	70.00	07/29/1973	H	--	--	--	2660
145-099-12CBB	LEE, GEORGE	105	105	93	5	07/18/1976	70.00	07/18/1976	P	--	3500	13.0	2665
145-100-14CC	TEXACO	9547	--	--	--	05/15/1960	--	--	--	--	--	--	2320
145-101-07AB	TROTTER, LEIGHTON	230	262	262	5	01/15/1974	70.00	01/15/1974	H	--	2000	12.7	2170
145-101-10CC	BELCO PET.	9550	--	--	--	09/21/1978	--	--	--	--	--	--	2299
145-101-17CCC	TROTTER, EDGAR	1300	1300	1250	5	02/29/1977	--	--	S	--	1700	13.5	2180
145-101-194CC	TROTTER, EDGAR	1305	1305	1230	2	07/31/1975	--	--	S	--	1300	17.0	2160
145-102-11DAB	TROTTER, JOHN	638	638	599	4	10/31/1959	--	--	S	--	1900	14.5	2080
145-102-13ABC	BRIGHT, J.C.	1255	1255	1212	1.25	09/17/1970	57.50+	06/13/1980	S	211HCFH	1600	18.0	2150
145-102-24DDA	TROTTER, LEIGHTON	608	608	514	4	12/16/1959	18.40+	11/02/1979	S	12SLDLW	2090	13.0	2060
145-102-26AA	TROTTER, LEIGHTON	417	417	375	4	12/17/1959	--	--	S	--	1900	12.5	2190
145-102-27CBB	GOLDSBERRY, VERNON	1240	1240	1206	4	11/29/1965	--	--	S	211HCFH	1650	19.0	2170
145-103-18CDA	FARMLAND	2657	--	--	--	06/26/1976	--	--	--	--	--	--	2657
145-104-09BAC	TESCHER, JIM	346	346	336	5	06/22/1972	266.00	06/22/1972	S	--	--	--	2435
145-104-16BBB	NDSWC 6042	540	765	761	2	10/27/1981	333.79	10/31/1983	U	12STGRV	2180	13.5	2455
145-104-213DC	GORRELL, JAY	220	220	180	6	04/25/1974	95.00	04/25/1974	S	--	--	--	2355
145-104-27BC	SPERRY, KYLE, JR.	160	160	120	5	12/06/1974	104.00	12/06/1974	S	--	--	--	2343
146-098-04CCA	WATSON, WOODIE	76	75	65	5	08/29/1972	40.00	08/29/1972	H,S	--	400	13.4	2530
146-099-018BB	BYERLY, G.S.	40	40	20	5	07/24/1973	20.00	07/24/1973	H	--	--	--	2610
146-099-06CCA	CARSON, WALLACE	--	1300	--	--	--	12.00+	10/10/1978	S	211HCFH	1900	15.0	2200
146-099-36BBB	LEE, JOHN	78	78	58	4	11/29/1974	52.00	11/29/1974	H	--	450	10.2	2650
146-101-14CC	TEXACO	9730	--	--	--	07/10/1960	--	--	--	--	--	--	2579
146-101-30BDB1	HARTMAN, LOREN	1320	1320	1260	2	11/27/1974	--	--	S	--	1710	17.5	2105
146-101-30BDB2	HARTMAN, LOREN	1300	1300	1240	2	12/12/1974	--	--	S	211HCFH	1700	17.5	2155
146-101-31B4D	TROTTER, EDGAR	1435	1435	1326	2	07/23/1975	--	--	S	--	1400	13.5	2170
146-101-33ABA	NDSWC 5951	600	436	418	2	07/07/1981	49.53	10/31/1983	U	12STGRV	2300	13.0	2125
146-102-26CCA	NDSWC 11584	40	--	--	--	05/19/1981	--	--	U	--	--	--	2059
146-102-26CDA	NDSWC 11535	116	81	76	1.25	05/19/1981	12.00	05/27/1981	U	110LLMR	2450	--	2059
146-102-26CDB	NDSWC 11536	67	--	--	--	05/19/1981	--	--	U	--	--	--	2058

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146-102-278CA	NELSON, ALVIN	1310	1310	1260	5	02/12/1974	80.00+	06/10/1980	S	211MCFH	1600	14.5	2127
146-102-34ABC	ROCKEMAN, LLOYD	1395	1395	1352	5	09/06/1977	92.00+	11/01/1973	S	211MCFH	1600	14.0	2158
146-103-023CC	RIVET, LEON	1520	1520	1455	2	05/09/1977	41.00	05/09/1977	M	211MCFH	1700	9.0	2240
146-103-023SD	RIVET, PIERRE	320	276	--	4	06/30/1972	153.00	06/30/1972	S	--	--	--	2250
146-103-098A	TARGET OIL	5888	--	--	--	11/15/1969	--	--	--	--	--	--	2276
146-103-09600	GENERAL	13101	--	--	--	02/16/1971	--	--	--	--	--	--	2355
146-103-268AC	NDSWC 5946	940	--	--	--	07/23/1981	--	--	U	--	--	--	2400
146-103-31409	GOLDSBERRY, VERNON	455	420	420	4	07/18/1966	254.00	07/18/1966	H,S	--	--	--	2345
146-103-34CC0	GRAZING ASSOC.	1705	1663	1663	4	12/30/1973	260.00	12/30/1973	S	--	--	--	2455
146-104-03CCC1	NDSWC 5632	162	--	--	--	10/14/1979	--	--	U	--	--	--	2275
146-104-03CCC2	NDSWC 5947	900	--	--	--	07/23/1981	--	--	U	--	--	--	2274
146-104-050C1	BEERY	430	405	405	4	12/08/1967	193.00	12/08/1967	H,S	--	--	--	2270
146-104-06ACC	WHEELING, HOWARD	420	220	200	5	11/02/1977	80.00	11/02/1977	S	--	--	--	2245
146-104-07SD	WHEELING, JOSEPH	502	265	245	6	01/24/1973	148.00	01/24/1973	H,S	--	--	--	2500
146-104-07CC	TARGET OIL	5954	--	--	--	12/03/1969	--	--	--	--	--	--	2440
146-104-09D40	MINOW, JIM	282	275	275	4	06/24/1971	75.00	06/24/1971	H	--	--	--	2290
146-104-27860	GRAZING ASSOC.	760	760	710	6	11/26/1977	358.00	11/26/1977	S	--	2000	13.0	2500
146-105-110CC	LARSON, MARY	290	290	270	5	10/30/1973	136.00	10/30/1973	S	--	2350	8.0	2300
146-105-134B3	NDSWC 11587	160	--	--	--	05/19/1981	--	--	U	--	--	--	2320
146-105-22A48	BERZEL, JOE	60	60	35	5	12/28/1974	20.00	12/28/1974	S	--	--	--	2270
147-093-02AC0	OFF, JERRY	1265	1265	--	--	08/16/1975	151.70+	11/03/1973	S,H	--	2800	14.0	1928
147-093-02C8A	NDSWC 5950	572	542	530	2	08/05/1981	1.00+	09/01/1981	U	125TGRV	3250	12.0	1980
147-093-04C4A	DANIELSON, CLARENCE	1130	1130	--	--	--	--	--	S	--	2300	16.0	2000
147-093-09AAC	MURRAY, AGNES	--	710	--	--	--	13.90+	06/24/1980	S	125L0LW	2500	14.3	1950
147-093-10AC8	GRAZING ASSOC.	220	220	200	6	07/30/1973	150.00	07/30/1973	S	--	--	--	2120
147-093-36AC	DUNCAN OIL	10070	--	--	--	11/28/1977	--	--	--	--	--	--	2501
147-093-04AC	USNPS	40	40	25	4	05/10/1976	21.00	05/10/1976	S	--	1750	9.9	1950
147-093-17D0C	GRAZING ASSOC.	2035	1955	1930	4	06/07/1976	360.00	06/07/1976	S	--	2200	20.0	2542
147-100-20D0S1	CEYNAR, ARNOLD	750	750	--	1.25	01/01/1971	18.50+	06/24/1980	S	125L0LW	2620	13.0	2010
147-100-20D0S2	CEYNAR, ARNOLD	1330	1330	1290	1.25	11/23/1972	177.90+	06/24/1980	S	211MCFH	1820	15.3	2010
147-100-21B8A	CEYNAR, ARNOLD	1323	1323	1273	1.25	05/30/1973	194.00+	06/24/1980	H,S	211MCFH	1820	22.0	1995
147-100-21C8A	NDSWC 11396	160	131	128	1.25	10/01/1980	22.40	11/04/1980	U	110LLMR	4100	9.7	2000
147-100-21C8C	NDSWC 11398	50	--	--	--	10/01/1980	--	--	U	--	--	--	2000
147-100-21D8B	NDSWC 11397	187	151	148	1.25	10/01/1980	20.10	11/04/1980	U	110LLMR	3000	10.5	1995
147-101-06D0A	NDSWC 4945	910	672	651	2	07/17/1981	171.00	12/21/1983	U	--	1980	--	2235
147-101-32AC0	LINSETH, G.	1376	1376	1321	2	09/01/1973	208.70+	06/24/1980	H,S	--	1500	--	2035
147-102-31D01	MOE, ARNOLD	251	231	231	4	01/17/1961	178.00	01/17/1961	--	--	--	--	2240
147-102-31D02	MOE, ARNOLD	310	262	262	4	01/16/1963	180.00	01/16/1963	H,S	--	--	--	2240
147-102-33B8C	NDSWC 5630	142	--	--	--	10/13/1979	--	--	U	--	--	--	2155
147-102-33ACC	NDSWC 5629	302	231	279	1.25	10/13/1979	103.34	11/01/1983	U	110BNPR	5300	10.5	2132

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147-102-33C8B	NDSWC 5631	302	267	264	1.25	10/14/1979	108.38	11/01/1983	U	110BNPR	3900	13.0	2145
147-102-36AAD	LINSETH, OMAR	1380	1380	1340	1.25	09/12/1973			H,S				2060
147-103-07C8A	NDSWC 11393	270	--	--	--	09/29/1980	--	--	U	--	--	--	2120
147-103-08C3A	INDEGARD, GEORGE	200	182	182	4	06/07/1962	115.00	06/07/1962	S	--	--	--	2166
147-103-113D	SINCLAIR	10198	--	--	--	02/27/1962	--	--	--	--	--	--	2330
147-103-14DDD	ENSTULEN, CHRISTIAN	90	90	65	4	07/05/1968	--	--	H,S	--	--	--	2240
147-103-16CCE	LELAND SCHOOL	1460	1460	1397	2	12/22/1979	32.30+	06/10/1980	P,H	211HCFH	1520	20.5	2165
147-103-17B81	LELAND, ERNEST	167	165	148	3	06/07/1962	90.00	06/07/1962	H	--	--	--	2130
147-103-17B62	LELAND, ERNEST	19C	190	163	3	05/04/1963	90.00	05/04/1963	S	--	--	--	2140
147-103-19DCC	LELAND, ERNEST	380	361	361	4	06/26/1971	240.00	06/26/1971	S	--	196C	13.5	2295
147-103-20BDD	PEAK, RAYMOND	165	149	149	4	11/04/1966	--	--	S	--	--	--	2162
147-103-21C6C	LELAND, ERNEST	200	168	168	5	09/12/1969	112.00	09/12/1969	S	--	--	--	2249
147-103-22ADC	LEWIS, WILLIAM	1505	1491	1431	2	12/11/1979	--	--	H,S	--	1820	--	2193
147-103-25ADD	NDSWC 11395	380	351	348	1.25	09/30/1980	154.06	11/01/1983	U	110BNPR	6300	11.5	2195
147-103-27BBD	MCRAE, GLENN	--	201	181	4	11/05/1961	145.00	11/05/1961	S	--	--	--	2249
147-104-04CCC	FALCONBRIDGE, ALAN	1290	1290	1247	6	12/14/1976			H,S	--	1300	18.0	2055
147-104-13DA	INDEGARD, GEORGE	230	203	203	4	1961	140.00	1961	S	--	--	--	2190
147-104-26DDC	HATTER, RUSSELL	40	40	29	4	09/29/1967	--	--	H	--	--	--	2195
147-105-24DDC	GRAZING ASSOC.	320	320	295	6	04/20/1974	170.00	04/20/1974	S	--	--	--	2180
148-098-08DCC	CHRISTIANSON, EMIL	180	140	35	4.50	09/10/1966	--	--	H	--	2600	11.7	2380
148-098-15DAA	HOFFMANN, DAVID	48	48	18	4	05/13/1976	--	--	S	--	--	--	2560
148-098-30AAA	BERG, MILMAN	170	170	152	4.50	07/18/1975	151.00	07/18/1975	S	--	--	--	2390
148-099-05DBA	GRAZING ASSOC.	1940	1940	1890	4	07/06/1977	210.00	07/06/1977	S	211HCFH	1800	18.0	2365
148-099-31ABC	USNPS	393	393	355	6	08/ /1935	--	--	H	--	2000	11.0	2015
148-099-35A8C	NDSWC 11339	160	--	--	--	09/04/1980	--	--	U	--	--	--	2000
148-099-35ACC	NDSWC 11338	180	49	46	1.25	09/04/1980	28.38	11/01/1983	U	110LLMR	3250	10.0	1940
148-099-35B5A	USNPS	400	400	--	--	1935	40.00	09/13/1963	H	--	1800	12.0	2000
148-099-350CA	NDSWC 11337	180	107	104	1.25	09/03/1980	22.10	11/04/1980	U	110LLMR	2150	10.0	1940
148-099-350DB	NDSWC 11336	100	--	--	--	09/03/1980	--	--	U	--	--	--	2000
148-099-36CAA	WIK, MERV	1475	1475	1435	2	11/10/1975	115.50+	11/01/1978	H,S	211HCFH	1800	18.0	2020
148-100-05B8A	GRAVOS, HAROLD	220	190	190	5	12/15/1975	54.00	12/15/1975	H,S	--	650	10.3	2210
148-100-08B8A	SCHULTZ, MARK	28C	280	--	5	02/17/1976	180.00	02/17/1976	S,H	--	2500	10.1	2250
148-100-09CA	MAYNARD	10100	--	--	--	08/17/1978	--	--	--	--	--	--	2311
148-100-17AAB	GEDMUNSEN, JIM	120	120	105	5	10/22/1977	--	--	S	--	--	--	2280
148-100-18ABB	ANDERSON, LLOYD	335	300	260	5	03/10/1973	85.00	03/10/1973	H,S	--	1200	12.4	2220
148-101-06AAA	NDSWC 5625	102	--	--	--	10/12/1979	--	--	U	--	--	--	2260
148-101-06ABB	NDSWC 5624	162	--	--	--	10/12/1979	--	--	U	--	--	--	2255
148-101-10CAC	TURNQUIST, GERALD	80	80	45	5	08/01/1975	35.00	08/01/1975	S	--	--	--	2280

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148-101-15CE	SHELL OIL	10272	--	--	--	03/21/1968	--	--	--	--	--	--	2233	
148-101-20DCC	TURNQUIST, EUGENE	80	80	50	5	02/02/1975	50.00	09/02/1975	H	--	--	--	2185	
148-101-23CCE	WRIGHT, PERRY	40	--	--	5	10/23/1974	--	--	S	--	--	--	2150	
148-101-26BDB	SHELL OIL	6678	--	--	--	04/08/1966	--	--	--	--	--	--	2200	
148-102-10AAD	SORENSEN, CLARENCE	85	65	35	--	08/14/1972	30.00	08/14/1972	H	--	1300	10.5	2330	
148-102-15CE	HUNT OIL	10174	--	--	--	02/23/1961	--	--	--	--	--	--	2635	
148-102-1500A1	NDSWC 5555	1875	1695	1696	4	09/04/1979	218.40	11/01/1979	U	211HCFH	1600	22.0	2385	
148-102-1500A2	NDSWC 5943	1500	1352	1328	2	09/04/1979	248.45	11/01/1983	U	125LDLW	2920	13.5	2395	
148-102-1500A3	NDSWC 5944	1000	942	882	2	09/04/1979	317.40	11/01/1983	U	125TGRV	2550	13.5	2395	
148-103-02BBD	ANDERSON, CLARENCE	105	105	85	4	11/10/1963	75.00	11/10/1963	S	--	--	--	2380	
148-103-07CDD	GREENWOOD, DALE	224	224	133	4	06/23/1969	--	--	S	--	6500	10.8	2280	
148-103-08DDD	GREENWOOD, DALE	175	175	145	4	10/26/1964	118.00	--	U,S	--	--	--	2300	
148-103-09ABB	NDSWC 5942	920	690	672	2	07/07/1981	356.70	11/01/1983	U	--	--	--	2300	
148-103-28CDD	USFS	130	130	104	4	12/20/1966	--	--	U,S	--	--	--	2285	
148-104-0488B	ROEDESKE, FRED	364	364	363	4	09/01/1965	265.00	09/01/1965	H,S	--	2100	12.8	2220	
148-104-14DAD	WAMBACH, MARVIN	460	438	438	4	11/15/1968	396.00	11/15/1968	S	--	2200	13.5	2440	
148-104-23CCC	GRAZING ASSOC.	505	470	470	4	09/16/1968	400.00	09/16/1968	S	--	--	--	2450	
148-104-28CB	GULF OIL	13502	--	--	--	09/20/1955	--	--	--	--	--	--	2326	
148-104-30BAC	GRAZING ASSOC.	1460	1460	1402	1.25	06/02/1977	--	--	F	--	1810	17.9	2055	
148-105-13CCA	SHELL OIL	1460	1460	1420	2	03/29/1980	--	--	F	--	1790	16.2	2115	
148-105-15ADA	NDSWC 11394	67	60	57	1.25	09/30/1980	4.20	11/03/1980	U	1108NPR	5000	8.5	1950	
148-105-26DDB	KLANDL, CLARENCE	1290	1290	1230	6	09/15/1973	--	--	F	H,S	211HCFH	1700	20.0	2040
148-105-35CDB	KLANDL, JULIUS	170	170	148	4	08/26/1967	80.00	08/26/1967	S	--	--	--	2070	
148-105-36BDD	KLANDL, JULIUS	180	180	152	2	08/21/1967	--	--	F	S	--	9.6	1990	
148-105-36CDB	NDSWC 5636	162	145	139	1.25	10/15/1979	36.04	11/01/1983	U	1108NPR	4000	9.0	2040	
148-105-36CDB2	KOCH HYDROCARB	1280	1280	1220	2	01/04/1980	--	--	F	N	--	1720	14.2	2115
148-105-36CDD	NDSWC 5633	142	136	133	1.25	10/14/1979	29.90	11/14/1979	U	1108NPR	3800	9.0	2014	
148-105-36DCD	NDSWC 5634	182	141	138	1.25	10/15/1979	--	--	U	1108NPR	--	--	2020	
148-105-36DDO	NDSWC 5635	182	141	138	1.25	10/15/1979	24.60	12/06/1979	U	1108NPR	3400	9.0	2002	
149-094-143A	MANDAREE 3	1746	1745	1605	6	07/21/1970	111.00	05/09/1970	P	211HCFH	2950	14.9	2160	
149-094-21AAD	NDSWC 11352	240	147	144	1.25	09/09/1980	--	--	U	--	--	--	2152	
149-094-22BBS	NDSWC 11351	140	--	--	--	09/09/1980	--	--	U	--	--	--	2150	
149-094-22BCB	NDSWC 11353	80	--	--	--	09/09/1980	--	--	U	--	--	--	2155	
149-094-27CB	WOLF, GEORGE	36	36	28	30	05/19/1973	12.00	05/19/1973	H	--	--	--	2345	
149-095-04CCB	NDSWC 11357	140	--	--	--	09/10/1980	--	--	U	--	--	--	2226	
149-095-05DCD	NDSWC 11358	180	--	--	--	09/10/1980	--	--	U	--	--	--	2228	
149-095-06ACC	NDSWC 5938	920	883	859	2	06/26/1981	314.72	11/01/1983	U	125TGRV	2950	11.5	2258	
149-095-06DAA	NDSWC 11359	140	--	--	--	09/11/1980	--	--	U	--	--	--	2250	
149-095-08ADA	NDSWC 11356	200	135	132	1.25	09/10/1980	90.03	11/01/1983	U	--	--	--	2222	
149-095-15CBB	NDSWC 11354	120	--	--	--	09/10/1980	--	--	U	--	--	--	2220	

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149-095-16AA	AMERADA	9618	--	--	--	03/15/1953	--	--	--	--	--	--	2353
149-095-16DAD	NDSWC 11355	140	--	--	--	09/10/1990	--	--	U	--	--	--	2230
149-096-0300D	ANDERSON, SKIP	95	95	85	8	10/01/1976	--	--	H	--	--	--	2380
149-096-118A	AMERADA	11696	--	--	--	03/19/1953	--	--	--	--	--	--	2361
149-096-120C1	AMERADA	13765	--	--	--	09/10/1951	--	--	--	--	--	--	2419
149-096-120C2	MALLARD	11632	--	--	--	07/16/1962	--	--	--	--	--	--	2419
149-096-27C3A	JORGENSEN, EINAR	1440	1440	1380	2	06/21/1972	110.90+	07/01/1980	S	211MCFH	2120	19.0	2045
149-097-020D	AMERADA	9670	--	--	--	07/01/1966	--	--	--	--	--	--	2197
149-097-16B3B	NDSWC 11364	107	84	78	1.25	09/16/1980	14.99	11/01/1983	U	112CRCK	3150	9.5	1952
149-097-2940D	GRAZING ASSOC.	1720	1590	1690	4	07/17/1976	120.00	07/17/1976	S	211MCFH	2000	15.0	2250
149-098-110B	CAROLINE TRUST	10102	--	--	--	07/21/1962	--	--	--	--	--	--	2230
149-098-19CAC	NORSTOG BROS.	60	60	50	4	03/24/1973	24.00	03/24/1973	S	--	--	--	2210
149-099-11AAA	NDSWC 11723	40	--	--	--	09/21/1981	--	--	U	--	--	--	2115
149-099-1135E	NDSWC 11724	80	57	52	1.25	09/21/1981	9.14	11/01/1983	U	112T+CG	3200	7.0	2103
149-099-1240A	YOST, CLARENCE	135	135	103	5	07/19/1974	105.00	07/19/1974	H	--	--	--	2210
149-099-1288A	BROWN, ALFRED	126	126	101	5	04/09/1971	74.00	04/09/1971	H	--	--	--	2120
149-099-310CC	STASHUK, JOE	635	635	595	5.50	06/05/1976	360.00	06/05/1976	H	--	--	--	2370
149-100-14AAA	NORGARD, WILLIAM	95	75	45	6	09/20/1975	50.00	09/20/1975	H	--	--	--	2160
149-100-14ABA	NORGARD, JAMES	120	100	57	6	10/26/1977	--	--	S	--	--	--	2185
149-100-25C2B	NDSWC 11589	100	81	78	1.25	05/20/1981	5.07	11/01/1983	U	112T+CG	2100	9.0	2154
149-100-26AAA	NDSWC 11590	240	--	--	--	05/20/1981	--	--	U	--	--	--	2158
149-100-27C0C	NDSWC 5627	122	--	--	--	10/12/1979	--	--	U	--	--	--	2170
149-100-32AAA	NDSWC 5628	42	--	--	--	10/12/1979	--	--	U	--	--	--	2193
149-100-3539A	NDSWC 11588	60	--	--	--	05/20/1981	--	--	U	--	--	--	2173
149-100-3539B	NDSWC 5626	102	61	56	1.25	10/12/1979	9.00	11/01/1983	U	112T+CG	770	8.0	2168
149-101-11C83	NDSWC 11559	40	--	--	--	05/07/1981	--	--	U	--	--	--	2251
149-101-11C03	NDSWC 11560	120	--	--	--	05/07/1981	--	--	U	--	--	--	2253
149-101-1488A	NDSWC 11559	180	110	107	1.25	05/07/1981	75.19	11/01/1983	U	--	2790	8.5	2277
149-101-34CCD	NDSWC 5623	122	--	--	--	10/11/1979	--	--	U	--	--	--	2275
149-102-038C3	NDSWC 11562	60	--	--	--	05/07/1981	--	--	U	--	--	--	2140
149-102-038CC	NDSWC 11564	40	--	--	--	05/07/1981	--	--	U	--	--	--	2150
149-102-0444D	NDSWC 11563	40	--	--	--	05/07/1981	--	--	U	--	--	--	2140
149-102-110CC1	POWELL, RAY	40	--	--	--	04/19/1974	--	--	H	--	2000	9.0	2210
149-102-110CC2	POWELL, RAY	56	56	30	4.50	03/15/1976	--	--	H	--	1300	13.5	2210
149-102-110CC	POWELL, RAY	56	56	50	--	08/27/1975	30.00	08/27/1975	H,S	--	--	--	2170
149-102-14AAA	NDSWC 11561	60	--	--	--	05/07/1981	--	--	U	--	--	--	2180
149-102-310AC	FAA	1920	1910	1805	6	--	330.00	1973	H	211MCFH	1200	12.5	2510
149-104-050CC	GRAZING ASSOC.	835	605	577	4	08/10/1967	13.90+	06/25/1980	S	125LDLW	2950	14.8	1947
149-104-0640B	PEDERSON, H. J.	1220	1220	1192	1.25	07/06/1971	207.90+	06/25/1980	H,S	211MCFH	1920	--	1902
149-104-0600D1	NDSWC 23	50	--	--	--	06/07/1957	--	--	U	--	--	--	1960

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149-104-06DDD2	NCSWC 24	90	--	--	--	06/10/1957	--	--	U	--	--	--	1960
149-104-2100	SHELL OIL	13050	--	--	--	12/25/1979	--	--	--	--	--	--	2207
149-104-29CDA	CHRISTENSON, CHRIS	158	158	157	6	07/17/1971	95.00	07/17/1971	H	--	--	--	2075
149-104-29CDC	NW WELL SERVICE	160	160	140	5	11/03/1979	70.00	11/03/1979	H	--	--	--	2090
149-104-29ABS	SURNS, RAY	103	103	82	4	07/15/1977	65.00	07/15/1977	S	--	--	--	2040
150-094-15ABC	FOX, NICK	414	414	393	1.25	1962	17.74+	08/29/1972	S	--	--	11.5	1918
150-094-16ACC1	NDSWC 11360	40	--	--	--	09/11/1980	--	--	U	--	--	--	1861
150-094-16ACC2	NDSWC 11361	40	--	--	--	09/11/1980	--	--	U	--	--	--	1861
150-094-21ABA	YOUNGWOLF	380	380	362	1.25	1964	2.50+	1964	S	--	--	10.5	2020
150-094-22CBA	YOUNGWOLF	327	327	306	1.50	1964	--	--	S	--	--	9.5	1980
150-094-33CB	OCCIDENTAL	11630	--	--	--	12/20/1964	--	--	--	--	--	--	2320
150-095-14DCB	BERWALD, CAROLE	35	35	20	5	12/13/1972	20.00	12/13/1972	S	--	1180	9.3	2080
150-095-16CC	AMERADA	9337	--	--	--	06/06/1953	--	--	--	--	--	--	--
150-095-16CCD	NDSWC 11545	120	--	--	--	05/05/1981	--	--	U	--	--	--	2245
150-095-29CAC	KUMMER, LILLIAN	240	240	206	5	08/23/1975	175.00	08/23/1975	H,S	--	4100	10.8	2300
150-095-02CD	SIGNALNESS, LEE	300	--	--	4.50	09/08/1973	260.00	09/08/1973	S	--	--	--	2370
150-095-05B2C	NDSWC 6050	1067	927	903	2	12/05/1981	468.78	11/01/1983	U	125TGRV	3000	11.0	2410
150-095-08BA	RAINBOW RES.	9650	--	--	--	02/15/1973	--	--	--	--	--	--	2731
150-095-10A8A	NDSWC 11368	180	--	--	--	09/16/1980	--	--	U	--	--	--	2300
150-095-10A8D	NDSWC 11367	220	--	--	--	09/16/1980	--	--	U	--	--	--	2290
150-096-11DAA	DAHL, ROLLIE	100	100	90	4.50	10/05/1976	--	--	S	--	2700	--	2350
150-096-12DCA	BROWN, GERALD	170	170	169	5.50	09/01/1974	140.00	09/01/1974	H,S	--	--	--	2280
150-096-18CC	NDSWC 6045	1300	1058	1034	2	11/07/1981	314.01	11/01/1983	U	125TGRV	2850	13.0	2300
150-096-20DCS	RINK, DELMER	1630	1604	1583	4	03/24/1980	214.00	03/24/1980	S	211HCFH	2400	10.5	2325
150-096-270AD	NDSWC 11366	60	--	--	--	09/16/1980	--	--	U	--	--	--	2290
150-096-27DC	AMERADA	6515	--	--	--	05/10/1953	--	--	--	--	--	--	2353
150-096-29CCD1	PARRISH, POWELL	130	--	--	--	09/30/1966	--	--	--	--	--	--	2310
150-096-29CCD2	PARRISH, CALVIN	136	135	120	4.50	10/13/1966	--	--	H,S	--	--	--	2310
150-096-36AC	AMERADA	11727	--	--	--	07/12/1952	--	--	--	--	--	--	2377
150-097-09DC	KLAMM, PAUL	135	135	125	5	06/21/1977	--	--	S	--	2300	9.7	2250
150-097-14BA5	KOESER, RALPH	50	50	49	6.62	01/ /1975	10.00	01/ /1975	S	--	--	--	2140
150-097-15DCC	LILLIBRIDGE, BILL	120	120	75	4.50	07/25/1973	13.00	07/25/1973	H	--	--	--	2120
150-097-16BB	KLAMM, PAUL	128	128	120	4.50	06/23/1977	--	--	S	--	5200	10.0	2135
150-097-17DBA	GIERKE, HERMAN	42	42	27	4.50	07/03/1975	20.00	07/03/1975	S	--	--	--	2020
150-097-18ADD1	GIERKE, HERMAN	80	80	65	4	02/15/1973	45.00	02/15/1973	S	--	--	--	2075
150-097-18ADD2	GIERKE, HERMAN	65	65	55	--	05/16/1974	35.00	05/16/1974	S	--	--	--	2075
150-097-18DAB	GIERKE, HERMAN	70	70	55	--	05/17/1974	50.00	05/17/1974	H	--	--	--	2040
150-097-20ADD	GIERKE, HERMAN	240	224	224	4	02/20/1973	120.00	02/20/1973	S	--	5000	10.0	2120
150-097-26CD	AMERADA	11643	--	--	--	04/19/1966	--	--	--	--	--	--	2222
150-097-27CA	STENEHJEM, O.V.	390	380	355	6	03/12/1973	80.00	03/12/1973	S	--	--	--	2240

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150-098-02AAA	NDSWC 11735	160	--	--	--	09/23/1981	--	--	U	--	--	--	2040
150-098-02AAB	NDSWC 11736	240	--	--	--	09/23/1981	--	--	U	--	--	--	2040
150-098-03ABA	NDSWC 11733	69	53	48	1.25	09/22/1981	7.55	11/01/1983	U	112T6CG	1380	7.0	2020
150-098-03ABP	NDSWC 11734	40	--	--	--	05/22/1981	--	--	U	--	--	--	2020
150-098-04BAA	NDSWC 11742	20	--	--	--	09/23/1981	--	--	U	--	--	--	2030
150-098-06AAA	NDSWC 11743	120	103	98	1.25	09/23/1981	11.95	10/08/1981	U	112T6CG	1110	8.0	2046
150-098-06ABD	JOHNSRUD, JOHN	160	160	--	2	11/ /1977	35.75	06/25/1979	U	--	--	--	2065
150-098-06ADA	NDSWC 8	143	121	111	1.25	05/06/1980	14.04	11/01/1983	U	--	1420	9.5	2050
150-098-06ADD1	JOHNSRUD, MARK	--	136	--	--	05/01/1980	7.60	05/19/1980	I	112TECG	1090	12.0	2040
150-098-06ADD2	NDSWC C	143	121	118	1.25	05/06/1980	7.84	11/01/1983	U	112TECG	1200	9.8	2040
150-098-06BA8	NDSWC 11745	40	--	--	--	09/24/1981	--	--	U	--	--	--	2140
150-098-06DA41	NDSWC 5615	162	104	98	1.25	10/05/1979	6.90	11/01/1983	U	112T6CG	950	10.0	2045
150-098-06DA42	NDSWC A	143	121	118	1.25	05/05/1980	8.83	11/01/1983	U	112T6CG	1080	9.5	2046
150-098-06DDD1	NDSWC 1447	32	--	--	--	11/12/1958	--	--	U	--	--	--	2040
150-098-06DDD2	NDSWC 5607	102	--	--	--	10/03/1979	--	--	U	--	--	--	2040
150-098-07ADA1	NDSWC 1448	42	--	--	--	11/13/1958	--	--	U	--	--	--	2035
150-098-07ADA2	NDSWC 5606	82	--	--	--	10/03/1979	--	--	U	--	--	--	2040
150-098-07CDD	NDSWC 5405	82	39	33	1.25	10/03/1979	--	--	U	--	--	--	2043
150-098-07DAD	NDSWC 1446	42	--	--	--	11/12/1958	1.14	11/01/1983	U	112T6CG	770	9.8	2036
150-098-140DC	NDSWC 11544	40	--	--	--	05/05/1981	--	--	U	--	--	--	2010
150-098-16CBA	WTFRD GOLF CLUB	150	150	125	6	05/20/1975	90.00	05/20/1975	I	--	1150	9.7	2130
150-098-16CCC	NDSWC 11340	200	164	158	1.25	09/04/1980	3.80	11/01/1983	U	112T6CG	1620	9.0	2045
150-098-16CDD	WTFRD GOLF CLUB	160	160	139	5	04/29/1971	115.00	04/29/1971	C	--	700	11.8	2120
150-098-17CCC	ROUGH RIDER EQ.	220	220	200	4.50	10/18/1974	12.00	10/18/1974	C	--	--	--	2045
150-098-17CDD	NDSWC 11731	60	--	--	--	09/22/1981	--	--	U	--	--	--	2050
150-098-17DCC	NDSWC 11732	120	98	93	1.25	09/22/1981	7.94	10/05/1981	U	112T6CG	1610	8.0	2047
150-098-18CSA	HOLM, RICK	100	100	60	4	06/16/1977	--	--	H	--	--	--	2085
150-098-18DDC	NDSWC 11730	60	36	31	1.25	09/22/1981	12.29	11/01/1983	U	112T6CG	3440	8.0	2051
150-098-19AB	WATFORD CITY 4	79	79	59	16	12/ /1957	11.50	12/ /1957	P	112T6CG	1300	14.0	2045
150-098-19ABA	WATFORD CITY 1	--	--	--	--	--	--	--	P	--	1500	9.0	2045
150-098-19CCB	NDSWC 11728	120	78	73	1.25	09/22/1981	15.10	11/01/1983	U	112T6CG	1160	8.0	2064
150-098-20SAB	NDSWC 11556	60	--	--	--	05/06/1981	--	--	U	--	--	--	2055
150-098-21ACD	B. H. TRUCKING	1810	1810	1730	2	08/04/1980	--	--	H	--	--	--	2125
150-098-228CC	EIDE, ALFRED	110	--	--	--	05/ /1974	46.20+	03/04/1980	H	211MCFH	--	--	2100
150-098-23AAB	NDSWC 5608	162	104	98	1.25	10/03/1979	9.54	11/01/1983	U	112CRCK	2500	8.5	2002
150-098-23ABB	NDSWC 11543	40	--	--	--	05/05/1981	--	--	U	--	--	--	2010
150-098-24DBE	HARTEL, ALECK	83	83	82	7	02/03/1973	40.00	02/03/1973	H	--	2300	--	2030
150-098-28ABH	NDSWC 11542	140	95	92	1.25	05/05/1981	18.60	11/01/1983	U	112CRCK	2150	8.5	2059
150-098-30BEC	NDSWC 11727	60	38	33	1.25	09/22/1981	6.69	11/01/1983	U	112T6CG	1950	3.0	2060
150-098-30CBB	EAGLES CLUB	130	130	120	6.63	05/17/1975	30.00	05/17/1975	C	--	2350	8.7	2055

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150-093-34AAB	BROGERSON, RONALD	90	90	55	4.50	11/19/1974	55.00	11/19/1974	S	--	2400	--	2140'
150-093-34BCC	NDSWC 11365	200	125	122	1.25	09/16/1980	77.43	11/01/1983	U	112CRCK	5900	9.0	2105
150-098-34CAD	NDSWC 11363	80	--	--	--	09/15/1980	--	--	U	--	--	--	2060
150-099-34CCA	SONDRLO, LEROY	255	255	215	4	10/23/1975	231.00	10/23/1975	S	--	3400	--	2155
150-099-02CCC	NDSWC 11369	160	126	123	1.25	09/17/1980	25.10	11/01/1983	U	112TCCG	1100	9.0	2090
150-099-02COC	NDSWC 11566	116	97	94	1.25	05/11/1981	14.91	11/01/1983	U	112TCCG	1320	8.5	2094
150-099-02COC	NDSWC 11567	120	63	80	1.25	05/11/1981	9.10	11/01/1983	U	112TCCG	2000	9.5	2088
150-099-10AAA	NDSWC 11565	80	46	43	1.25	05/08/1981	26.78	11/01/1983	U	112TCCG	1590	8.0	2112
150-099-15DDD	NDSWC 5630	182	82	73	1.25	10/01/1979	.11	11/01/1983	U	112TCCG	900	9.0	2079
150-099-20ADA	NDSWC 11370	60	--	--	--	09/17/1980	--	--	U	--	--	--	2129
150-099-22AAA	NDSWC 5603	122	59	83	1.25	10/02/1979	.75	11/01/1983	U	112TCCG	700	8.0	2080
150-099-22AAA	NDSWC 5604	102	74	68	1.25	10/02/1979	4.98	11/01/1983	U	112TCCG	1350	8.0	2087
150-099-228AA1	NDSWC 5782	2100	1804	1774	2	09/01/1980	46.69	11/01/1983	U	112TCCG	2300	20.0	2187
150-099-228AA2	NDSWC 5782A	860	838	826	2	09/01/1980	223.45	11/01/1983	U	125TGRV	2300	13.0	2187
150-099-228AA3	NDSWC 5782B	1442	1413	1395	2	09/01/1980	82.00	11/01/1983	U	125LULW	3450	12.0	2187
150-099-23BAA	NDSWC 5602	62	--	--	--	10/02/1979	--	--	U	--	--	--	2098
150-099-23BAA	NDSWC 5601	102	44	36	1.25	10/02/1979	1.93	11/01/1983	U	112TCCG	750	8.0	2081
150-099-24DAA	NDSWC 11729	100	76	71	1.25	09/22/1981	16.34	11/01/1983	U	112TCCG	1350	8.0	2083
150-099-24DDE	WATFORD CITY 2	60	60	48	8	11/02/1947	27.00	11/02/1947	P	112TCCG	750	9.5	2120
150-099-24DDA	WATFORD CITY 3	100	--	--	--	1952	--	--	P	112TCCG	1300	10.1	2060
150-099-25A0D	NDSWC 11726	60	--	--	--	09/22/1981	--	--	U	--	--	--	2066
150-099-25C0C	NDSWC 11341	120	53	50	1.25	09/05/1980	6.31	11/01/1983	U	112TCCG	2000	8.5	2075
150-099-25D0D	NDSWC 11725	80	55	50	1.25	09/22/1981	11.02	11/01/1983	U	112TCCG	1440	8.0	2070
150-099-26D0D	NDSWC 11342	60	--	--	--	09/05/1980	--	--	U	--	--	--	2076
150-099-2700D	NDSWC 11345	60	--	--	--	09/03/1980	--	--	U	--	--	--	2076
150-099-3560A	NDSWC 11344	140	--	--	--	09/08/1980	--	--	U	--	--	--	2078
150-099-35D0D	NORSTOG, KONRAD	88	--	--	--	12/15/1977	20.00	12/15/1977	H	--	--	--	2100
150-099-36AAA	NDSWC 11344	60	--	--	--	09/08/1980	--	--	U	--	--	--	2030
150-099-36AAA	NDSWC 11343	80	--	--	--	09/08/1980	--	--	U	--	--	--	2080
150-100-05CAA	HOVDE, HJALMER	185	185	173	4.50	10/27/1965	--	--	H	--	2200	11.0	2210
150-100-14DCC	HOWISTON, ERNIE	90	90	70	4.50	05/01/1976	--	--	P	--	1500	8.9	2255
150-100-14DDE	MELLOR, WILLIAM	70	70	50	4	03/28/1973	32.00	03/28/1973	H	--	870	10.1	2245
150-100-14DAA	STENSETH, SOLVEIG	95	95	89	4.50	06/02/1975	75.00	06/02/1975	H+S	--	1800	10.0	2325
150-100-26C9A	MOSBY, PHILLIP	323	323	313	4	08/25/1977	275.00	08/25/1977	H+S	--	--	--	2340
150-100-27AAA	SCHULTZ, CARL	270	270	260	4	08/16/1976	--	--	S	--	2200	10.8	2295
150-100-2906	TRUE OIL	14125	--	--	--	01/13/1976	--	--	--	--	--	--	2319
150-101-05B0E	NDSWC 1833	53	--	--	--	10/12/1960	--	--	U	--	--	--	2190
150-101-05B0C	NDSWC 1833	42	--	--	--	10/11/1960	--	--	U	--	--	--	2225
150-101-05C0A	NDSWC 1849	65	--	--	--	10/22/1960	--	--	U	--	--	--	2187
150-101-05CCA	NDSWC 1850	52	--	--	--	10/22/1960	--	--	U	--	--	--	2160

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150-101-05CCC1	ALEXANDER 1	--	38	--	--	01/01/1959	--	--	P	--	2150	9.0	2150
150-101-05CCC2	NDSWC 1834	84	--	--	--	10/12/1960	--	--	U	--	--	--	2140
150-101-05CCD	HIGGINS, HOWARD	49	49	45	5	06/15/1975	7.00	06/15/1975	H	--	2700	9.1	2150
150-101-07AAA	NDSWC 1832	63	--	--	--	10/10/1960	--	--	U	--	--	--	2135
150-101-07BBA	NDSWC 1837	84	--	--	--	10/13/1960	--	--	U	--	--	--	2150
150-101-08AAA	NDSWC 1842	52	--	--	--	10/18/1960	--	--	U	--	--	--	2163
150-101-08CEC	NDSWC 1840	63	--	--	--	10/17/1960	--	--	U	--	--	--	2145
150-101-09AAD	NDSWC 1843	63	--	--	--	10/18/1960	--	--	U	--	--	--	2165
150-101-10DDD	NDSWC 11592	20	--	--	--	05/20/1981	--	--	L	--	--	--	2200
150-101-11CCB	NDSWC 1844	42	--	--	--	10/18/1960	--	--	U	--	--	--	2200
150-101-14ADD	NDSWC 11591	60	--	--	--	05/20/1981	--	--	U	--	--	--	2230
150-101-18DAD	NDSWC 1841	42	--	--	--	10/18/1960	--	--	U	--	--	--	2210
150-101-21DAA	DWYER, TOM	50	50	23	4.50	11/26/1974	--	--	S	--	--	--	2225
150-101-24ABA	NDSWC 11799	65	58	53	1.25	10/22/1981	20.10	11/01/1983	U	--	1060	9.0	2275
150-101-31AAA	NYGARD, PETER	80	60	50	--	07/10/1975	50.00	07/10/1975	H	--	2300	11.0	2210
150-101-31000	NDSWC 1836	63	--	--	--	10/19/1960	--	--	U	--	--	--	2210
150-102-02DAD	NDSWC 1839	74	--	--	--	10/14/1960	--	--	U	--	--	--	2115
150-102-02DDA	NDSWC 1838	105	--	--	--	10/13/1960	--	--	U	--	--	--	2105
150-102-07BBA	NDSWC 1837	84	--	--	--	10/13/1960	--	--	U	--	--	--	2045
150-102-15ACB	LINK, DON	63	65	29	5.50	06/07/1972	9.00	06/07/1972	H+S	--	3000	9.5	2160
150-102-156DC	LINK, WALTER	59	59	16	5.50	06/11/1972	15.00	06/11/1972	H	--	2700	9.5	2120
150-102-19DDD	KUTKENDALL, J.H.	226	225	225	4	12/23/1966	--	--	H	--	--	--	2100
150-103-0108D	NDSWC 11382	27	--	--	--	09/23/1980	--	--	U	--	--	--	2020
150-103-01DDA	NDSWC 11383	120	--	--	--	09/23/1980	--	--	U	--	--	--	2015
150-103-03AAC	NDSWC 5941	1160	816	798	2	07/07/1981	297.10	11/01/1983	U	125TGRV	2850	12.0	2230
150-103-23CDD	GRAZING ASSOC.	1450	1450	1414	1.25	11/11/1970	--	--	S	--	--	--	2220
150-104-0188B	NDSWC 11387	87	76	73	1.25	09/24/1980	41.70	11/06/1980	U	112CRNB	2500	8.7	1914
150-104-02AAD	NDSWC 11386	87	73	70	1.25	09/24/1980	40.60	11/06/1980	U	110YLMR	3600	9.5	1920
150-104-02ABB	NDSWC 1275	42	--	--	--	01/08/1957	--	--	U	--	--	--	1877
150-104-02ACC	NDSWC 15	60	--	--	--	05/10/1957	--	--	U	--	--	--	1895
150-104-02ADA1	NDSWC 11388	86	--	--	--	09/24/1980	--	--	U	--	--	--	1925
150-104-02ADA2	NDSWC 11392	100	80	77	1.25	09/26/1980	50.30	11/06/1980	U	110YLMR	4500	9.2	1925
150-104-02ADB	NDSWC 16	64	--	--	--	05/17/1957	--	--	U	--	--	--	1917
150-104-02ADD	BERRY, RON	655	655	621	4	01/23/1967	--	--	H+S	--	2100	12.5	1940
150-104-02BDC	NDSWC 1274	52	--	--	--	01/03/1958	--	--	U	--	--	--	1875
150-104-02BDD	NDSWC 14	60	--	--	--	05/09/1957	--	--	U	--	--	--	1890
150-104-04ABB	SCHLOTHAUER, HAROLD	1385	1385	1340	5	07/25/1977	231.00+	10/31/1978	H	211HCFH	2200	22.0	1895
150-104-04BBB	FALTENHAGEN, CLAYTON	1340	1340	1305	6	02/14/1977	--	--	H+S	211HCFH	2200	14.5	1893
150-104-05DDD	NDSWC 11581	109	86	83	1.25	05/14/1981	3.10	06/02/1981	U	110YLMR	1810	8.0	1889
150-104-09CBB	HELM, DONALD	1365	1365	1340	1.25	02/01/1975	--	--	H+S	--	--	--	1886

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150-104-10ADD	NDSWC 1278	74	--	--	--	01/20/1957	--	--	U	--	--	--	1835
150-104-10BAB	JOHNSON, ELDON	1400	1380	1330	5	05/26/1977	--	F	S	--	2100	21.5	1894
150-104-10DAA1	NDSWC 1279	52	--	--	--	01/22/1958	--	--	U	--	730	--	1870
150-104-10DAA2	LASSEY, WILLIAM	78	78	66	3	05/07/1967	--	--	H	--	--	--	1895
150-104-10DAC	NDSWC 11	70	--	--	--	05/01/1957	--	--	U	--	--	--	1885
150-104-10DCC	NDSWC 1280	42	--	--	--	01/27/1958	--	--	U	--	1150	--	1877
150-104-10DDA	NDSWC 12	48	--	--	--	05/04/1957	--	--	U	--	--	--	1895
150-104-1188D	NDSWC 27	60	--	--	--	06/13/1957	--	--	U	--	--	--	1882
150-104-11CCB	NDSWC 13	60	--	--	--	05/07/1957	--	--	U	--	--	--	1930
150-104-146CA	WALKER, JOHN	1270	960	943	1.25	08/30/1967	37.00+	06/26/1980	S	211HCFH	3200	15.0	2092
150-104-15AAA	NDSWC 28	60	--	--	--	06/14/1957	--	--	U	--	--	--	1900
150-104-15ACB	NDSWC 25	60	--	--	--	06/11/1957	--	--	U	--	--	--	1885
150-104-168BB	DENOVH, E.A.	1333	1333	1287	6	03/1/1977	--	F	S	--	2200	14.5	1889
150-104-19ABA	DEAN, DALE	93	89	87	6	04/18/1968	19.33	04/18/1968	H/S	--	1300	10.5	1890
150-104-19CBC	NDSWC 19	70	--	--	--	05/24/1957	--	--	U	--	--	--	1892
150-104-19DDC1	NDSWC 1-860	105	--	--	--	03/21/1967	--	--	U	--	--	--	1891
150-104-19DDC2	NDSWC 3-860	30	--	--	--	03/21/1967	--	--	U	--	--	--	1837
150-104-19DDD	NDSWC 5622	102	82	79	2	10/11/1979	12.40	11/14/1979	U	110YLMR	950	8.0	1892
150-104-20A6C	NDSWC 1281	83	--	--	--	02/04/1958	--	--	U	--	--	--	1875
150-104-20BBC1	NDSWC	100	--	--	--	10/24/1966	--	--	U	--	--	--	1887
150-104-20BBC2	NDSWC 860	74	67	64	1.25	03/09/1967	17.37	03/10/1967	U	110YLMR	1900	--	1885
150-104-20CBB	NDSWC	110	--	--	--	10/24/1966	--	--	U	--	--	--	1892
150-104-20CCC1	NDSWC 67-458	100	89	69	1.25	10/23/1966	12.40	11/01/1983	U	110YLMR	950	--	1890
150-104-20CCC2	NDSWC 4-860	84	74	71	1.25	03/28/1967	14.30	03/30/1967	U	110YLMR	857	--	1890
150-104-20CCC3	NDSWC 4-860	40	40	37	1.25	03/28/1967	14.70	03/30/1967	U	--	1040	--	1890
150-104-20CDA	NDSWC 6-860	105	93	90	1.25	03/29/1967	13.20	03/30/1967	U	110YLMR	1980	--	1885
150-104-21CAD	FLYNN, MIKE	102	102	99	6	04/24/1969	25.00	04/24/1969	H	--	--	--	1900
150-104-21CCA	NDSWC	105	--	--	--	10/29/1966	--	--	U	--	--	--	1887
150-104-21CDB	FLYNN, MIKE	1345	1325	1300	5	08/23/1977	--	F	S/H	--	2000	13.5	1900
150-104-230CD	GRAZING ASSOC.	1450	1450	1414	1.25	11/11/1970	--	F	S	--	2020	19.0	2015
150-104-298BB	NDSWC 5-860	84	84	81	1.25	03/28/1969	13.00	03/30/1969	U	110YLMR	832	--	1890
150-104-298BC1	NDSWC 20	85	--	--	--	05/27/1957	--	--	U	--	--	--	1885
150-104-298BC2	NDSWC 21	90	--	--	--	05/28/1957	--	--	U	--	--	--	1890
150-104-298BD	NDSWC	100	--	--	--	10/30/1966	--	--	U	--	--	--	1885
150-104-298CB	NDSWC	100	--	--	--	10/24/1966	--	--	U	--	--	--	1890
150-104-29CCB	NDSWC 1283	63	--	--	--	04/14/1958	--	--	U	--	--	--	1885
150-104-29CCC	NDSWC 22	60	--	--	--	05/28/1957	--	--	U	--	--	--	1890
150-104-30AAA	NDSWC 18	70	--	--	--	05/22/1957	--	--	U	--	--	--	1885
150-104-30ABB	NDSWC 17	97	--	--	--	05/18/1957	--	--	U	--	--	--	1885
150-104-30ABC	NDSWC 1282	84	--	--	--	04/11/1958	--	--	U	--	--	--	1890

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151-094-10AD	STANOLIND	11100	--	--	--	10/12/1955	--	--	--	--	--	--	1940
151-094-10BB	PETREL OIL CO.	12208	--	--	--	01/29/1969	--	--	--	--	--	--	1942
151-094-10CA	STANDARD OIL	5800	--	--	--	10/01/1955	--	--	--	--	--	--	1940
151-094-17CC	JORDAN, T.	9330	--	--	--	11/18/1965	--	--	--	--	--	--	2059
151-095-0408D1	NDSWC 5939	1260	1196	1178	2	06/30/1981	233.28	11/01/1983	U	--	--	--	2300
151-095-0408D2	NDSWC 6164	1620	1432	1407	2	06/30/1981	184.50	11/01/1983	U	--	--	--	2300
151-095-09CD	TEXACO	9500	--	--	--	07/07/1965	--	--	--	--	--	--	2448
151-095-29ABB	KIESON, WILLARD	80	80	72	4	02/12/1975	55.80	06/14/1979	U	--	--	--	2440
151-095-298CB	SIVERTSON, SIGURD	80	80	68	4	04/08/1976	--	--	H	--	5000	9.5	2340
151-095-36ABA	HALL, JIM	40	40	32	24	05/22/1973	24.00	05/22/1973	M/S	--	--	--	2290
151-095-368BA	NDSWC 6053	1280	882	798	2	05/28/1982	344.22	11/01/1983	U	--	3950	11.0	2262
151-096-02AD	ANDERSON, LLOYD	175	175	160	4	08/19/1974	160.00	08/19/1975	U	--	--	--	2385
151-096-09ABB	CLEAR CR CHURCH	110	109	91	4	05/07/1976	74.00	05/27/1976	P	--	--	--	2285
151-096-10CDD	TANK, GEORGE	100	95	75	4	06/21/1976	70.00	06/21/1976	M/S	--	1370	7.9	2300
151-096-118CD	GILSTAD, RAYMOND	70	70	50	4.50	08/22/1974	52.00	08/22/1974	S	--	--	--	2290
151-096-148DA	BLEGEN, RAYMOND	70	70	55	--	02/16/1976	25.00	02/16/1976	S	--	680	9.1	2330
151-096-15DD	AMERADA	2382	--	--	--	07/06/1953	--	--	--	--	--	--	2392
151-096-2488B	NDSWC 1494	137	--	--	--	04/16/1959	--	--	U	--	--	--	2018
151-096-26C8C	BROWN, DEAN	90	--	--	--	09/08/1976	58.00	09/08/1976	S	--	--	--	2400
151-096-28CCD	NDSWC 11546	260	--	--	--	05/05/1981	--	--	U	--	--	--	2260
151-096-290DD	KIESON, WILLARD	30	30	23	4	01/30/1975	12.60	01/30/1975	S	--	--	--	2270
151-096-30AAA	NDSWC 11547	120	--	--	--	05/05/1981	--	--	U	--	--	--	2259
151-096-34DD	AMERADA	9700	--	--	--	07/26/1966	--	--	--	--	--	--	2421
151-096-36AAA	NDSWC 6051	1300	--	--	--	12/08/1981	--	--	U	--	--	--	2490
151-097-208DD	WOLD, WESLEY	173	173	158	4	09/13/1977	--	--	S	--	2850	11.0	2220
151-097-33CB	JOHNSON, IVAN	40	40	28	5	09/20/1973	9.00	09/20/1973	S	--	2250	8.4	2240
151-097-358B	TEXACO	9855	--	--	--	04/14/1958	--	--	--	--	--	--	2418
151-098-04CDD	NDSWC 11593	120	--	--	--	05/20/1981	--	--	U	--	--	--	2003
151-098-040DC	NDSWC 11594	140	105	102	1.25	05/20/1981	5.59+	06/02/1981	U	112T8CG	3100	9.0	1985
151-098-05CCD	SKOGLUND, GLEN	135	135	115	4	02/19/1974	--	--	H	--	1600	8.9	2130
151-098-088CB	FARLAND, ALFRED	115	115	100	4	08/10/1974	85.00	08/10/1974	S	--	--	--	2110
151-098-09AAA	NDSWC 1490	136	--	--	--	04/13/1959	--	--	U	--	--	--	1933
151-098-095AA	NDSWC 1491	116	--	--	--	04/14/1959	--	--	U	--	--	--	2003
151-098-1088B	NDSWC 1489	116	--	--	--	04/10/1959	--	--	U	--	--	--	1993
151-098-220AA	NDSWC 11350	80	--	--	--	09/09/1980	--	--	U	--	--	--	2020
151-098-26C8C	NDSWC 11348	100	--	--	--	09/09/1980	--	--	U	--	--	--	2025
151-098-27AAA	NDSWC 11349	200	--	--	--	09/09/1980	--	--	U	--	--	--	2025
151-098-29CCB1	NDSWC 1449	105	--	--	--	11/13/1958	--	--	U	--	--	--	2025
151-098-29CCB2	NDSWC 11746	40	27	22	1.25	09/24/1981	4.17	11/01/1983	U	112T8CG	1360	8.0	2026
151-098-30ADD	NDSWC 1492	84	--	--	--	04/14/1959	--	--	U	--	--	--	2020

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151-098-30DAA	NDSWC 1450	105	--	--	--	11/21/1958	--	--	U	--	--	--	2020
151-098-31SDS	LAWLAR, RICHARD	116	116	96	5	04/13/1976	94.00	04/13/1976	S	--	--	--	2100
151-098-310CC	NDSWC 11744	20	--	--	--	09/24/1981	--	--	U	--	--	--	2050
151-098-310DA	NDSWC 11557	80	67	64	1.25	05/06/1981	12.40	06/02/1981	U	112TECG	1150	8.0	2045
151-098-310JC	NDSWC 5614	142	94	88	1.25	10/05/1979	27.60	12/04/1979	U	112TECG	1350	8.5	2052
151-098-32CCC	NDSWC E	83	41	38	1.25	05/08/1980	--	--	U	112TACG	1000	11.0	2060
151-098-33CCC	NDSWC 11741	20	--	--	--	09/23/1981	--	--	U	--	--	--	2060
151-098-34DDC	NDSWC 11247	80	--	--	--	09/08/1980	--	--	U	--	--	--	2020
151-098-36DDC	NDSWC 11737	100	91	86	1.25	09/23/1981	29.04	11/01/1983	U	112TSCG	1390	8.0	2052
151-099-17C6B	LEISETH, OLAF	130	130	115	4	05/29/1976	110.00	05/29/1976	S	--	2200	8.7	2280
151-099-22CCC	LEISETH, KENNY	130	130	115	4	07/30/1975	100.00	07/30/1975	H	--	1800	9.0	2210
151-099-25DDC	LAWLAR, RICHARD	80	76	57	4	04/18/1976	18.00	04/18/1976	H/S	--	1200	12.0	2070
151-099-3340B	TORSTENSON, JEROME	80	80	65	4	05/05/1976	20.00	05/05/1976	H/S	--	1200	--	2140
151-099-3408C	NDSWC 11572	20	--	--	--	05/12/1981	--	--	U	--	--	--	2097
151-099-3540D	NDSWC 11571	40	--	--	--	05/12/1981	--	--	U	--	--	--	2014
151-099-35C0C	NDSWC 11568	136	126	123	1.25	05/12/1981	5.74	11/01/1983	U	112TECG	1500	7.5	2087
151-099-35DAA	NDSWC 11570	60	--	--	--	05/12/1981	--	--	U	--	--	--	2076
151-099-35DCC	NDSWC 11569	120	90	87	1.25	05/12/1981	5.10	11/01/1983	U	112TECG	1300	8.0	2085
151-099-35D0D	NDSWC 11751	40	--	--	--	09/24/1981	--	--	U	--	--	--	2093
151-099-35D0C	NDSWC 11750	40	--	--	--	09/24/1981	--	--	U	--	--	--	2085
151-099-36CDD	NDSWC 11749	20	--	--	--	09/24/1981	--	--	U	--	--	--	2140
151-101-048AA	NDSWC 5619	82	--	--	--	10/10/1979	--	--	U	--	--	--	1945
151-101-06CCC	NDSWC 11573	80	--	--	--	05/12/1981	--	--	U	--	--	--	2032
151-101-06DAB	NDSWC 11859	20	--	--	--	06/02/1982	--	--	U	--	--	--	1990
151-101-06DAC	NDSWC 11858	20	--	--	--	06/02/1982	--	--	U	--	--	--	1990
151-101-06DAD	NDSWC 11857	20	--	--	--	06/02/1982	--	--	U	--	--	--	1990
151-101-07B5C	NDSWC 11856	240	226	220	1.25	05/01/1982	--	--	U	112CRNB	1450	12.0	2023
151-101-07B5C	NDSWC 11857	60	--	--	--	05/12/1981	--	--	U	--	--	--	2020
151-101-07B5C	NDSWC 11855	20	--	--	--	06/01/1982	--	--	U	--	--	--	2040
151-101-07B5C	NDSWC 11855	202	121	118	1.25	10/09/1979	53.20	12/06/1979	U	--	--	--	1988
151-101-08DAA	NDSWC 5617	20	--	--	--	06/02/1982	--	--	U	--	--	--	1990
151-101-08DCC	NDSWC 11798	40	--	--	--	10/22/1981	--	--	U	--	--	--	2035
151-101-09B4A	NDSWC 5618	202	161	158	1.25	10/09/1979	31.19	11/01/1983	U	112CRNB	1300	9.0	1983
151-101-10CCC	BRATCHER, EDWARD	92	92	65	4	01/09/1975	35.00	01/09/1975	H	--	3300	9.0	1983
151-101-16A8B	MELLING, GLENN	30	30	--	4	06/29/1977	--	--	S	--	--	--	2025
151-101-23AC	CONSOLIDATED	13615	--	--	--	10/03/1969	--	--	--	--	--	--	2034
151-101-27CAD	NDSWC 1846	63	--	--	--	10/19/1960	--	--	U	--	--	--	2100
151-101-29B8B	NDSWC 1847	62	--	--	--	10/19/1960	--	--	U	--	--	--	2247
151-101-31DDO	NDSWC 1836	63	--	--	--	10/13/1960	--	--	U	--	--	--	2220
151-101-33CBH	NDSWC 1845	105	--	--	--	10/19/1960	--	--	U	--	--	--	2200
151-101-36CCC	NDSWC 6055	1040	801	777	2	06/03/1982	276.50	11/01/1983	U	125TRV	--	--	2225

B2

LOCAL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	DEPTH TO FIRST OPENING (FEET)	CASING DIAMETER (INCHES)	DATE COMPLETED	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED	USE OF WATER	PRINCIPAL AQUIFER	SPECIFIC CONDUCTANCE (UMHO/CM AT 25° C)	TEMPERATURE (DEGREES C)	ALTITUDE OF LAND SURFACE (FEET)
151-102-10008	WAHLSTROM, JOHN	125	125	109	6	12/01/1965	--	--	H	--	--	--	2090
151-102-12CC8	NDSWC 11797	260	235	230	1.25	10/22/1981	89.05	11/01/1983	U	--	1880	10.0	2045
151-102-12CCC	NOSWC 11795	60	--	--	--	10/22/1981	--	--	U	--	--	--	2045
151-102-13AAA	NDSWC 11752	60	--	--	--	09/26/1981	--	--	U	--	--	--	2065
151-102-13CBB	NDSWC 11796	40	--	--	--	10/22/1981	--	--	U	--	--	--	2070
151-102-13DAA	NDSWC 11753	40	--	--	--	09/24/1981	--	--	U	--	--	--	2110
151-102-14C8C	NDSWC 5620	142	--	--	--	10/10/1979	--	--	U	--	--	--	2058
151-102-14CCC	NDSWC 5637	302	264	258	1.25	10/16/1979	116.30	12/06/1979	U	112CRNB	1900	9.0	2074
151-102-15AAA	NDSWC 5633	142	--	--	--	10/16/1979	--	--	U	--	--	--	2095
151-102-15ADC	WAHLSTROM, JOHN	100	--	--	--	10/21/1976	--	--	U	--	--	--	2065
151-102-21BCC1	NDSWC 11379	120	--	--	--	09/22/1980	--	--	U	--	--	--	2050
151-102-21BCC2	NDSWC 11380	50	--	--	--	09/22/1980	--	--	U	--	--	--	2052
151-102-21C9C	NDSWC 11378	247	226	223	1.25	09/19/1980	90.26	11/01/1983	U	112CRNB	1500	9.5	2040
151-102-21CCC	NDSWC 11377	160	--	--	--	09/18/1980	--	--	U	--	--	--	2065
151-102-22AAA	NDSWC 11376	100	--	--	--	09/18/1980	--	--	U	--	--	--	2095
151-102-22000	MRACHEK, JOHN	72	72	58	4.50	02/28/1975	60.00	02/28/1975	S	--	2200	11.0	2125
151-102-24000	DWYER, TIM	170	170	160	4	03/15/1975	70.00	03/15/1975	H	--	--	--	2230
151-102-26ADD1	PESEK, MONTE	195	195	95	4	04/16/1974	--	--	H	--	2200	9.0	2160
151-102-26ADD2	PESEK, MONTE	60	60	20	8	07/30/1974	22.00	07/30/1974	U	--	--	--	2160
151-102-32ACC	NDSWC 11381	40	--	--	--	09/23/1980	--	--	U	--	--	--	2024
151-102-350A0	MRACHEK, RAY	152	150	138	4	07/12/1977	--	--	S	--	--	--	2180
151-103-08AC	INVESTORS	9710	--	--	--	01/02/1958	--	--	--	--	--	--	2199
151-103-08DCA	OLSON, MILTON	130	130	50	4.50	10/30/1974	52.00	10/30/1974	H	--	490	9.7	2175
151-103-23C3D	SKOGEN, ARNOLD	165	165	148	4	08/03/1967	43.00	08/03/1967	H	--	--	--	1990
151-103-26AC8	NOSWC 1254	21	--	--	--	04/15/1958	--	--	U	--	--	--	1980
151-103-27AAA1	NDSWC 1285	42	--	--	--	04/15/1958	--	--	U	--	--	--	1983
151-103-27AAA2	KLOSE, VERNON	170	153	133	1.25	03/05/1976	31.57	12/02/1983	U	--	--	--	1983
151-103-27ACA1	KLOSE, VERNON	150	137	117	1.25	09/17/1976	18.75	12/06/1979	U	--	--	--	1955
151-103-27ACA2	KLOSE, VERNON	150	136	116	14	10/25/1976	18.00	10/25/1976	I	112CRNB	1300	12.0	1955
151-103-28DD0	NDSWC 5621	142	121	118	1.25	10/10/1979	33.18	11/01/1983	U	112CRNB	1350	9.0	1965
151-103-33BBA	NDSWC 11575	120	109	103	1.25	05/13/1981	14.78	11/01/1983	U	112CRNB	1640	8.7	1930
151-104-02ABA1	NOSWC	130	--	--	--	10/25/1966	--	--	U	--	--	--	1876
151-104-02ABA2	NOSWC	120	--	--	--	10/26/1966	--	--	U	--	--	--	1875
151-104-02AB8	NDSWC 1275	42	--	--	--	01/08/1958	--	--	U	--	--	--	1876
151-104-02BDC	NDSWC 1274	53	--	--	--	01/03/1958	--	--	U	--	--	--	1882
151-104-02CAA	NDSWC 1276	53	--	--	--	01/09/1958	--	--	U	--	--	--	1876
151-104-02CCA1	NDSWC 1277	53	--	--	--	01/09/1958	--	--	U	--	--	--	1855
151-104-02CCA2	NDSWC 1277	53	--	--	--	01/14/1958	--	--	U	--	--	--	1875
151-104-04AAA	BISEK, HARLOW	1405	1405	1342	5	12/26/1973	242.60*	09/15/1979	H/S	211MCFH	2300	17.0	1879
151-104-10CBB	NOSWC 8025	40	30	27	1.25	07/15/1971	5.70	12/06/1979	U	110YLMR	3860	8.0	1880

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LOCAL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	DEPTH TO FIRST OPENING (FEET)	CASING DIAMETER (INCHES)	DATE COMPLETED	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED	USE OF WATER	PRINCIPAL AQUIFER	SPECIFIC CONDUCTANCE (uMHO/CM AT 25° C)	TEMPERATURE (DEGREES C)	ALTITUDE OF LAND SURFACE (FEET)
151-104-12B3C	NDSWC 1631	95	--	--	--	10/23/1959	--	--	U	--	--	--	1838
151-104-12CBD	NDSWC 2	120	--	--	--	10/23/1966	--	--	U	--	--	--	1875
151-104-12CCC1	NDSWC 1628	105	--	--	--	10/20/1959	--	--	U	--	2050	--	1877
151-104-12CCC2	NDSWC 1	130	--	--	--	10/22/1966	--	--	U	--	--	--	1876
151-104-12CCG	NDSWC 1633	105	--	--	--	10/28/1959	--	--	U	--	--	--	1880
151-104-12DCC	NDSWC 1629	73	--	--	--	10/22/1959	--	--	U	--	--	--	1833
151-104-13B3B	NDSWC 11582	107	85	82	1.25	05/14/1981	12.20	11/01/1983	U	110YLMR	1900	3.5	1876
151-104-13FCB	NDSWC 1632	105	--	--	--	10/27/1959	--	--	U	--	1280	--	1879
151-104-14ADC	NDSWC 1843	116	--	--	--	10/21/1960	--	--	U	--	--	--	1880
151-104-14DAA	NDSWC 1630	53	--	--	--	10/23/1959	--	--	U	--	--	--	1880
151-104-17CCC	NDSWC 11390	60	--	--	--	09/25/1980	--	--	U	--	--	--	1915
151-104-20DCC	HARDY, CHARLES	50	34	26	6	06/05/1975	19.00	06/05/1975	H	--	1470	9.1	1897
151-104-23DBD	KOCH, HATH	1450	1450	1411	1.25	07/26/1971	--	--	H	211MCFH	2080	16.0	1950
151-104-29AEB	NDSWC 11369	67	51	48	1.25	09/25/1980	11.40	11/01/1983	U	110YLMR	1420	8.9	1900
151-104-31A8A	MON-KOTA INC.	1385	1385	1320	2	01/18/1980	--	--	N	--	2100	--	1905
151-104-34AAA	NDSWC 11391	67	56	50	1.25	09/25/1980	10.30	11/01/1983	U	110YLMR	1620	8.8	1885
151-104-36AAA	NDSWC 11578	87	71	68	1.25	05/13/1981	15.35	06/02/1981	U	112CRNS	1620	8.5	1910
151-104-36AAD1	PADSON, ARTHUR	48	--	--	6	03/23/1977	--	--	H	--	--	--	1900
151-104-36AAD2	CROY, RICHARD	41	--	--	6	03/27/1977	--	--	H	--	--	--	1900
151-104-36ACA	NDSWC 11576	83	74	71	1.25	05/13/1981	13.55	06/02/1981	U	112CRNS	1410	8.0	1903
151-104-36ACD	NDSWC 11384	67	--	--	--	09/23/1980	--	--	U	--	--	--	1890
151-104-36CCA	NDSWC 11385	80	61	58	1.25	09/23/1980	21.10	11/06/1980	U	112CRNS	1450	8.5	1895
151-104-36DAA	NDSWC 11577	80	69	66	1.25	05/13/1981	9.80	11/01/1983	U	112CRNS	1790	8.5	1895
151-104-36DAD	NDSWC 29	70	--	--	--	06/15/1957	--	--	U	--	--	--	2060
152-094-06DC	AMERADA	5359	--	--	--	04/11/1963	--	--	--	--	--	--	2098
152-094-07BB	AMERADA	11020	--	--	--	04/27/1967	--	--	--	--	--	--	2186
152-094-10ABC	SKARDA, BILL	25	25	15	--	12/02/1972	10.00	12/02/1972	U	--	--	--	1980
152-094-10ABD	SKARDA, BILL	120	120	96	--	07/13/1976	28.00	06/06/1979	H	--	--	--	1930
152-094-19ACC	USGS 16	200	--	--	--	12/10/1951	--	--	U	--	--	--	2210
152-094-19BAC	USGS 68	200	--	--	--	12/11/1951	--	--	U	--	--	--	2250
152-094-20ACC	USGS 50	200	--	--	--	11/08/1951	--	--	U	--	--	--	2220
152-094-20DDA	USGS 33	205	--	--	--	11/06/1951	--	--	U	--	--	--	2151
152-094-21BCC	USGS 31	205	--	--	--	11/05/1951	--	--	U	--	--	--	2190
152-094-21CAD	USGS 72	200	--	--	--	12/12/1952	--	--	U	--	--	--	2155
152-094-21DAA	USGS 49	120	--	--	--	11/12/1951	--	--	U	--	--	--	2060
152-094-21D5C	USGS 73	200	--	--	--	12/13/1951	--	--	U	--	--	--	2140
152-094-21DCC	STANOLIND	12460	--	--	--	12/06/1953	--	--	--	--	--	--	2129
152-094-21DDB	USGS 74	200	--	--	--	12/12/1951	--	--	U	--	--	--	2090
152-094-24B8B	NDSWC 6049	1040	906	882	2	12/02/1981	172.09	11/01/1983	U	125TGRV	--	--	2040
152-094-27AAB	USGS 2	255	--	--	--	10/30/1951	--	--	U	--	--	--	2160

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152-094-2788B	USGS 3	255	--	--	--	10/30/1951	--	--	U	--	--	--	2180
152-094-2700D	USGS 35	205	--	--	--	11/07/1951	--	--	U	--	--	--	2163
152-094-2888A	USGS 76	185	--	--	--	01/07/1952	--	--	U	--	--	--	2115
152-094-2888B	USGS 5	355	--	--	--	10/31/1951	--	--	U	--	--	--	2220
152-094-2888C	USGS 71	200	--	--	--	12/11/1951	--	--	U	--	--	--	2190
152-094-2944B	USGS 70	200	--	--	--	12/11/1951	--	--	U	--	--	--	2195
152-094-2944C	USGS 63	205	--	--	--	11/12/1951	--	--	U	--	--	--	2180
152-094-2944D	USGS 53	200	--	--	--	11/08/1951	--	--	U	--	--	--	2200
152-094-2944E	USGS 52	205	--	--	--	11/08/1951	--	--	U	--	--	--	2155
152-094-3044D	USGS 60	190	--	--	--	11/12/1951	--	--	U	--	--	--	2240
152-094-3044E	USGS 61	205	--	--	--	11/12/1951	--	--	U	--	--	--	2215
152-094-3044F	USGS 54	200	--	--	--	11/08/1951	--	--	U	--	--	--	2200
152-094-3144A	USGS 43	200	--	--	--	11/08/1951	--	--	U	--	--	--	2135
152-094-3144B	USGS 55	180	--	--	--	01/07/1952	--	--	U	--	--	--	2080
152-094-3144C	USGS 44	205	--	--	--	11/06/1951	--	--	U	--	--	--	2135
152-094-3244B	USGS 46	205	--	--	--	11/07/1951	--	--	U	--	--	--	2190
152-094-3244C	USGS 47	125	--	--	--	11/07/1951	--	--	U	--	--	--	2180
152-094-3344A	USGS 40	205	--	--	--	11/06/1951	--	--	U	--	--	--	2175
152-094-3344B	USGS 39	200	--	--	--	11/06/1951	--	--	U	--	--	--	2175
152-094-3444C	USGS 36	200	--	--	--	11/07/1951	--	--	U	--	--	--	2120
152-094-3444A	USGS 37	200	--	--	--	11/06/1951	--	--	U	--	--	--	2110
152-095-0280D	AMERADA	9356	--	--	--	06/09/1956	--	--	--	--	--	--	2282
152-095-0680A	GRIMESTAD, LAWRENCE	65	62	--	--	01/30/1976	36.00	01/30/1976	M	--	--	--	2240
152-095-0780B	AMERADA	9274	--	--	--	01/12/1965	--	--	--	--	--	--	2363
152-095-0880C	AMERADA	5313	5313	--	--	10/17/1964	700.00	07/19/1979	N	--	8000	80.0	2326
152-095-1640D	NDSWC 6048	1000	696	672	2	11/21/1981	369.88	11/01/1983	U	125TGRV	3200	8.5	2295
152-095-19001	AMERADA	40	60	45	--	08/21/1975	47.00	08/21/1975	N	--	--	--	2435
152-095-19002	AMERADA	45	45	32	--	08/27/1975	30.00	08/27/1975	N	--	--	--	2435
152-095-3280C	NDSWC 11549	90	--	--	--	05/05/1981	--	--	U	--	--	--	2380
152-096-0280D	AMERADA	9078	--	--	--	07/17/1953	--	--	--	--	--	--	2362
152-096-0380B	NDSWC 5948	940	817	790	2	07/30/1981	402.83	11/01/1983	U	125TGRV	--	--	2350
152-096-1240D	AMERADA	9260	--	--	--	03/23/1966	--	--	--	--	--	--	2353
152-096-1580B	AMERADA	12399	--	--	--	10/07/1952	--	--	--	--	--	--	2460
152-096-2380D	SORENSEN, ELMO	100	92	32	4	09/05/1974	32.00	09/05/1974	S	--	3000	8.0	2360
152-096-2380C	SORENSEN, ELMO	112	111	90	4	09/17/1977	69.00	09/17/1977	S	--	2500	8.1	2386
152-096-2680B	NDSWC 11348	38	--	--	--	05/05/1981	--	--	U	--	--	--	2325
152-096-3400D	NDSWC 6046	1240	948	924	2	11/11/1981	439.76	11/01/1983	U	125TGRV	2900	11.0	2390
152-096-3580B	ANDERSON, LLOYD	27	27	--	--	06/27/1977	--	--	S	--	2000	7.2	2380
152-097-0644A	NDSWC 1484	53	--	--	--	06/09/1959	--	--	U	--	--	--	1915
152-097-0744A	NDSWC 11555	87	76	73	1.25	05/06/1981	12.89	11/01/1983	U	112TBCG	3000	8.5	1946

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152-097-08BAA	GRANTIER, LAWRENCE	1530	1530	1485	5	11/27/1972					2900	16.0	2020	
152-097-08BBC	GRANTIER, LAWRENCE	40	40	30	5	06/01/1974	20.00	06/01/1974	S		1620	7.9	1950	
152-097-14B03	ROLLA, GARVEY	20	20	12	5	05/26/1974	7.00	05/26/1974	S			--	1960	
152-097-1600C	NDSWC 11554	40	--	--	--	05/06/1981			U			--	2030	
152-097-27B08	STOLE, HAAS	60	60	45	4	07/01/1973	35.00	07/01/1973	U			--	2120	
152-098-010DA	NDSWC 11748	80	69	64	1.25	09/24/1981	27.50	11/01/1983	U	112TBCG	3450	8.0	1950	
152-098-020CC	NDSWC 11740	140	104	99	1.25	09/23/1981	42.79	01/28/1982	U	112TBCG		--	1985	
152-098-030A6	STEELMAN, JOHN	1730	1730	1625	2	07/18/1973			F	4, S	2600	16.5	2020	
152-098-10C0D	GUNDERSON, ARTHUR	1750	1750	1660	2	08/07/1974			F	S	211HCFH	2600	13.5	2060
152-098-11C0D	NDSWC 11553	80	--	--	--	05/06/1981			U			--	1970	
152-098-11DCC	NDSWC 11552	180	112	109	1.25	05/06/1981	11.55	06/02/1981	U	112TBCG	3050	8.5	1956	
152-098-110DD	NDSWC 11550	80	--	--	--	05/06/1981			U			--	1951	
152-098-13BAA	NDSWC 11551	40	--	--	--	05/06/1981			U			--	1950	
152-098-14CCC	NDSWC 1488	179	--	--	--	04/10/1959			U			--	1969	
152-098-23A85	NDSWC 1486	74	--	--	--	04/09/1959			U			--	1960	
152-098-23A0D	HAUGEN, CLAF	72	72	54	5	05/23/1974	24.10	06/12/1979	S		2600	8.0	1990	
152-098-23BAA1	NDSWC 1487	73	--	--	--	04/10/1959			U			--	1955	
152-098-23BAA2	NDSWC 11739	80	50	45	1.25	09/23/1981	8.58	11/01/1983	U	112TBCG	2950	8.0	1965	
152-098-23BCC	NDSWC 11747	120	105	98	1.25	09/24/1981	9.49	11/01/1983	U	112TBCG	3600	8.0	1967	
152-098-24CCC	AAGVIK, NORMAN	1730	1730	1680	2	06/21/1975	53.10+	06/25/1980	S	211HCFH	3020	21.9	2002	
152-098-27C0D1	NDSWC 5949	940	900	882	2	09/23/1981	29.14	11/01/1983	U	125TGRV	3590	10.0	1990	
152-098-27C0D2	NDSWC 11738	200	178	173	1.25	09/23/1981	16.34	11/01/1983	U	112TBCG	2950	8.0	1989	
152-098-34CAB	WOLLAN, CORNELL	150	150	130	5	05/22/1974	30.00	05/22/1974	H		3700	10.0	2000	
152-099-03ACB	JOHNSTON, CARROLL	1610	1610	1560	2	08/19/1974	198.40+	06/25/1980	S	211HCFH	2450	16.0	1920	
152-099-24B8B	JOHNSTON, BEN	1795	1795	1735	2	06/29/1975			F	S	211HCFH	2400	20.0	2040
152-099-24C0A	JOHNSTON, BEN	120	120	105	5	07/22/1973	28.00	07/22/1973	H			--	1875	
152-099-25AAB	JOHNSTON, BEN	1800	1800	1730	2	07/16/1976			F	S		2400	22.0	2100
152-099-28B8A	LAHLAR, GLEN	195	195	180	4	06/27/1974	180.00	06/27/1974	H		4310	9.6	2140	
152-099-31CA	HUNT OIL	10238	--	--	--	04/11/1961			--	--		--	2304	
152-099-33ADB	LOOMER, ORRIN	125	125	65	4	12/08/1974	60.00	12/08/1974	H		989	9.0	2300	
152-101-14ACA	NDSWC 6044	1000	969	945	2	11/06/1981	2.55+	11/01/1983	U	125TGRV	2980	10.0	1940	
152-101-14CAD	LINDVIG, JOHN	1855	1855	1730	2	07/03/1976	11.60+	06/25/1980	S	211HCFH	3000	14.0	2040	
152-101-15ADD	LINDVIG, JOHN	1640	1547	1517	2.50	06/24/1982	115.00+	06/24/1982	S	211HCFH	2400	21.0	1995	
152-101-19CAD	RETTIG, ED	80	80	50	--	08/16/1972	50.00	08/16/1972	H		640	7.5	2265	
152-101-24C8B1	NDSWC 5616	62	31	28	1.25	10/08/1979	6.32	11/01/1983	U	112CRNE	1900	8.0	1878	
152-101-24C8B2	NDSWC 6043	1120	--	--	--	11/02/1981			U			--	1879	
152-102-08BAC	REMBERG, R.J.	152	--	--	--	06/20/1975	60.00	06/20/1975	4, S			--	2050	
152-102-13CA	PHILLIPS OIL	13515	--	--	--	01/01/1954			--	--		--	2266	
152-102-17DAC	STEPANEK, RONALD	70	70	55	4	03/21/1974			S			--	2070	
152-102-27C0D	MONSON, WILLIAM	110	110	100	--	04/04/1974	92.00	04/04/1974	H		1680	9.5	2278	

LOCAL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	DEPTH TO FIRST OPENING (FEET)	CASING DIAMETER (INCHES)	DATE COMPLETED	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED	USE OF WATER	PRINCIPAL AQUIFER	SPECIFIC CONDUCTANCE (UMHO/CM AT 25° C)	TEMPERATURE (DEGREES C)	ALTITUDE OF LAND SURFACE (FEET)
152-103-25CAB	ERICKSON, ROBERT	1530	1530	1485	4.50	11/05/1977	161.70*	06/25/1980	S	211HCFH	2100	22.5	1965
152-104-20CCC	SCHMITT, JOHN	1485	1465	1442	2	02/16/1977		--	H,S	--	--	--	1930
152-104-26DAD	NDSWC 11583	127	104	101	1.25	05/15/1981	14.29	11/01/1983	U	110YLMR	750	8.5	1876
152-104-30DAC	JOHNSON, HERMAN	116	116	103	4.50	10/02/1975	30.00	10/02/1975	S	--	--	--	1930
152-104-32CC8	NDSWC 11580	60	41	38	1.25	05/14/1981	4.13	11/01/1983	U	110YLMR	2700	8.5	1890
152-104-33DAA	NDSWC 11579	56	27	24	1.25	05/14/1981	6.05	11/01/1983	U	110YLMR	2700	8.5	1875
152-104-34AAA	NDSWC 8027	150	123	117	1.25	07/14/1971	--	--	U	110YLMR	--	--	1878
152-104-34CDC	CAYKO, JOHN	1425	1425	1396	5	05/21/1977		--	S,H	--	2200	17.5	1875
152-104-36DBC	WAMBACH, MARVIN	220	220	200	4	02/18/1975	130.00	02/18/1975	S	--	--	--	2030
153-094-19CDD	FROMLH, CARL	113	--	--	--	01/21/1976	--	--	U	--	--	--	2235
153-094-23CCC1	NDSWC 5781	1854	1767	1745	2	08/21/1980	74.27	11/01/1983	U	211HCFH	3000	10.0	2186
153-094-23CCC2	NDSWC 5781A	1465	1434	1410	2	08/21/1980	148.12	11/01/1983	U	125LDLW	3600	9.0	2186
153-094-23CCC3	NDSWC 5781B	980	895	871	2	08/21/1980	330.83	11/01/1983	U	125TGRV	3500	9.0	2186
153-094-26CCC	SCHMBACK, MARVIN	200	80	68	6	06/26/1974	16.00	06/06/1979	S	--	--	--	2310
153-094-30DD	AMERADA	50	--	--	--	05/24/1975	20.00	05/24/1975	U	--	--	--	2200
153-095-0298	TEXACO	8659	--	--	--	05/16/1955	--	--	--	--	--	--	2046
153-095-06AC	TEXACO	8499	--	--	--	12/12/1955	--	--	--	--	--	--	1940
153-095-08A8A	TEXAS OIL	160	160	55	4	06/28/1973	55.00	06/28/1973	N	--	--	--	2100
153-095-16CCC	NDSWC 6047	1060	669	651	2	11/13/1981	393.40	11/01/1983	U	125TGRV	--	--	2330
153-095-26CCC	SHERVEN, VERN	125	--	--	--	11/20/1972	65.00	11/20/1972	H	--	--	--	2310
153-095-29CDD	THOMPSON, HARLEY	110	110	--	--	01/27/1976	88.60	01/27/1976	S	--	3500	8.0	2210
153-095-33B8B	NDSWC 11362	100	--	--	--	09/11/1980	--	--	U	--	--	--	2215
153-096-03B6B	SORENSEN, HOMER	1075	1075	1053	2	03/19/1977	18.50*	06/24/1980	S	211HCFH	3220	15.8	1937
153-096-05CAA	SORENSEN, HOMER	1290	1290	1272	2	11/20/1976		--	S	--	3250	17.7	1912
153-096-10CD	AMERADA	943	--	--	--	01/24/1958	--	--	--	--	--	--	2005
153-097-01C6D	TOEPKE, KERMIT	32	31	20	4	12/11/1974	19.00	12/11/1974	H	--	1000	9.3	1855
153-097-02CDD	WOLD, LYNN	1467	1467	1404	5.50	06/18/1976	110.90*	06/25/1979	S	211HCFH	2600	17.5	1940
153-097-10DAC	NDSWC 1478	73	--	--	--	04/04/1959	--	--	U	--	--	--	1890
153-097-10DAD	NDSWC 1477	105	--	--	--	04/02/1959	--	--	U	--	--	--	1865
153-097-11CCA	NDSWC 1479	32	--	--	--	04/04/1959	--	--	U	--	--	--	1880
153-097-13CCC	NDSWC 5613	202	135	129	1.25	10/05/1979	43.90	12/05/1979	U	112TBCG	2000	8.0	1915
153-097-13CCD1	NDSWC 1482	105	--	--	--	04/08/1959	--	--	U	--	--	--	1912
153-097-13CCD2	NDSWC 1483	105	--	--	--	04/08/1959	--	--	U	--	--	--	1915
153-097-16AAA	NDSWC 6054	1060	243	231	2	05/28/1982	69.18	11/01/1983	U	112TBCG	2400	9.0	1920
153-097-19CDD	GARMANN, HENRY	1840	1840	1770	5	02/02/1973	30.00	02/02/1973	S	--	2400	15.5	2175
153-097-20AAA	HELLANDSAAS, ORVILLE	220	195	165	4	01/04/1975	145.00	01/04/1975	U	--	--	--	2015
153-097-21DCA	OPSTA, HELMER	155	155	154	5	09/12/1973	48.00	09/12/1973	H	--	2400	10.0	1920
153-097-22AAA	NDSWC 5611	62	33	27	1.25	10/04/1979	12.70	02/13/1980	U	112TBCG	2100	9.0	1870

LOCAL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	DEPTH TO FIRST OPENING (FEET)	CASING DIAM-ETER (INCHES)	DATE COMPLETED	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED	USE OF WATER	PRINCIPAL AQUIFER	SPECIFIC CONDUCTANCE (UMHO/CM AT 25° C)	TEMPERATURE (DEGREES C)	ALTITUDE OF LAND SURFACE (FEET)
153-097-22AB8	NDSWC 5612	142	109	103	1.25	10/04/1979	26.15	11/02/1963	U	112TBCG	2300	9.0	1890
153-097-23BAA1	NDSWC 1480	42	--	--	--	04/06/1959	--	--	U	--	--	--	1870
153-097-23BAA2	NDSWC 5609	82	--	--	--	10/04/1979	--	--	U	--	--	--	1880
153-097-23BBA	NDSWC 5610	82	34	28	1.25	10/04/1979	9.86	11/02/1963	U	112TBCG	2000	9.0	1865
153-097-23BB8	NDSWC 1431	63	--	--	--	04/06/1959	--	--	U	--	--	--	1875
153-097-32BAA	GARMANN, JERRY	163	163	--	--	10/10/1972	145.00	10/10/1972	H/S	--	625	9.5	2110
153-097-32BB8	NDSWC 5940	1040	964	960	2	07/01/1981	144.94	--	U	--	2000	12.5	2090
153-097-34CB0	WOLD, MYRON	1660	1660	1600	2	07/27/1974	--	F	S	--	2650	13.5	1985
153-097-34DAA	NDSWC 1485	32	--	--	--	04/09/1959	--	--	U	--	--	--	1900
153-097-34DAB	WOLD, MYRON	30	30	22	5	06/02/1974	15.00	06/02/1974	S	--	--	--	1910
153-097-350CC	FLATLAND, OLAF	1465	1465	1360	2	11/23/1976	--	F	S	211HCFH	2800	22.0	1940
153-093-33DCA	MASTON, HERBERT	850	850	--	--	--	13.00+	07/09/1980	S	125LDLW	3090	14.2	1870
153-096-35ACA	SAX, THORAL	1665	1665	1609	2	06/08/1975	--	F	S	--	2400	18.5	1920
153-101-06ADB	NDSWC 11373	127	96	93	1.25	09/17/1980	7.14	11/01/1983	U	110YLMR	1020	10.0	1850
153-101-069AA	NDSWC 11372	140	81	78	1.25	09/17/1980	4.94	11/01/1983	U	110YLMR	1100	9.0	1855
153-101-06DAD	NDSWC 11374	107	86	83	1.25	09/18/1980	6.16	11/01/1983	U	110YLMR	1250	9.5	1860
153-101-16BAC	NDSWC 11371	67	51	48	1.25	09/17/1980	6.31	11/01/1983	U	110YLMR	1630	8.5	1855
153-101-16DBC	NDSWC 11375	40	--	--	--	09/18/1980	--	--	U	--	--	--	1854
154-095-33C	AMERADA	10525	--	--	--	12/26/1975	--	--	--	--	--	--	1910
154-095-34CA	AMERADA	40	40	30	3	09/15/1976	31.00	09/15/1976	N	--	--	--	1865
154-096-31CCA	NDSWC 5937	840	696	672	2	06/11/1981	4.73	11/01/1983	U	125TGRV	3200	10.0	1940
154-096-31DDD	GRAZING ASSOC.	400	341	341	4	12/27/1971	260.00	12/27/1971	S	--	--	--	2180
154-097-35DCB	NO PARK SERVICE	45	45	25	--	12/10/1974	30.00	12/10/1974	P	--	2800	9.0	1965
154-097-36CCC	NDSWC 1476	21	--	--	--	04/02/1959	--	--	U	--	--	--	1945
MISCELLANEOUS SURFACE-WATER DATA-COLLECTION SITES													
144-102-08ABA	LITTLE MISSOURI RIVER	--	--	--	--	--	--	--	--	--	2510	17.0	--
148-099-3500A	LITTLE MISSOURI RIVER	--	--	--	--	--	--	--	--	--	2550	5	--

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TABLE 2.--Water levels in selected wells

EXPLANATION

Water levels shown have been adjusted to feet below or above (+) land surface

Mp, measuring point lsd, land surface datum

Depth to water, in feet below or above (+) land surface

147-102-33CBB MP is top of 1-1/4-inch plastic pipe 2.50 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
May 14, 1980...	108.50	Apr. 1.....	108.39	Oct. 26, 1982...	108.75
July 8.....	107.20	May 21.....	108.61	Nov. 1, 1983...	108.38
Oct. 7.....	109.43	July 21.....	108.81		
Feb. 24, 1981...	108.65	Sept. 15.....	108.99		

148-099-35DCA MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Nov. 4, 1980...	22.10	May 22.....	21.25	Jan. 19, 1982...	22.32
Dec. 2.....	22.16	Aug. 10.....	21.95	June 30.....	20.70
Feb. 26, 1981...	21.77	Sept. 10.....	22.17	Nov. 28, 1983...	20.77
Mar. 31.....	21.90	Nov. 17.....	22.45		

148-105-36CDC1 MP is top of 1-1/4-inch plastic pipe 2.10 ft above lsd.

Dec. 6, 1979...	35.98	Dec. 2.....	36.20	Dec. 2.....	36.27
Feb. 14, 1980...	35.99	Feb. 24, 1981...	36.00	Jan. 19, 1982...	35.99
Mar. 25.....	35.79	Apr. 1.....	36.02	July 1.....	35.70
May 14.....	36.07	May 21.....	36.07	Oct. 26.....	36.03
July 8.....	36.29	July 21.....	36.41	Nov. 1, 1983...	36.04
Oct. 7.....	36.42	Sept. 15.....	36.65		

148-105-36DDD MP is top of 1-1/4-inch plastic pipe 2.10 ft above lsd.

Nov. 14, 1979...	25.00	Feb. 14, 1980...	24.47	May 14.....	24.40
Dec. 6.....	24.60	Mar. 25.....	24.25		

149-100-35BBB MP is top of 1-1/4-inch plastic pipe 1.60 ft above lsd.

Dec. 11, 1979...	8.38	Dec. 2.....	10.15	Jan. 19, 1982...	12.41
Feb. 14, 1980...	8.91	Feb. 24, 1981...	10.59	July 1.....	7.15
Mar. 25.....	8.40	Apr. 1.....	10.69	Oct. 26.....	8.93
May 14.....	8.67	May 18.....	11.00	Nov. 1, 1983...	9.00
July 8.....	9.20	July 21.....	11.31	Nov. 28.....	9.42
Aug. 25.....	9.70	Sept. 15.....	10.45		
Oct. 7.....	10.10	Nov. 17.....	12.00		

Depth to water, in feet below or above (+) land surface

150-098-06DAA1 MP is top of 1-1/4-inch plastic pipe 1.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 4, 1979...	3.95	Oct. 7.....	6.60	Nov. 18.....	6.48
Feb. 13, 1980...	4.07	Dec. 2.....	5.65	Jan. 18, 1982...	6.23
Mar. 25.....	3.95	Feb. 25, 1981...	5.25	June 30.....	2.85
May 13.....	4.05	May 20.....	18.94	Nov. 1, 1983...	6.90
July 8.....	11.20	July 22.....	6.97		

150-098-07CDD MP is top of 1-1/4-inch plastic pipe 1.30 ft above lsd.

May 13, 1980...	0.80	Mar. 31, 1981...	0.17	Nov. 18.....	1.19
July 8.....	1.49	May 20.....	.74	June 30, 1982...	.45
Aug. 25.....	1.65	July 22.....	1.16	Oct. 27.....	.60
Oct. 7.....	.40	Sept. 9.....	2.24	Nov. 1, 1983...	1.14

150-098-16CCC MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Nov. 5, 1980...	4.20	May 20.....	4.10	June 30.....	3.90
Dec. 2.....	4.10	Sept. 8.....	4.64	Oct. 27.....	3.20
Feb. 24, 1981...	3.99	Nov. 18.....	4.29	Nov. 1, 1983...	3.80
Mar. 31.....	3.90	Jan. 18, 1982...	4.15	Nov. 28.....	3.57

150-098-23AAB MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Dec. 4, 1979...	9.30	Dec. 2.....	9.56	Jan. 18, 1982...	9.58
Feb. 13, 1980...	9.32	Feb. 24, 1981...	9.20	June 30.....	8.55
Mar. 25.....	9.34	Mar. 31.....	9.40	Oct. 27.....	9.22
May 13.....	9.34	May 20.....	9.41	Nov. 1, 1983...	9.54
July 8.....	9.59	July 22.....	9.47	Nov. 28.....	9.51
Aug. 25.....	9.72	Sept. 8.....	9.70		
Oct. 7.....	9.76	Nov. 18.....	9.73		

150-099-15DDD MP is top of 1-1/4-inch plastic pipe 1.80 ft above lsd.

Dec. 5, 1979...	+0.06	Mar. 31, 1981...	+0.01	June 30, 1982...	+1.10
May 13, 1980...	+.76	May 18.....	.28	Oct. 27.....	+.89
July 8.....	.19	July 21.....	.48	Nov. 1, 1983...	.11
Aug. 25.....	.45	Sept. 9.....	.36		
Oct. 7.....	.64	Nov. 17.....	1.15		

150-099-22ABA MP is top of 1-1/4-inch plastic pipe 2.70 ft above lsd.

Dec. 4, 1979...	1.55	Dec. 2.....	0.85	Nov. 17.....	1.68
May 13, 1980...	+.22	Mar. 31, 1981...	.44	June 30, 1982...	+.95
July 8.....	.77	May 18.....	.68	Nov. 1, 1983...	.75
Aug. 25.....	1.10	July 21.....	+.21		
Oct. 7.....	1.29	Sept. 9.....	1.93		

Depth to water, in feet below or above (+) land surface

150-099-22ABB MP is top of 1-1/4-inch plastic pipe 3.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 4, 1979...	4.45	Oct. 7.....	5.45	Sept. 9.....	5.73
Feb. 18, 1980...	4.45	Dec. 2.....	4.82	Nov. 17.....	5.65
Mar. 25.....	4.05	Feb. 24, 1981...	5.06	Jan. 19, 1982...	5.44
May 13.....	3.70	Mar. 31.....	4.38	June 30.....	2.70
July 8.....	4.80	May 18.....	4.47	Nov. 1, 1983...	4.98
Aug. 25.....	5.49	July 21.....	4.52		

150-099-23BBA MP is top of 1-1/4-inch plastic pipe 3.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 4, 1979...	6.30	Dec. 2.....	3.10	Nov. 17.....	3.97
May 13, 1980...	2.12	Feb. 24, 1981...	3.09	Jan. 19, 1982...	4.04
July 8.....	3.28	Mar. 31.....	2.67	June 30.....	1.70
Aug. 25.....	3.41	May 18.....	2.99	Nov. 1, 1983...	1.93
Oct. 7.....	3.49	July 18.....	3.45		

150-104-19DDD MP is top of 2-inch plastic pipe 1.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Nov. 14, 1979...	12.40	Oct. 7.....	11.35	Sept. 15.....	12.24
Dec. 6.....	12.90	Dec. 2.....	12.38	Dec. 2.....	13.41
Feb. 12, 1980...	13.15	Feb. 24, 1981...	12.85	July 8, 1982...	11.29
Mar. 7.....	12.90	Apr. 1.....	13.35	Nov. 2, 1983...	13.40
May 13.....	13.41	May 21.....	13.67		
July 8.....	10.49	July 21.....	12.19		

151-098-31DDC MP is top of 1-1/4-inch plastic pipe 1.70 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 4, 1979...	27.60	Dec. 2.....	28.24	Jan. 19, 1982...	28.63
Feb. 13, 1980...	26.72	Feb. 24, 1981...	27.84	June 30.....	27.35
Mar. 25.....	26.69	Mar. 31.....	27.68	Nov. 1, 1983...	9.35
May 13.....	26.80	May 20.....	29.39	Nov. 28.....	8.96
July 8.....	28.90	July 22.....	29.19		
Oct. 2.....	28.20	Nov. 18.....	28.94		

151-101-09BAA MP is top of 1-1/4-inch plastic pipe 2.40 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 6, 1979...	31.58	Oct. 7.....	32.16	Sept. 9.....	32.32
Feb. 12, 1980...	31.82	Dec. 2.....	32.25	Dec. 2.....	32.29
Mar. 26.....	32.03	Feb. 24, 1981...	32.41	Oct. 26, 1982...	31.40
May 13.....	32.16	Apr. 1.....	32.40	Nov. 1, 1983...	31.19
July 8.....	32.10	May 21.....	32.31	Dec. 2.....	28.84
Aug. 25.....	32.11	July 21.....	32.40		

151-102-14CCC MP is top of 1-1/4-inch plastic pipe 2.70 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 6, 1979...	118.30	Aug. 25.....	116.50	Apr. 1, 1981...	117.98
May 13, 1980...	118.50	Oct. 7.....	118.15	May 21.....	117.65

Depth to water, in feet below or above (+) land surface

151-103-27AAA2 MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Mar. 23, 1977...	31.03	July 6, 1979...	30.20	Feb. 24, 1981...	31.76
May 4.....	31.45	Aug. 14.....	30.10	Apr. 1.....	31.55
June 27.....	32.90	Sept. 26.....	30.30	May 21.....	31.57
Aug. 27.....	34.00	Nov. 15.....	30.55	July 21.....	32.68
Oct. 3.....	31.45	Dec. 6.....	30.42	Sept. 15.....	31.98
May 1, 1978...	29.55	Feb. 12, 1980...	30.14	Dec. 2.....	32.02
July 1.....	30.20	Mar. 25.....	30.62	Jan. 20, 1982...	31.01
Aug. 1.....	30.40	May 13.....	31.59	July 8.....	30.90
Sept. 1.....	31.00	July 8.....	32.60	July 8, 1983...	30.50
Oct. 1.....	30.80	Oct. 7.....	32.16	Dec. 2.....	31.57
Nov. 1.....	30.40	Dec. 2.....	31.94		

151-103-27ACA1 MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Mar. 23, 1977...	19.30	Sept. 1.....	19.50	Nov. 15.....	18.85
May 4.....	19.55	Oct. 1.....	19.40	Dec. 6.....	18.75
June 27.....	19.90	Nov. 1.....	19.20	Feb. 12, 1980...	19.01
Aug. 27.....	19.60	Dec. 1.....	19.00	Oct. 7.....	20.45
Oct. 3.....	19.65	Apr. 6, 1979...	18.80	Dec. 2.....	20.27
Nov. 2.....	19.70	May 8.....	16.65	Feb. 24, 1981...	20.06
May 1, 1978...	17.75	June 6.....	18.60	Apr. 1.....	19.87
June 1.....	17.85	July 6.....	21.30	May 21.....	19.97
July 1.....	18.70	Aug. 14.....	18.45		
Aug. 1.....	19.15	Sept. 26.....	18.70		

151-103-28DDD MP is top of 1-1/4-inch plastic pipe 2.30 ft above lsd.

Dec. 6, 1979...	31.45	Dec. 2.....	32.69	Dec. 2.....	32.94
Feb. 8, 1980...	31.60	Feb. 24, 1981...	32.49	Jan. 20, 1982...	32.94
Mar. 25.....	31.54	Apr. 1.....	32.51	Nov. 1, 1983...	33.18
May 13.....	31.69	May 21.....	32.54	Nov. 2.....	33.18
July 8.....	32.09	July 21.....	32.51	Dec. 2.....	33.16
Oct. 7.....	32.80	Sept. 9.....	33.07		

151-104-10CBB MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Aug. 12, 1971...	4.33	Aug. 15.....	4.18	Feb. 12, 1980...	6.52
Dec. 21.....	5.80	Feb. 9, 1976...	6.37	Mar. 25.....	6.66
May 11, 1972...	4.21	June 22.....	5.55	May 13.....	5.44
Aug. 3.....	2.45	July 27.....	4.39	July 8.....	4.25
Oct. 3.....	4.66	Sept. 10.....	3.09	Oct. 7.....	4.82
Mar. 12, 1973...	6.41	Mar. 23, 1977...	6.42	Dec. 2.....	5.55
June 5.....	3.40	May 4.....	6.48	Feb. 24, 1981...	6.59
Aug. 9.....	2.90	June 27.....	1.33	Apr. 1.....	6.51
Nov. 20.....	5.44	Apr. 6, 1979...	5.48	May 21.....	5.72
June 3, 1974...	4.34	June 6.....	4.45	July 21.....	2.30
July 15.....	4.77	July 6.....	4.50	Sept. 19.....	3.44
Aug. 29.....	3.68	Sept. 26.....	4.20	Dec. 2.....	5.48
Jan. 30, 1975...	6.67	Nov. 15.....	5.60	Jan. 20, 1982...	6.32
July 10.....	5.26	Dec. 6.....	5.70	July 8.....	5.08

Depth to water, in feet below or above (+) land surface

152-101-24CBB1 MP is top of 1-1/4-inch plastic pipe 2.00 ft above lsd.

Date	Water level	Date	Water level	Date	Water level
Dec. 6, 1979...	6.07	Dec. 2.....	5.45	Jan. 20, 1982...	5.17
Feb. 12, 1980...	6.10	Feb. 24, 1981...	5.32	July 8.....	5.70
Mar. 26.....	5.65	Apr. 1.....	5.36	Oct. 26.....	6.11
May 13.....	5.95	May 21.....	5.41	Nov. 1, 1983...	6.32
July 8.....	5.55	July 21.....	5.31	Nov. 2.....	6.32
Aug. 25.....	5.85	Sept. 15.....	5.57	Dec. 2.....	5.77
Oct. 7.....	6.19	Dec. 2.....	4.97		

153-097-15CCC MP is top of 1-1/4-inch plastic pipe 2.70 ft above lsd.

Dec. 5, 1979...	43.90	Oct. 7.....	42.51	Sept. 8.....	42.81
Feb. 13, 1980...	42.05	Dec. 2.....	42.60	Nov. 18.....	42.77
Mar. 25.....	42.19	Feb. 25, 1981...	42.56	Jan. 19, 1982...	42.79
May 13.....	42.28	Mar. 31.....	42.45	June 30.....	42.00
July 9.....	42.35	May 20.....	42.57	Oct. 27.....	41.77
Aug. 25.....	42.41	July 20.....	42.72		

153-097-22AAA MP is top of 1-1/4-inch plastic pipe 2.40 ft above lsd.

Feb. 13, 1980...	12.70	Dec. 2.....	12.67	Nov. 18.....	12.84
Mar. 25.....	12.14	Feb. 25, 1981...	12.44	Jan. 19, 1982...	12.92
May 13.....	12.30	Mar. 31.....	12.45	June 30.....	11.70
July 9.....	12.42	May 20.....	12.59	Oct. 27.....	11.45
Aug. 25.....	12.55	July 20.....	12.75		
Oct. 25.....	12.63	Sept. 8.....	12.82		

153-097-22ABB MP is top of 1-1/4-inch plastic pipe 2.50 ft above lsd.

Dec. 5, 1979...	26.10	Oct. 7.....	26.79	Sept. 8.....	27.02
Feb. 13, 1980...	26.20	Dec. 2.....	26.85	Nov. 18.....	26.99
Mar. 25.....	26.37	Feb. 25, 1981...	26.73	Jan. 19, 1982...	27.09
May 13.....	26.54	Mar. 31.....	26.69	June 30.....	26.15
July 9.....	26.64	May 20.....	26.85	Oct. 27.....	24.64
Aug. 25.....	26.60	July 20.....	26.96	Nov. 2, 1983...	26.15

153-097-23BBA MP is top of 1-1/4-inch plastic pipe 2.20 ft above lsd.

Dec. 5, 1979...	10.98	Dec. 2.....	10.80	Nov. 18.....	10.94
Feb. 13, 1980...	10.20	Feb. 25, 1981...	10.49	Jan. 19, 1982...	11.04
Mar. 25.....	10.24	Mar. 31.....	10.54	June 30.....	9.75
May 13.....	10.45	May 20.....	10.69	Oct. 27.....	9.10
Aug. 25.....	10.65	July 20.....	10.84	Nov. 2, 1983...	9.86
Oct. 7.....	10.74	Sept. 8.....	10.95		

153-101-16BAC MP is top of 1-1/4-inch plastic pipe 1.80 ft above lsd.

Nov. 6, 1980...	6.80	July 21.....	6.23	Nov. 1, 1983...	6.31
Dec. 2.....	7.27	Sept. 15.....	8.05	Nov. 2.....	6.31
Feb. 24, 1981...	4.89	Dec. 2.....	7.59	Dec. 2.....	4.47
Apr. 1.....	6.51	Jan. 20, 1982...	5.12		
May 21.....	6.42	July 8.....	3.50		

TABLE 3.--Logs of wells and test holes

Bulk density logs are in grams/cc
(grams per cubic centimeter).

Depths are shown in feet below land
surface.

Gamma-ray logs are in API GR units
(American Petroleum Institute
gamma-ray units).

Neutron logs are in API N units
(American Petroleum Institute
neutron units).

Potential logs are in mV
(millivolts).

Resistance logs (single point) are
in ohms.

Resistivity logs are in ohm-m
(ohm-meters).

Spontaneous potential (SP) logs are
in mV (millivolts).

Temperature logs are in °F (degrees
Fahrenheit).

LOCATION: 145-098-03DDD1, 2

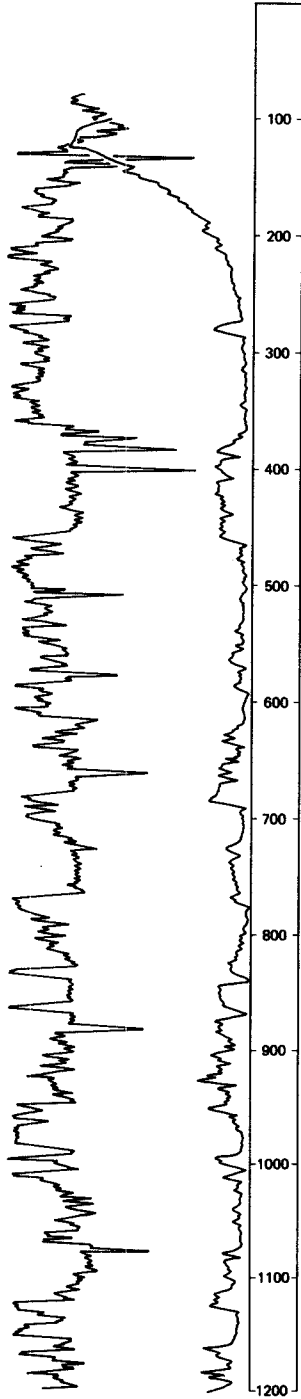
DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-29 Silt and sand, yellowish-brown.

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION

29-205 Siltstone and sandstone, clayey, olive-gray.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

205-215 Lignite.

215-375 Siltstone and lignite, olive-gray.

375-475 Sandstone, silty, fine to medium.

475-650 Siltstone and claystone, gray.

650-700 Siltstone and sandstone.

700-765 Siltstone and claystone.

765-775 Lignite.

775-810 Siltstone and claystone, lignitic.

810-950 Sandstone, silty, fine to medium.

950-975 Lignite.

LOWER PART OF FORT UNION FORMATION

975-1360 Siltstone and claystone, olive-gray.

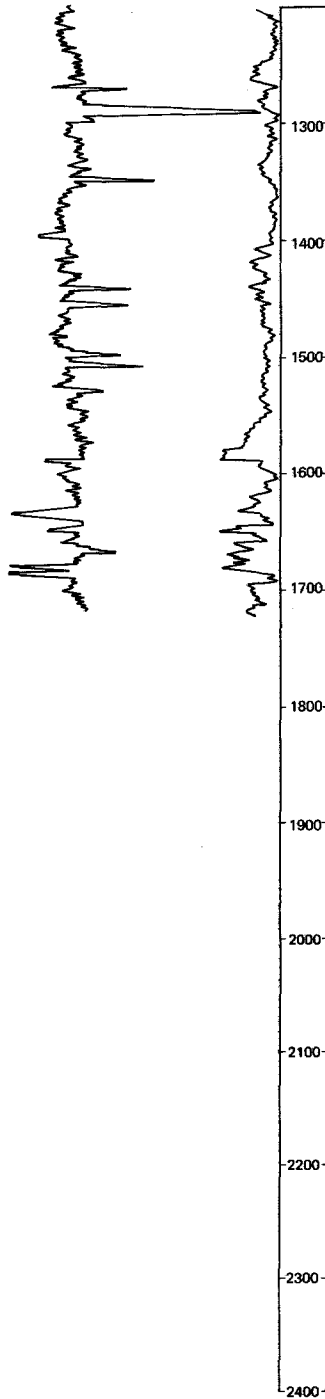
LOCATION: NDSWC 5952, 5952A, Continued
145-098-03DDDD1, 2

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

NEUTRON (API) S.P. (MV)



DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued

- 1360-1400 Claystone, silty, greenish-gray.
- 1400-1635 Siltstone and claystone, gray, carbonaceous.

- 1635-1700 Siltstone and sandstone, lignitic.

HELL CREEK AND FOX HILLS
FORMATIONS, UNDIFFERENTIATED

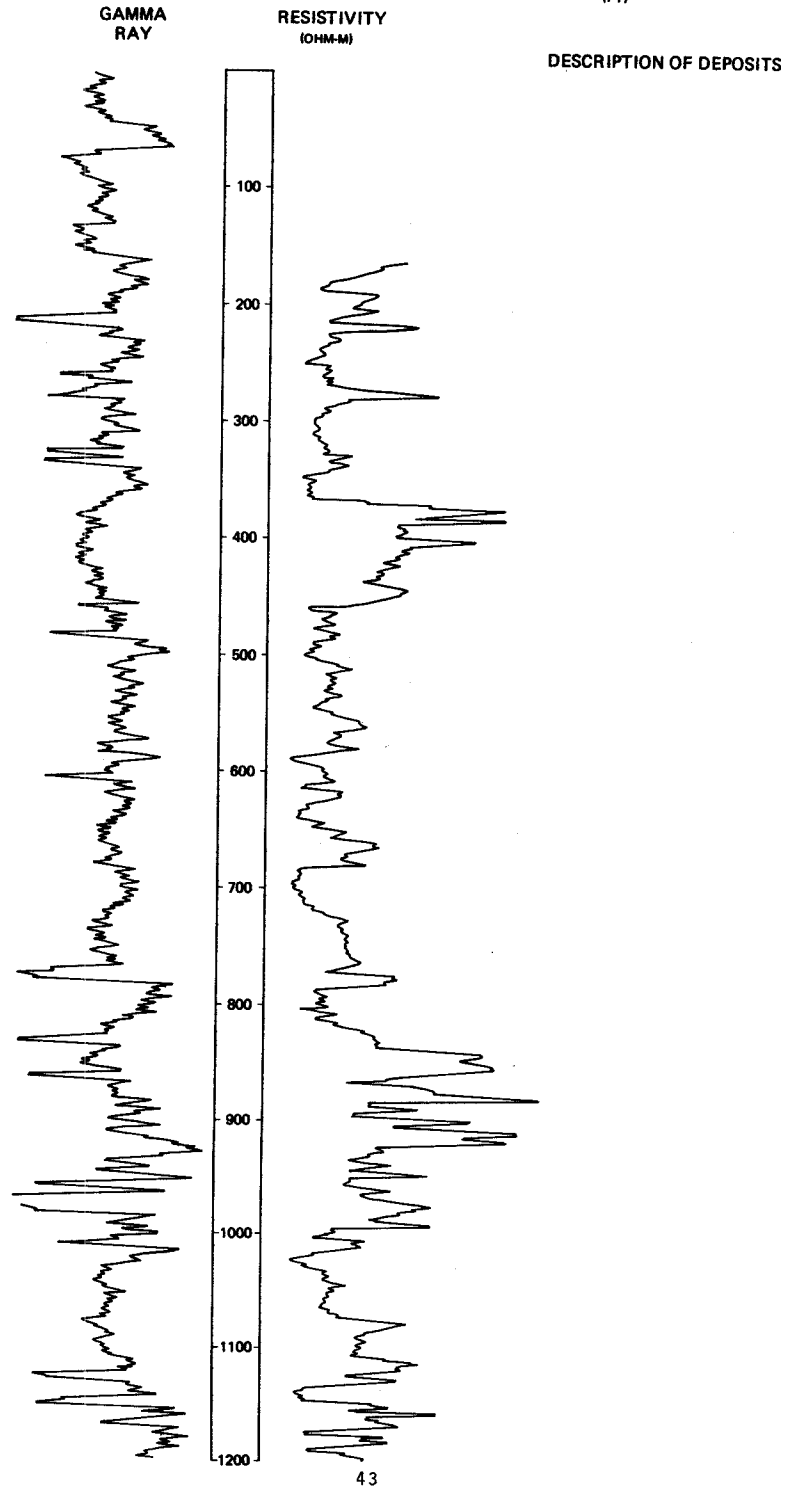
- 1700-1720 Siltstone, sandy.

NDSWC 5952, 5952A, Continued
LOCATION: 145-098-03DDD1, 2

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

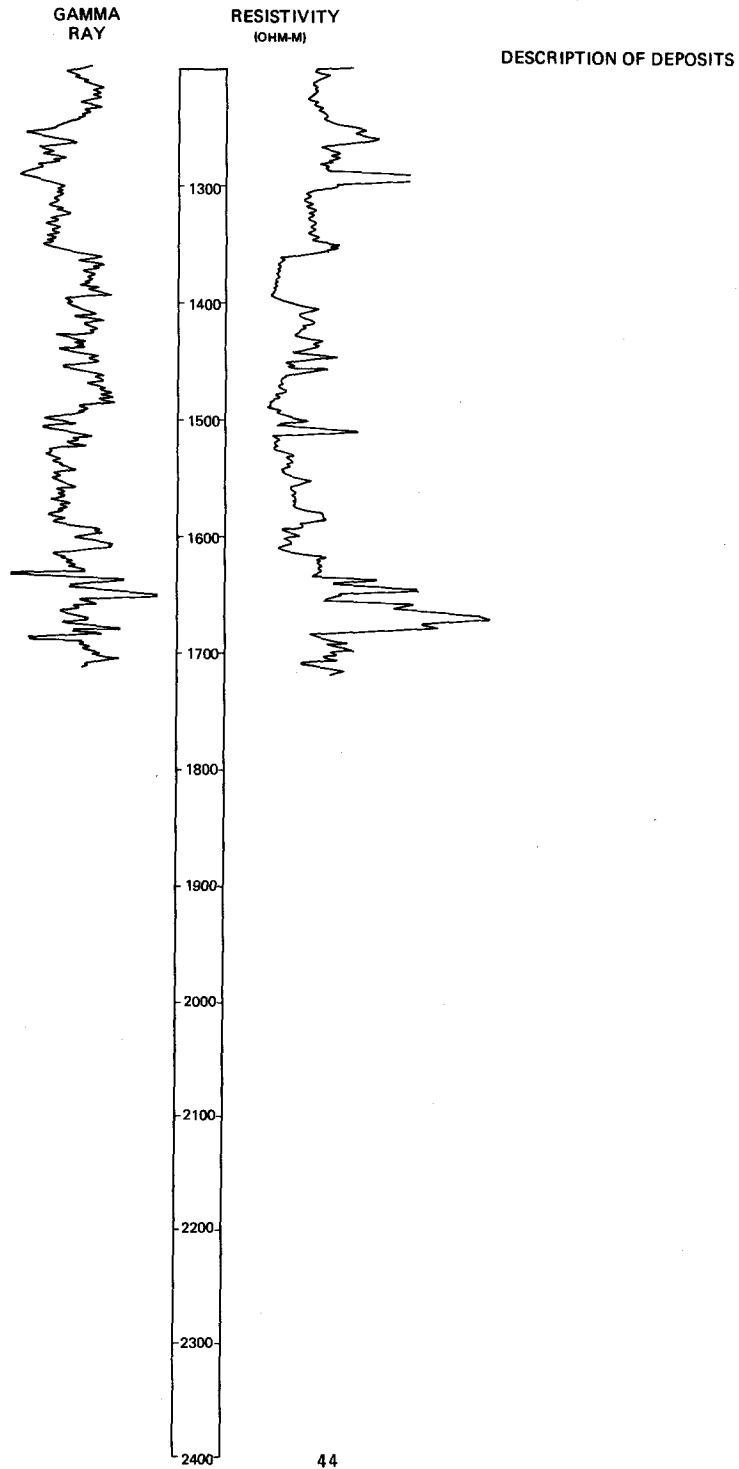


LOCATION: 145-098-03DDD1, 2 NDSWC 5952, 5952A, Continued

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

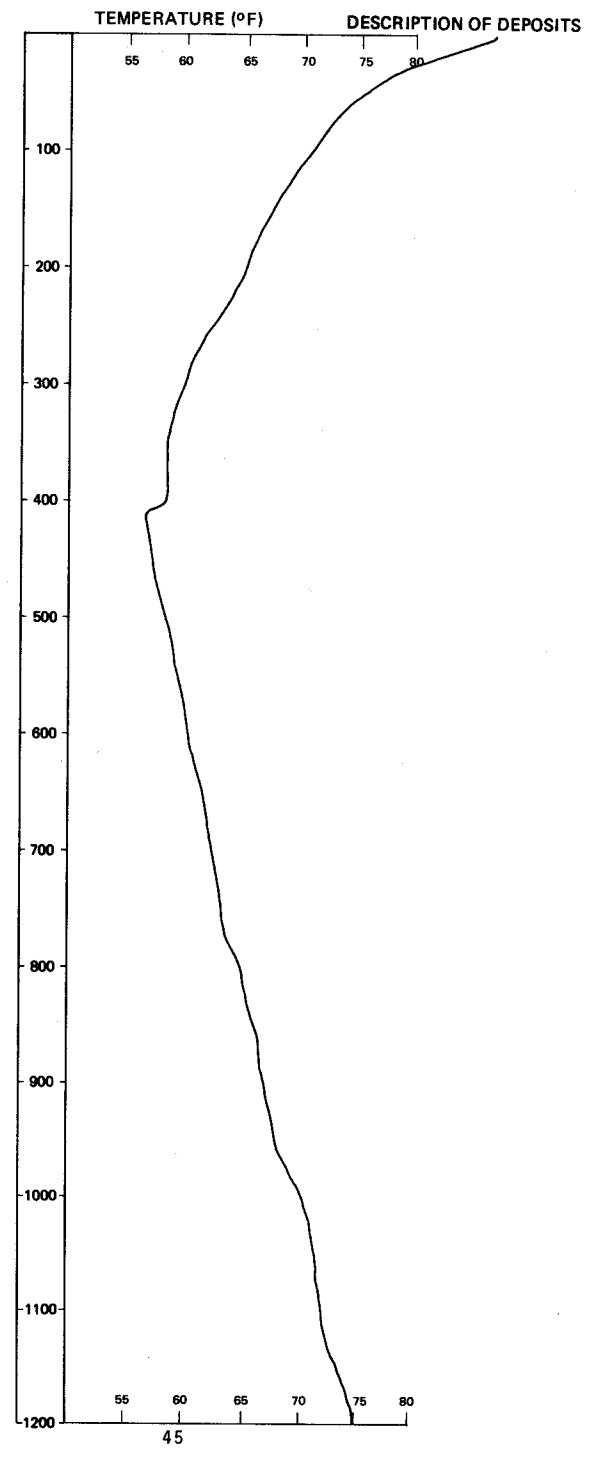


LOCATION: 145-098-030001 NDSWC 5952, Continued

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

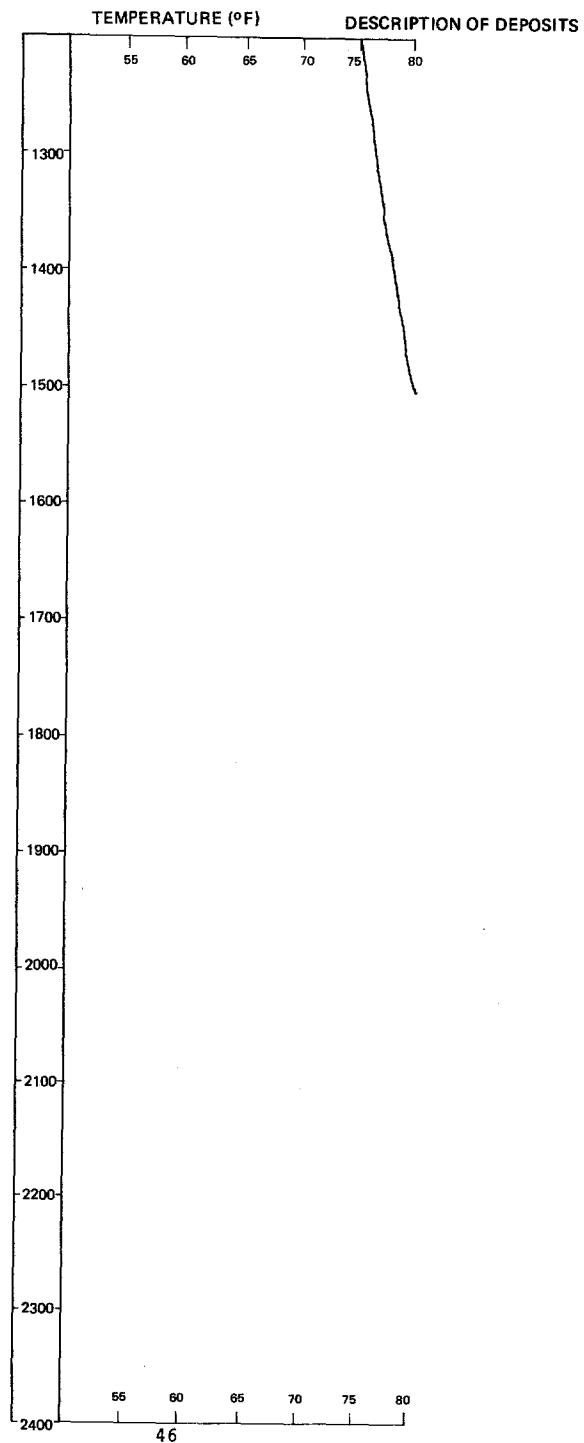


LOCATION: 145-098-03DDD1 NDSWC 5952, Continued

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 1720
(FT)

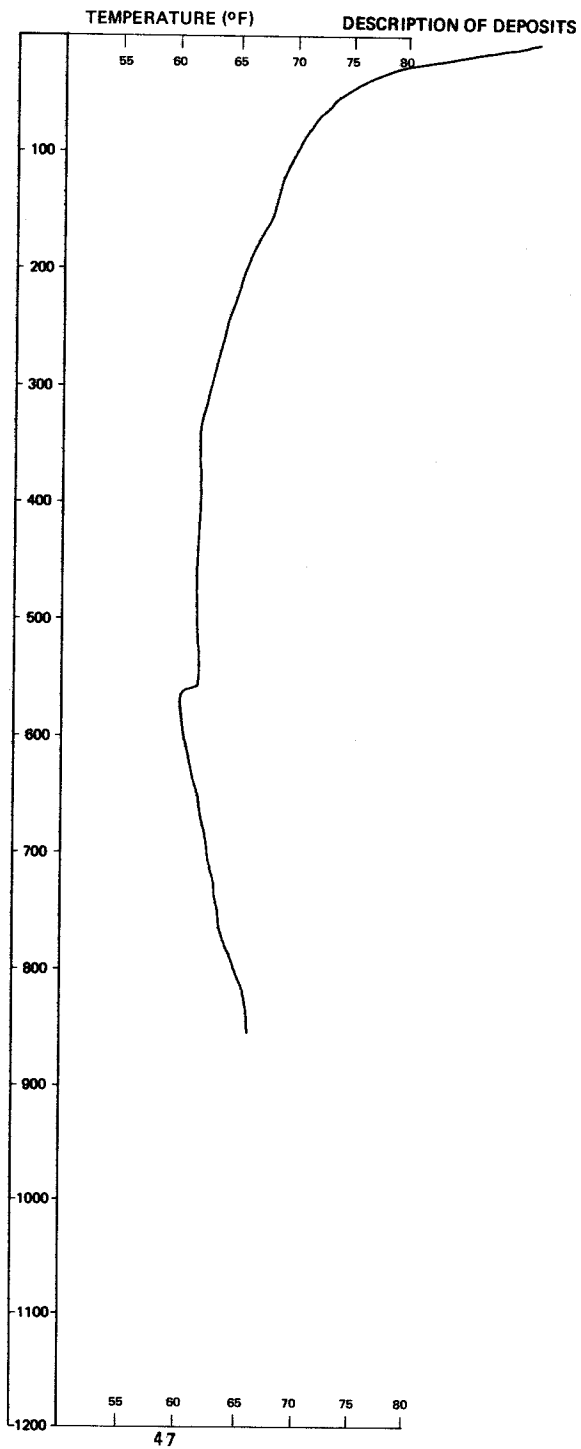


LOCATION: 145-098-03DDD2

DATE DRILLED: 08/14/81

ALTITUDE: 2590
(FT, NGVD)

DEPTH: 885
(FT)



145-098-07BCB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2610 feet Date drilled: 9/28/72

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand-----	14	14
	Clay-----	8	22
	Clay, sandy-----	50	72
	Sand-----	14	86
	Clay-----	4	90

145-098-20CAA
(Log modified from Francis Boyce Water Well)

Altitude: 2640 feet Date drilled: 8/26/72

	Clay, brown-----	12	12
	Clay, gray-----	15	27
	Coal-----	4	31
	Clay, gray-----	26	57
	Coal-----	9	66
	Clay, gray-----	9	75
	Sandstone-----	2	77
	Shale, gray-----	12	89
	Coal-----	8	97
	Shale, gray-----	33	130
	Coal-----	3	133
	Shale, gray-----	53	186
	Sandstone-----	2	188
	Shale, gray-----	7	195
	Coal-----	3	198
	Shale, gray-----	94	292
	Sandstone-----	1	293
	Shale, gray-----	44	337
	Coal-----	3	340
	Shale, gray; small layers of sandstone (no water)-----	180	520

145-098-34DCA
(Log modified from Kruger Drilling)

Altitude: 2585 feet Date drilled: 9/01/77

	Sand-----	60	60
	Clay-----	140	200
	Coal-----	20	220
	Sand-----	6	226
	Clay-----	369	595
	Sand-----	10	605
	Clay-----	85	690
	Coal-----	5	695
	Clay-----	315	1010
	Sand-----	30	1040
	Clay-----	450	1490
	Clay, sandy-----	60	1550
	Clay-----	70	1620
	Coal-----	20	1640
	Clay-----	70	1710
	Sand-----	280	1990
	Shale, sandy-----	23	2013

145-099-01BDD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2640 feet	Date drilled: 10/01/72		
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	32	32
	Rock-----	3	35
	Clay-----	20	55
	Coal-----	7	62
	Sand-----	3	65
	Clay-----	10	75

145-099-11DDA
(Log modified from Knutson Well Drilling)

Altitude: 2665 feet	Date drilled: 3/05/77		
	Clay and shale-----	29	29
	Coal-----	4	33
	Shale-----	52	85
	Sand-----	4	89
	Coal-----	1	90
	Shale-----	5	95
	Coal-----	3	98
	Shale-----	2	100

145-099-12ADD
(Log modified from Heiser Garage & Well Drilling)

Altitude: 2625 feet	Date drilled: 8/08/75		
	Sand, brown-----	50	50
	Clay, brown and gray-----	20	70
	Sand, gray, and rock-----	5	75
	Rock-----	10	85
	Rock, sand, and clay; soft-----	11	96

145-099-12CAB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2640 feet	Date drilled: 12/05/77		
	Clay-----	42	42
	Coal-----	2	44
	Clay-----	21	65
	Sand-----	5	70
	Coal-----	4	74
	Clay-----	8	82
	Sand-----	24	106
	Clay-----	4	110

145-099-12CBA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2660 feet	Date drilled: 7/29/73		
	Clay and coal slack-----	20	20
	Clay, blue-----	32	52
	Rock-----	5	57
	Sand, blue-----	25	82
	Rock-----	2	84
	Sand and rock-----	7	91
	Clay-----	3	94

145-099-12C8B
(Log modified from Heiser Garage & Well Drilling)

Altitude: 2665 feet Date drilled: 7/18/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand and clay-----	10	10
	Clay and coal-----	10	20
	Clay and traces of coal-----	15	35
	Clay and coal-----	20	55
	Sand and clay-----	20	75
	Sand and traces of clay-----	10	85
	Rock, hard-----	2	87
	Sand, gray-----	2	89
	Rock-----	3	92
	Sand, gray-----	13	105

145-101-07AB
(Log modified from Boyce Drilling, Inc.)

Altitude: 2170 feet Date drilled: 1/15/74

	Sand and brown clay-----	63	63
	Clay, gray-----	4	67
	Coal-----	6	73
	Clay, gray-----	48	121
	Sandstone-----	1	122
	Sand, fine; water-----	7	129
	Clay, gray-----	101	230
	Coal-----	20	250
	Shale, gray-----	11	261
	Sand, gray; water-----	19	280

145-101-17CCC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2180 feet Date drilled: 8/29/77

	Clay, sandy; scoria chips-----	58	58
	Clay, gray-----	7	65
	Rock-----	1	66
	Coal-----	5	71
	Clay, sandy; thin beds of coal-----	74	145
	Clay; thin beds of coal-----	255	400
	Rock-----	10	410
	Clay, sandy, gray-----	322	732
	Rock-----	3	735
	Clay-----	18	753
	Rock-----	2	755
	Clay-----	165	920
	Rock-----	3	923
	Clay-----	57	980
	Sand-----	10	990
	Rock-----	2	992
	Clay, sandy-----	93	1085
	Clay-----	45	1130
	Rock-----	3	1133
	Sand-----	77	1210
	Clay-----	28	1238
	Clay, sandy-----	8	1246
	Sand-----	51	1297
	Clay-----	3	1300

145-101-19AAC
(Log modified from Ralph Wold Well Drilling)

Altitude: 2160 feet Date drilled: 7/31/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	55	55
	Coal-----	8	63
	Clay-----	12	75
	Coal-----	30	105
	Clay-----	30	135
	Coal-----	13	148
	Clay-----	48	196
	Coal-----	16	212
	Clay-----	98	310
	Coal-----	10	320
	Clay-----	140	460
	Sand-----	50	510
	Clay-----	82	592
	Coal-----	16	608
	Clay-----	3	611
	Rock-----	5	616
	Clay-----	44	660
	Coal-----	10	670
	Shale-----	160	830
	Sand-----	28	858
	Clay-----	17	875
	Coal-----	13	888
	Shale-----	82	970
	Coal-----	5	975
	Clay-----	32	1007
	Rock-----	2	1009
	Clay-----	106	1115
	Coal-----	15	1130
	Clay-----	29	1159
	Sand-----	34	1193
	Shale-----	27	1220
	Coal-----	5	1225
	Clay-----	5	1230
	Sand and water-----	75	1305

145-102-11DAB
(Log modified from Francis Boyce Water Well)

Altitude: 2080 feet Date drilled: 10/31/59

	Topsoil, fine; scoria-----	45	45
	Sand; scoria chips-----	14	59
	Shale-----	61	120
	Coal-----	15	135
	Shale-----	155	290
	Sand, water-bearing-----	10	300
	Shale-----	120	420
	Sand, water-bearing-----	20	440
	Rock-----	3	443
	Sand, water-bearing-----	12	455
	Shale-----	145	600
	Sand-----	38	638

145-102-15ABC
(Log modified from Francis Boyce Water Well)

Altitude: 2160 feet

Date drilled: 9/17/70

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay fill-----	26	26
	Scoria and fine gravel-----	12	38
	Coal-----	5	43
	Shale, gray-----	117	160
	Coal-----	7	167
	Shale, gray, firm-----	98	265
	Sandstone-----	45	310
	Shale, gray-----	26	336
	Rock-----	2	338
	Shale, gray, soft to medium-hard-----	277	615
	Shale, gray, hard-----	32	647
	Rock-----	5	652
	Shale, gray, hard-----	37	689
	Rock-----	2	691
	Shale, gray, hard-----	164	855
	Rock-----	4	859
	Shale, gray and brown, hard-----	51	910
	Shale, gray, hard; sandstone layers-----	60	970
	Rock-----	6	976
	Sandstone and gray shale; thinly layered-----	82	1058
	Rock-----	5	1063
	Shale, gray, medium-hard-----	131	1194
	Shale, gray, hard-----	18	1212
	Sandstone; artesian strata-----	43	1255

145-102-24DDA
(Log modified from Francis Boyce Water Well)

Altitude: 2060 feet

Date drilled: 12/16/59

	Topsoil-----	35	35
	Gravel, fine-----	26	61
	Shale-----	4	65
	Sand-----	15	80
	Shale-----	25	105
	Sand-----	3	108
	Coal-----	7	115
	Shale-----	37	152
	Rock-----	3	155
	Sand; interbedded with shale-----	30	185
	Shale-----	109	294
	Coal-----	3	297
	Shale-----	38	335
	Sand; interbedded with shale-----	15	350
	Shale-----	85	435
	Sand-----	21	456
	Shale-----	79	535
	Sand-----	73	608

145-102-26AA
(Log modified from Francis Boyce Water Well)

Altitude: 2190 feet Date drilled: 12/17/59

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and fill-----	20	20
	Gravel, fine-----	11	31
	Shale, gray-----	39	70
	Sand-----	10	80
	Shale, gray-----	20	100
	Coal-----	12	112
	Shale, gray-----	51	163
	Coal-----	12	175
	Shale, gray-----	70	245
	Coal-----	12	257
	Shale-----	8	265
	Sand; artesian; 1 quart per minute-----	10	275
	Shale-----	65	340
	Rock-----	2	342
	Shale-----	33	375
	Sand, fine, gray; water; 3 gallons per minute----	42	417

145-102-27CBB
(Log modified from Francis Boyce Water Well)

Altitude: 2170 feet Date drilled: 11/29/65

	Topsoil and clay fill-----	35	35
	Shale, hard-----	23	58
	Rock, hard-----	5	63
	Shale, gray-----	12	75
	Coal-----	5	80
	Shale, gray; streaks of coal and sandstone-----	129	209
	Shale-----	38	247
	Coal-----	15	262
	Sandstone-----	58	320
	Rock-----	1	321
	Shale-----	24	345
	Coal-----	8	353
	Shale; layers of coal and rock-----	292	645
	Shale-----	141	786
	Rock-----	3	789
	Shale, rock, and sandstone-----	123	912
	Sandstone; artesian strata flows; 1-1/2 gallons per minute-----	23	935
	Shale, dark-----	115	1050
	Rock-----	5	1055
	Shale, tough; rock in layers-----	135	1190
	Shale, hard-----	8	1198
	Sandstone; 15 gallons per minute-----	42	1240

145-104-09BAC
(Log modified from K. D. Thompson)

Altitude: 2435 feet Date drilled: 6/22/72

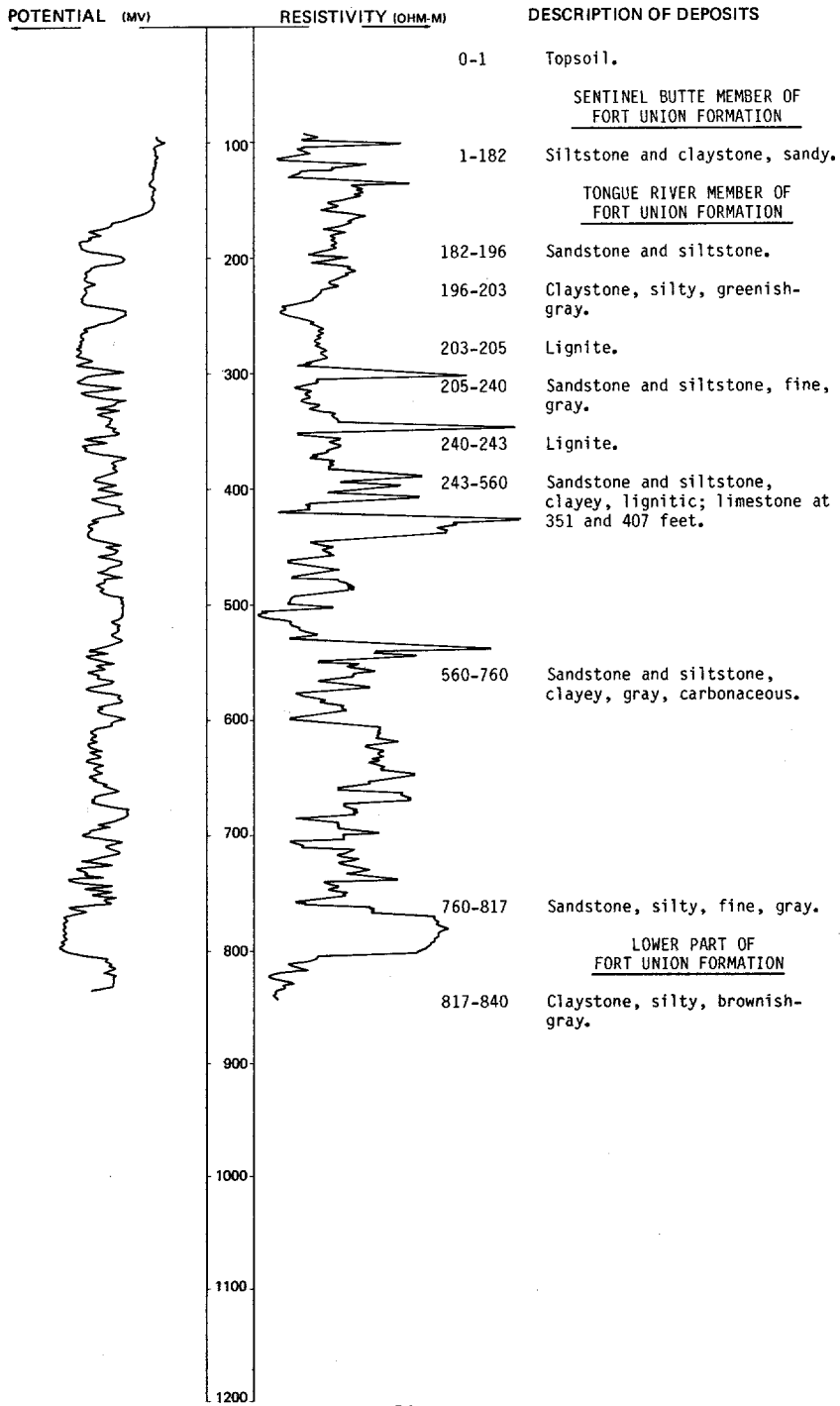
	Clay, yellow-----	65	65
	Coal slack and sand; some water-----	5	70
	Shale-----	70	140
	Sand, fine; some water-----	3	143
	Shale-----	67	210
	Clay, sandy-----	20	230
	Shale-----	105	335
	Sand, fine; water-----	11	346

LOCATION: 145-104-16BBB

DATE DRILLED: 10/27/81

ALTITUDE: 2455
(FT. NGVD)

DEPTH: 840
(FT)



LOCATION: 145-104-16888

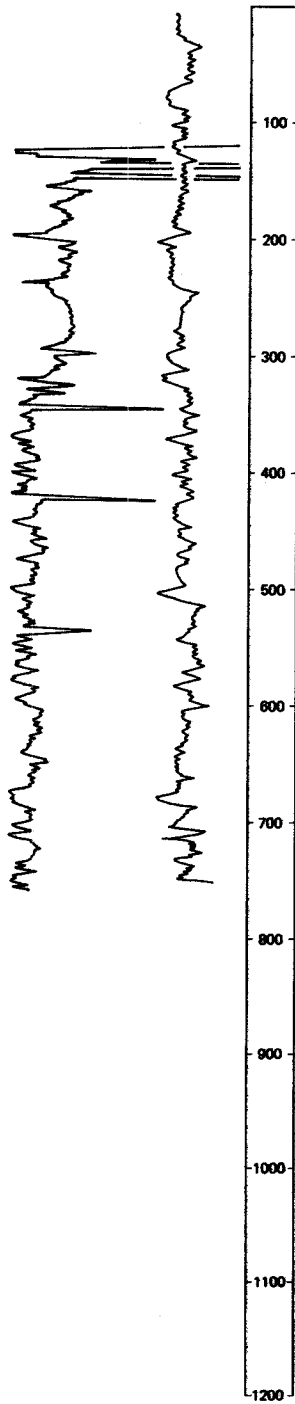
DATE DRILLED: 10/27/81

ALTITUDE: 2455
(FT, NGVD)

DEPTH: 840
(FT)

NEUTRON GAMMA
(API) RAY

DESCRIPTION OF DEPOSITS

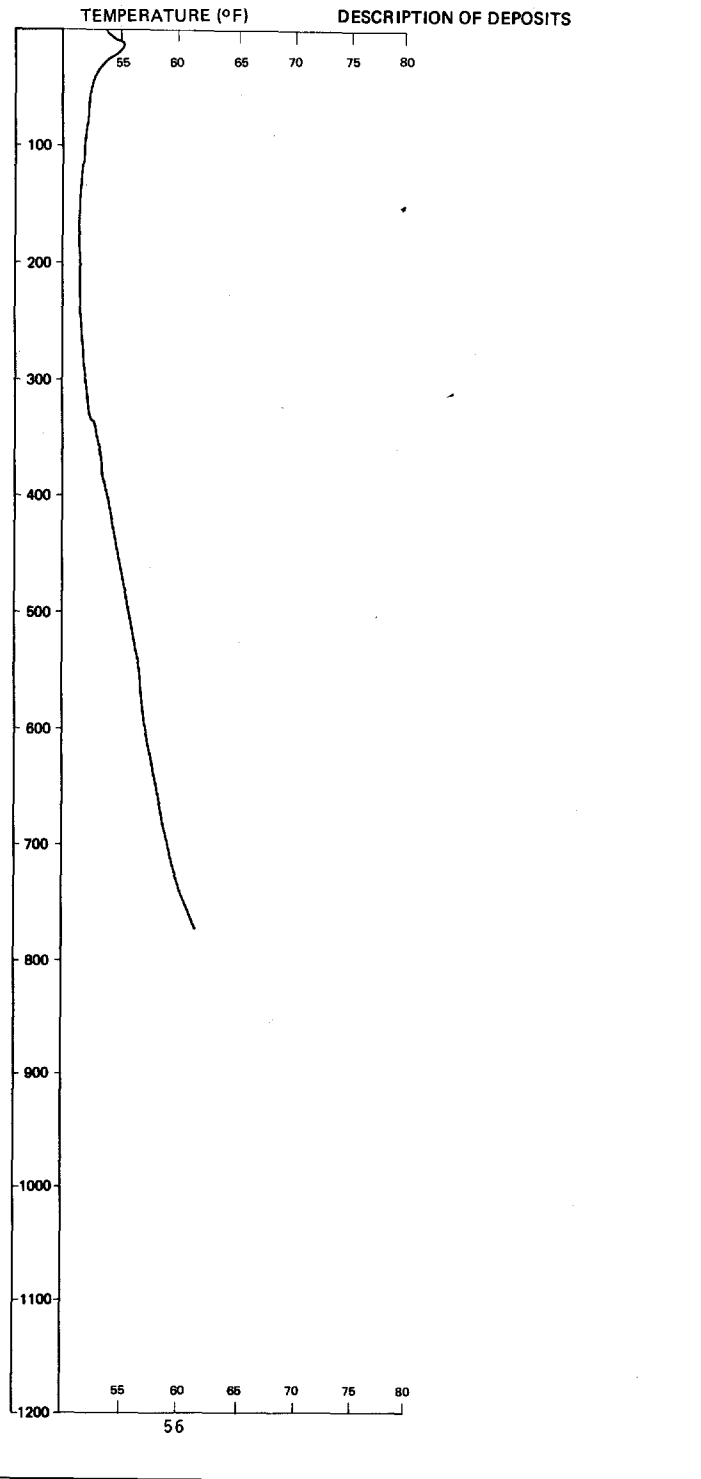


LOCATION: 145-104-16888

DATE DRILLED: 10/27/81

ALTITUDE: 2455
(FT, NGVD)

DEPTH: 840
(FT)



145-104-218DC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2335 feet Date drilled: 4/25/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	38	38
	Sandstone-----	3	41
	Clay, gray-----	59	100
	Coal-----	8	108
	Shale, gray-----	47	155
	Sand, fine, gray-----	3	158
	Shale, gray-----	10	168
	Sand, fine, gray-----	27	195
	Shale, gray-----	16	211
	Sand, fine, gray-----	7	218
	Coal-----	2	220

145-104-278C
(Log modified from Boyce Drilling, Inc.)

Altitude: 2340 feet Date drilled: 12/06/74

	Topsoil and clay-----	11	11
	Clay, sandy, brown-----	19	30
	Clay and scoria-----	6	36
	Sand, brown-----	9	45
	Clay-----	13	58
	Sand, brown, and clay-----	4	62
	Clay, gray-----	31	93
	Coal-----	14	107
	Clay, gray-----	13	120
	Sandstone and clay layers-----	40	160

146-098-04CCA
(Log modified from Francis Boyce Water Well)

Altitude: 2530 feet Date drilled: 8/29/72

	Clay, sandy, brown-----	6	6
	Sand, brown-----	39	45
	Sand, gray; water-----	24	69
	Coal-----	2	71
	Clay, gray-----	5	76

146-099-018BB
(Log modified from Francis Boyce Water Well)

Altitude: 2610 feet Date drilled: 7/24/73

	Sand and brown clay-----	25	25
	Coal-----	1	26
	Clay, gray-----	14	40

146-099-368BB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2650 feet Date drilled: 11/29/74

	Clay, sandy-----	30	30
	Rock-----	4	34
	Sand, fine-----	11	45
	Sand, medium-----	23	68
	Clay-----	10	78

146-101-308DB1
(Log modified from Ralph Wold Well Drilling)

Altitude: 2105 feet

Date drilled: 11/27/74

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, sandy-----	15	15
	Clay-----	30	45
	Gravel-----	13	58
	Clay-----	11	69
	Coal-----	6	75
	Clay-----	25	100
	Rock-----	2	102
	Clay-----	78	180
	Sand-----	20	200
	Clay-----	150	350
	Coal-----	5	355
	Clay-----	35	390
	Sand-----	30	420
	Clay-----	50	470
	Sand-----	35	505
	Clay-----	10	515
	Sand-----	45	560
	Clay-----	5	565
	Rock-----	7	572
	Clay-----	123	695
	Clay, sandy-----	22	717
	Clay-----	16	733
	Sand-----	17	750
	Shale-----	259	1009
	Sand-----	11	1020
	Shale-----	145	1165
	Sand-----	10	1175
	Shale-----	37	1212
	Rock-----	4	1216
	Shale-----	34	1250
	Sand-----	70	1320

146-101-31BAD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2170 feet

Date drilled: 7/23/75

<u>GEOLOGIC</u> <u>SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS</u> <u>(FEET)</u>	<u>DEPTH</u> <u>(FEET)</u>
	Clay-----	25	25
	Gravel-----	3	28
	Clay-----	7	35
	Coal-----	7	42
	Clay-----	28	70
	Coal-----	8	78
	Clay-----	292	370
	Coal-----	35	405
	Clay-----	25	430
	Coal-----	25	455
	Clay-----	45	500
	Coal-----	18	518
	Clay, sandy-----	164	682
	Coal-----	6	688
	Clay, sandy-----	42	730
	Clay-----	177	907
	Rock-----	2	909
	Clay-----	65	974
	Shale-----	29	1003
	Coal-----	11	1014
	Shale-----	21	1035
	Coal-----	10	1045
	Shale-----	35	1080
	Coal-----	45	1125
	Shale-----	50	1175
	Coal-----	15	1190
	Coal; interbedded with shale-----	38	1228
	Coal-----	24	1252
	Shale-----	41	1293
	Sand-----	8	1301
	Coal; interbedded with shale-----	26	1327
	Sand-----	108	1435

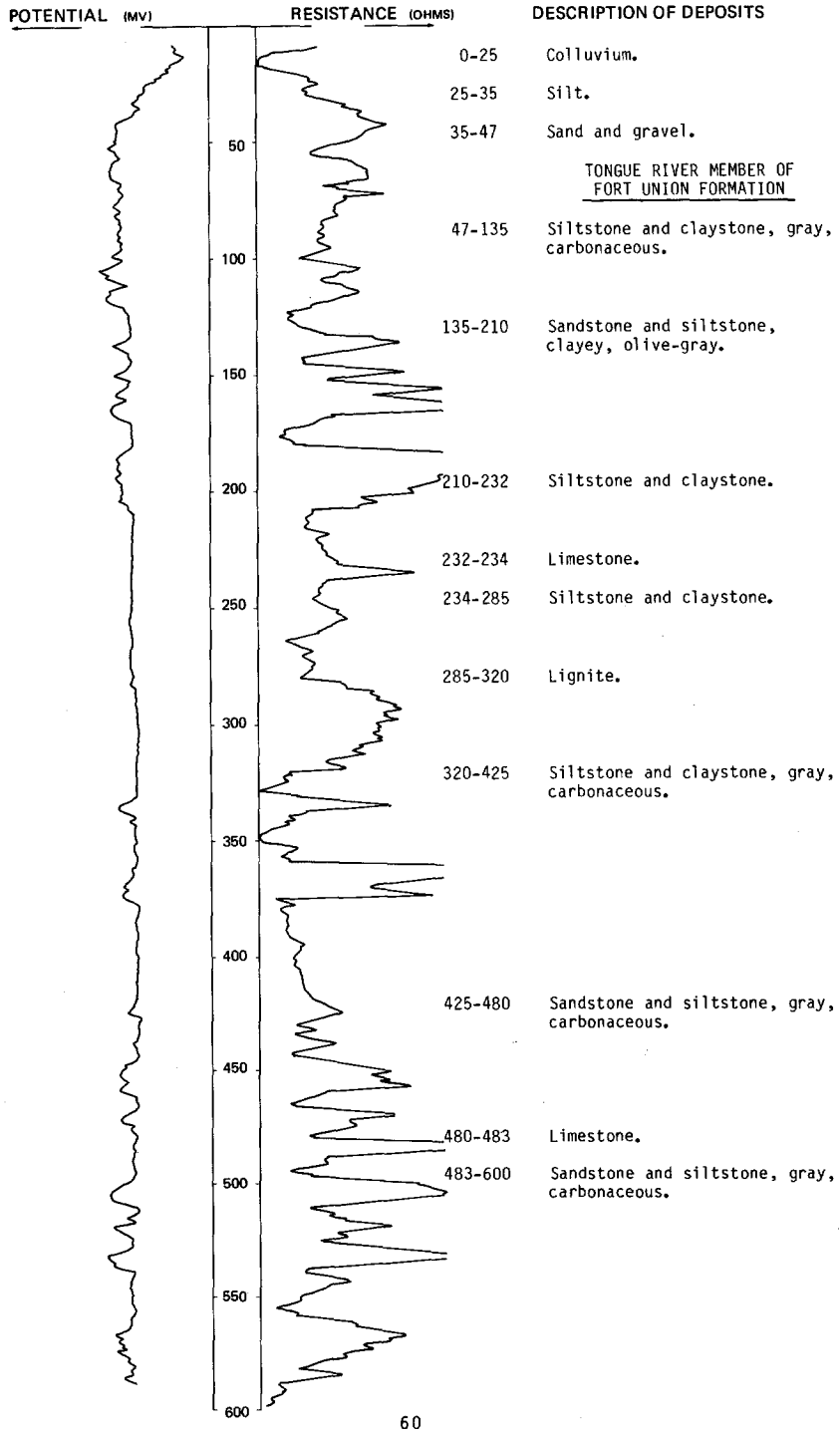
NDSWC 5951

LOCATION: 146-101-33ABA

DATE DRILLED: 7/07/81

ALTITUDE: 2125
(FT, NGVD)

DEPTH: 600
(FT)



LOCATION: 146-101-33ABA

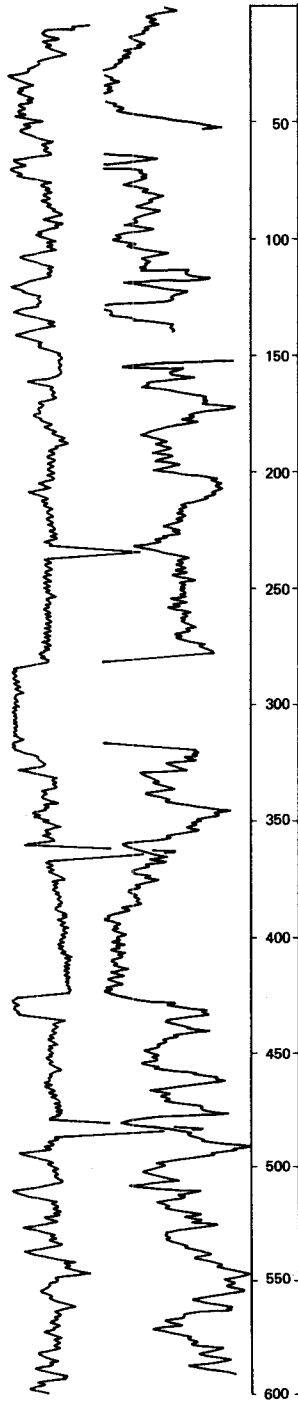
DATE DRILLED: 7/07/81

ALTITUDE: 2125
(FT, NGVD)

DEPTH: 600
(FT)

NEUTRON GAMMA
(API) RAY

DESCRIPTION OF DEPOSITS



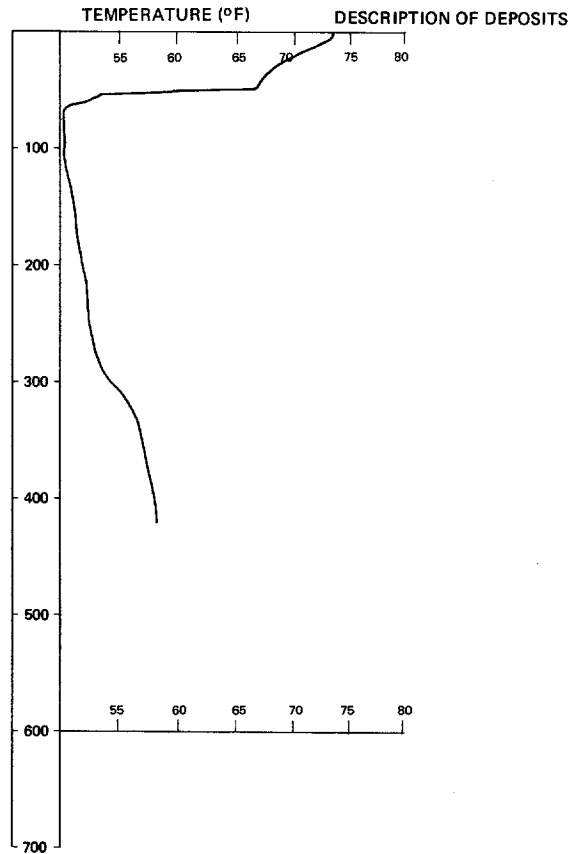
LOCATION: 146-101-33ABA

NDSWC 5951, Continued

DATE DRILLED: 7/07/81

ALTITUDE: 2125
(FT, NGVD)

DEPTH: 600
(FT)



146-102-26CCA
NDSWC 11584

Altitude: 2059 feet

Date drilled: 5/19/81

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, silty, dark-yellowish-brown, plastic-----	19	19
	Sand, coarse, poorly sorted, lignitic-----	6	25
	Silt, gray; bedrock-----	15	40

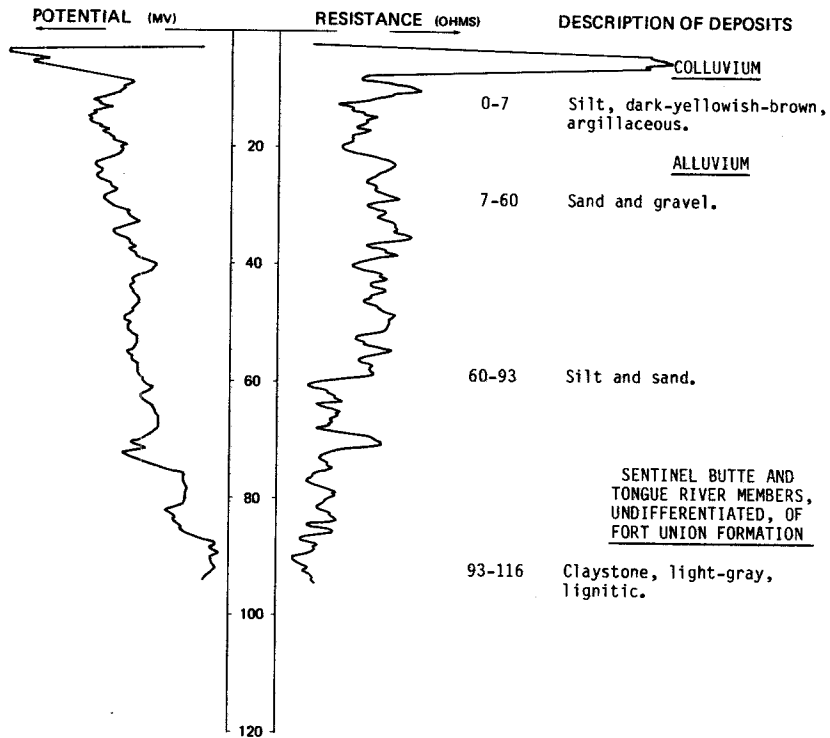
LOCATION: 146-102-26CDA

NDSWC 11585

DATE DRILLED: 5/19/81

ALTITUDE: 2059
(FT, NGVD)

DEPTH: 116
(FT)



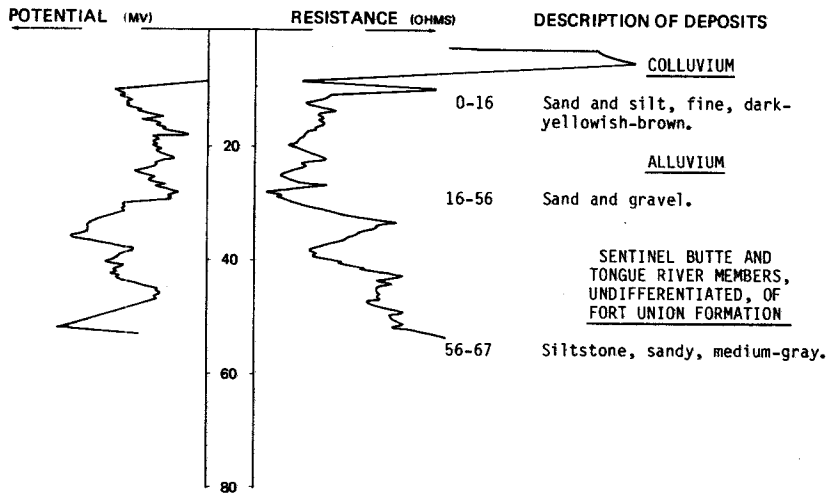
LOCATION: 146-102-26DCB

NDSWC 11586

DATE DRILLED: 5/19/81

ALTITUDE: 2058
(FT, NGVD)

DEPTH: 67
(FT)



146-102-27BCA
(Log modified from Boyce Drilling, Inc.)

Altitude: 2127 feet

Date drilled: 2/12/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand and brown clay-----	70	70
	Clay, gray-----	5	75
	Coal-----	4	79
	Shale, gray-----	51	130
	Sandstone-----	1	131
	Shale, gray-----	84	215
	Coal-----	7	222
	Shale, gray-----	54	276
	Coal-----	3	279
	Shale, gray-----	14	293
	Coal-----	32	325
	Shale, gray-----	172	497
	Sand, gray; water-----	28	525
	Shale, gray-----	206	731
	Sandstone-----	1	732
	Clay, sandy, gray-----	267	999
	Sandstone-----	1	1000
	Shale, gray-----	50	1050
	Sandstone-----	1	1051
	Shale, gray-----	199	1250
	Sand, gray; water-----	50	1300
	Shale, gray-----	10	1310

146-102-34ABC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2158 feet

Date drilled: 9/06/77

	Topsoil-----	20	20
	Rock-----	1	21
	Coal; scoria chips-----	71	92
	Clay-----	38	130
	Sandstone-----	35	165
	Clay-----	115	280
	Coal-----	27	307
	Shale; interbedded with coal-----	179	486
	Rock-----	3	489
	Shale; interbedded with coal-----	88	577
	Rock-----	3	580
	Coal-----	130	710
	Rock-----	5	715
	Shale, gray; interbedded with coal-----	220	935
	Rock-----	2	937
	Clay, sandy-----	213	1150
	Clay-----	100	1250
	Sand-----	18	1268
	Rock-----	5	1273
	Sand-----	37	1310
	Clay-----	35	1345
	Sand-----	48	1393
	Clay-----	2	1395

146-103-02BCC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2240 feet Date drilled: 5/09/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and brown clay-----	45	45
	Rock, yellow, fractured-----	2	47
	Clay, gray-----	113	160
	Sand, fine; drift type-----	8	168
	Clay, gray; layers of coal-----	207	375
	Coal-----	57	432
	Sand and clay, mixed-----	38	470
	Clay, gray; layers of coal-----	510	980
	Clay, gray-----	115	1095
	Sandstone-----	15	1110
	Clay, gray-----	72	1182
	Coal-----	8	1190
	Clay, gray-----	12	1202
	Sandstone-----	12	1214
	Clay, gray; layers of coal-----	244	1458
	Coal-----	6	1464
	Sandstone-----	3	1467
	Clay, sandy-----	14	1481
	Sandstone-----	1	1482
	Sand, dark-gray; water-----	38	1520

146-103-02DBD
(Log modified from Francis Boyce Water Well)

Altitude: 2250 feet Date drilled: 6/30/72

	Topsoil, brown sand, and brown clay-----	68	68
	Sand, brown, and scoria-----	19	87
	Clay, brown-----	32	119
	Clay, gray-----	35	154
	Coal and clay layers-----	35	189
	Coal-----	4	193
	Shale, gray-----	4	197
	Sandstone-----	2	199
	Shale, gray-----	37	236
	Coal-----	5	241
	Shale, gray-----	31	272
	Sand, gray; water-----	48	320
	Shale-----	--	320

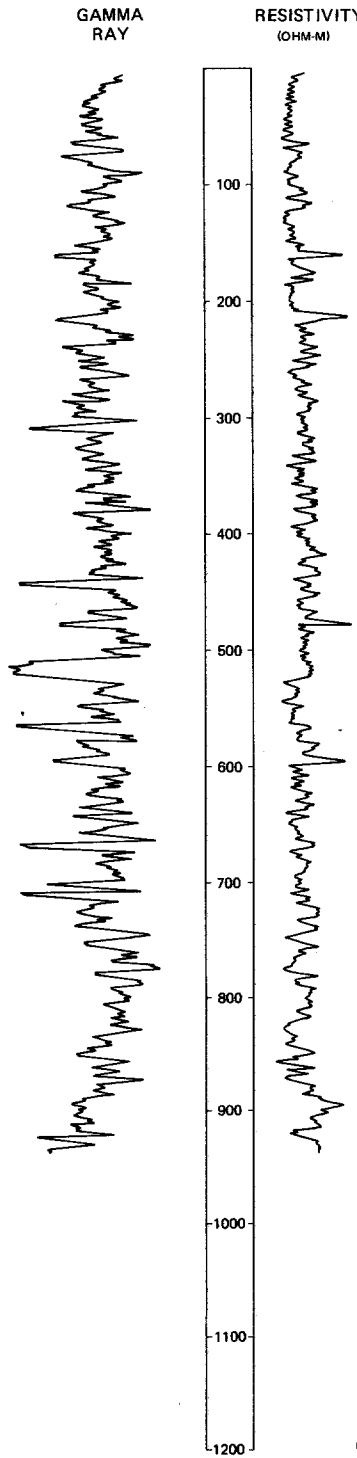
LOCATION: 146-103-26BAC

NDSWC 5946

DATE DRILLED: 7/23/81

ALTITUDE: 2400
(FT, NGVD)

DEPTH: 940
(FT)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-45 Silt, sandy, scoriaceous.

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION

45-60 Siltstone, argillaceous, bentonitic.

60-80 Siltstone and lignite.

80-100 Siltstone and claystone, carbonaceous.

100-120 Siltstone and lignite, greenish-gray.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

120-210 Siltstone and claystone, sandy, olive-gray.

210-220 Siltstone and sandstone, gray.

220-300 Siltstone and claystone.

300-312 Lignite.

312-440 Siltstone and claystone, gray, carbonaceous.

440-450 Lignite.

450-510 Siltstone and claystone, gray.

510-530 Lignite.

530-564 Claystone, silty.

564-575 Lignite.

575-640 Siltstone and sandstone, gray, carbonaceous.

640-685 Siltstone.

685-695 Lignite.

695-700 Siltstone.

700-720 Lignite and claystone.

720-830 Siltstone and sandstone, fine, gray.

LOWER PART OF FORT UNION FORMATION

830-875 Siltstone and claystone, brownish-gray.

875-940 Siltstone and sandstone, fine.

146-103-31ADB
(Log modified from Francis Boyce Water Well)

Altitude: 2365 feet

Date drilled: 7/18/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay-----	15	15
	Clay and scoria traces-----	18	33
	Clay and conglomerate-----	35	68
	Clay, gray-----	7	75
	Shale, gray-----	37	112
	Rock, soft-----	1	113
	Shale-----	18	131
	Rock-----	6	137
	Sandstone and clay-----	20	157
	Coal-----	1	158
	Clay and shale-----	47	205
	Coal-----	10	215
	Shale and soft rock-----	109	324
	Coal-----	6	330
	Shale-----	10	340
	Coal-----	4	344
	Shale, sandstone, and soft rock-----	69	413
	Coal-----	13	426
	Sandstone-----	29	455

146-103-34CCD
(Log modified from Boyce Drilling, Inc.)

Altitude: 2455 feet

Date drilled: 12/30/73

	Sand and brown clay-----	55	55
	Clay, gray-----	17	72
	Coal-----	13	85
	Shale, gray-----	240	325
	Coal-----	5	330
	Shale, gray-----	38	368
	Coal-----	6	374
	Shale, gray-----	46	420
	Sandstone-----	2	422
	Shale, gray; layers of sandstone-----	123	545
	Coal-----	4	549
	Shale, gray-----	16	565
	Sand, fine, bluish-gray-----	85	650
	Shale, gray-----	25	675
	Sandstone-----	6	681
	Shale, gray; layers of sandstone-----	194	875
	Coal-----	7	882
	Shale, gray; layers of hard sandstone-----	593	1475
	Coal-----	5	1480
	Clay, sandy, gray-----	51	1531
	Sandstone-----	3	1534
	Shale, gray-----	131	1665
	Sand, coarse, dark-gray; water-----	40	1705

LOCATION: 146-104-03CCC1

NDSWC 5632

DATE DRILLED: 10/14/79

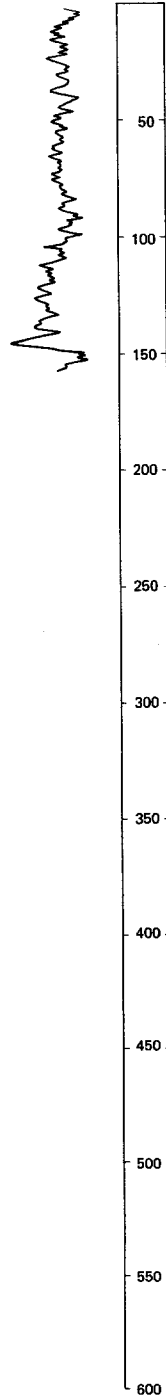
ALTITUDE: 2275
(FT, NGVD)

DEPTH: 162
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS



COLLUVIUM

0-23 Clay, silty, slightly sandy to very sandy, dark-yellowish-brown.

LAKE BEDS(?)

23-43 Clay, silty, yellowish-brown, very plastic, sticky.

LAKE BEDS

43-66 Clay, mottled gray and olive-gray, waxy.

66-111 Clay, silty to siliceous, bluish-gray to dark-gray, lignitic; with thin very fine sand layers.

GLACIAL OUTWASH

111-140 Sand, gravel, and clay; interbedded.

TONGUE RIVER MEMBER OF
FORT UNION FORMATION

140-144 Claystone, light-gray.

144-147 Lignite.

147-155 Claystone, dark-gray, organic, waxy.

155-162 Claystone, silty, medium-bluish-gray, tight.

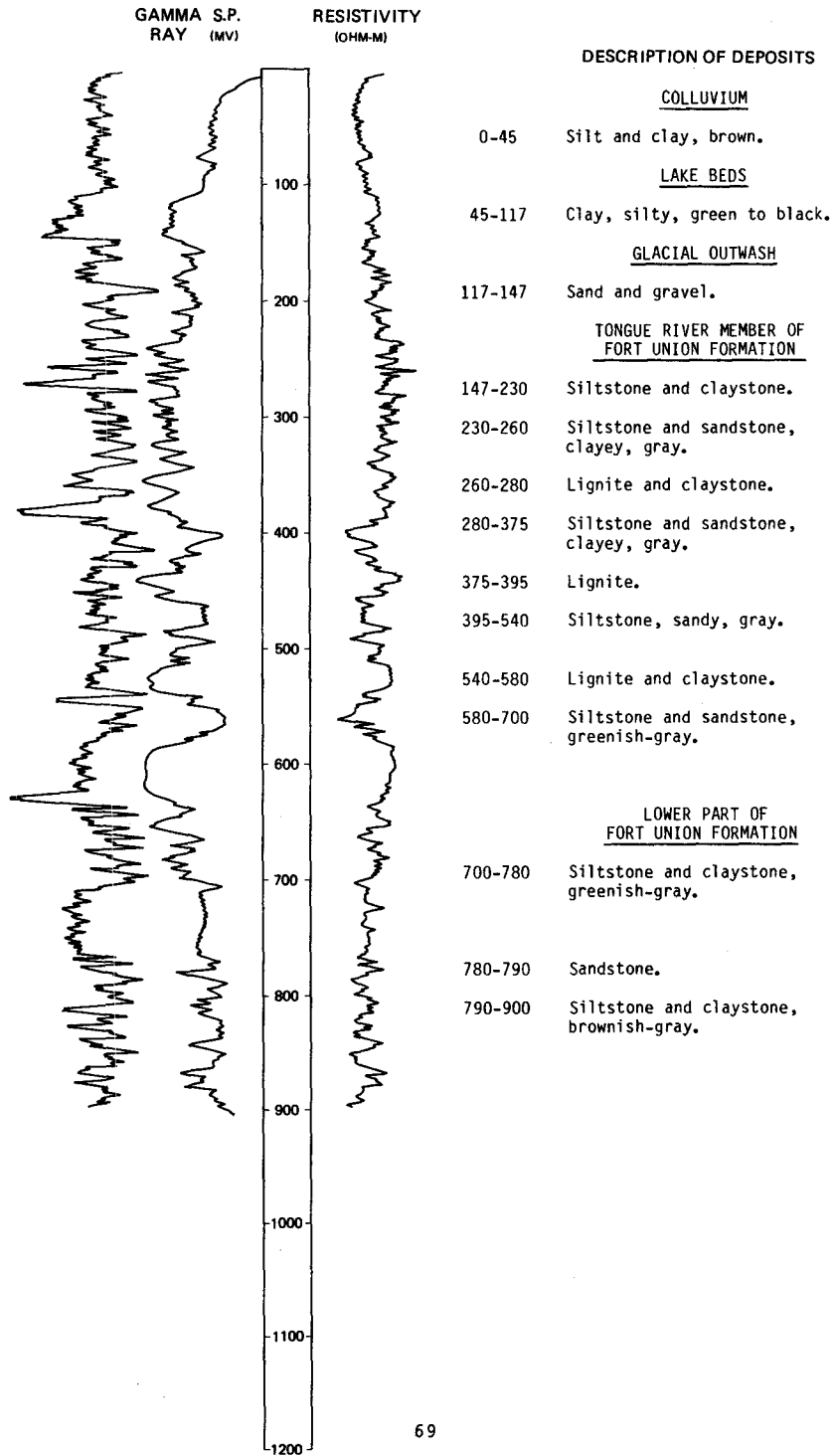
LOCATION: 146-104-03CCC2

NDSWC 5947

DATE DRILLED: 7/23/81

ALTITUDE: 2274
(FT, NGVD)

DEPTH: 900
(FT)



146-104-05DCA
(Log modified from Francis Boyce Water Well)

Altitude: 2270 feet Date drilled: 12/08/67

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay fill-----	90	90
	Clay, scoria, and fine rock-----	12	102
	Clay, firm-----	8	110
	Layers of clay and brown sand-----	53	163
	Coal-----	3	166
	Shale, gray-----	134	300
	Shale, gray; sandstone layers-----	100	400
	Shale, hard-----	5	405
	Sandstone, gray-----	25	430

146-104-06ACC
(Log modified from Francis Boyce Water Well)

Altitude: 2245 feet Date drilled: 11/02/77

	Sand, brown, and clay-----	35	35
	Clay, gray-----	50	85
	Coal-----	3	88
	Clay, gray-----	102	190
	Water sand, fine, gray-----	31	221
	Sandstone-----	1	222
	Coal-----	3	225
	Clay, gray-----	110	335
	Coal-----	10	345
	Clay, gray-----	40	385
	Sand, fine, and soft sandstone-----	35	420

146-104-07BD
(Log modified from Francis Boyce Water Well)

Altitude: 2300 feet Date drilled: 1/24/73

	Sand, brown, and brown clay-----	75	75
	Coal-----	3	78
	Clay, gray-----	52	130
	Sand and small coal layers-----	30	160
	Shale, gray, and small coal layers-----	80	240
	Sand, fine-----	40	280
	Shale, gray-----	45	325
	Coal-----	3	328
	Shale-----	24	352
	Sandstone-----	3	355
	Shale, gray, and layers of fine sand-----	51	406
	Coal-----	9	415
	Shale-----	87	502

146-104-09DAD
(Log modified from Francis Boyce Well Drilling)

Altitude: 2290 feet Date drilled: 6/24/71

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and yellow clay-----	25	25
	Sand, brown-----	50	75
	Coal-----	5	80
	Shale, gray-----	75	155
	Coal-----	20	175
	Shale, gray-----	78	253
	Sandstone, hard-----	3	256
	Sandstone aquifer, gray-----	19	275
	Coal-----	7	282

146-104-27BBD
(Log modified from Boyce Drilling, Inc.)

Altitude: 2500 feet Date drilled: 11/26/77

	Sand, brown-----	90	90
	Clay, gray-----	100	190
	Sandstone-----	1	191
	Clay, gray-----	39	230
	Sandstone-----	1	231
	Clay; interbedded with coal-----	194	425
	Coal-----	7	432
	Clay-----	56	488
	Sandstone-----	1	489
	Clay-----	181	670
	Coal-----	5	675
	Clay-----	28	703
	Sandstone-----	1	704
	Sand-----	21	725
	Sandstone-----	1	726
	Sand-----	29	755
	Clay-----	5	760

146-105-11CDC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2300 feet Date drilled: 10/30/73

	Sand, brown, and brown clay; layers of scoria-----	108	108
	Coal-----	12	120
	Shale, gray, and small layers of coal-----	143	263
	Coal and sand layers-----	17	280
	Shale, gray-----	10	290

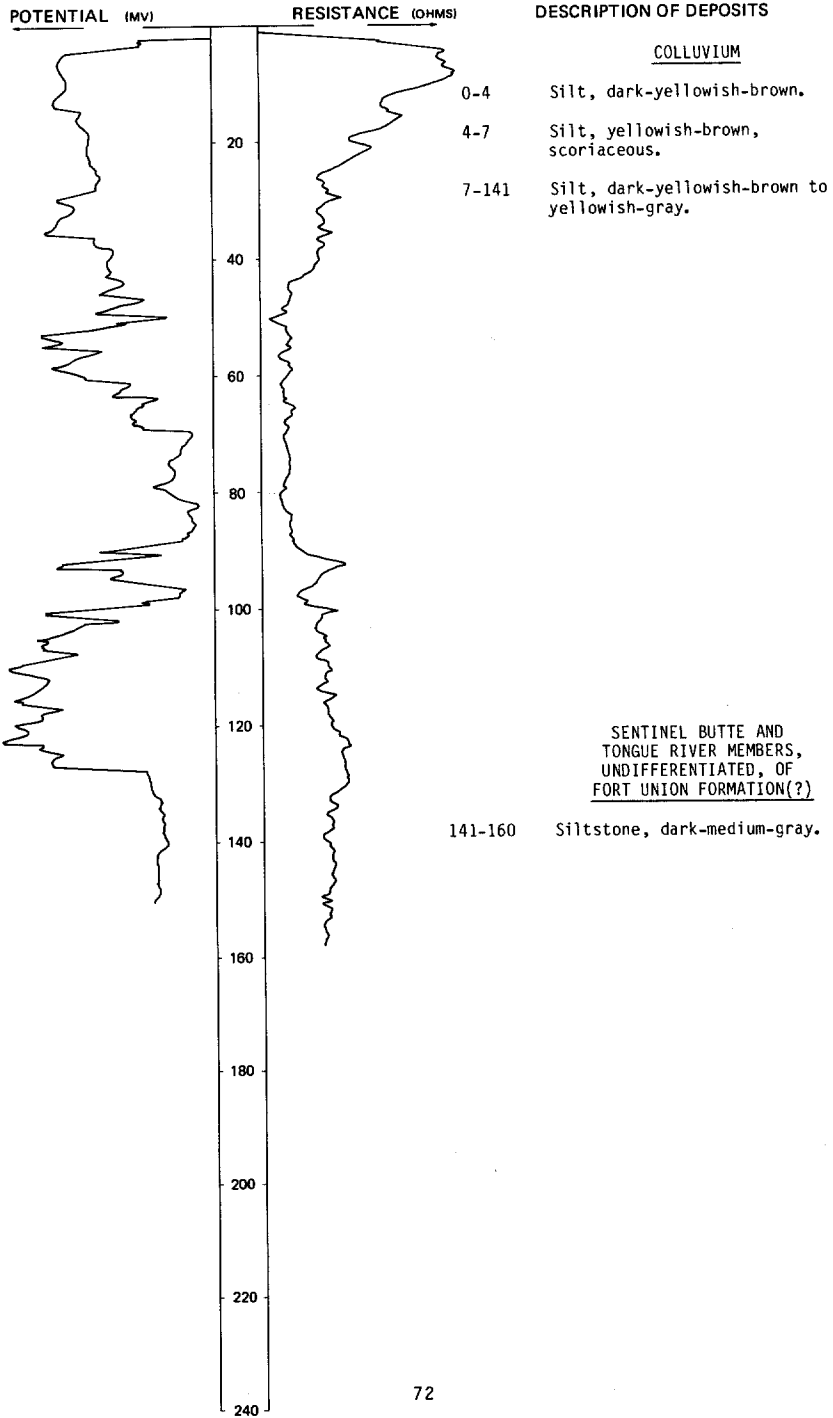
NDSWC 11587

LOCATION: 146-105-13ABB

DATE DRILLED: 5/19/81

ALTITUDE: 2320
(FT, NGVD)

DEPTH: 160
(FT)



146-105-22AAB
(Log modified from Boyce Drilling, Inc.)

Altitude: 2270 feet Date drilled: 12/28/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay-----	15	15
	Clay-----	18	33
	Shale, hard-----	8	41
	Sand, fine-----	5	46
	Coal-----	6	52
	Clay, sandy-----	8	60

147-098-02ACD
(Log modified from Ralph Wold Well Drilling)

Altitude: 1928 feet Date drilled: 8/16/75

	Clay, sandy-----	10	10
	Sand-----	12	22
	Coal-----	2	24
	Sand-----	14	38
	Coal-----	6	44
	Clay, sandy-----	116	160
	Clay-----	68	228
	Coal-----	10	238
	Clay-----	25	263
	Coal-----	12	275
	Clay-----	13	288
	Sand-----	9	297
	Coal-----	3	300
	Clay-----	15	315
	Coal-----	20	335
	Clay-----	75	410
	Coal-----	20	430
	Clay-----	70	500
	Sand-----	35	535
	Clay-----	126	661
	Coal-----	3	664
	Clay-----	9	673
	Rock-----	2	675
	Clay-----	40	715
	Sand-----	10	725
	Clay-----	55	780
	Clay, sandy-----	75	855
	Shale-----	160	1015
	Sand-----	12	1027
	Clay-----	121	1148
	Sand-----	10	1158
	Clay, sandy-----	12	1170
	Coal-----	20	1190
	Sand-----	10	1200
	Clay-----	5	1205
	Sand-----	60	1265

LOCATION: 147-098-02CBA

NDSWC 5950

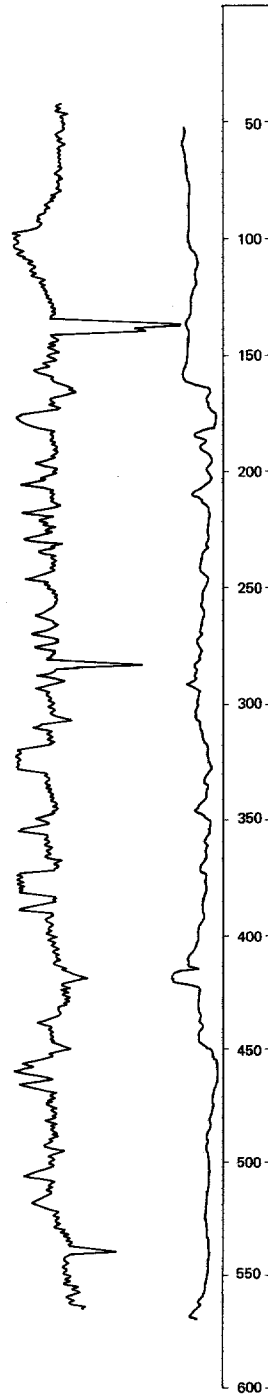
DATE DRILLED: 8/05/81

ALTITUDE: 1980
(FT, NGVD)

DEPTH: 572
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

COLLUVIUM

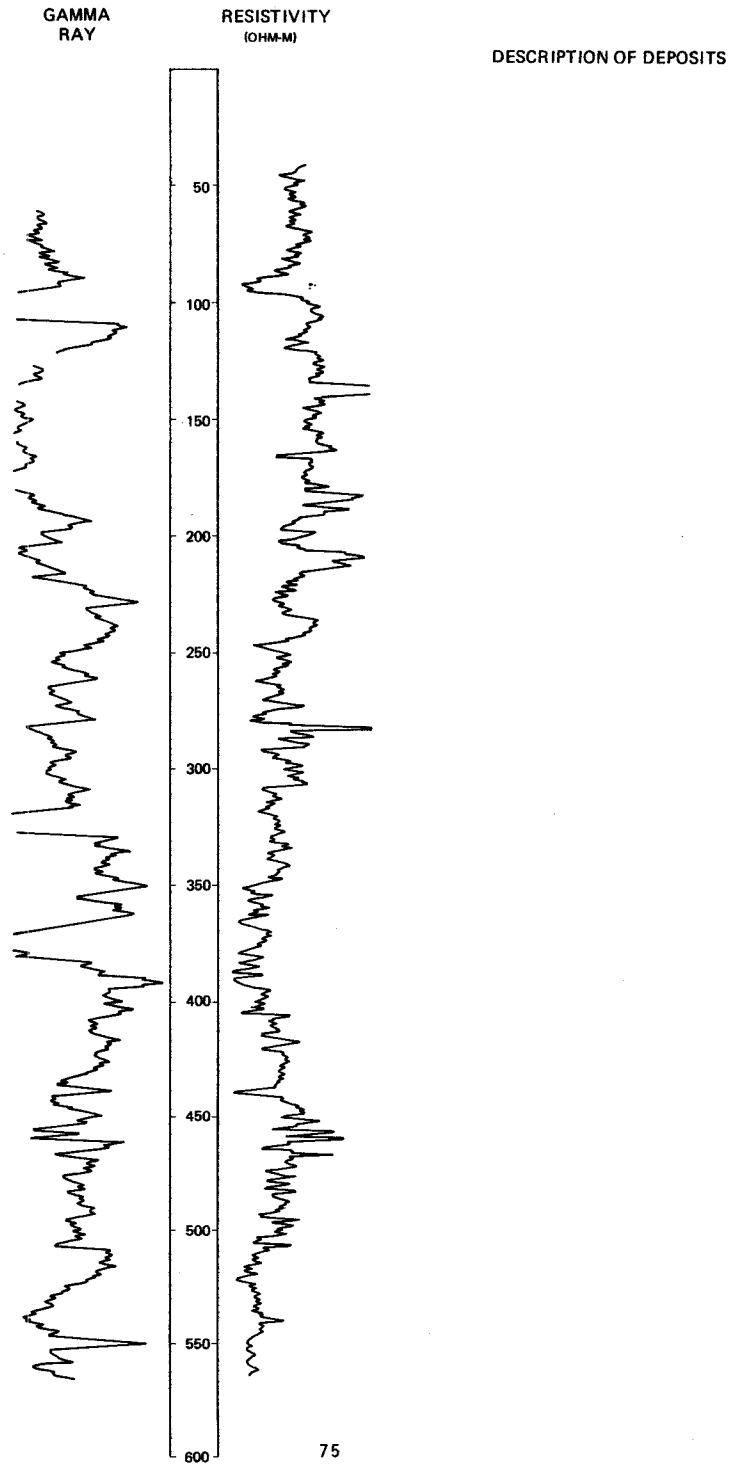
- 0-5 Silt and clay.
- SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION
- 5-90 Siltstone and sandstone, gray.
- TONGUE RIVER MEMBER OF
FORT UNION FORMATION
- 90-110 Lignite.
- 110-225 Siltstone and sandstone,
clayey; lignite from 164 to
170 feet.
- 225-275 Siltstone and claystone, gray.
- 275-320 Siltstone and sandstone, gray,
carbonaceous.
- 320-330 Lignite.
- 330-370 Siltstone and claystone,
sandy, gray.
- 370-382 Lignite.
- 382-405 Siltstone.
- 405-455 Sandstone, silty, fine to
medium.
- 455-460 Lignite.
- 460-530 Siltstone and claystone.
- 530-572 Siltstone and sandstone.

LOCATION: 147-098-02CBA

DATE DRILLED: 8/05/81

ALTITUDE: 1980
(FT, NGVD)

DEPTH: 572
(FT)



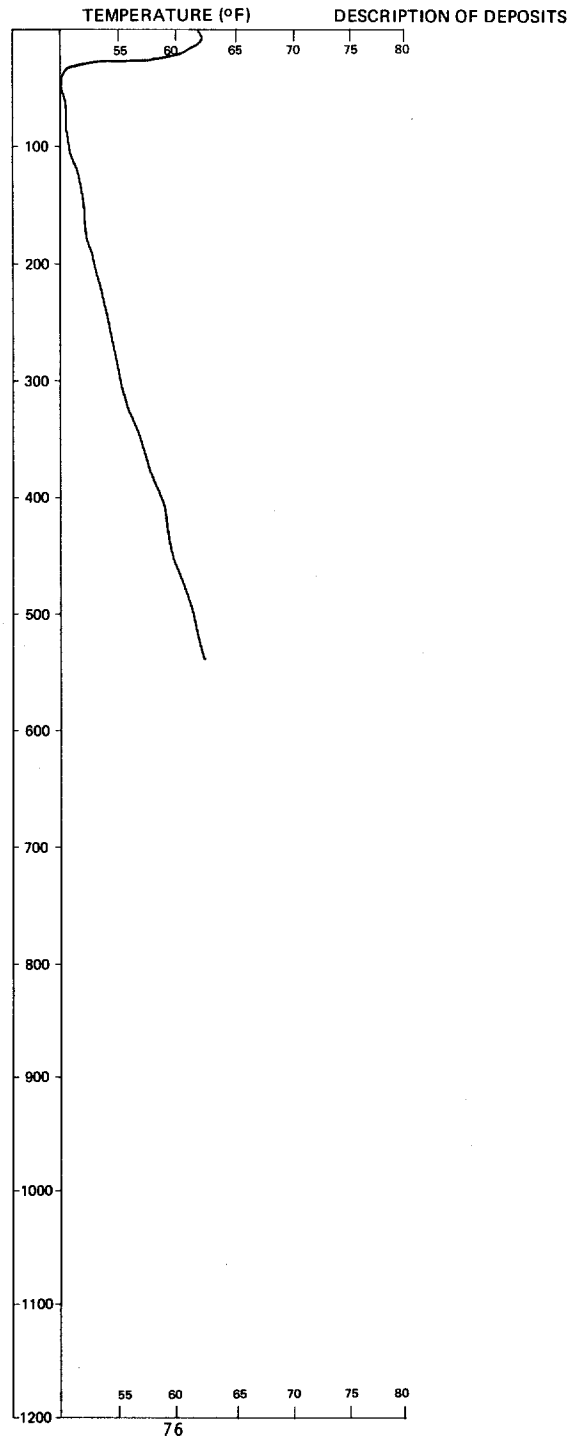
NDSWC 5950, Continued

LOCATION: 147-098-02CBA

DATE DRILLED: 8/05/81

ALTITUDE: 1980
(FT, NGVD)

DEPTH: 572
(FT)



147-100-200DB2
(Log modified from K. D. Thompson)

Altitude: 2010 feet Date drilled: 11/28/72

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Shale, blue-----	210	210
	Sand-----	30	240
	Shale and thin rocks-----	210	450
	Coal slack, fine-----	50	500
	Shale-----	150	650
	Sand, fine; small flow-----	25	675
	Shale-----	230	905
	Sand; water-----	15	920
	Shale-----	290	1210
	Sand; very small flow-----	10	1220
	Shale-----	70	1290
	Sand-----	40	1330

147-100-21BBA
(Log modified from K. D. Thompson)

Altitude: 1995 feet Date drilled: 5/30/73

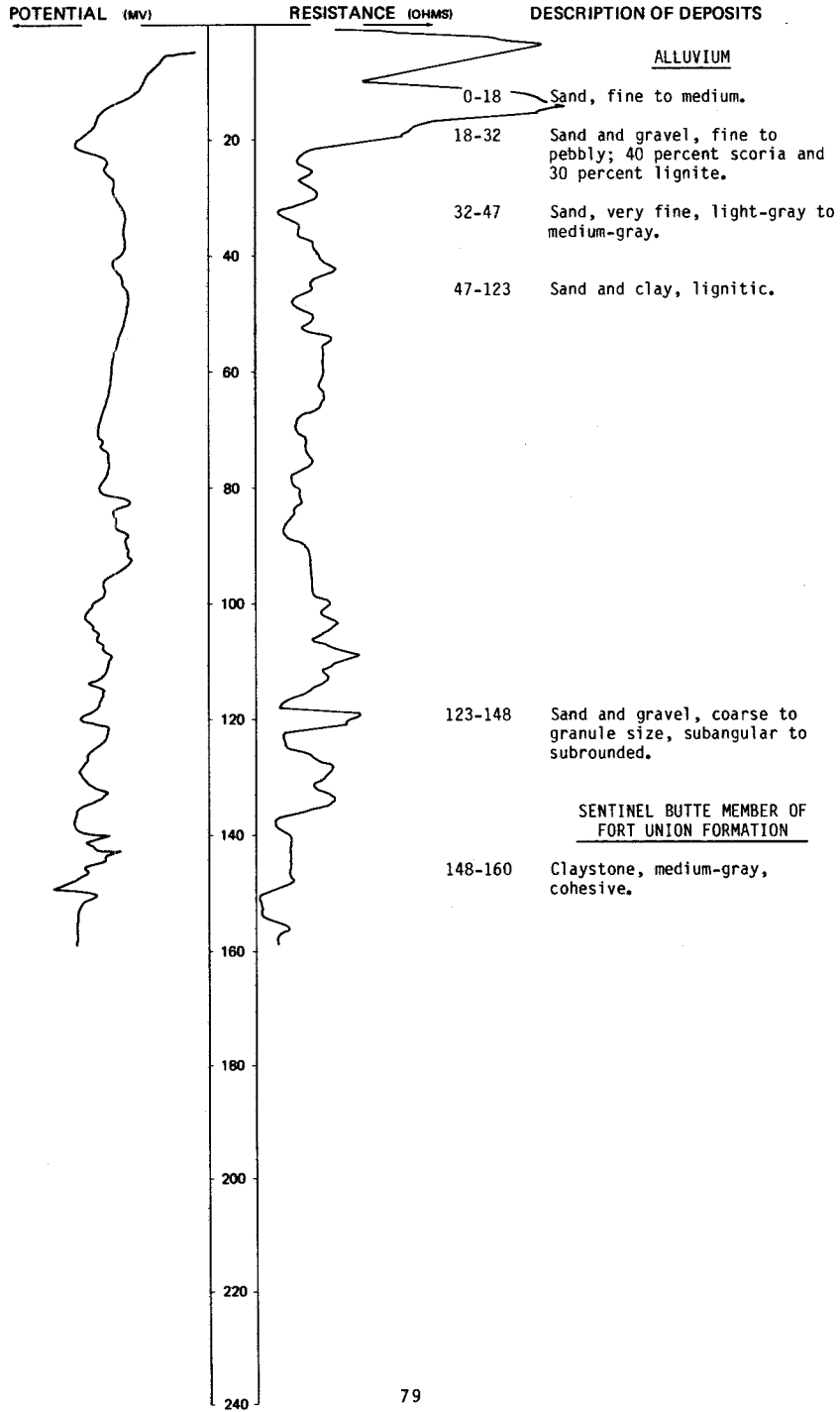
	Clay, sandy-----	12	12
	Sand and gravel-----	48	60
	Coal-----	5	65
	Shale-----	20	85
	Sand, fine, and gravel-----	40	125
	Shale-----	280	405
	Coal-----	45	450
	Shale-----	150	600
	Sand-----	25	625
	Shale-----	75	700
	Sand and shale-----	40	740
	Shale and thin rock-----	160	900
	Sand-----	10	910
	Shale-----	290	1200
	Sandstone, brown-----	60	1260
	Sand-----	55	1315
	Shale-----	8	1323

LOCATION: 147-100-21CAB
ALTITUDE: 2000
(FT, NGVD)

NDSWC 11396

DATE DRILLED: 10/01/80

DEPTH: 160
(FT)



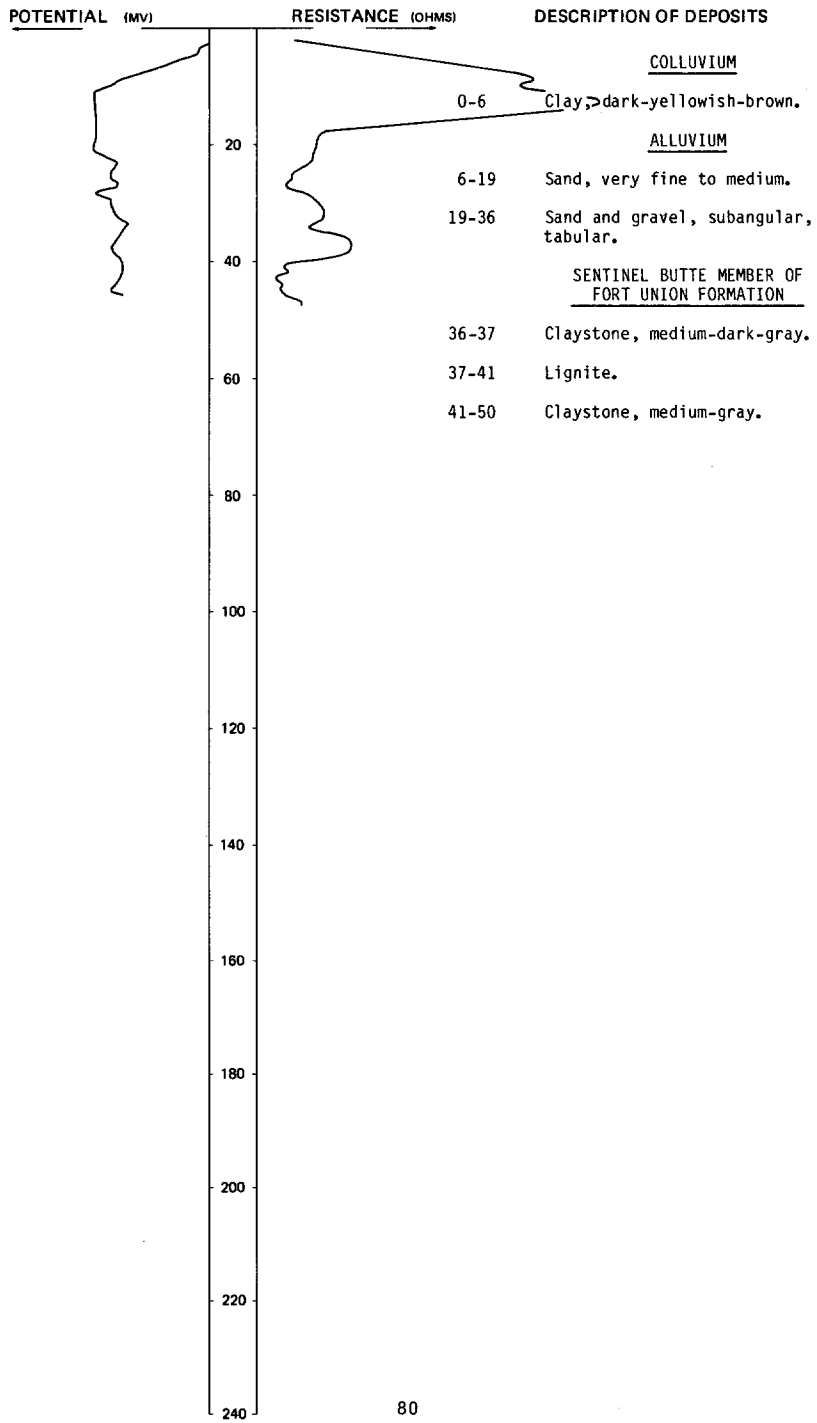
LOCATION: 147-100-21CBC

NDSWC 11398

DATE DRILLED: 10/01/80

ALTITUDE: 2000
(FT, NGVD)

DEPTH: 50
(FT)

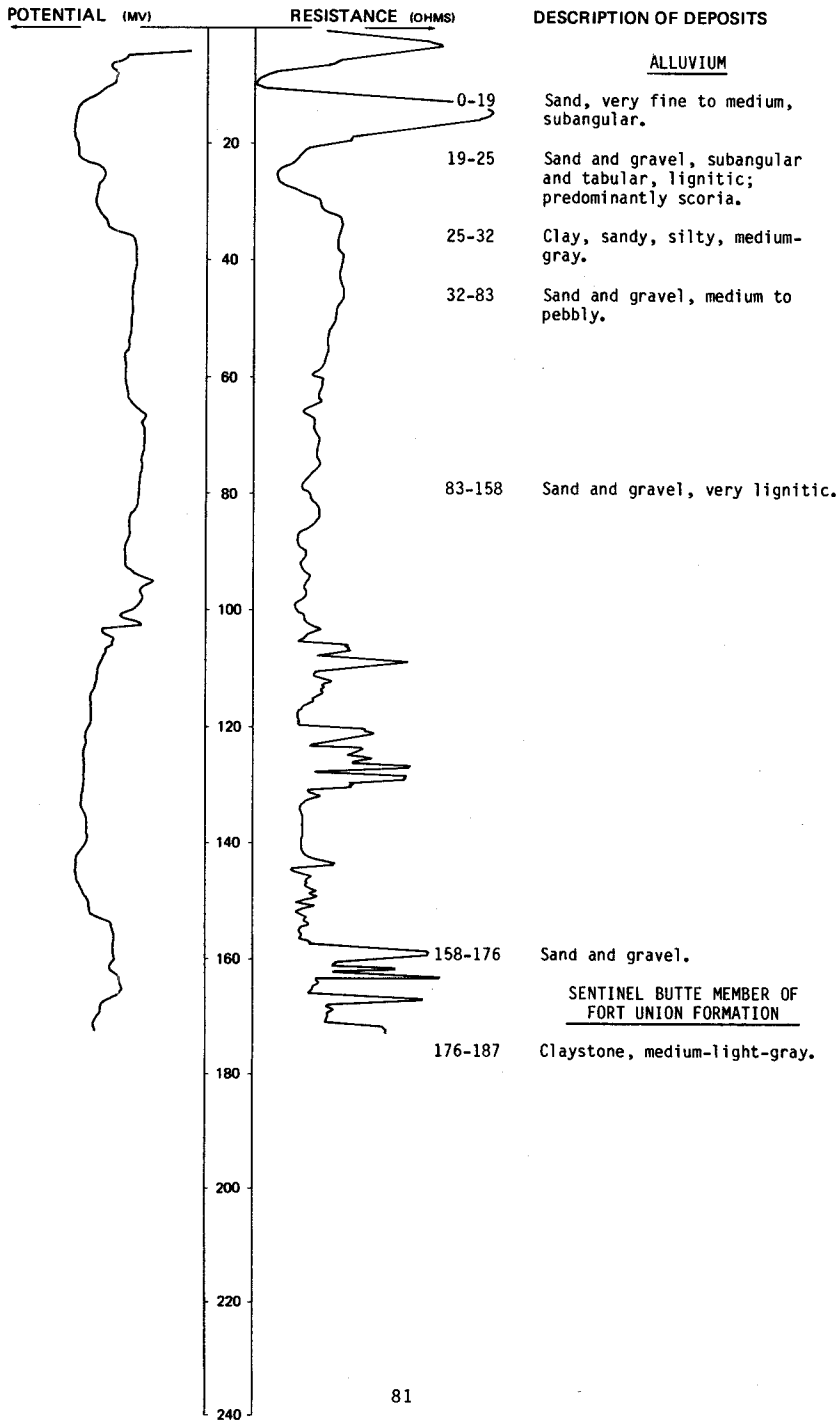


LOCATION: 147-100-21DBB
ALTITUDE: 1995
(FT, NGVD)

NDSWC 11397

DATE DRILLED: 10/01/80

DEPTH: 187
(FT)



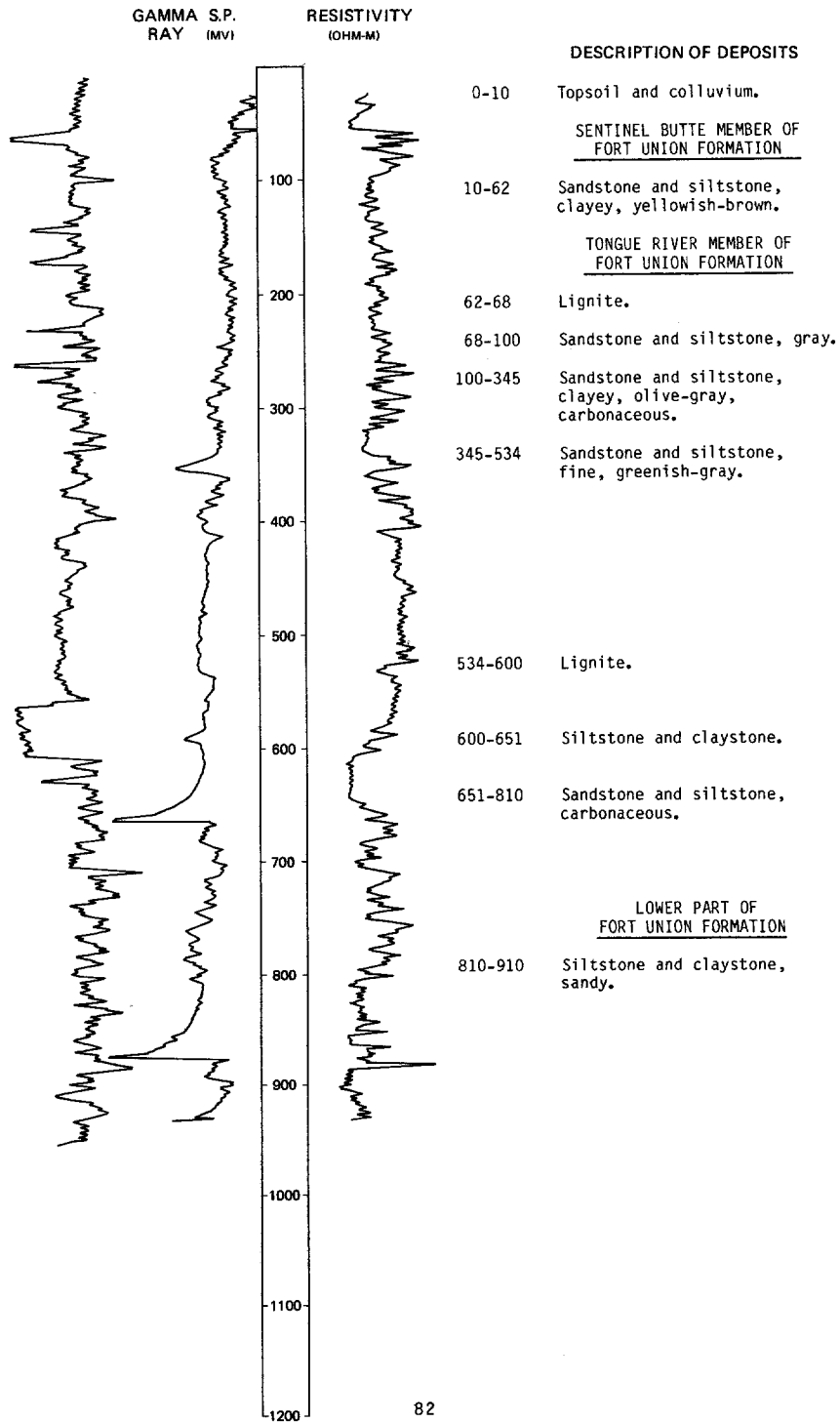
LOCATION: 147-101-06DDA

NDSWC 4945

DATE DRILLED: 7/17/81

ALTITUDE: 2235
(FT, NGVD)

DEPTH: 910
(FT)

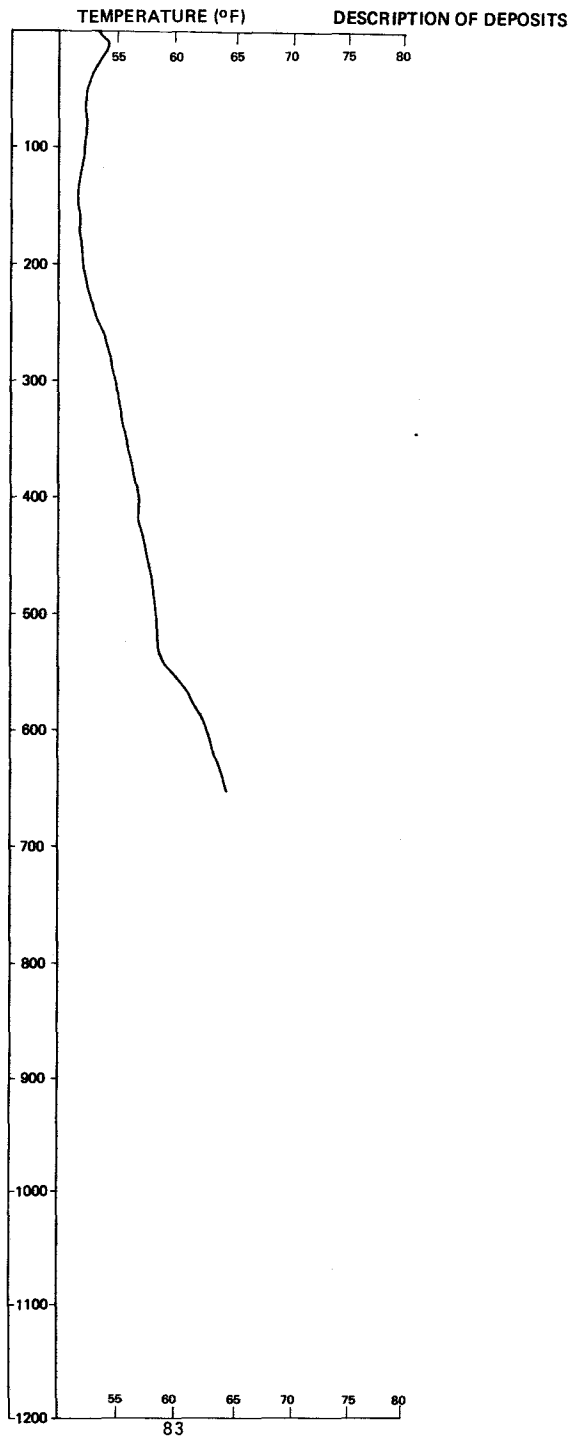


LOCATION: 147-101-06DDA NDSWC 4945, Continued

DATE DRILLED: 7/17/81

ALTITUDE: 2235
(FT, NGVD)

DEPTH: 910
(FT)



147-101-32ACD
(Log modified from K. D. Thompson)

Altitude: 2035 feet

Date drilled: 9/01/73

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy, yellow-----	30	30
	Scoria, sand, and clay; mixed-----	10	40
	Clay, blue-----	80	120
	Clay, sandy, fine-----	40	160
	Shale-----	90	250
	Coal-----	50	300
	Clay, blue, and thin rock-----	225	525
	Sand, fine; water-----	25	550
	Shale and small coal veins-----	300	850
	Sand; no test-----	25	875
	Shale-----	75	950
	Sand; no test-----	20	970
	Shale-----	130	1100
	Sandstone, brown-----	40	1140
	Shale-----	110	1250
	Sand; no test-----	10	1260
	Shale-----	60	1320
	Sand-----	30	1350
	Shale-----	6	1356
	Sand-----	18	1374
	Shale-----	2	1376

147-102-310D1
(Log modified from Francis Boyce Water Well)

Altitude: 2240 feet

Date drilled: 1/17/61

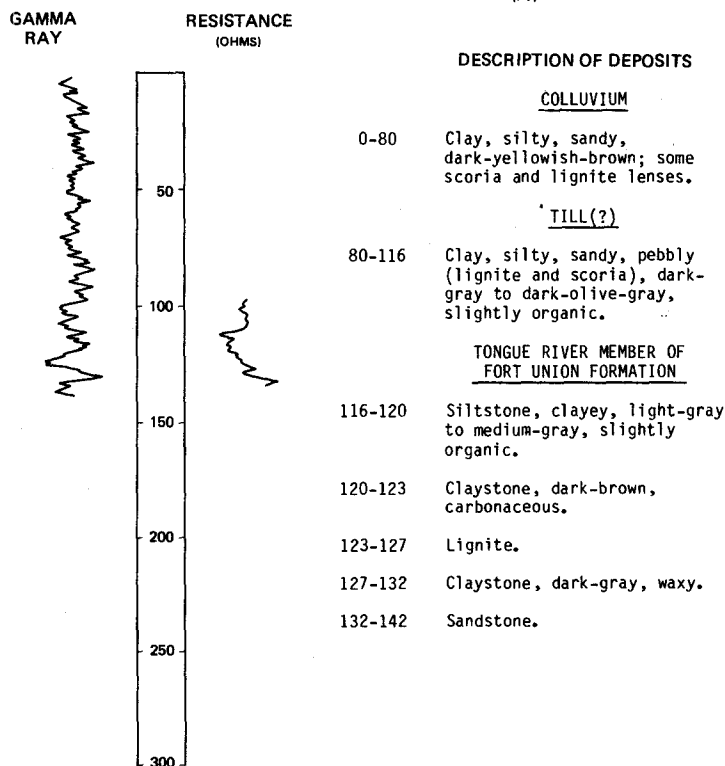
	Topsoil and fill-----	14	14
	Fill, sandy, fine-----	(?)	(?)
	Clay fill in yellow and brown streaks-----	(?)	110
	Clay, gray-----	28	138
	Rock, soft-----	3	141
	Shale, gray-----	23	164
	Rock, soft-----	6	170
	Clay, gray-----	8	178
	Coal, soft-----	2	180
	Shale, firm, and thin layers of coal-----	20	200
	Shale, gray-----	30	230
	Sandstone, firm-----	4	234
	Sandstone, water-bearing-----	13	247
	Shale, gray-----	4	251

147-102-31DD2
(Log modified from Francis Boyce Water Well)

Altitude: 2240 feet Date drilled: 1/16/63

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, clay fill, and traces of brown sand-----	110	110
	Shale, gray-----	14	124
	Coal-----	2	126
	Shale, gray-----	34	160
	Coal-----	1	161
	Shale, gray, soft-----	13	174
	Coal-----	2	176
	Shale, gray, and 1 foot of coal-----	14	190
	Shale, gray; streaks of gray sand-----	10	200
	Shale, gray-----	26	226
	Shale and sand-----	4	230
	Shale, firm-----	30	260
	Shale, hard, or soft rock-----	7	267
	Dakota Sandstone, gray; water-bearing strata-----	41	308
	Shale-----	2	310

LOCATION: 147-102-33BBC NDSWC 5630 DATE DRILLED: 10/13/79
ALTITUDE: 2155 (FT. NGVD) DEPTH: 142 (FT)



LOCATION: 147-102-338CC

NDSWC 5629

DATE DRILLED: 10/13/79

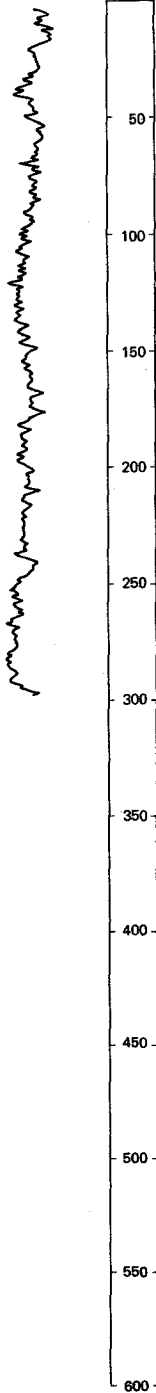
ALTITUDE: 2132
(FT, NGVD)

DEPTH: 302
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS



COLLUVIUM

0-140 Clay, silty, sandy, dark-yellowish-brown; thin scoria lenses and organic streaks.

TILL(?)

140-245 Clay, silty, sandy, pebbly, dark-yellowish-brown, sticky to tough.

GLACIAL OUTWASH

245-262 Sand, fine, medium-gray, well-rounded.

262-295 Gravel, fine to very coarse; includes granite fragments.

TONGUE RIVER MEMBER OF
FORT UNION FORMATION

295-302 Claystone, silty, bluish-gray to light-gray, soft.

LOCATION: 147-102-33CBB

NDSWC 5631

DATE DRILLED: 10/14/79

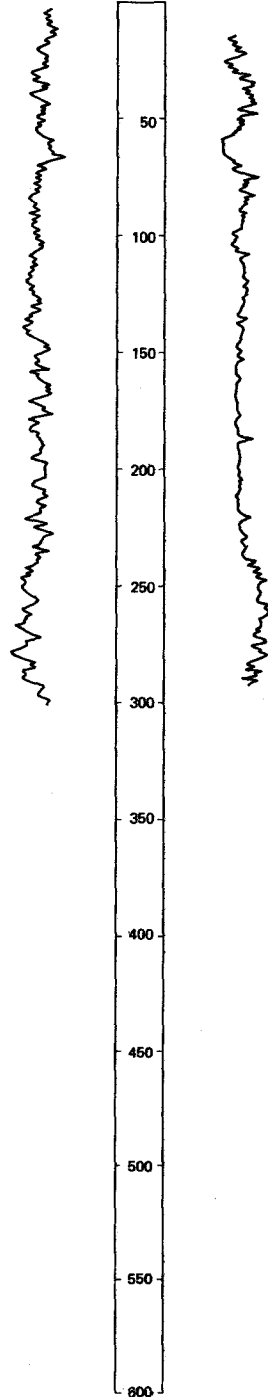
ALTITUDE: 2145
(FT. NGVD)

DEPTH: 302
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS



COLLUVIUM

0-57 Clay, very silty, sandy, pebbly, dark-yellowish-brown, sticky to crumbly.

LAKE BEDS

57-97 Clay, smooth to silty, gray to olive-gray, waxy to very plastic.

TILL(?)

97-239 Clay, silty, sandy, pebbly, olive-gray to dark-gray; lignitic pebbles, scoria, and gravel lenses.

GLACIAL OUTWASH

239-262 Sand, fine to medium, medium-gray; thin layers of very coarse sand and gravel.

262-272 Gravel and sand, fine to very coarse.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

272-293 Limestone, medium-gray to dark-gray, hard; alternating sandstone layers.

293-302 Siltstone, medium-gray, fairly tight.

147-102-36AAD
(Log modified from K. D. Thompson)

Altitude: 2060 feet

Date drilled: 9/12/73

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, sandy, yellow-----	20	20
	Clay, sandy, and scoria-----	50	70
	Sand and coal shale-----	5	75
	Clay, blue, and shale-----	185	260
	Coal-----	55	315
	Shale, blue, and thin rock-----	215	530
	Sand, fine-----	25	555
	Shale and small coal veins-----	305	860
	Sand, fine-----	30	890
	Shale-----	60	950
	Sand, fine-----	10	960
	Shale-----	150	1110
	Sandstone, brown-----	60	1170
	Shale-----	60	1230
	Sand; no test-----	15	1245
	Shale-----	75	1320
	Rock-----	10	1330
	Shale, sandy-----	5	1335
	Sand-----	45	1380

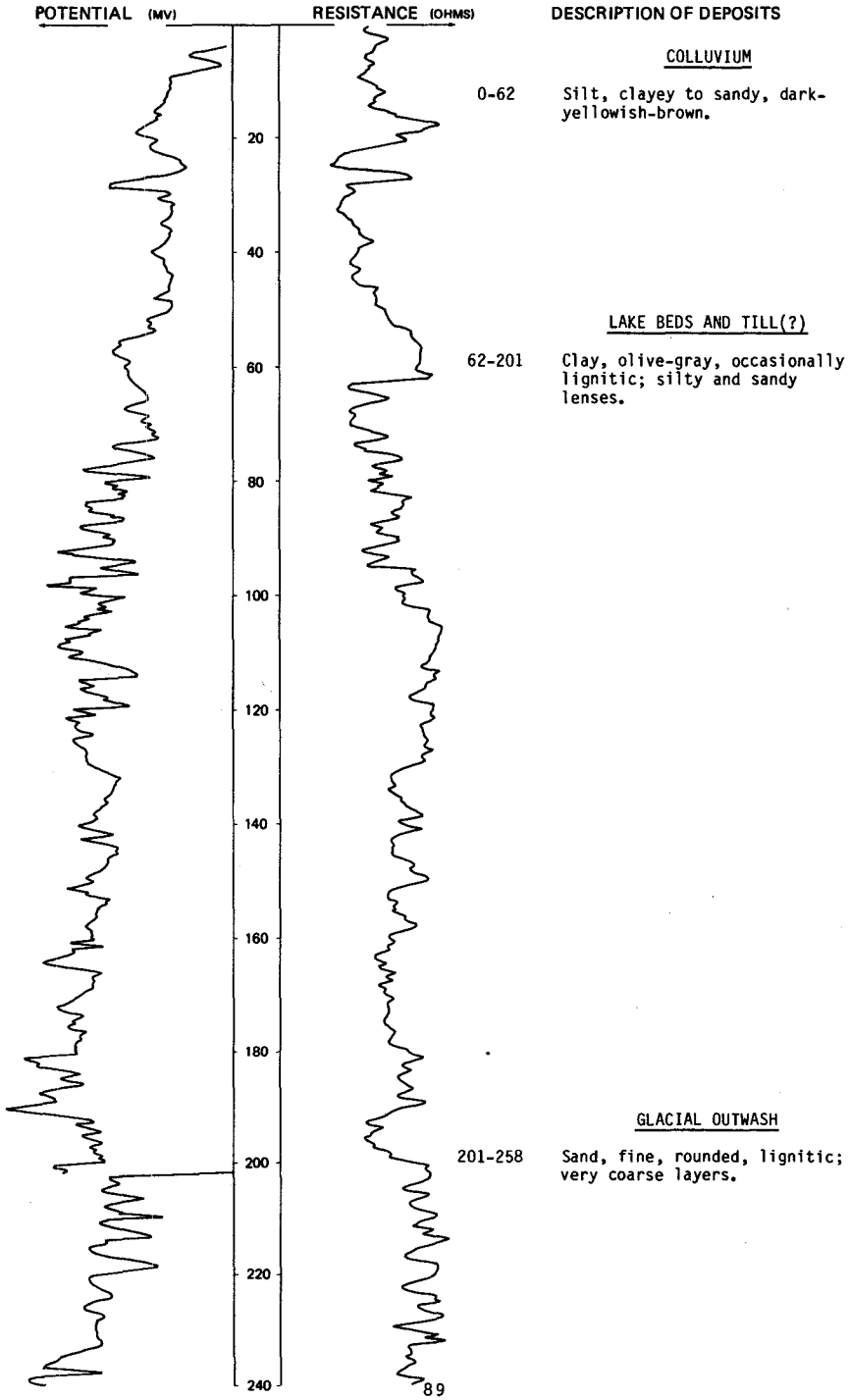
LOCATION: 147-103-07CBA

NDSWC 11393

DATE DRILLED: 9/29/80

ALTITUDE: 2120
(FT, NGVD)

DEPTH: 270
(FT)

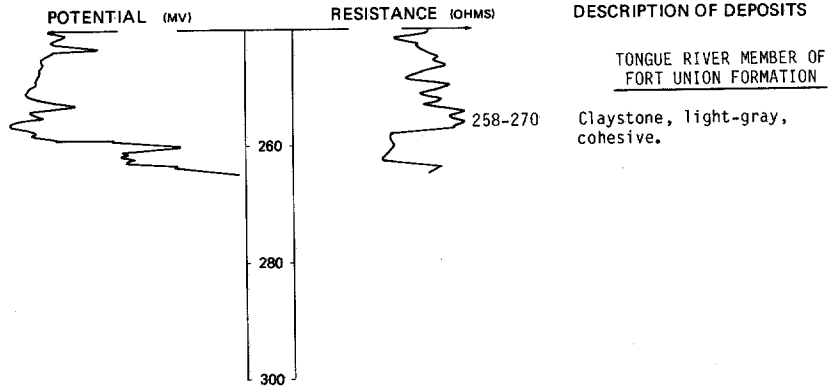


LOCATION: 147-103-07CBA

DATE DRILLED: 9/29/80

ALTITUDE: 2120
(FT, NGVD)

DEPTH: 270
(FT)



147-103-08CBA

(Log modified from Francis Boyce Water Well)

Altitude: 2166 feet

Date drilled: 6/07/62

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay fill-----	10	10
	Clay fill, yellow-----	63	73
	Clay, yellow, and brown sand-----	3	76
	Clay fill, yellow-----	16	92
	Clay, gray, and three thin layers of coal-----	48	140
	Clay, gray-----	28	168
	Coal, soft-----	4	172
	Shale, firm-----	14	186
	Sandstone, gray, soft-----	14	200

147-103-14DDD
(Log modified from Francis Boyce Water Well)

Altitude: 2240 feet Date drilled: 7/05/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay-----	15	15
	Clay, yellow, soft-----	20	35
	Clay, yellow, firm-----	10	45
	Clay, gray-----	5	50
	Rock, soft-----	5	55
	Clay, gray-----	22	77
	Rock-----	1	78
	Sandstone, fine-----	9	87
	Clay, hard-----	3	90

147-103-16CCB
(Log modified from Boyce Drilling, Inc.)

Altitude: 2165 feet Date drilled: 12/22/79

	Sand, brown, and brown clay-----	70	70
	Sandstone-----	1	71
	Clay, brown-----	24	95
	Clay, gray-----	35	130
	Coal-----	5	135
	Clay, gray-----	55	190
	Sand, fine, gray-----	40	230
	Sandstone-----	3	233
	Clay, gray-----	62	295
	Sand, fine, gray-----	10	305
	Coal-----	20	325
	Clay, gray-----	45	370
	Sandstone-----	2	372
	Sand, gray-----	66	438
	Sandstone-----	6	444
	Clay, gray-----	136	580
	Sandstone-----	5	585
	Clay, gray; layers of sandstone-----	300	885
	Sand, fine, gray-----	35	920
	Clay, gray-----	280	1200
	Sandstone-----	5	1205
	Clay, gray-----	125	1330
	Sand, gray-----	20	1350
	Clay, gray-----	35	1385
	Sand, gray-----	65	1450
	Clay, gray-----	10	1460

147-103-17BB1
(Log modified from Francis Boyce Water Well)

Altitude: 2130 feet Date drilled: 6/07/62

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay fill-----	18	18
	Clay-----	32	50
	Clay, firm-----	23	73
	Trace of scoria and sand; dry-----	3	76
	Clay fill-----	60	136
	Sand, fine, and fine coal slack-----	10	146
	Sand, coarse; fine scoria; and coarse coal slack-----	16	162
	Sand and fine coal slack; no scoria-----	5	167

147-103-17BB2
(Log modified from Francis Boyce Water Well)

Altitude: 2140 feet Date drilled: 5/04/63

	Topsoil and clay-----	45	45
	Clay, sticky-----	24	69
	Sand, fine, brown-----	11	80
	Clay, gray-----	40	120
	Clay and coal slack-----	7	127
	Sand, firm, and clay-----	13	140
	Sand, fine, gray, and coal slack; trace of scoria-----	20	160
	Sand, coarse, and fine scoria; some coal slack-----	20	180
	Sand, coarse, and fine scoria; some coal slack and clay-----	10	190

147-103-19DCC
(Log modified from Francis Boyce Water Well)

Altitude: 2295 feet Date drilled: 6/26/71

	Topsoil and brown clay-----	15	15
	Sand, brown, and scoria-----	25	40
	Sandstone-----	1	41
	Clay, brown-----	14	55
	Clay, gray-----	50	105
	Coal-----	4	109
	Shale, gray-----	78	187
	Coal-----	3	190
	Clay, sandy, gray-----	28	218
	Coal-----	12	230
	Shale, gray-----	25	255
	Coal-----	7	262
	Shale, gray-----	66	328
	Coal-----	8	336
	Shale, gray, hard-----	21	357
	Sandstone, gray; aquifer-----	18	375
	Shale, gray-----	5	380

147-103-20BDD
(Log modified from Francis Boyce Water Well)

Altitude: 2162 feet Date drilled: 11/04/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and yellow clay fill-----	80	80
	Clay, sandy-----	11	91
	Coal-----	4	95
	Shale, gray, soft-----	43	138
	Coal-----	3	141
	Shale, sandy, gray-----	9	150
	Sandstone, gray-----	15	165

147-103-21CBC
(Log modified from Francis Boyce Water Well)

Altitude: 2249 feet Date drilled: 9/12/69

	Topsoil and dark clay-----	27	27
	Scoria and clay-----	33	60
	Clay, yellowish-gray-----	82	142
	Sand, fine; coal slack; and clay-----	11	153
	Clay, gray-----	12	165
	Rock, medium-hard-----	14	179
	Sandstone-----	21	200

147-103-22ADC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2193 feet Date drilled: 12/11/79

	Clay, brown, and scoria-----	110	110
	Clay, gray-----	50	160
	Coal-----	10	170
	Sand and sandy clay-----	80	250
	Sandstone-----	6	256
	Sand and sandy clay-----	84	340
	Clay, gray-----	15	355
	Coal-----	5	360
	Clay, gray; layers of coal-----	95	455
	Sandstone-----	1	456
	Clay, sandy, gray-----	248	704
	Sandstone-----	12	716
	Clay, gray-----	132	848
	Sandstone-----	4	852
	Clay, gray; layers of sandstone-----	448	1300
	Sand, gray, and gray clay-----	110	1410
	Sand, gray; water-----	80	1490
	Clay, gray-----	15	1505

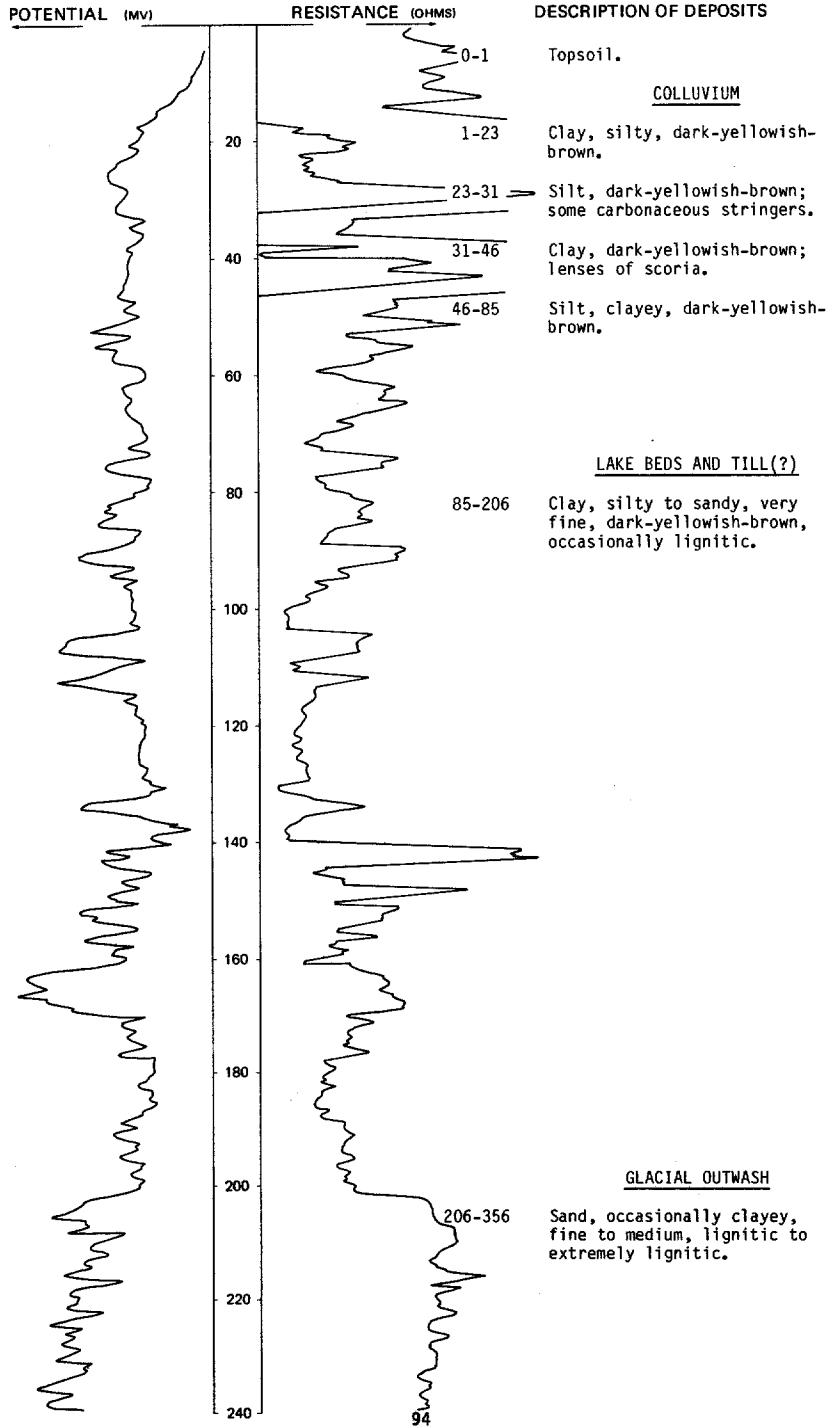
NDSWC 11395

LOCATION: 147-103-25A00

DATE DRILLED: 9/30/80

ALTITUDE: 2195
(FT, NGVD)

DEPTH: 380
(FT)

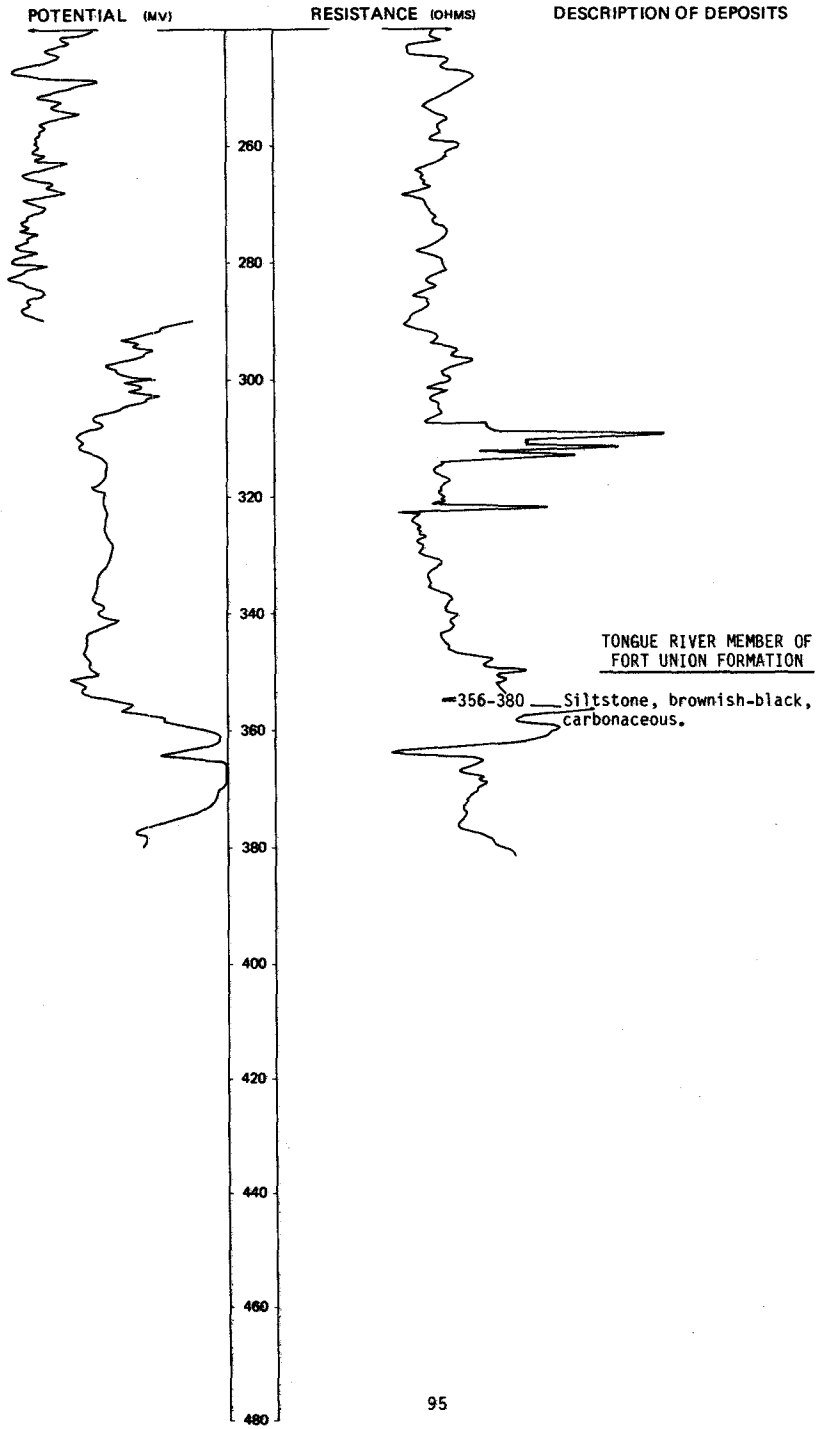


LOCATION: 147-103-25ADD

DATE DRILLED: 9/30/80

ALTITUDE: 2195
(FT, NGVD)

DEPTH: 380
(FT)



147-104-04CCC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2055 feet Date drilled: 12/14/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	30	30
	Sand, brown; interbedded with scoria and coal----	187	217
	Clay, gray; interbedded with coal-----	338	555
	Sandstone-----	5	560
	Clay-----	300	860
	Clay; interbedded with coal-----	180	1040
	Clay-----	37	1077
	Sandstone-----	4	1081
	Clay, gray-----	141	1222
	No description available-----	23	1245
	Sand-----	45	1290

147-104-13DA
(Log modified from Francis Boyce Water Well)

Altitude: 2190 feet Date drilled: 1961

	Topsoil and yellow clay-----	9	9
	Scoria-----	2	11
	Clay, yellow, and sand fill-----	49	60
	Clay, gray-----	27	87
	Coal-----	3	90
	Clay, gray-----	56	146
	Coal-----	2	148
	Clay, gray-----	54	202
	Sandstone, water-bearing-----	14	216
	Coal-----	7	223
	Clay, gray-----	7	230

147-104-26DDC
(Log modified from Francis Boyce Water Well)

Altitude: 2195 feet Date drilled: 9/29/67

	Topsoil-----	3	3
	Clay fill-----	26	29
	Scoria and coarse sand-----	11	40

147-105-24DDC
(Log modified from Francis Boyce Water Well)

Altitude: 2180 feet Date drilled: 4/20/74

	Sand, brown, and clay-----	18	18
	Coal-----	2	20
	Clay, gray-----	39	59
	Coal-----	4	63
	Shale, gray-----	40	103
	Sandstone-----	1	104
	Shale, gray-----	7	111
	Sand, fine, gray-----	19	130
	Shale, brown-----	100	230
	Sand, fine, gray-----	25	255
	Coal-----	15	270
	Shale, gray-----	20	290
	Sandstone-----	2	292
	Water sand, gray-----	28	320

148-098-08DCC
(Log modified from Thompson Drilling Co.)

Altitude: 2380 feet Date drilled: 9/10/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
Clay-----		26	26
Coal-----		9	35
Clay-----		20	55
Sand, soft-----		10	65
Sand, clear-----		2	67
Clay-----		11	78
Coal-----		3	81
Clay-----		1	82
Coal-----		4	86
Clay-----		20	106
Coal-----		3	109
Clay-----		71	180

148-098-15DAA
(Log modified from Thompson Drilling Co.)

Altitude: 2560 feet Date drilled: 5/13/76

Soil-----		3	3
Clay-----		9	12
Sand, coarse-----		6	18
Clay-----		22	40
Sand, dirty-----		8	48

148-098-30AAA
(Log modified from Kieson Drilling)

Altitude: 2390 feet Date drilled: 7/18/75

Topsoil-----		3	3
Clay, sandy-----		27	30
Sand-----		5	35
Clay, yellow-----		15	50
Clay, gray-----		14	64
Rock-----		1	65
Clay, gray-----		15	80
Coal-----		8	88
Clay, yellow-----		7	95
Clay, gray-----		11	106
Coal-----		4	110
Clay-----		23	133
Coal-----		7	140
Clay, sandy-----		8	148
Coal-----		7	155
Sand-----		15	170

148-099-05DBA
(Log modified from Boyce Drilling, Inc.)

Altitude: 2365 feet Date drilled: 7/06/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy, yellow-----	40	40
	Clay, gray; interbedded with coal-----	60	100
	Clay, sandy, gray; interbedded with coal-----	300	400
	Sand-----	15	415
	Clay, gray; interbedded with coal-----	345	760
	Sand, fine, gray-----	10	770
	Clay, sandy, gray-----	85	855
	Sand, fine, gray-----	15	870
	Clay, gray; interbedded with coal-----	665	1535
	Sand, fine, gray-----	25	1560
	Clay, gray-----	25	1585
	Sandstone-----	1	1586
	Clay, gray-----	144	1730
	Sand, fine, gray-----	20	1750
	Sand, coarse, gray-----	10	1760
	Clay, gray-----	60	1820
	Sand, gray-----	38	1858
	Clay, gray-----	30	1888
	Sand, gray-----	52	1940

148-099-31ABC
(Log modified from C. A. Simpson & Son)

Altitude: 2015 feet Date drilled: 8/ /35

	Clay, yellow-----	28	28
	Coal-----	2	30
	Clay, yellow-----	10	40
	Shale, sandy, gray-----	52	92
	Coal-----	13	105
	Sandstone-----	2	107
	Shale, blue-----	13	120
	Shale, sandy, blue-----	30	150
	Rock-----	1	151
	Shale, sandy, blue-----	22	173
	Shale-----	22	195
	Coal-----	10	205
	Shale-----	31	236
	Coal-----	6	242
	Shale-----	8	250
	Sandstone-----	5	255
	Coal-----	2	257
	Shale, light-colored-----	53	310
	Shale, brown-----	50	360
	Sandstone-----	33	393

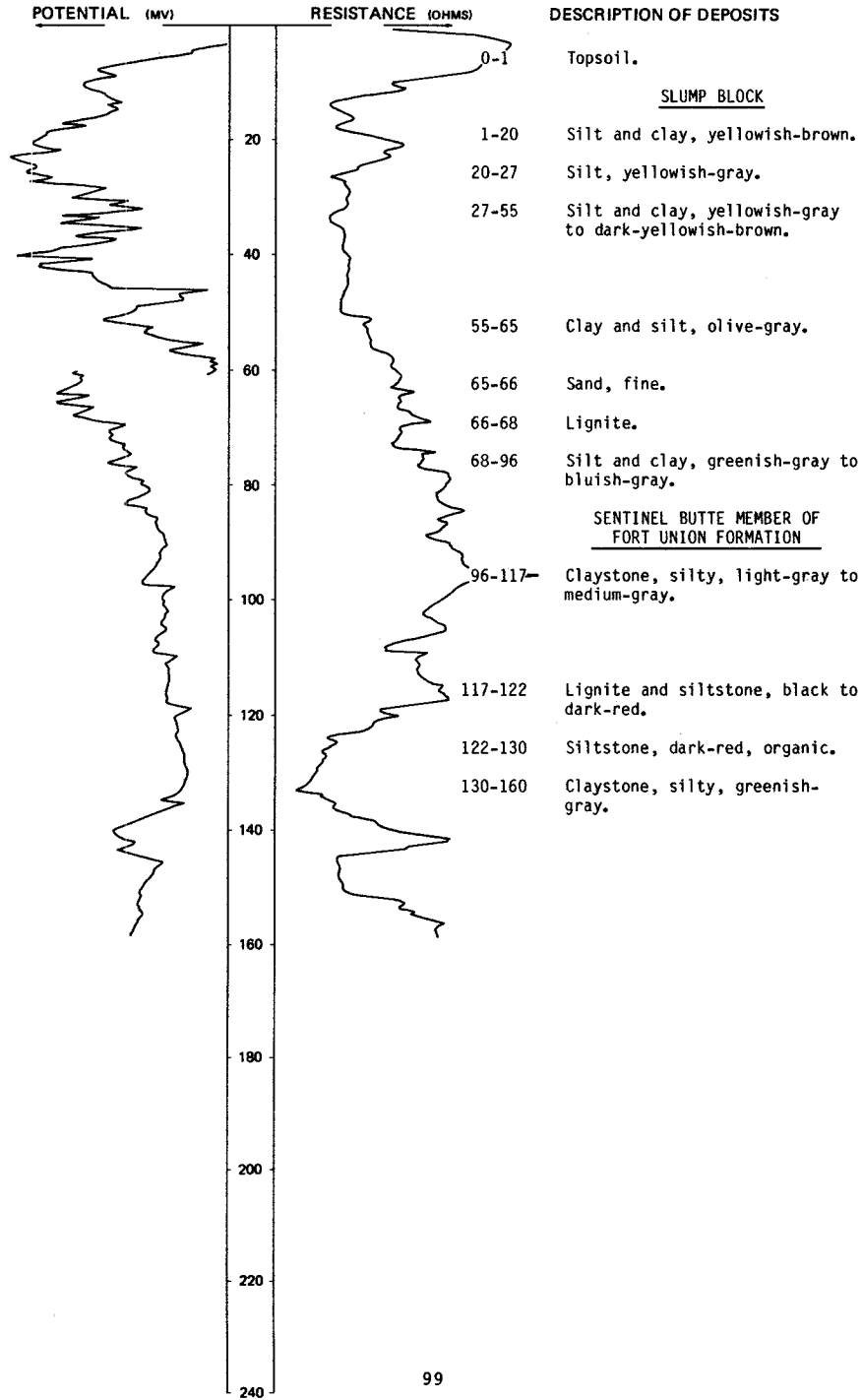
NDSWC 11339

LOCATION: 148-099-35ABC

DATE DRILLED: 9/04/80

ALTITUDE: 2000
(FT, NGVD)

DEPTH: 160
(FT)



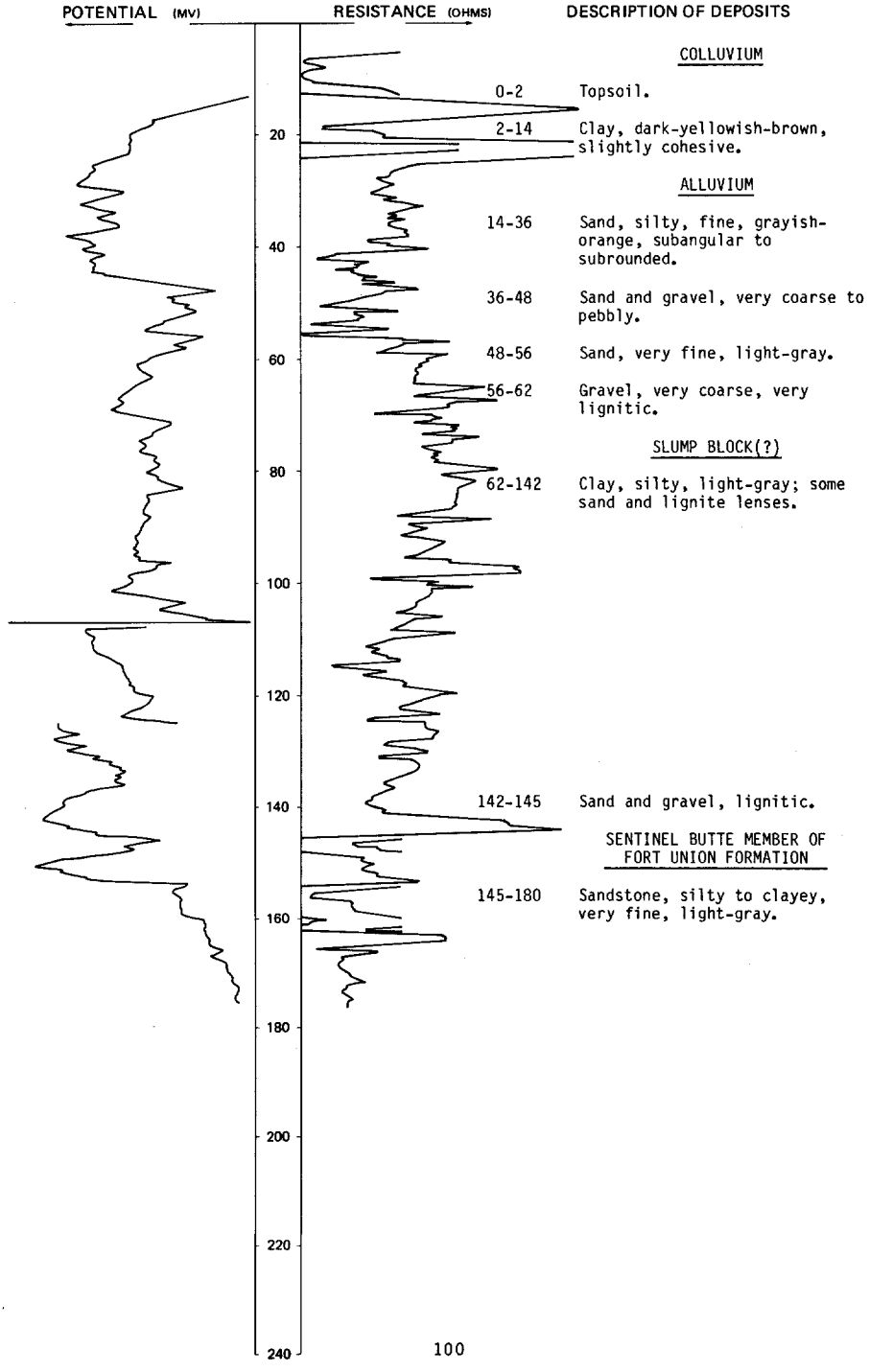
LOCATION: 148-099-35ACC

NOSWC 11338

DATE DRILLED: 9/04/80

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 180
(FT)



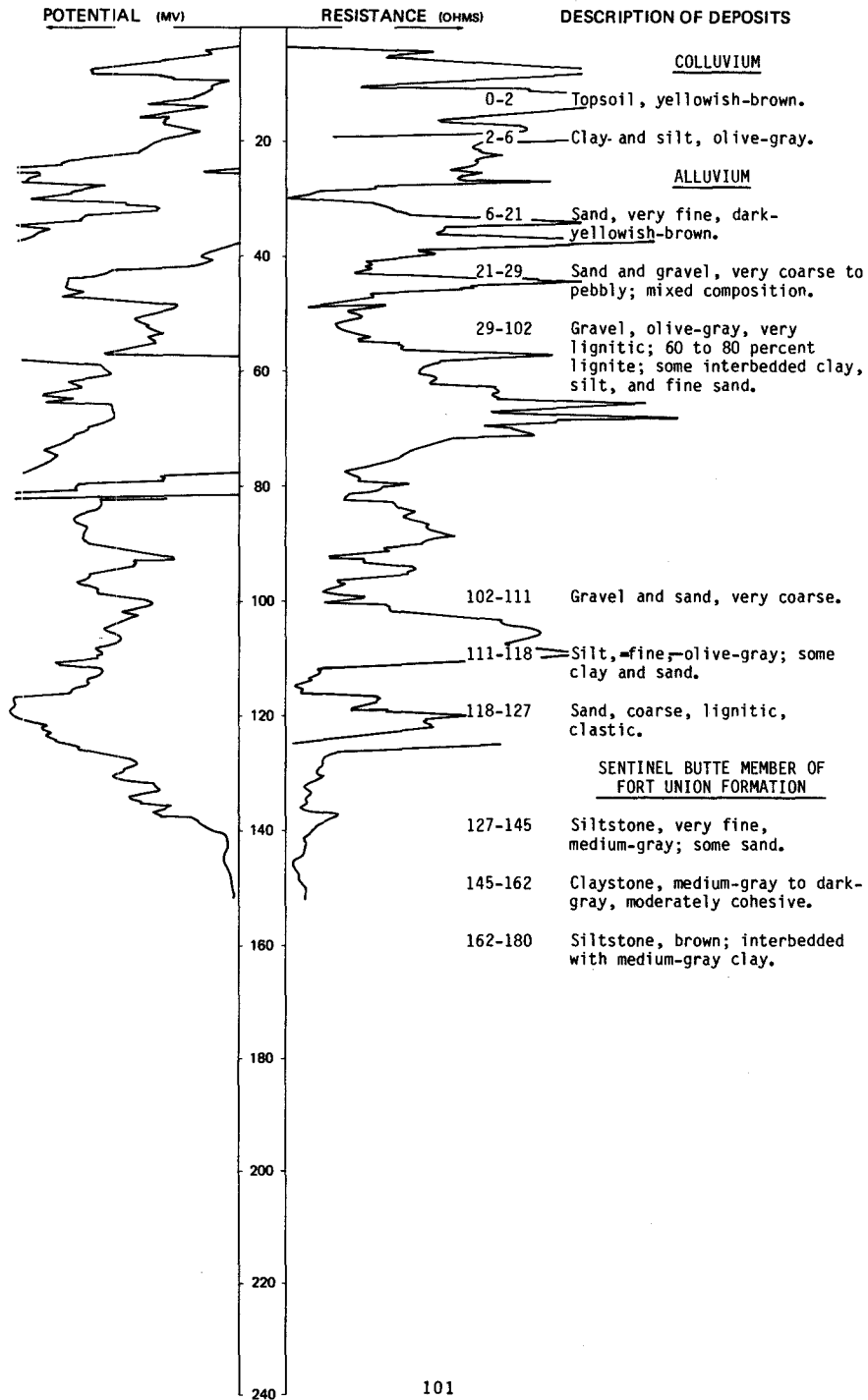
LOCATION: 148-099-35DCA

NDSWC 11337

DATE DRILLED: 9/03/80

ALTITUDE: 1940
(FT. NGVD)

DEPTH: 180
(FT)



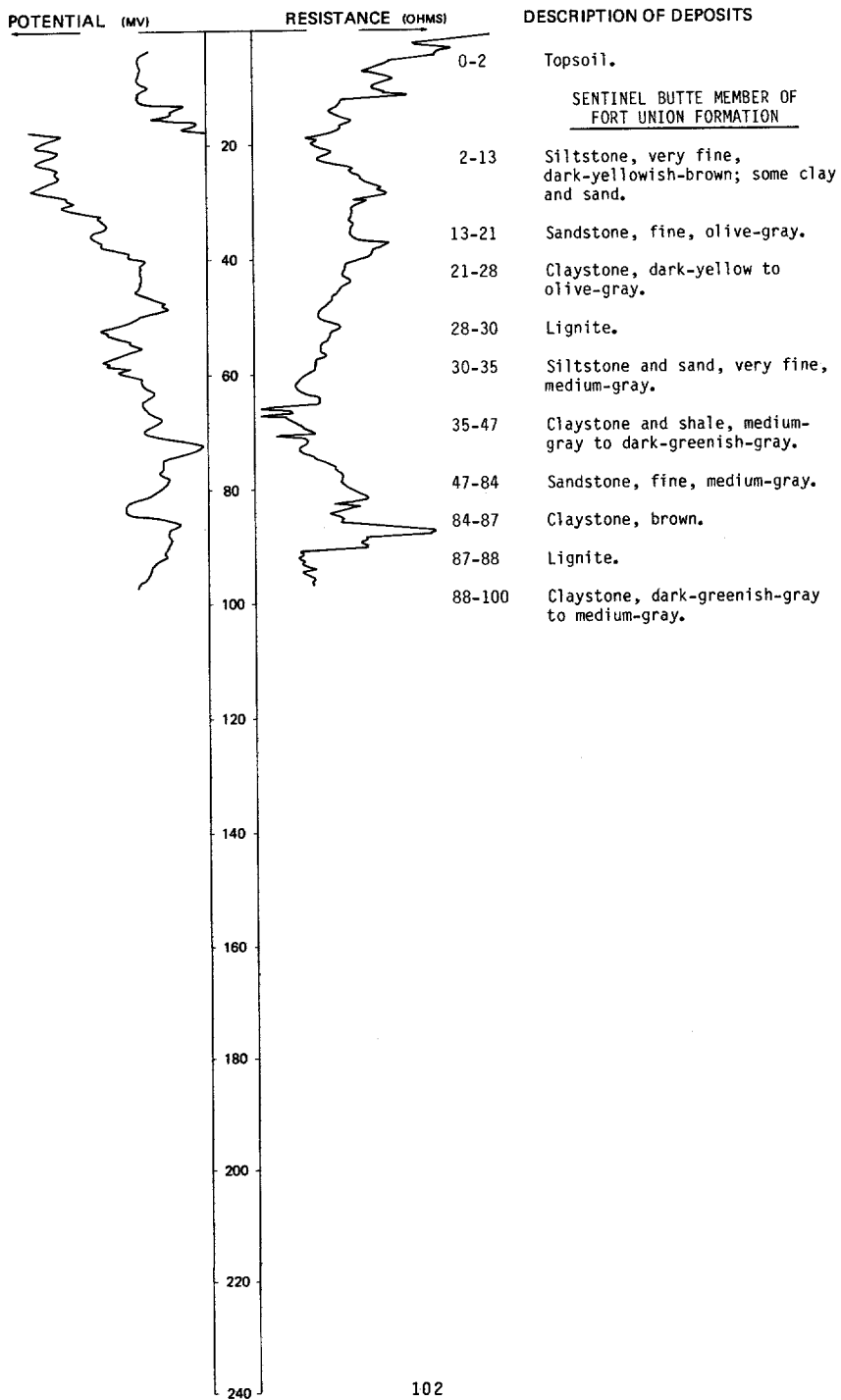
NDSWC 11336

LOCATION: 148-099-350DB

DATE DRILLED: 9/03/80

ALTITUDE: 2000
(FT, NGVD)

DEPTH: 100
(FT)



148-099-36CAA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2020 feet

Date drilled: 11/10/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	10	10
	Coal-----	2	12
	Clay-----	38	50
	Coal-----	10	60
	Clay-----	190	250
	Coal-----	34	284
	Clay-----	22	306
	Coal-----	36	342
	Clay-----	113	455
	Coal-----	15	470
	Clay-----	65	535
	Coal-----	25	560
	Clay-----	120	680
	Sand-----	10	690
	Clay-----	38	728
	Sand-----	30	758
	Clay-----	22	780
	Sand-----	25	805
	Clay, sandy-----	77	882
	Clay-----	18	900
	Clay, sandy-----	110	1010
	Shale-----	110	1120
	Sand-----	10	1130
	Shale-----	20	1150
	Sand-----	10	1160
	Shale-----	73	1233
	Sand-----	10	1243
	Shale-----	14	1257
	Sand-----	21	1278
	Shale-----	116	1394
	Rock-----	4	1398
	Shale-----	18	1416
	Rock-----	14	1430
	Coal-----	10	1440
	Sand-----	35	1475

148-100-05BAB
(Log modified from Boyce Drilling, Inc.)

Altitude: 2210 feet Date drilled: 12/15/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and sand-----	4	4
	Clay-----	14	18
	Clay, gray-----	24	42
	Coal-----	6	48
	Shale, gray-----	62	110
	Rock; interbedded with coal-----	15	125
	Shale, gray-----	53	178
	Rock-----	3	181
	Shale, gray-----	9	190
	Coal-----	3	193
	Sand, coarse, gray-----	4	197
	Sandstone, crumbly-----	8	205
	Clay, sandy, gray-----	15	220

148-100-08BCA
(Log modified from Kieson Drilling)

Altitude: 2250 feet Date drilled: 2/17/76

	Topsoil-----	2	2
	Clay, yellow-----	18	20
	Clay, gray-----	27	47
	Sand-----	9	56
	Clay, sandy-----	9	65
	Clay-----	3	68
	Coal-----	1	69
	Clay, gray-----	6	75
	Coal-----	4	79
	Clay-----	11	90
	Coal-----	1	91
	Clay-----	13	104
	Coal-----	2	106
	Clay-----	27	133
	Coal-----	2	135
	Clay-----	22	157
	Coal-----	3	160
	Clay-----	50	210
	Sand-----	14	224
	Coal-----	4	228
	Clay-----	22	250
	Sand and coarse gravel-----	22	272
	Coal-----	4	276
	Clay-----	4	280

148-100-17AAB
(Log modified from Thompson Drilling Co.)

Altitude: 2280 feet Date drilled: 10/22/77

<u>GEOLOGIC</u>		<u>THICKNESS</u>	<u>DEPTH</u>
<u>SOURCE</u>	<u>MATERIAL</u>	<u>(FEET)</u>	<u>(FEET)</u>
	Topsoil-----	2	2
	Sand, soft-----	25	27
	Clay-----	25	52
	Clay and sandstone-----	4	56
	Clay-----	6	62
	Coal-----	4	66
	Clay-----	26	92
	Sand, gray-----	23	115
	Sand, blue-----	5	120

148-100-18ABB
(Log modified from Francis Boyce Water Well)

Altitude: 2220 feet Date drilled: 3/10/73

	Sand, brown-----	15	15
	Clay, gray-----	23	38
	Coal-----	6	44
	Clay, gray-----	33	77
	Coal and brown water-----	6	83
	Clay, gray-----	21	104
	Sandstone-----	1	105
	Clay, gray-----	27	132
	Sandstone-----	1	133
	Shale, gray-----	42	175
	Coal; water-----	6	181
	Shale, gray-----	14	195
	Sandstone-----	1	196
	Shale, gray-----	70	266
	Coal; water-----	8	274
	Shale, gray-----	23	297
	Rock, fractured-----	5	302
	Clay, sandy, gray-----	33	335
	Coal-----	--	335

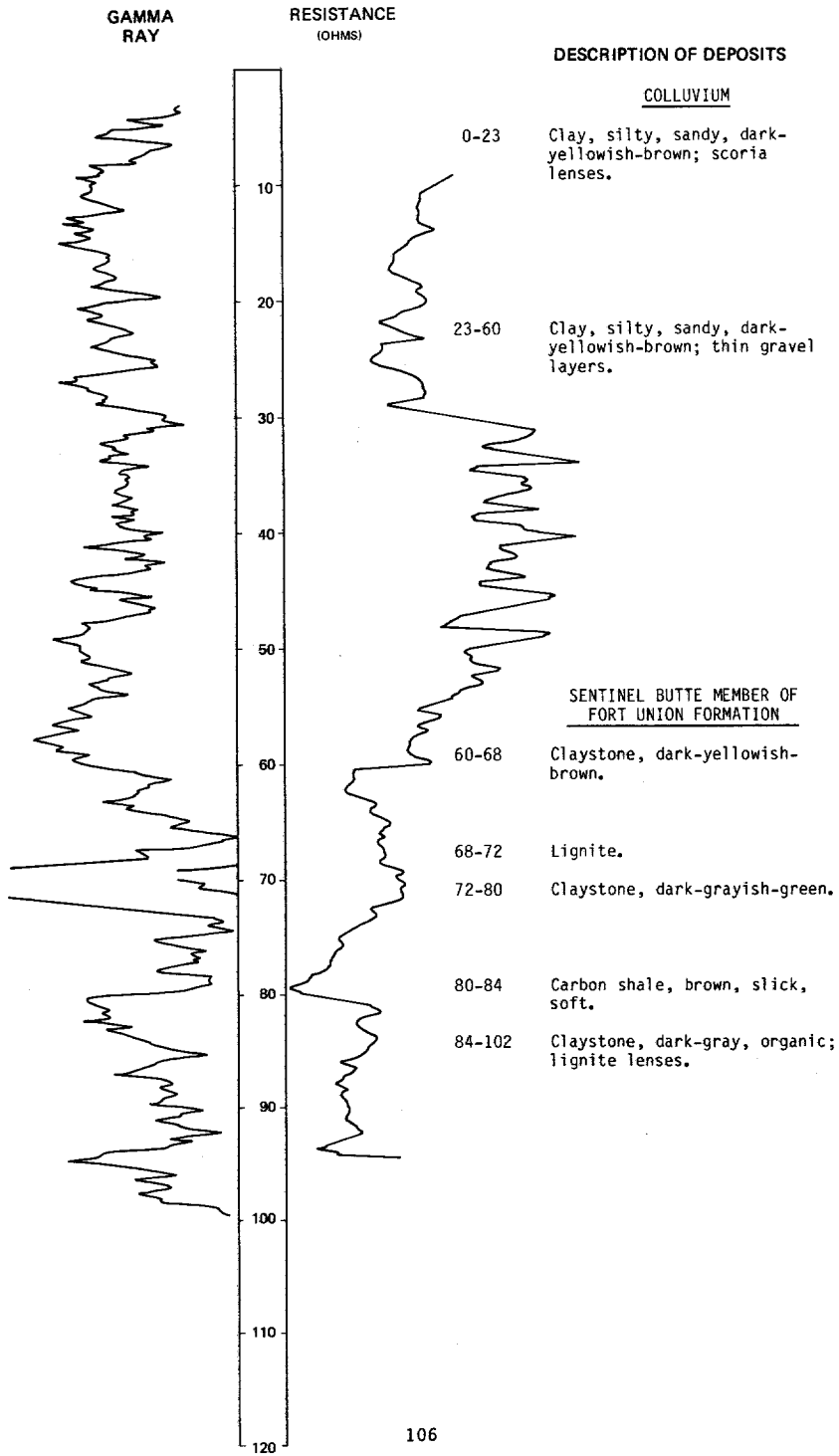
LOCATION: 148-101-06AAA

NDSWC 5625

DATE DRILLED: 10/12/79

ALTITUDE: 2260
(FT, NGVD)

DEPTH: 102
(FT)



LOCATION: 148-101-06ABB

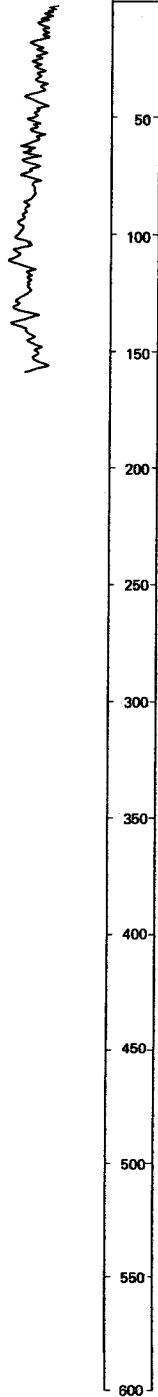
DATE DRILLED: 10/12/79

ALTITUDE: 2255
(FT, NGVD)

DEPTH: 162
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-86 Clay, silty, olive-gray, soft.

86-101 Clay, silty to very sandy, medium-gray; limonite hardpan streaks and organic material.

101-114 Clay, sandy, silty, dark-gray to olive-gray; thin gravel lenses.

LAKE BEDS

114-121 Clay, silty to very sandy, dark-bluish-gray; organic material.

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION

121-136 Sandstone, fine to medium, greenish-blue.

136-138 Siltstone, clayey, dark-gray.

138-140 Limestone, light-yellowish-brown, hard.

140-162 Claystone, greenish-gray, waxy.

148-101-10CAC
(Log modified from Thompson Drilling Co.)

Altitude: 2280 feet	Date drilled: 8/01/75		
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Soil-----	2	2
	Clay-----	12	14
	Sand-----	19	33
	Pebbles and scoria-----	4	37
	Sand, soft-----	43	80

148-101-200CC
(Log modified from Thompson Drilling Co.)

Altitude: 2185 feet	Date drilled: 8/02/75		
	Topsoil-----	2	2
	Clay-----	15	17
	Sand-----	3	20
	Sand, fine, soft-----	15	35
	Sand, soft-----	45	80

148-101-23CCB
(Log modified from Thompson Drilling Co.)

Altitude: 2150 feet	Date drilled: 10/23/74		
	Topsoil-----	3	3
	Clay-----	9	12
	Sand-----	13	25
	Sand, soft-----	15	40

148-102-10AAD
(Log modified from Thompson Drilling Co.)

Altitude: 2330 feet	Date drilled: 8/14/72		
	Soil, dark-----	10	10
	Sand-----	25	35
	Clay and sand-----	45	80
	Clay-----	5	85

LOCATION: 148-102-15DDA1, 2, 3

NDSWC 5555, 5943, 5944

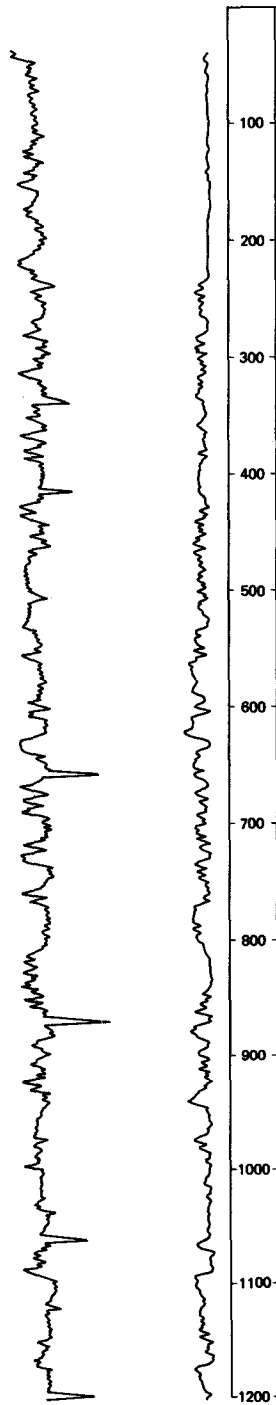
ALTITUDE: 2385
(FT, NGVD)

NEUTRON
(API)

S.P.
(MV)

DATE DRILLED: 9/04/79

DEPTH: 1875
(FT)



DESCRIPTION OF DEPOSITS

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION	
0-110	Siltstone, sandy, lignitic.
TONGUE RIVER MEMBER OF FORT UNION FORMATION	
110-234	Siltstone, clayey, sandy, gray; lignite from 210 to 220 feet.
234-340	Sandstone, silty, clayey; lignite at 312 feet.
340-530	Siltstone, clayey, sandy, gray; lignite from 424 to 450 feet.
530-624	Sandstone, silty, clayey, fine to medium, gray.
624-636	Lignite.
636-660	Sandstone and siltstone, gray.
660-666	Lignite.
666-765	Lignite and claystone, gray.
765-810	Sandstone, fine to medium, gray.
LOWER PART OF FORT UNION FORMATION	
810-862	Claystone and lignite, gray to greenish-gray.
862-980	Sandstone and siltstone, gray, lignitic.
980-1054	Siltstone and claystone, gray, lignitic.
1054-1300	Sandstone and siltstone, gray, lignitic.

LOCATION: NDSWC 5555, 5943, 5944, Continued
148-102-150DA1, 2, 3

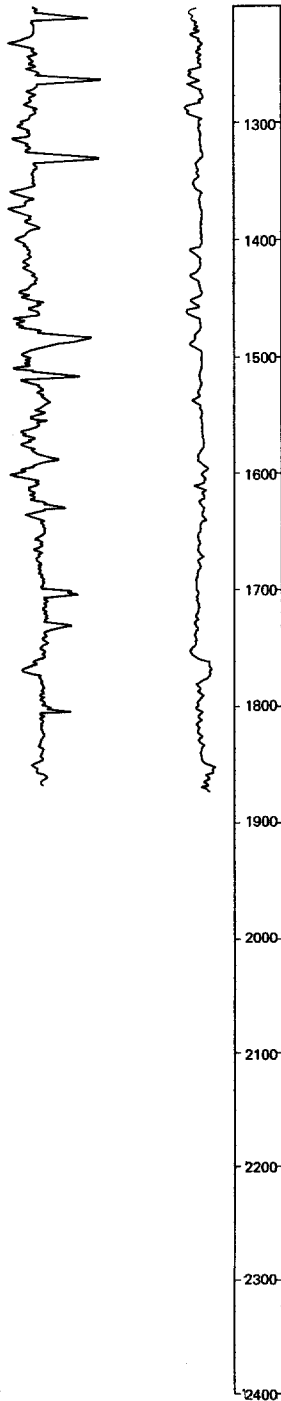
DATE DRILLED: 9/04/79

ALTITUDE: 2385
(FT, NGVD)

DEPTH: 1875
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued

1300-1354 Siltstone and claystone, gray.

1354-1375 Lignite and claystone.

HELL CREEK AND FOX HILLS
FORMATIONS, UNDIFFERENTIATED

1375-1450 Siltstone and claystone, gray.

1450-1490 Sandstone and siltstone,
clayey, fine to medium,
carbonaceous.

1490-1620 Siltstone and claystone, gray,
carbonaceous.

1620-1680 Sandstone, silty, fine to
medium, gray, carbonaceous.

1680-1755 Sandstone, silty, fine to
medium.

1755-1775 Siltstone, clayey, gray.

1775-1850 Sandstone, silty, fine to
medium.

PIERRE SHALE

1850-1875 Shale, gray.

NDSWC 5555, 5943, 5944, Continued
LOCATION: 148-102-150DA1, 2, 3

DATE DRILLED: 9/04/79

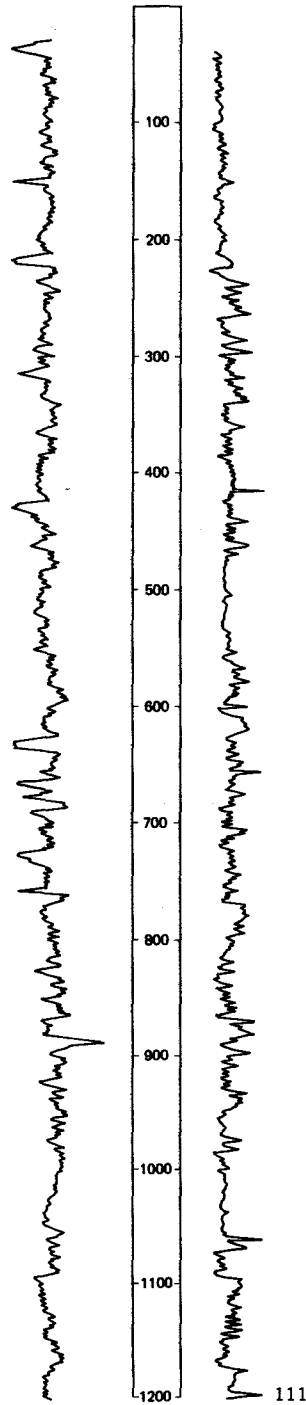
ALTITUDE: 2385
(FT, NGVD)

DEPTH: 1875
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



NDSWC 5555, 5943, 5944, Continued
LOCATION: 148-102-15DDA1, 2, 3

DATE DRILLED: 9/04/79

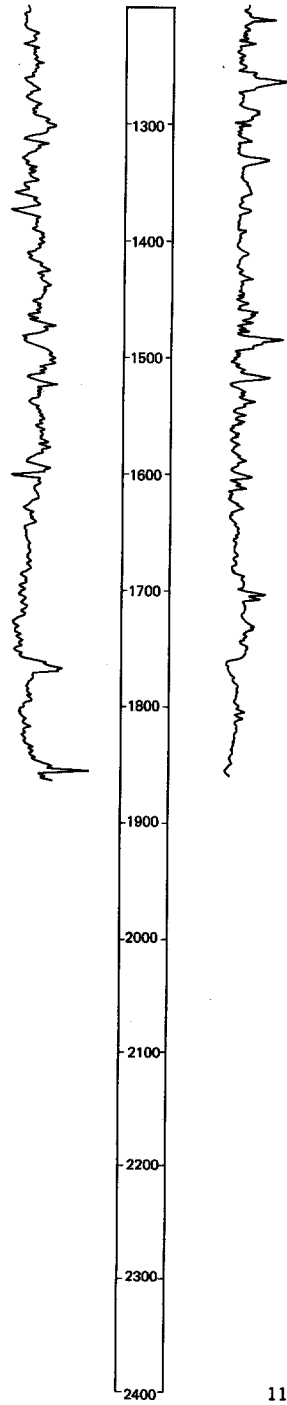
ALTITUDE: 2385
(FT, NGVD)

DEPTH: 1875
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

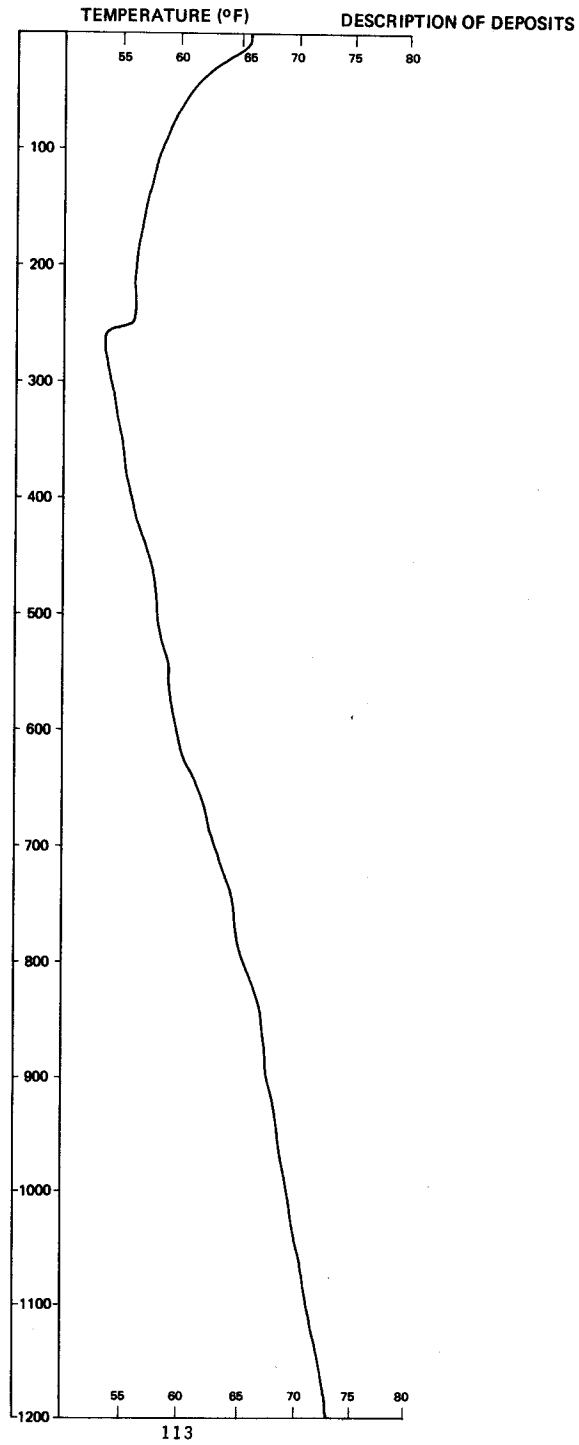


LOCATION: 148-102-15DDA2

DATE DRILLED: 9/04/79

ALTITUDE: 2385
(FT. NGVD)

DEPTH: 1500
(FT)

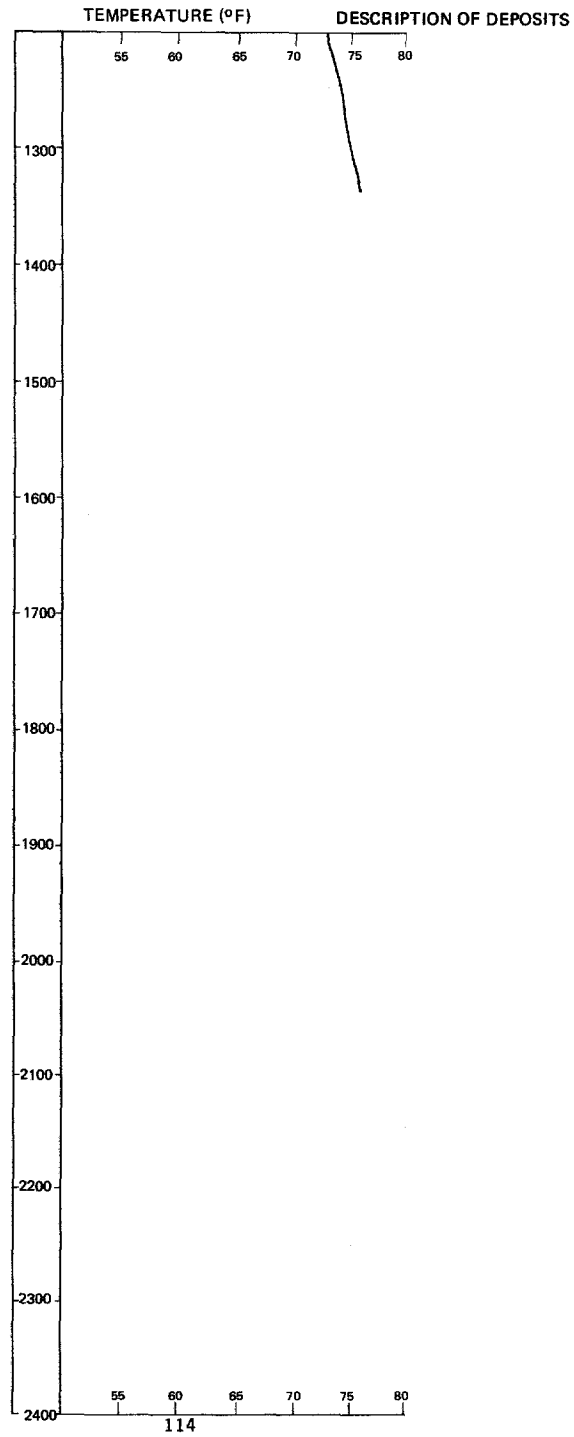


LOCATION: 148-102-15DDA2

DATE DRILLED: 9/04/79

ALTITUDE: 2385
(FT, NGVD)

DEPTH: 1500
(FT)



148-103-02BBD
(Log modified from Francis Boyce Water Well)

Altitude: 2380 feet Date drilled: 11/10/63

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and clay-----	4	4
	Sandstone-----	11	15
	Clay, dark-----	33	48
	Coal-----	2	50
	Shale, gray-----	35	85
	Sand strata, gray; water-----	7	92
	Coal-----	7	99
	Clay, gray-----	6	105

148-103-07CDD
(Log modified from Francis Boyce Water Well)

Altitude: 2280 feet Date drilled: 6/23/69

	Topsoil and yellow clay-----	18	18
	Sand, coarse, and yellow clay-----	11	29
	Clay, yellow, chalky-----	16	45
	Clay, gray, firm-----	19	64
	Coal-----	8	72
	Clay, gray-----	4	76
	Coal-----	3	79
	Shale, gray-----	28	107
	Rock-----	4	111
	Shale, gray, hard-----	27	138
	Sandstone; 1-1/2 gallons per minute-----	7	145
	Shale, gray-----	55	200
	Coal-----	2	202
	Clay-----	1	203
	Rock-----	1	204
	Shale, hard-----	4	208
	Sandstone; 3 gallons per minute-----	8	216
	Shale, gray-----	8	224

148-103-08DDD
(Log modified from Francis Boyce Water Well)

Altitude: 2300 feet Date drilled: 10/26/64

	Topsoil and clay-----	10	10
	Clay, yellow-----	20	30
	Coal-----	4	34
	Clay-----	2	36
	Coal-----	2	38
	Clay, gray-----	39	77
	Coal-----	3	80
	Clay, gray-----	51	131
	Shale layers and water-bearing sandstone-----	44	175

LOCATION: 148-103-09ABB

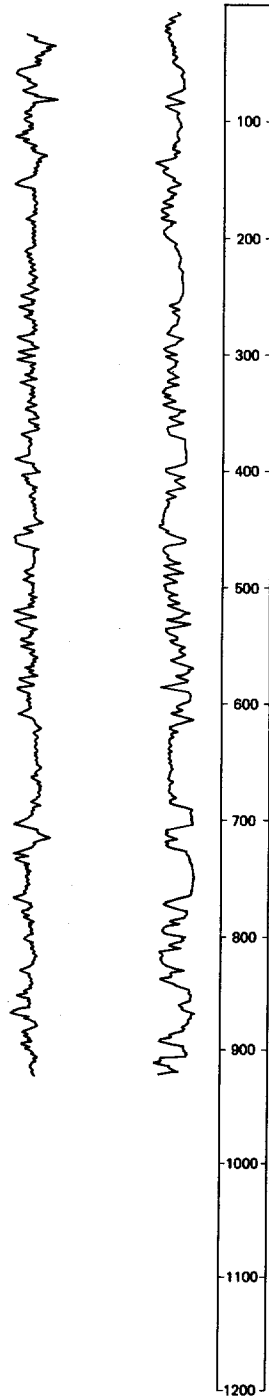
DATE DRILLED: 7/07/81

ALTITUDE: 2300
(FT. NGVD)

DEPTH: 920
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

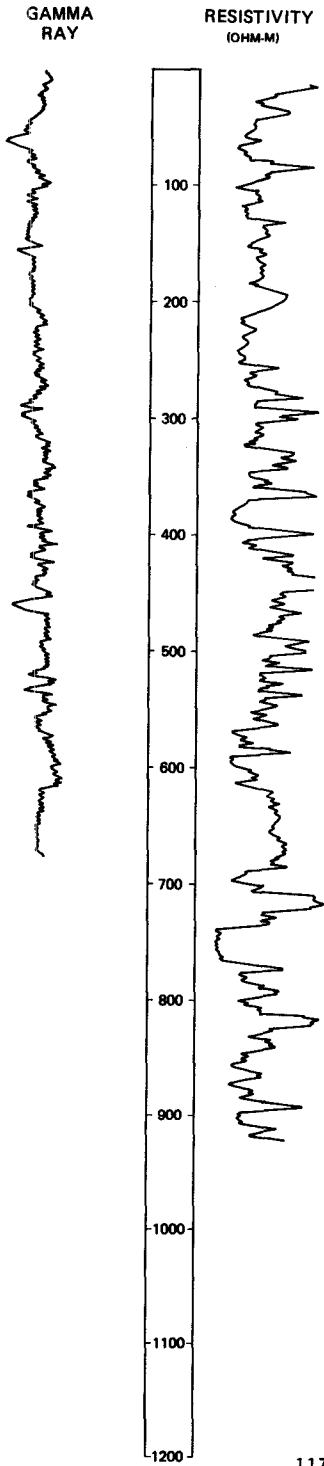
- 0-20 Colluvium.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 20-55 Siltstone and sandstone, clayey, yellowish-brown.
- TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 55-65 Lignite.
- 65-210 Siltstone and sandstone, gray; lignitic at 155 feet.
- 210-250 Claystone, silty, gray.
- 250-370 Siltstone and sandstone, gray.
- 370-390 Claystone, silty, gray.
- 390-590 Siltstone and sandstone, gray; lignitic at 460 feet.
- 590-610 Siltstone and claystone.
- 610-690 Sandstone, silty, fine to medium, gray.
- 690-700 Siltstone and claystone.
- 700-735 Siltstone and lignite.
- LOWER PART OF FORT UNION FORMATION
- 735-760 Siltstone and claystone, brownish-gray.
- 760-920 Siltstone and claystone, sandy, carbonaceous.

LOCATION: 148-103-09ABB

DATE DRILLED: 7/07/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 920
(FT)



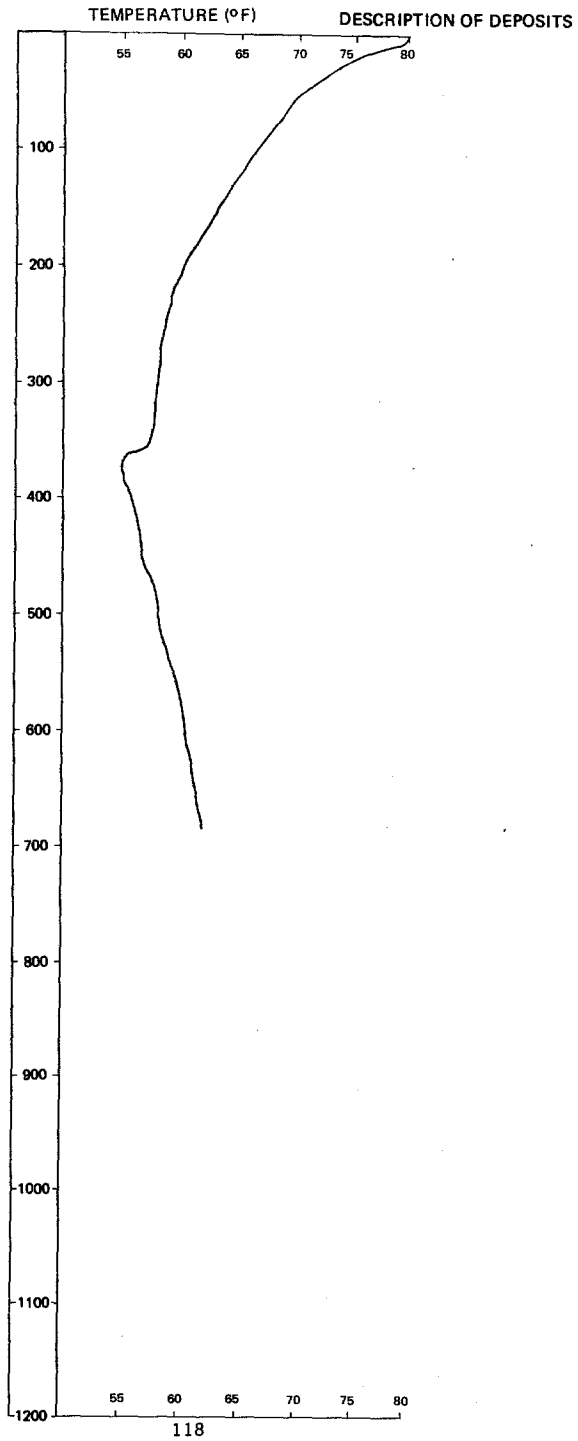
DESCRIPTION OF DEPOSITS

LOCATION: 148-103-09ABB

DATE DRILLED: 7/07/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 920
(FT)



148-103-28CDD
(Log modified from Thompson Drilling Co.)

Altitude: 2285 feet Date drilled: 12/20/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	104	104
	Sand; thin lenses-----	5	109
	Clay-----	15	124
	Sand-----	6	130

148-104-14DAD
(Log modified from Francis Boyce Water Well)

Altitude: 2440 feet Date drilled: 11/15/68

	Topsoil and clay-----	5	5
	Rock-----	1	6
	Clay, sandy-----	40	46
	Clay, sandy, bluish-gray-----	18	64
	Coal-----	8	72
	Shale, gray-----	117	189
	Coal-----	3	192
	Shale, gray, firm-----	78	270
	Coal-----	3	273
	Shale and layers of drift sand-----	35	308
	Rock-----	4	312
	Shale, gray-----	10	322
	Coal-----	2	324
	Shale, gray-----	72	396
	Rock-----	4	400
	Shale, hard-----	37	437
	Sandstone; water strata-----	23	460

148-104-23CCC
(Log modified from Francis Boyce Water Well)

Altitude: 2450 feet Date drilled: 9/16/68

	Topsoil and clay-----	8	8
	Clay and scoria-----	9	17
	Clay, firm-----	46	63
	Coal-----	12	75
	Shale, gray-----	40	115
	Rock-----	1	116
	Shale, gray, firm-----	39	155
	Rock-----	2	157
	Shale, gray-----	21	178
	Coal-----	2	180
	Shale, gray-----	82	262
	Coal-----	3	265
	Shale, gray-----	2	267
	Coal-----	2	269
	Shale, gray-----	42	311
	Rock-----	3	314
	Shale, gray-----	12	326
	Coal-----	2	328
	Shale, gray-----	41	369
	Sandstone, fine, hard-----	38	407
	No description available-----	98	505

148-104-30BAC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2055 feet

Date drilled: 6/02/77

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil and yellow clay-----	13	13
	Clay, gray, and coal layers-----	672	685
	Drift sand, fine-----	40	725
	Clay, gray-----	85	810
	Drift sand, fine-----	15	825
	Clay, gray, and coal layers-----	307	1132
	Rock-----	3	1135
	Clay, hard-----	35	1170
	Clay, sandy, gray-----	56	1226
	Rock-----	1	1227
	Clay, sandy-----	48	1275
	Rock-----	1	1276
	Clay, sandy-----	20	1296
	Rock, very hard-----	2	1298
	Clay, sandy-----	94	1392
	Rock, hard-----	10	1402
	Fox Hills Sandstone-----	58	1460

148-105-13CCA
(Log modified from Boyce Drilling, Inc.)

Altitude: 2115 feet

Date drilled: 3/29/80

	Sand, brown, and brown clay-----	60	60
	Clay, gray; coal layers-----	250	310
	Coal-----	10	320
	Clay, gray-----	170	490
	Sandstone-----	2	492
	Clay, gray; small coal layers-----	320	812
	Sandstone-----	4	816
	Clay, gray-----	124	940
	Sand, fine-----	30	970
	Clay, gray-----	170	1140
	Sandstone-----	2	1142
	Clay, gray-----	7	1149
	Sandstone-----	2	1151
	Clay, sandy, gray-----	70	1221
	Sandstone-----	1	1222
	Clay, sandy, gray-----	63	1285
	Sandstone-----	2	1287
	Clay, gray-----	16	1303
	Sandstone-----	59	1362
	Clay, sandy-----	13	1375
	Sand; water-----	49	1424
	Sandstone-----	2	1426
	Sand; water-----	34	1460

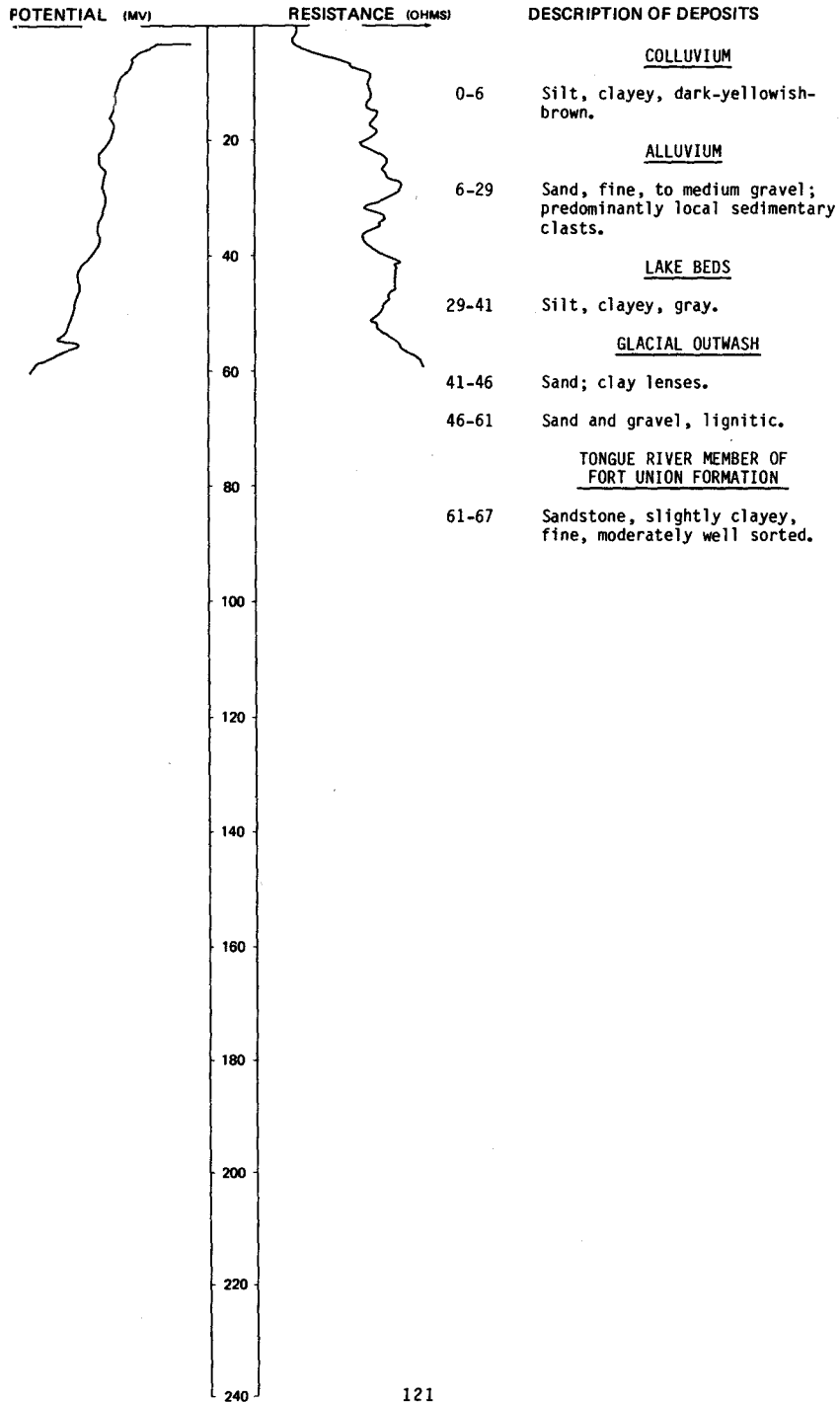
LOCATION: 148-105-15ADA

NDSWC 11394

DATE DRILLED: 9/30/80

ALTITUDE: 1950
(FT, NGVD)

DEPTH: 67
(FT)



148-105-2600B
(Log modified from Boyce Drilling, Inc.)

Altitude: 2040 feet Date drilled: 9/15/73

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, brown-----	38	38
	Coal-----	3	41
	Clay, gray-----	127	168
	Sandstone-----	9	177
	Clay, gray-----	6	183
	Coal-----	490	673
	Shale, sandy, gray-----	277	950
	Sandstone-----	2	952
	Shale, sandy, gray-----	293	1245
	Sandstone-----	1	1246
	Sand-----	44	1290

148-105-35CD
(Log modified from Francis Boyce Water Well)

Altitude: 2070 feet Date drilled: 8/26/67

	Topsoil-----	2	2
	Clay, yellow-----	36	38
	Sand and fine rockfill-----	4	42
	Coal-----	3	45
	Clay, gray, soft-----	10	55
	Coal-----	2	57
	Shale, gray, hard-----	14	71
	Rock-----	1	72
	Shale, gray, hard-----	45	117
	Sheet rock, gray, hard-----	2	119
	Shale, gray, hard-----	26	145
	Sandstone, fine; water-bearing strata-----	23	168
	Shale-----	2	170

148-105-36BDD
(Log modified from Francis Boyce Water Well)

Altitude: 1990 feet Date drilled: 8/21/67

	Topsoil-----	3	3
	Clay, gray-----	12	15
	Scoria, fine; rock; and soft clay-----	15	30
	Rock, fine, and sand-----	15	45
	Clay, rubbery; fine rock; and scoria-----	15	60
	Sand, fine, and coal slack-----	30	90
	Sand, coarse, and fine soft gravel-----	40	130
	Clay, gray-----	10	140
	Rock, gray, hard-----	5	145
	Shale, bluish-gray-----	4	149
	Coal-----	26	175
	Sandstone-----	5	180

LOCATION: 148-105-36CDC1

NDSWC 5636

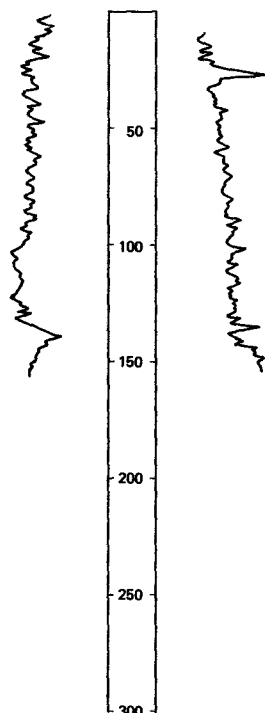
DATE DRILLED: 10/15/79

ALTITUDE: 2040
(FT. NGVD)

DEPTH: 162
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-30 Clay, very silty, sandy, dark-yellowish-brown; scoria pebbles.

LAKE BEDS

30-49 Clay, dark-yellowish-brown, soft.
49-90 Clay, silty, olive-gray, soft.

GLACIAL OUTWASH

90-103 Sand, fine to medium, lignitic; thin gravel lenses.
103-136 Sand, medium to very coarse, lignitic; fine to coarse gravel lenses.

TONGUE RIVER MEMBER OF
FORT UNION FORMATION

136-138 Limestone, light-gray, hard.
138-144 Claystone, dark-gray, smooth, tight.
144-162 Siltstone, medium-bluish-gray.

148-105-36CDC2
(Log modified from Boyce Drilling, Inc.)

Altitude: 2115 feet

Date drilled: 1/04/80

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand; layers of gravel-----	150	150
	Clay, gray-----	45	195
	Coal-----	10	205
	Sand, fine, gray-----	25	230
	Clay, gray; small coal layers-----	340	570
	Sandstone-----	2	572
	Clay, gray-----	23	595
	Sandstone-----	1	596
	Clay, gray-----	329	925
	Sand, fine-----	15	940
	Clay, gray; small sandstone layers-----	265	1205
	Sand, gray; water-----	75	1280
	Clay, gray-----	--	1280

LOCATION: 148-105-36CDD

DATE DRILLED: 10/14/79

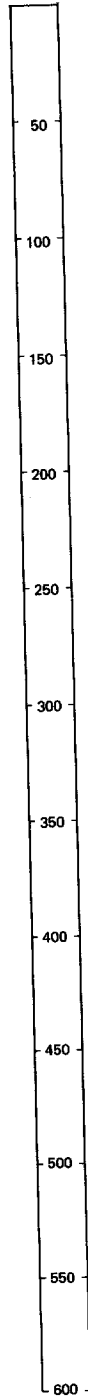
ALTITUDE: 2018
(FT, NGVD)

DEPTH: 142
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS



- COLLUVIUM
- 0-30 Clay, very silty, greenish-yellowish-brown; organic streaks.
- ALLUVIUM
- 30-44 Sand and fine gravel; predominantly scoria.
- LAKE BEDS
- 44-49 Clay, olive-gray, soft, plastic.
- 49-61 Clay, silty, sandy, olive-gray to dark-gray; lignite and limestone pebbles.
- 61-94 Clay, olive-gray, soft; sand and gravel layers.
- GLACIAL OUTWASH
- 94-121 Sand and gravel, silty, clayey, gray.
- 121-135 Gravel and sand.
- TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 135-141 Limestone, gray, hard.
- 141-142 Claystone, light-gray, bentonitic.

LOCATION: 148-105-36DCD

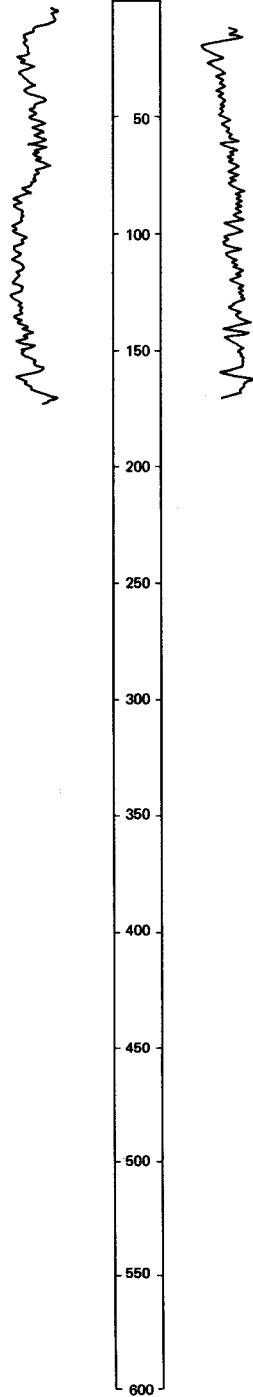
DATE DRILLED: 10/15/79

ALTITUDE: 2020
(FT, NGVD)

DEPTH: 182
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-22 Clay, silty, slightly sandy, dark-yellowish-brown.

ALLUVIUM

22-34 Sand and gravel, fine to coarse; predominantly scoria with dark-gray clay layers.

LAKE BEDS

34-80 Clay, silty, slightly sandy, olive-gray to medium-dark-gray, lignitic, soft.

GLACIAL OUTWASH

80-96 Sand, fine to medium, lignitic; a few medium-gray to dark-gray clay layers.

96-146 Sand and gravel.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

146-153 Sandstone, very silty, very fine, light-bluish-gray to medium-gray.

153-157 Siltstone, sandy, light-gray.

157-172 Claystone, dark-gray, organic.

172-176 Lignite.

176-182 Claystone, dark-greenish-gray, organic.

LOCATION: 148-105-36000

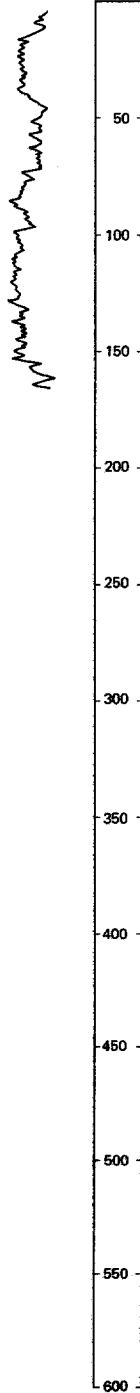
DATE DRILLED: 10/15/79

ALTITUDE: 2002
(FT, NGVD)

DEPTH: 182
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-22 Clay, very silty to very sandy, dark-yellowish-brown.

ALLUVIUM

22-41 Gravel; predominantly scoria with dark-gray clay layers.

LAKE BEDS

41-72 Clay, silty, medium-dark-gray to olive-gray, soft, sticky.

72-83 Clay and fine sand layers.

GLACIAL OUTWASH

83-96 Sand, silty, fine to coarse, and dark-gray clay layers.

96-155 Sand and gravel, fine to very coarse; with cobbles.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

155-160 Siltstone, slightly sandy, light-brownish-gray, slightly organic, micaceous.

160-164 Claystone, dark-gray, waxy.

164-168 Claystone, silty, dark-brown, carbonaceous.

168-176 Lignite.

176-182 Claystone, dark-brown, carbonaceous.

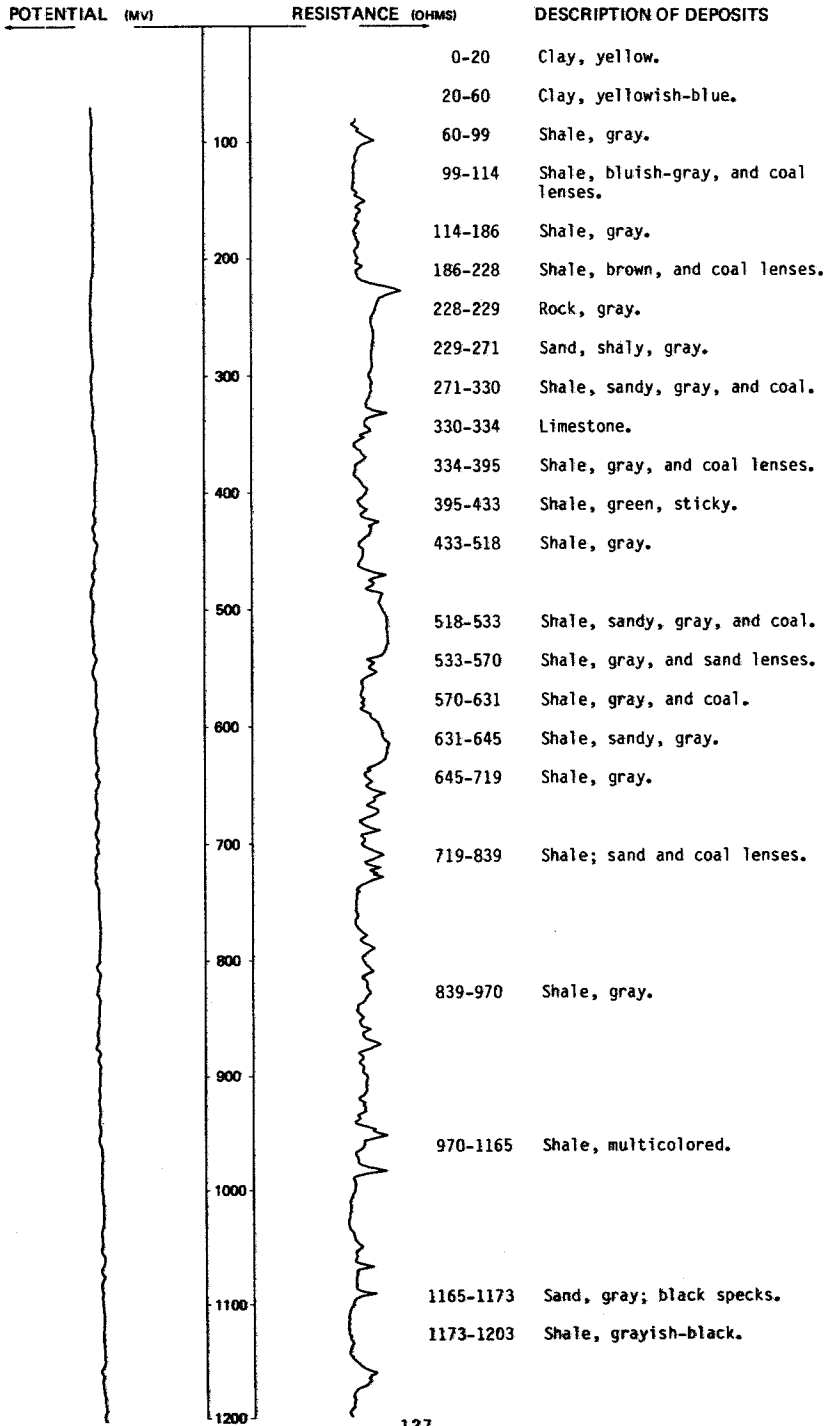
(Log modified from Frederickson's Inc.)

LOCATION: 149-094-148A

DATE DRILLED: 7/21/70

ALTITUDE: 2160
(FT. NGVD)

DEPTH: 1746
(FT)



(Log modified from Frederickson's Inc.), Continued
LOCATION: 149-094-14BA

DATE DRILLED: 7/21/70

ALTITUDE: 2160
(FT, NGVD)

DEPTH: 1746
(FT)

POTENTIAL (MV)	RESISTANCE (OHMS)	DESCRIPTION OF DEPOSITS
	1203-1266	Shale, sandy, grayish-black; some coal.
	1266-1274	Sand.
1300	1274-1287	Shale, grayish-black, and sandstone.
	1287-1317	Shale, sandy, dark-gray.
1400	1317-1380	Sand.
	1380-1401	Shale, gray.
	1401-1435	Shale, sandy.
1500	1435-1515	Shale, gray.
	1515-1527	Shale, sandy, gray.
	1527-1564	Sand.
1600	1564-1604	Shale, gray.
	1604-1628	Sand.
	1628-1637	Shale; sand lenses.
1700	1637-1648	Sand.
	1648-1700	Sand; shale lenses.
	1700-1746	Pierre Shale.
1800		
1900		
2000		
2100		
2200		
2300		
2400		

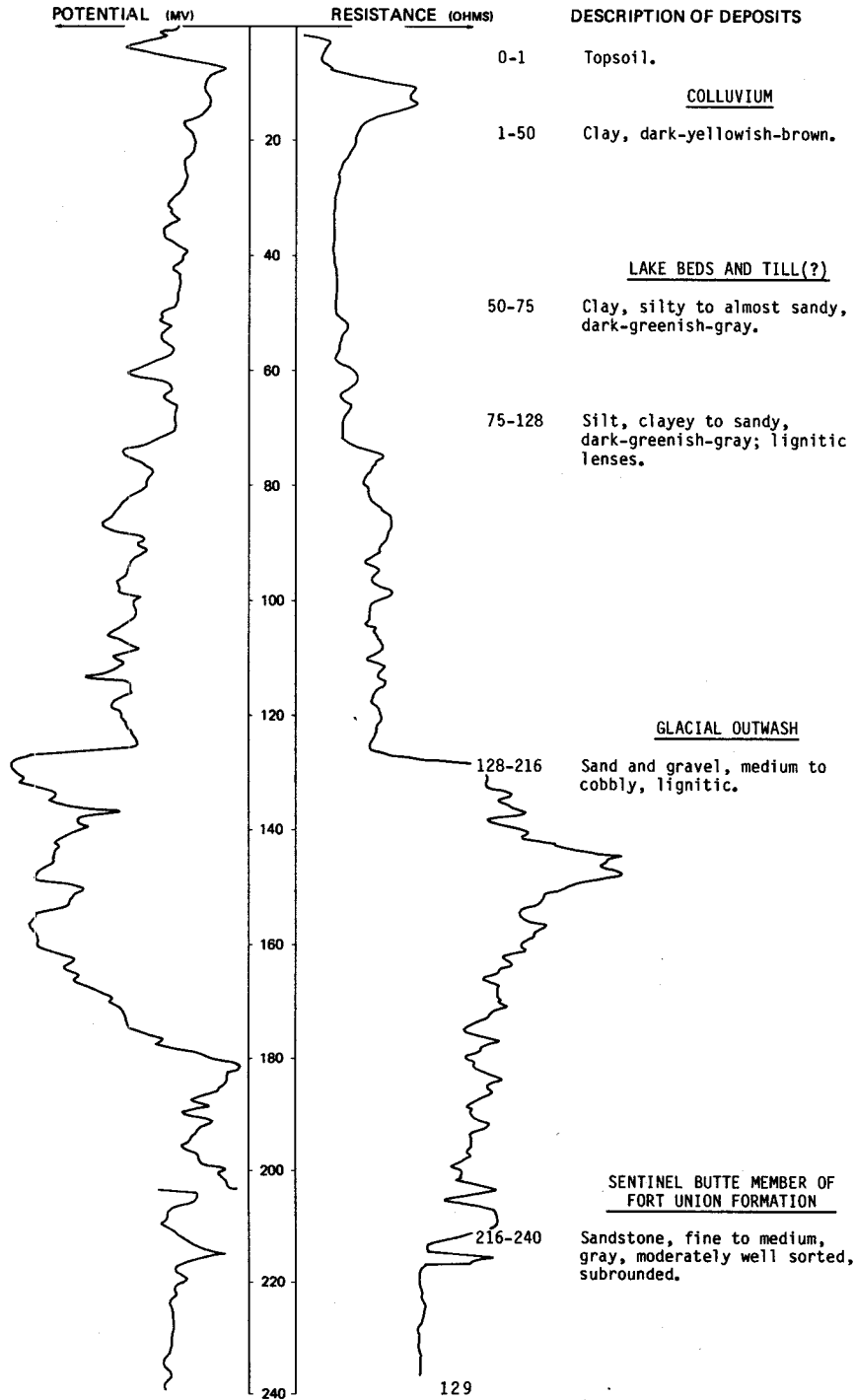
LOCATION: 149-094-21AAD

NDSWC 11352

DATE DRILLED: 9/09/80

ALTITUDE: 2152
(FT, NGVD)

DEPTH: 240
(FT)



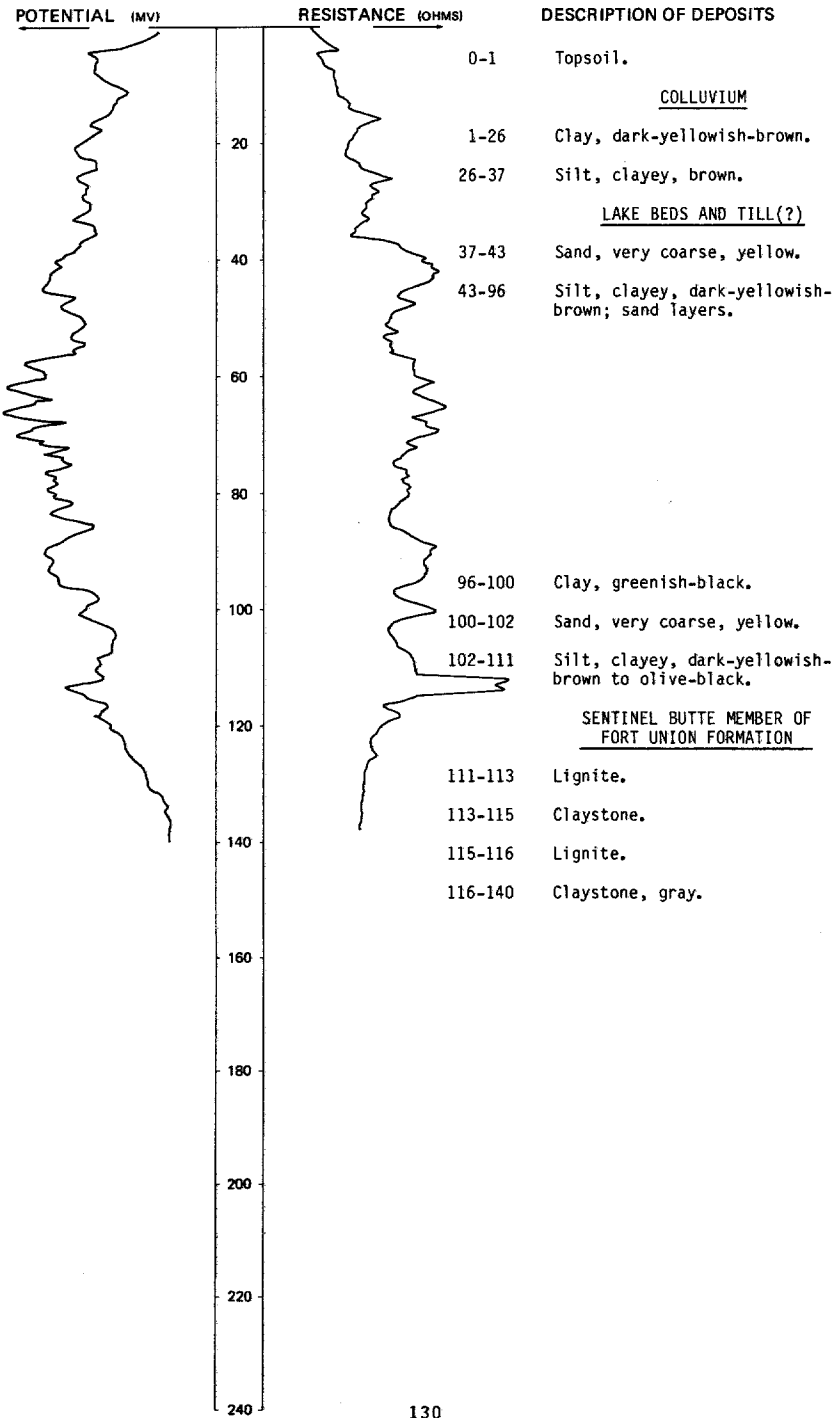
LOCATION: 149-094-22888

NDSWC 11351

DATE DRILLED: 9/09/80

ALTITUDE: 2150
(FT, NGVD)

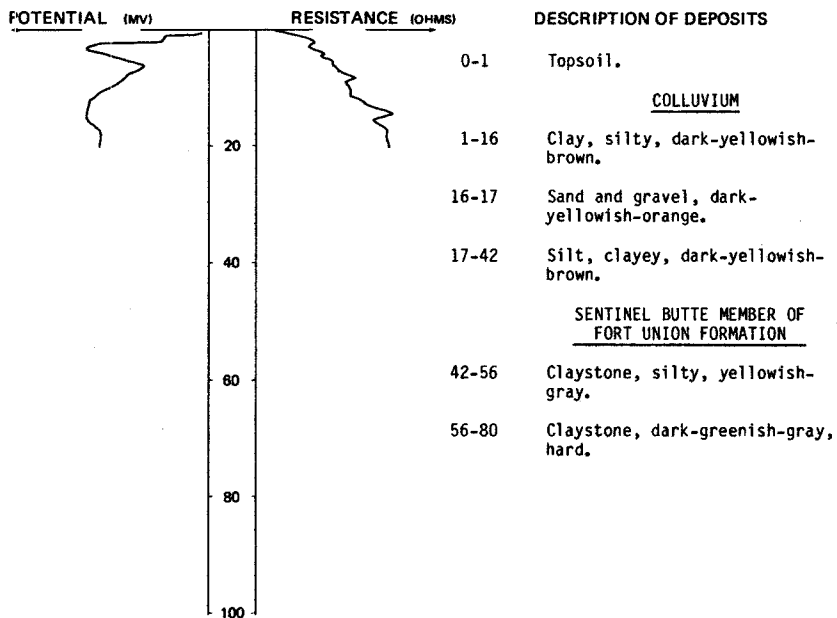
DEPTH: 140
(FT)



LOCATION: 149-094-228CB
 ALTITUDE: 2158
 (FT, NGVD)

NDSWC 11353

DATE DRILLED: 9/09/80
 DEPTH: 80
 (FT)



149-094-27CB
 (Log modified from Aberle Well Co.)

Altitude: 2345 feet

Date drilled: 5/19/73

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay, yellow-----	18	19
	Sand, blue-----	4	23
	Clay, gray-----	13	36

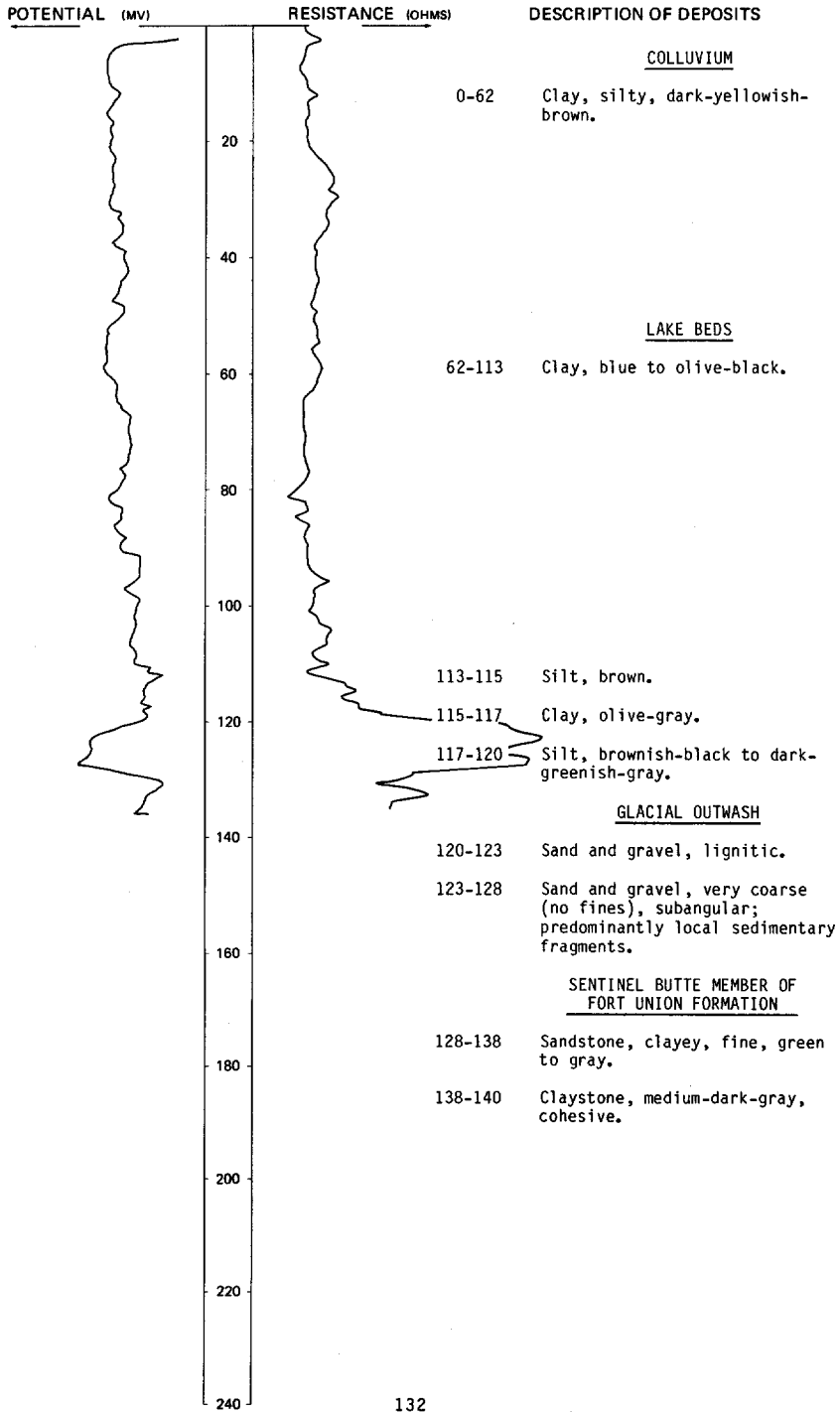
LOCATION: 149-095-04CCB

NDSWC 11357

DATE DRILLED: 9/10/80

ALTITUDE: 2226
(FT, NGVD)

DEPTH: 140
(FT)



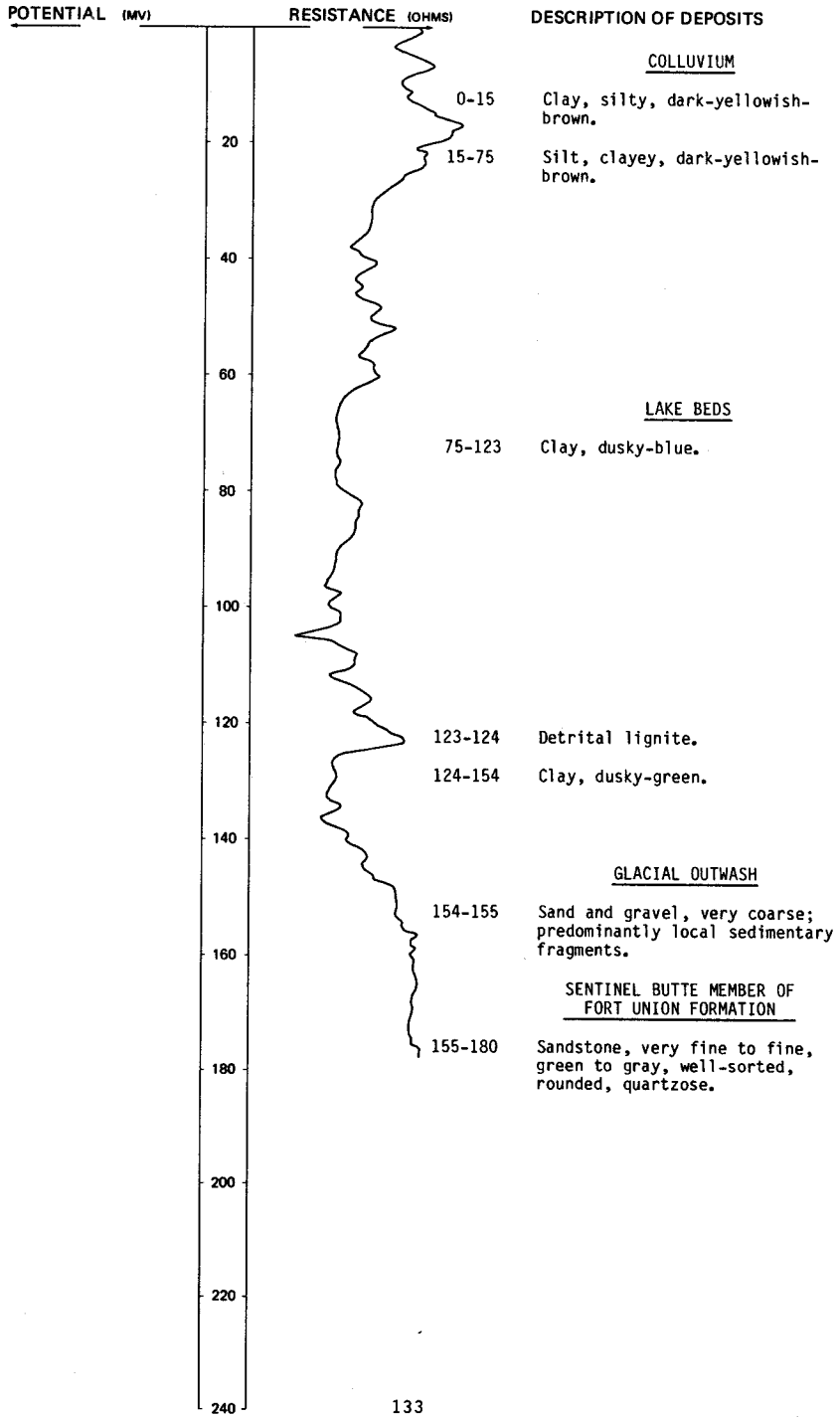
NDSWC 11358

LOCATION: 149-095-05DCD

DATE DRILLED: 9/10/80

ALTITUDE: 2228
(FT, NGVD)

DEPTH: 180
(FT)



LOCATION: 149-095-06ACC

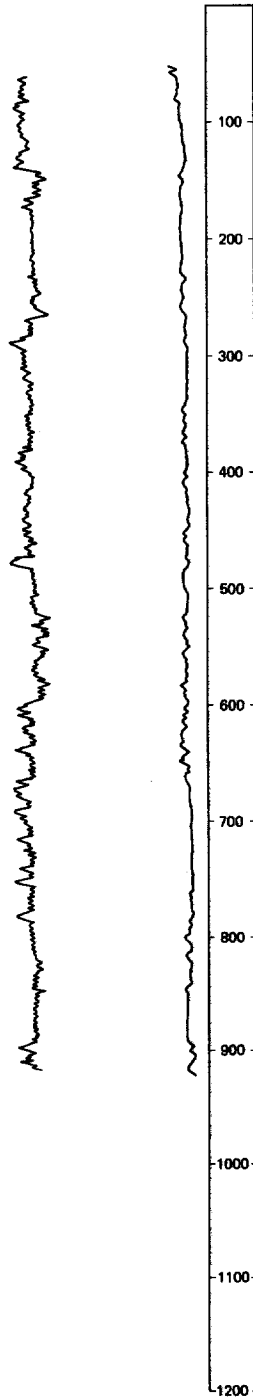
DATE DRILLED: 6/26/81

ALTITUDE: 2258
(FT, NGVD)

DEPTH: 920
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

- 0-78 Colluvium.
- 78-81 Sand and gravel.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 81-140 Siltstone and claystone.
- 140-260 Siltstone and sandstone, greenish-gray, carbonaceous.
- TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 260-285 Claystone and lignite.
- 285-340 Siltstone and claystone, gray.
- 340-390 Siltstone and sandstone.
- 390-465 Siltstone and claystone, gray.
- 465-480 Lignite.
- 480-655 Siltstone and sandstone, gray.
- 655-690 Claystone and lignite.
- 690-745 Siltstone and claystone, gray.
- 745-840 Siltstone and sandstone, gray, lignitic.
- 840-900 Sandstone, fine to medium, gray.
- 900-920 Siltstone and claystone.

LOCATION: 149-095-06ACC

DATE DRILLED: 6/26/81

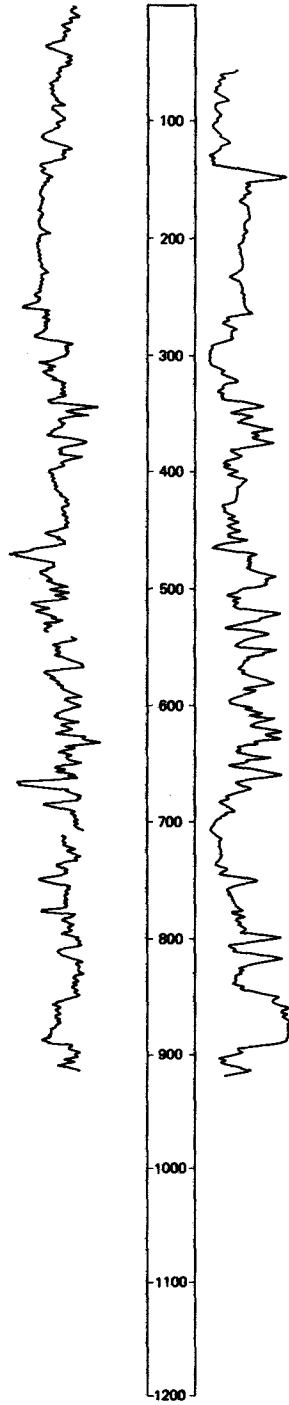
ALTITUDE: 2258
(FT, NGVD)

DEPTH: 920
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

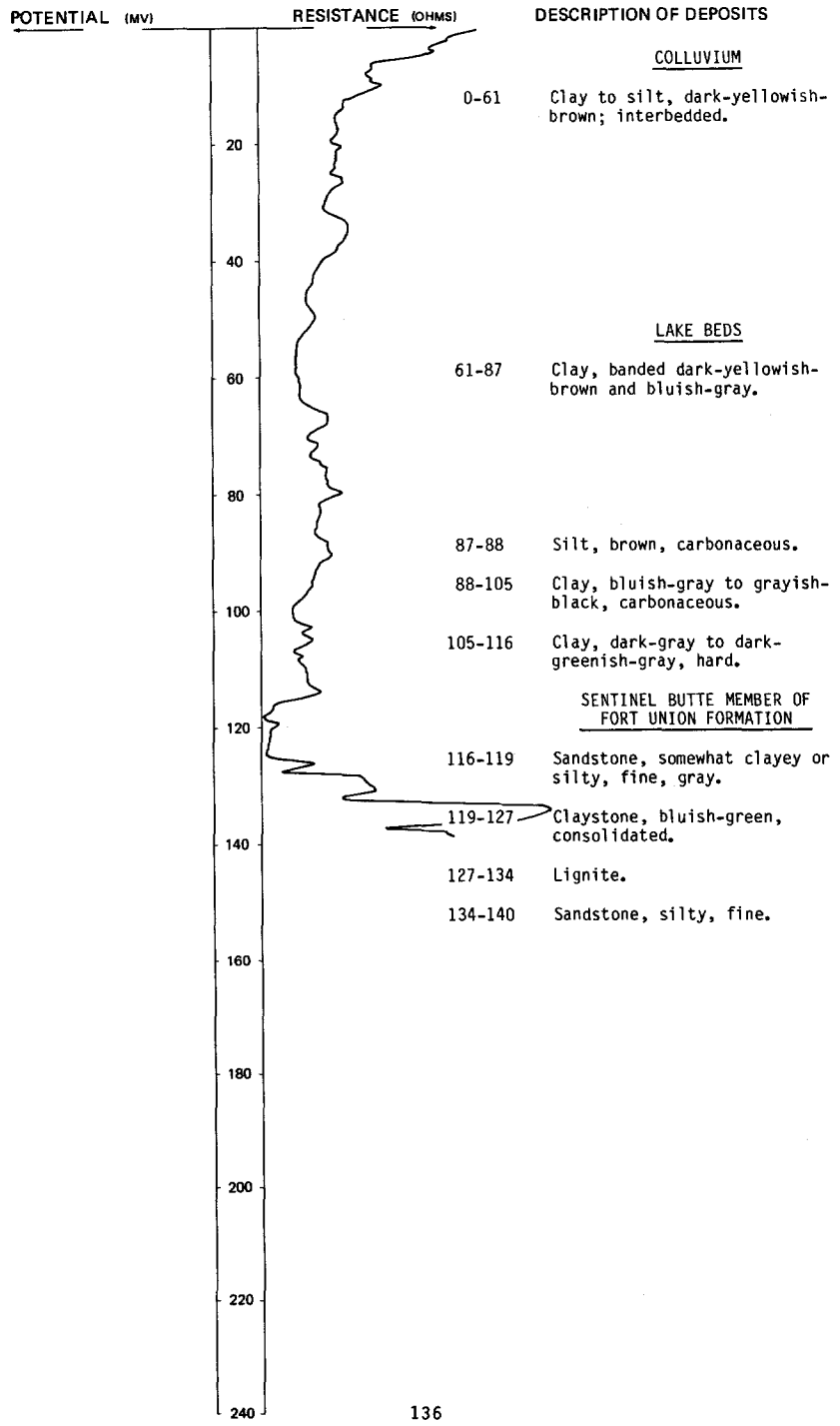
DESCRIPTION OF DEPOSITS



LOCATION: 149-095-060AA
 ALTITUDE: 2250
 (FT, NGVD)

NDSWC 11359

DATE DRILLED: 9/11/80
 DEPTH: 140
 (FT)

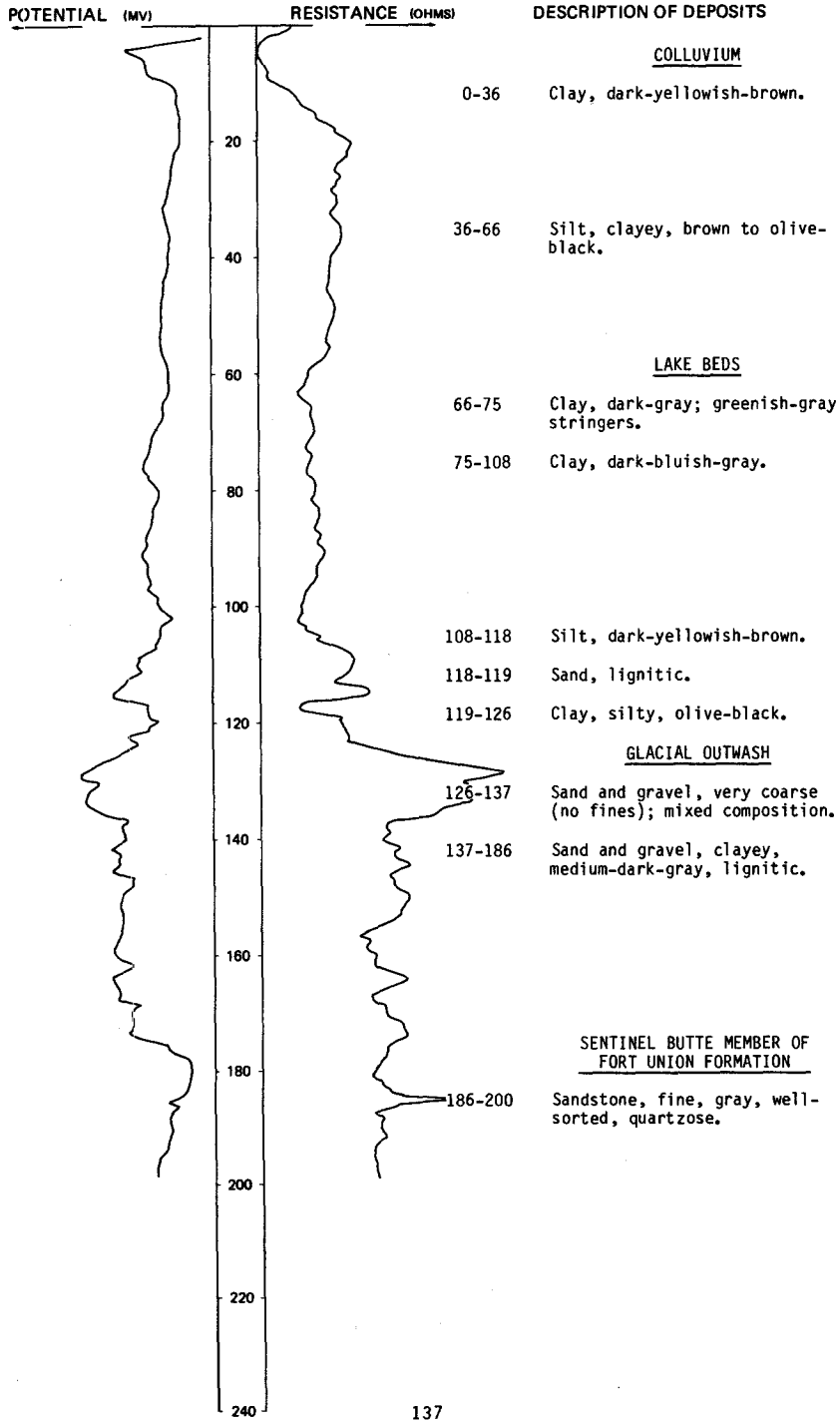


LOCATION: 149-095-08ADA

DATE DRILLED: 9/10/80

ALTITUDE: 2222
(FT, NGVD)

DEPTH: 200
(FT)



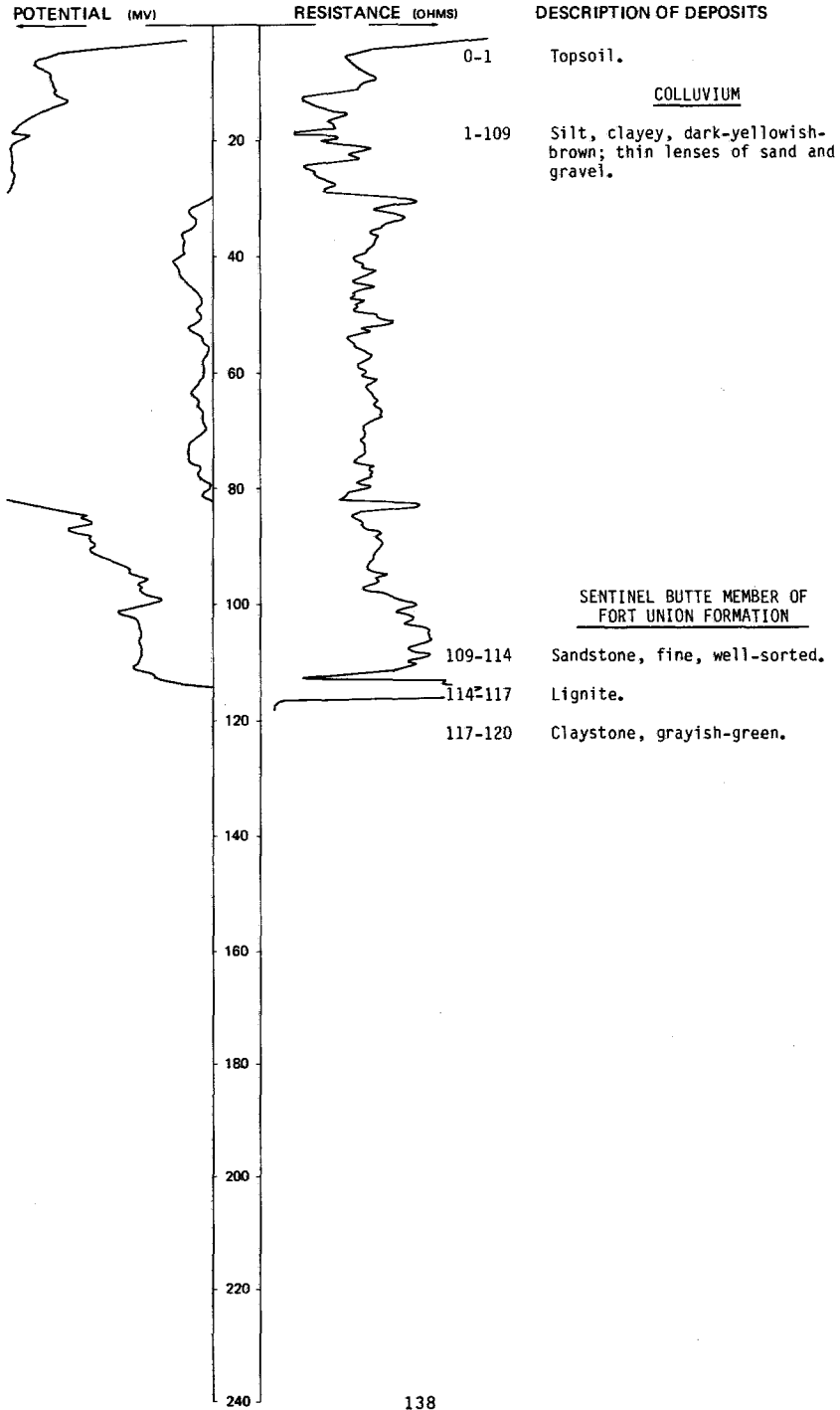
LOCATION: 149-095-15CBB

NDSWC 11354

DATE DRILLED: 9/10/80

ALTITUDE: 2220
(FT, NGVD)

DEPTH: 120
(FT)



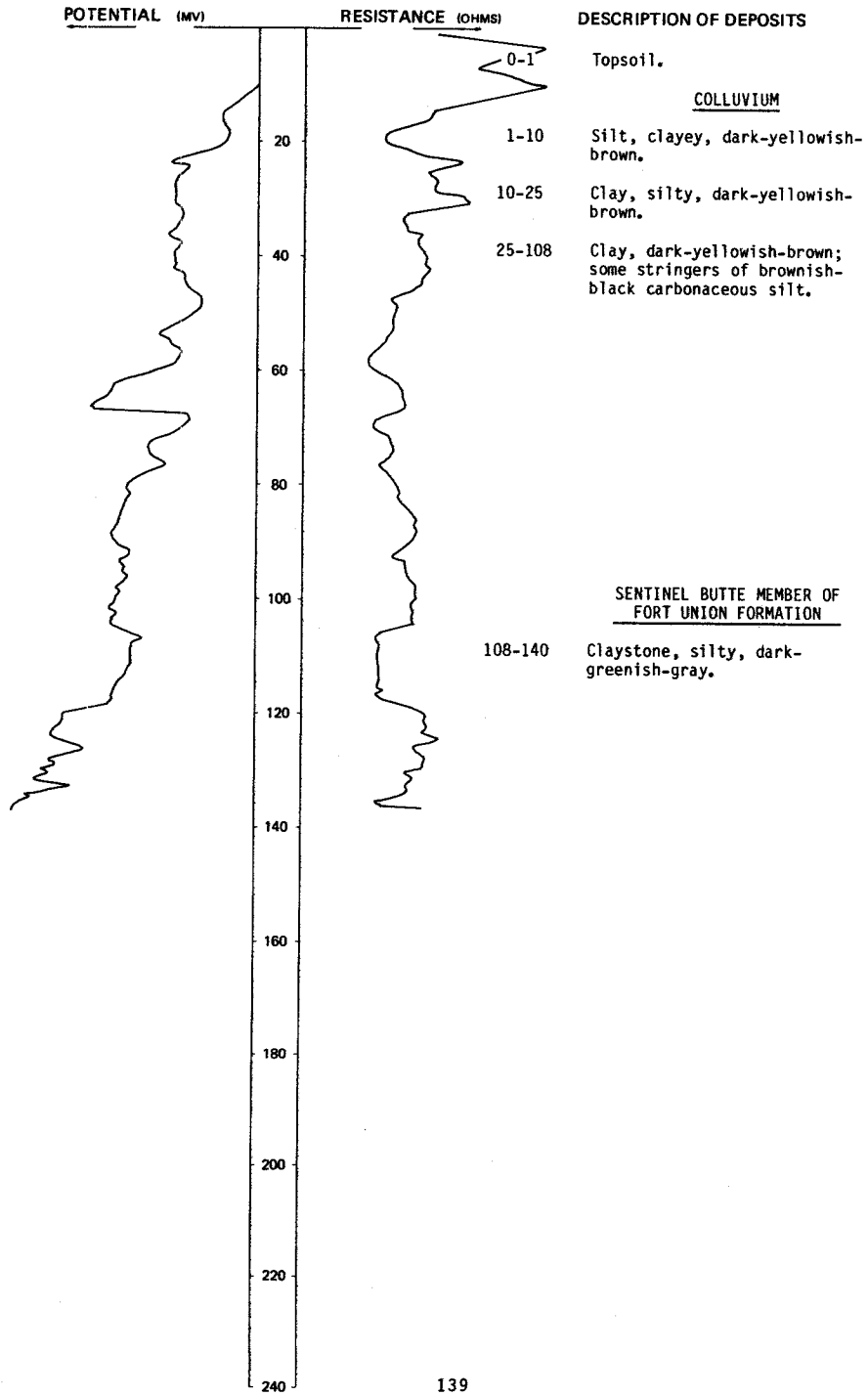
NDSWC 11355

LOCATION: 149-095-16DAD

DATE DRILLED: 9/10/80

ALTITUDE: 2230
(FT, NGVD)

DEPTH: 140
(FT)



149-096-03DDD
(Log modified from Thompson Drilling Co.)

Altitude: 2380 feet

Date drilled: 10/01/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	4	4
	Clay-----	33	37
	Clay, gritty-----	7	44
	Clay, blue-----	19	63
	Sand-----	12	75
	Hard shell-----	3	78
	Sand, gray-----	14	92
	Sand, blue-----	3	95

149-096-27CBA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2045 feet

Date drilled: 6/21/72

	Clay-----	75	75
	Coal-----	3	78
	Clay-----	17	95
	Coal-----	2	97
	Clay-----	31	128
	Coal-----	4	132
	Clay-----	11	143
	Coal-----	2	145
	Clay-----	48	193
	Coal-----	3	196
	Clay-----	28	224
	Rock-----	3	227
	Clay-----	70	297
	Coal-----	11	308
	Rock-----	3	311
	Clay-----	99	410
	Coal-----	6	416
	Clay, sandy-----	80	496
	Coal-----	6	502
	Clay-----	83	585
	Coal-----	8	593
	Clay-----	112	705
	Sand-----	22	727
	Clay-----	33	760
	Sand-----	14	774
	Rock-----	3	777
	Clay-----	21	798
	Coal-----	10	808
	Shale-----	292	1100
	Coal-----	15	1115
	Shale-----	65	1180
	Coal-----	10	1190
	Shale-----	20	1210
	Sand-----	50	1260
	Shale-----	117	1377
	Sand-----	63	1440

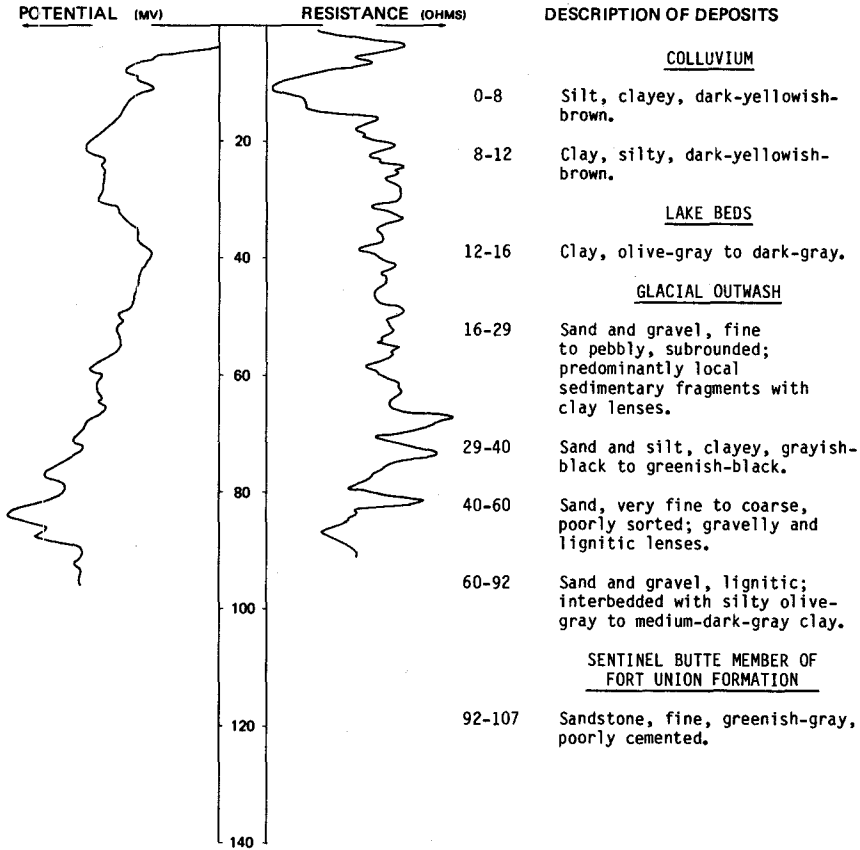
LOCATION: 149-097-168BB

NDSWC 11364

DATE DRILLED: 9/16/80

ALTITUDE: 1952
(FT, NGVD)

DEPTH: 107
(FT)



149-098-19CAC
(Log modified from Ralph Wold Well Drilling)

Altitude: 2210 feet

Date drilled: 3/24/73

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Till and clay-----	42	42
	Gravel-----	3	45
	Sand-----	7	52
	Clay-----	8	60

149-099-11AAA
NDSWC 11723

Altitude: 2115 feet

Date drilled: 9/21/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Silt and clay, dark-yellowish-brown-----	6	6
	Sand, fine to very fine-----	3	9
	Sand, gravel, and clay-----	14	23
	Sand and gravel; sorted-----	4	27
	Sand, gravel, and clay-----	2	29
	Claystone, medium-gray-----	11	40

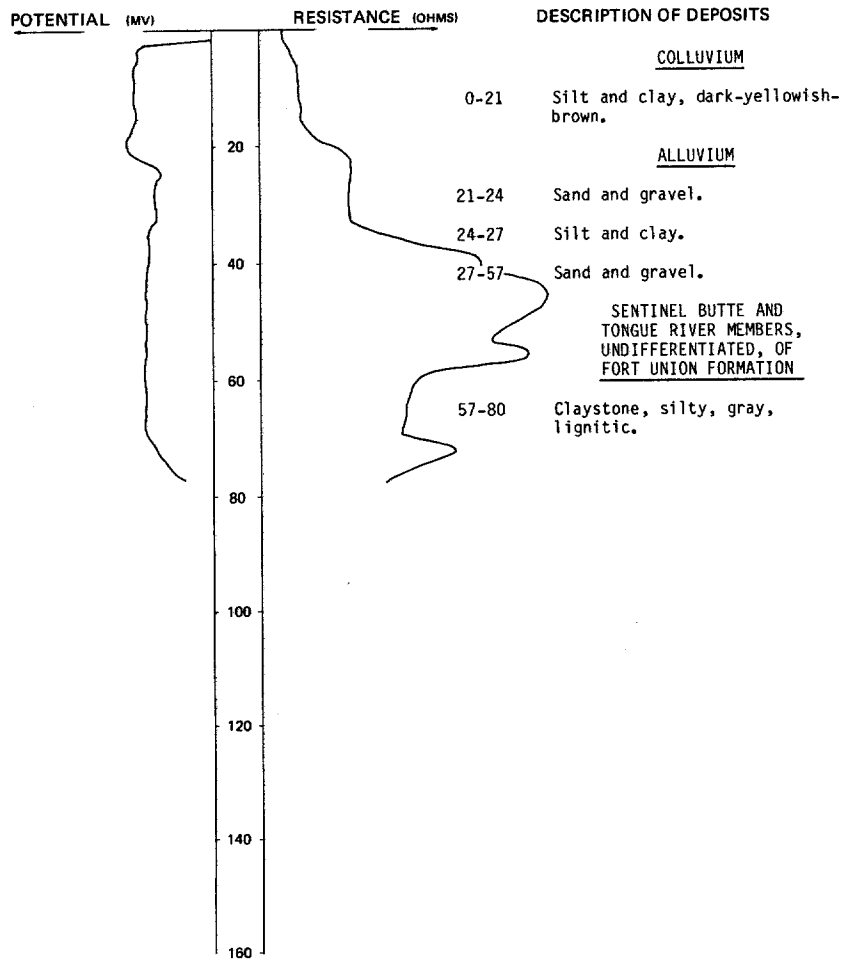
NDSWC 11724

LOCATION: 149-099-11888

DATE DRILLED: 9/21/81

ALTITUDE: 2103
(FT. NGVD)

DEPTH: 80
(FT)



149-099-12ADA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2210 feet Date drilled: 7/19/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand-----	35	35
	Rock-----	1	36
	Sand-----	49	85
	Rock-----	2	87
	Sand-----	21	108
	Rock-----	1	109
	Sand-----	19	128
	Coal-----	2	130
	Clay-----	5	135

149-099-12BBA
(Log modified from B & K Water Well Drilling Co.)

Altitude: 2120 feet Date drilled: 4/09/71

	Topsoil-----	2	2
	Sand, brown-----	17	19
	Coal and brown sand-----	2	21
	Rock-----	8	29
	Sand, brown-----	12	41
	Gravel, coarse-----	4	45
	Clay, sandy, brown-----	6	51
	Clay, brown-----	27	78
	Clay, blue-----	5	83
	Clay, sandy, blue-----	13	96
	Sand, grayish-blue-----	30	126

149-099-31CCC
(Log modified from Ralph Wold Well Drilling)

Altitude: 2370 feet Date drilled: 6/05/76

	Clay, sandy-----	38	38
	Coal-----	22	60
	Clay-----	20	80
	Coal-----	17	97
	Clay-----	31	128
	Coal-----	12	140
	Rock-----	2	142
	Clay-----	58	200
	Coal-----	12	212
	Clay-----	49	261
	Rock-----	1	262
	Clay-----	15	277
	Coal-----	13	290
	Clay-----	29	319
	Clay, sandy-----	31	350
	Coal-----	8	358
	Clay-----	5	363
	Coal-----	22	385
	Clay-----	36	421
	Clay, sandy-----	39	460
	Clay; interbedded with coal-----	110	570
	Coal-----	6	576
	Sand-----	3	579
	Coal-----	11	590
	Sand-----	40	630
	Sandstone-----	5	635

149-100-14AAA
(Log modified from Thompson Drilling Co.)

Altitude: 2160 feet

Date drilled: 9/20/75

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	2	2
	Sand-----	4	6
	Sandstone-----	24	30
	Sand-----	15	45
	Clay-----	4	49
	Coal and water-----	6	55
	Clay-----	7	62
	Clay, gritty-----	16	78
	Coal-----	1	79
	Clay-----	4	83
	Sand-----	12	95

149-100-14ABA
(Log modified from Thompson Drilling Co.)

Altitude: 2185 feet

Date drilled: 10/26/77

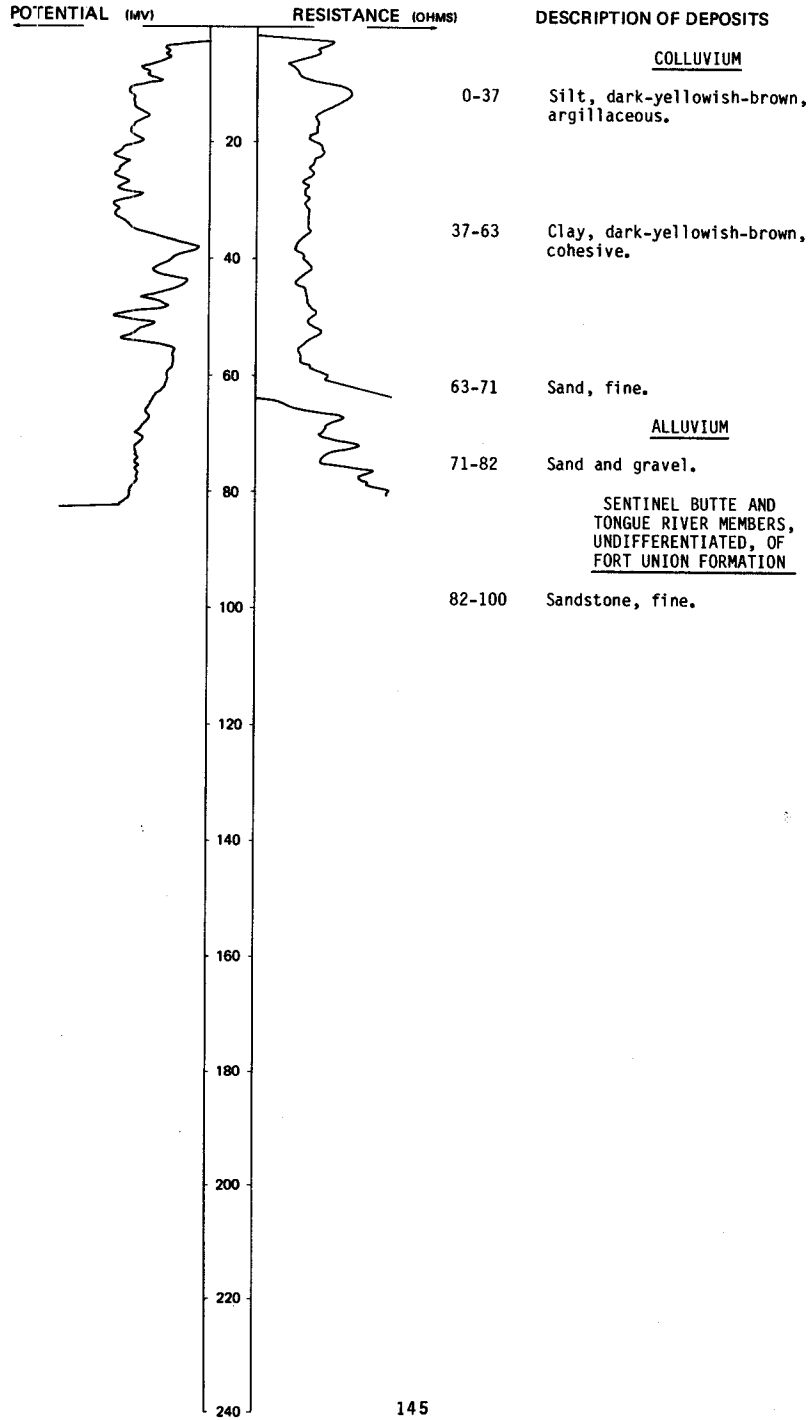
	Topsoil-----	3	3
	Clay-----	57	60
	Coal-----	2	62
	Clay-----	28	90
	Sand-----	5	95
	Clay-----	25	120

LOCATION: 149-100-25CBB

DATE DRILLED: 5/20/81

ALTITUDE: 2154
(FT, NGVD)

DEPTH: 100
(FT)



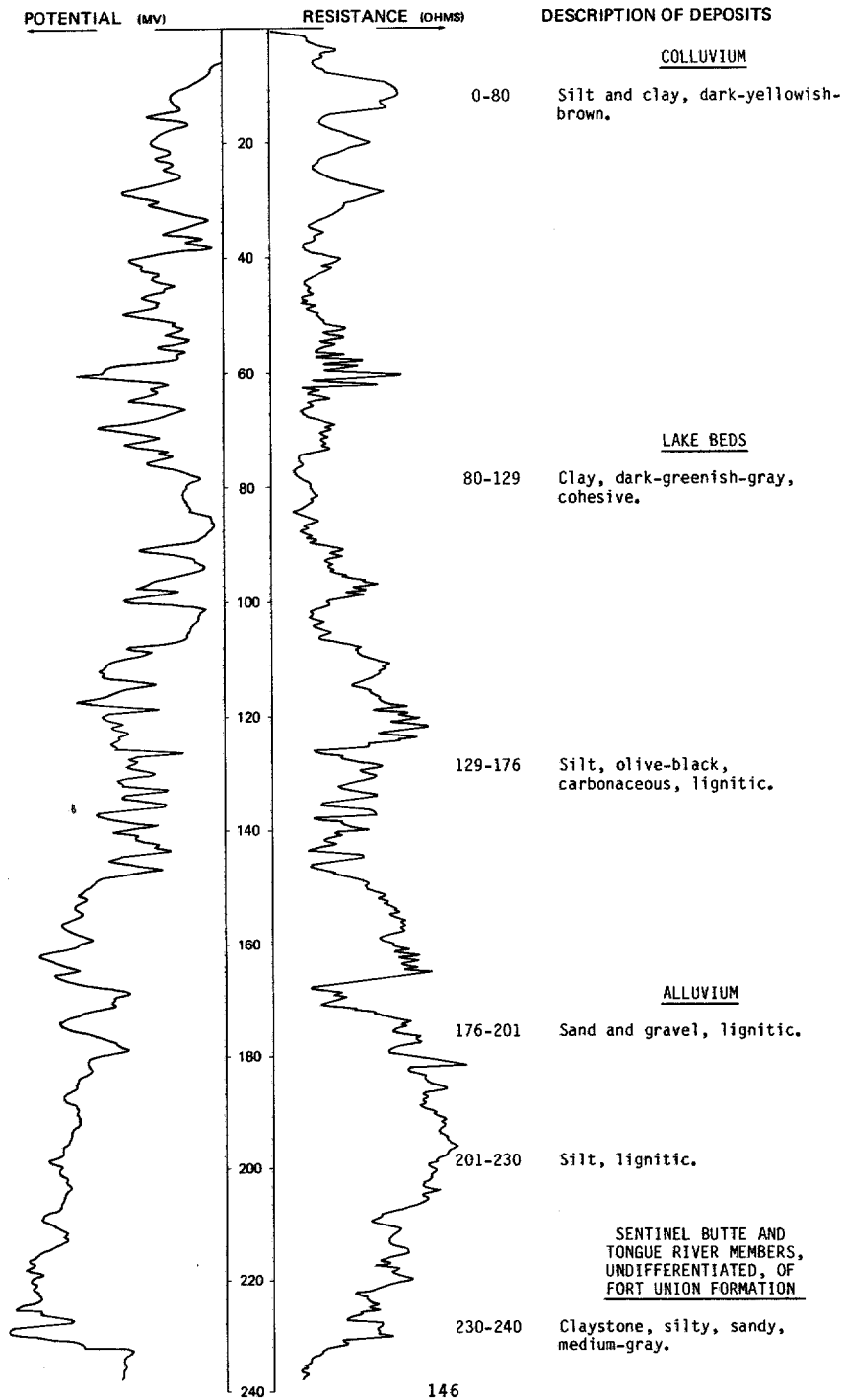
LOCATION: 149-100-26AAA

NDSWC 11590

DATE DRILLED: 5/20/81

ALTITUDE: 2158
(FT, NGVD)

DEPTH: 240
(FT)



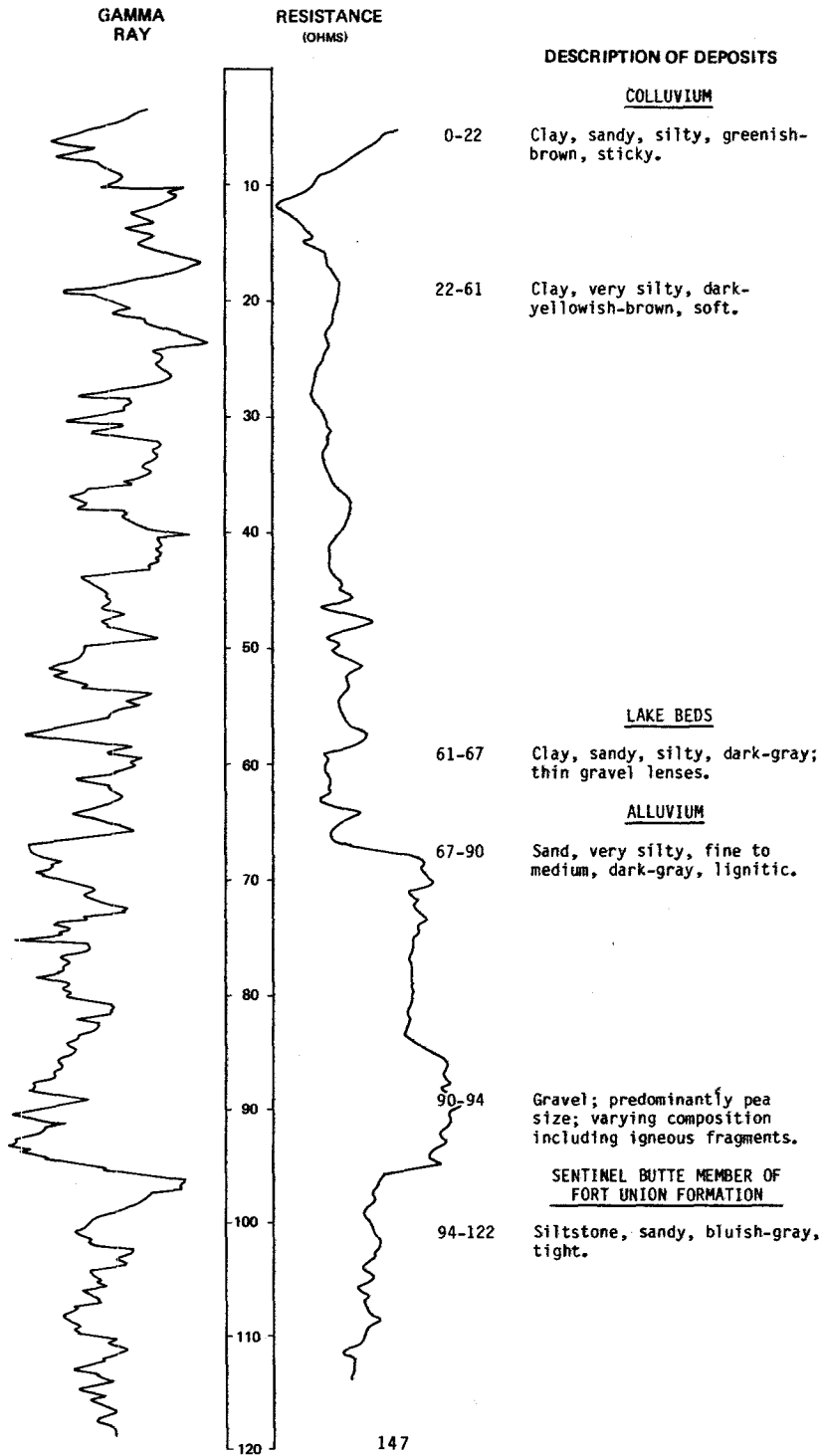
LOCATION: 149-100-27CDC

NDSWC 5627

DATE DRILLED: 10/12/79

ALTITUDE: 2170
(FT. NGVD)

DEPTH: 122
(FT)



149-100-32AAA
NDSWC 5628

Altitude: 2198 feet

Date drilled: 10/12/79

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, dark-brown-----	1	1
	Clay, sandy, silty, dark-yellowish-brown, fairly tight, oxidized-----	16	17
	Shale, dark-yellowish-brown, tight, oxidized-----	3	20
	Carbon shale, dark-brown, lignitic, soft, sticky-----	6	26
	Shale, bluish-green, tight, waxy-----	16	42

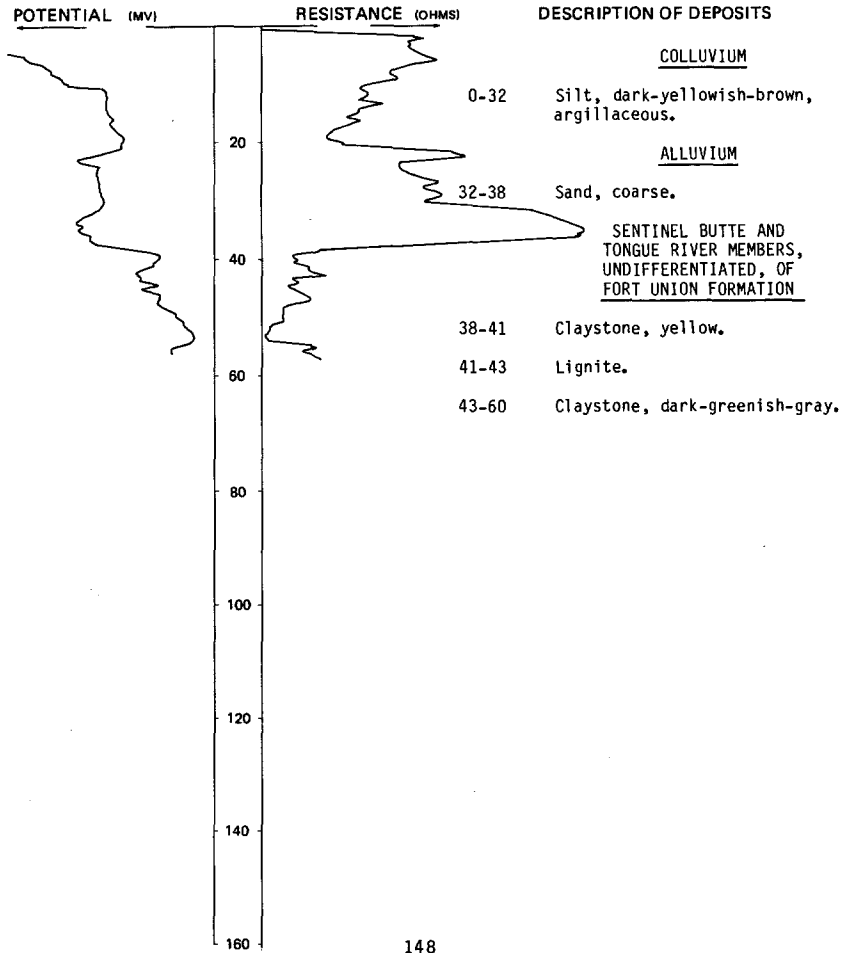
NDSWC 11588

LOCATION: 149-100-3588A

DATE DRILLED: 5/20/81

ALTITUDE: 2173
(FT, NGVD)

DEPTH: 60
(FT)

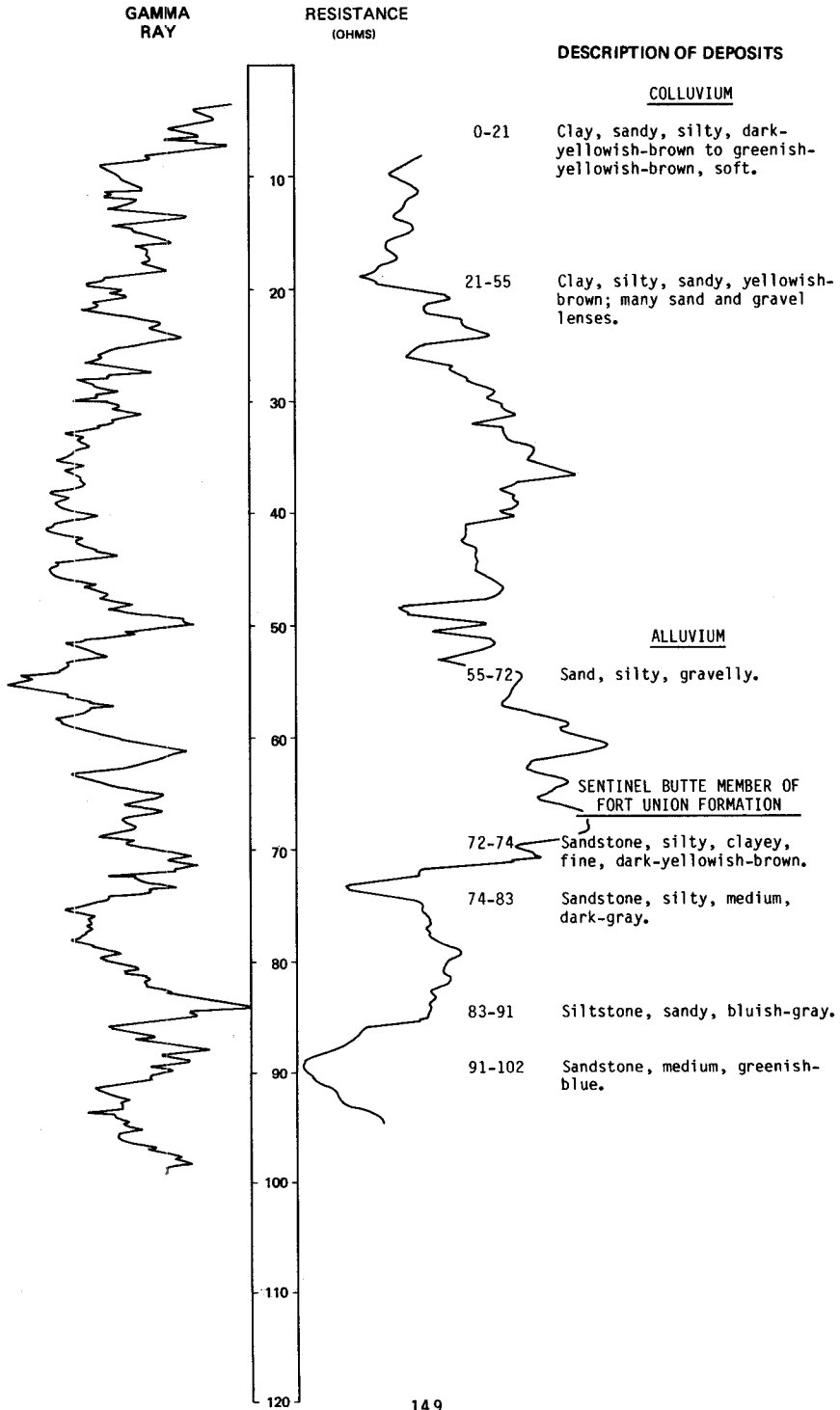


LOCATION: 149-100-35888

DATE DRILLED: 10/12/79

ALTITUDE: 2168
(FT, NGVD)

DEPTH: 102
(FT)



149-101-11CBB
NDSWC 11559

Altitude: 2251 feet

Date drilled: 5/07/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Silt, dark-yellowish-brown-----	20	20
	Clay, silty, dark-yellowish-brown-----	6	26
	Mudstone, dark-yellowish-brown-----	1	27
	Claystone, dark-greenish-gray to olive-gray-----	8	35
	Lignite, silty-----	5	40

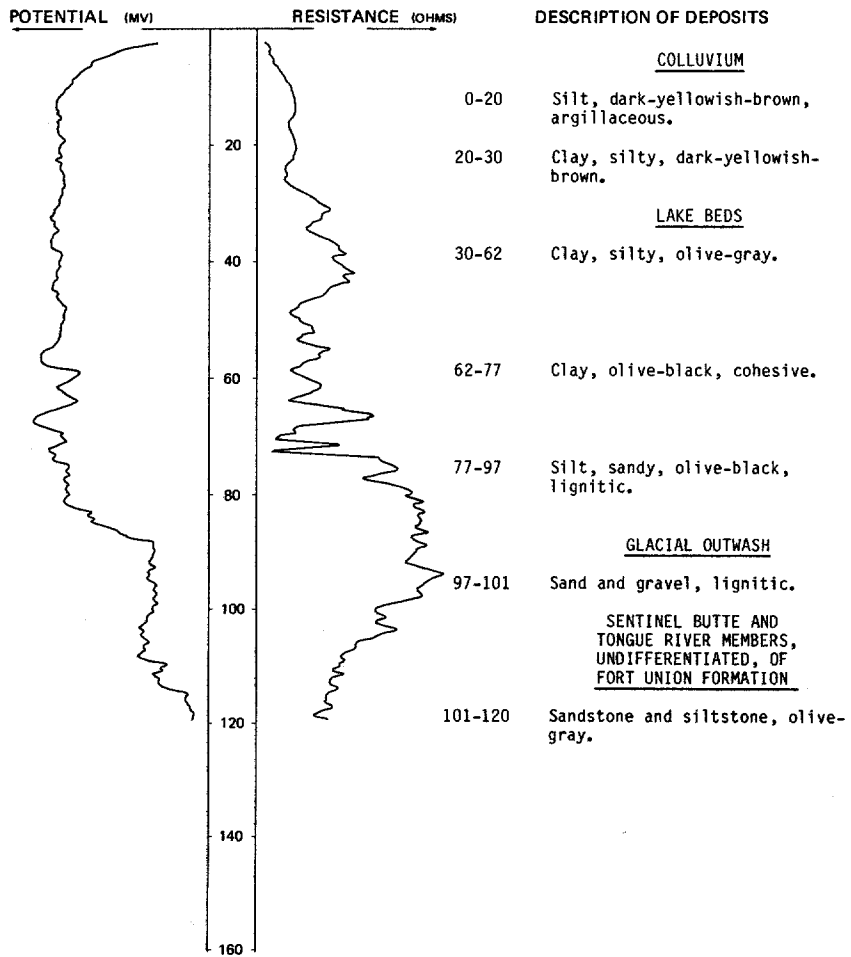
NDSWC 11560

LOCATION: 149-101-11CCB

DATE DRILLED: 5/07/81

ALTITUDE: 2253
(FT, NGVD)

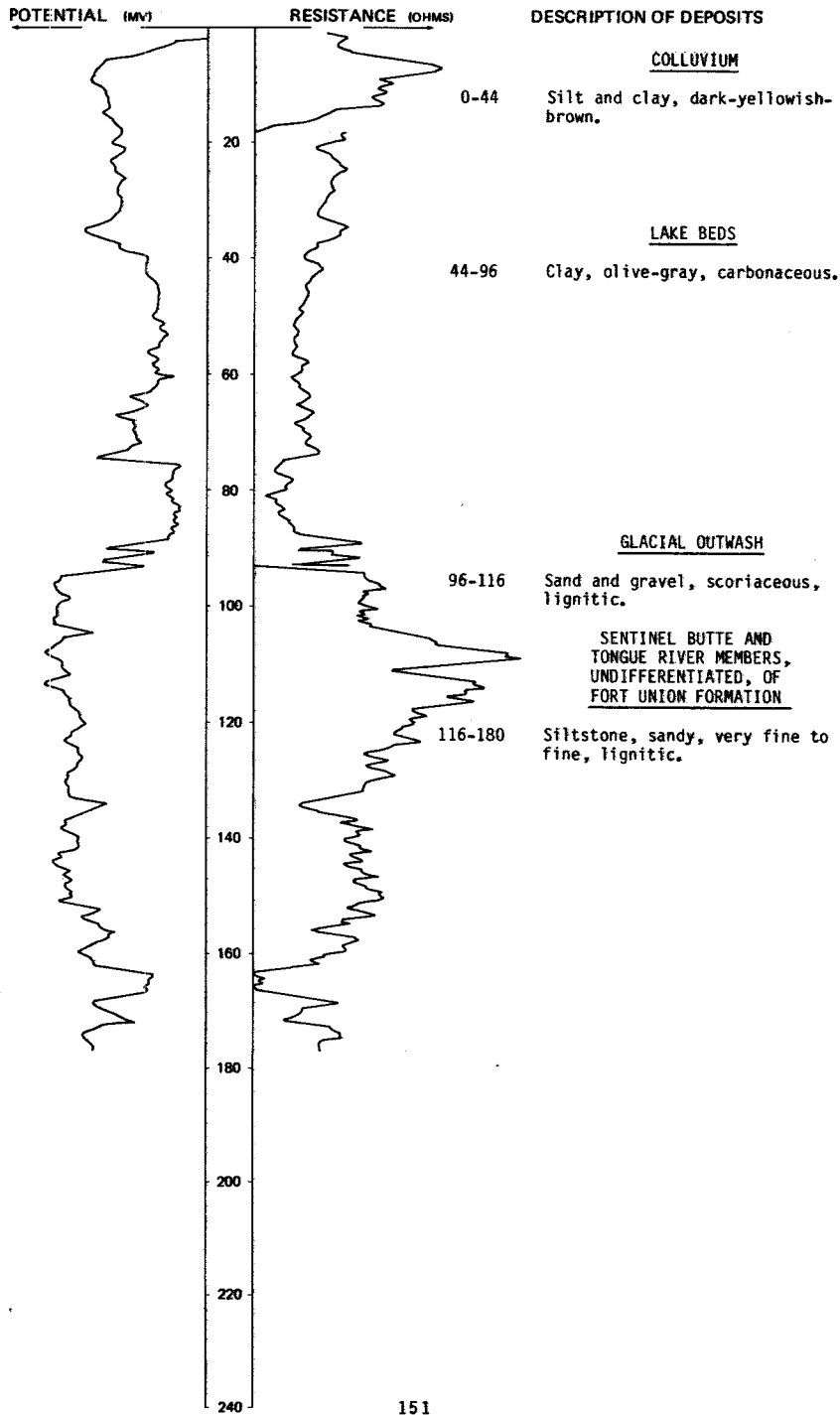
DEPTH: 120
(FT)



LOCATION: 149-101-1488A
ALTITUDE: 2277
(FT, NGVD)

NDSWC 11558

DATE DRILLED: 5/07/81
DEPTH: 180
(FT)



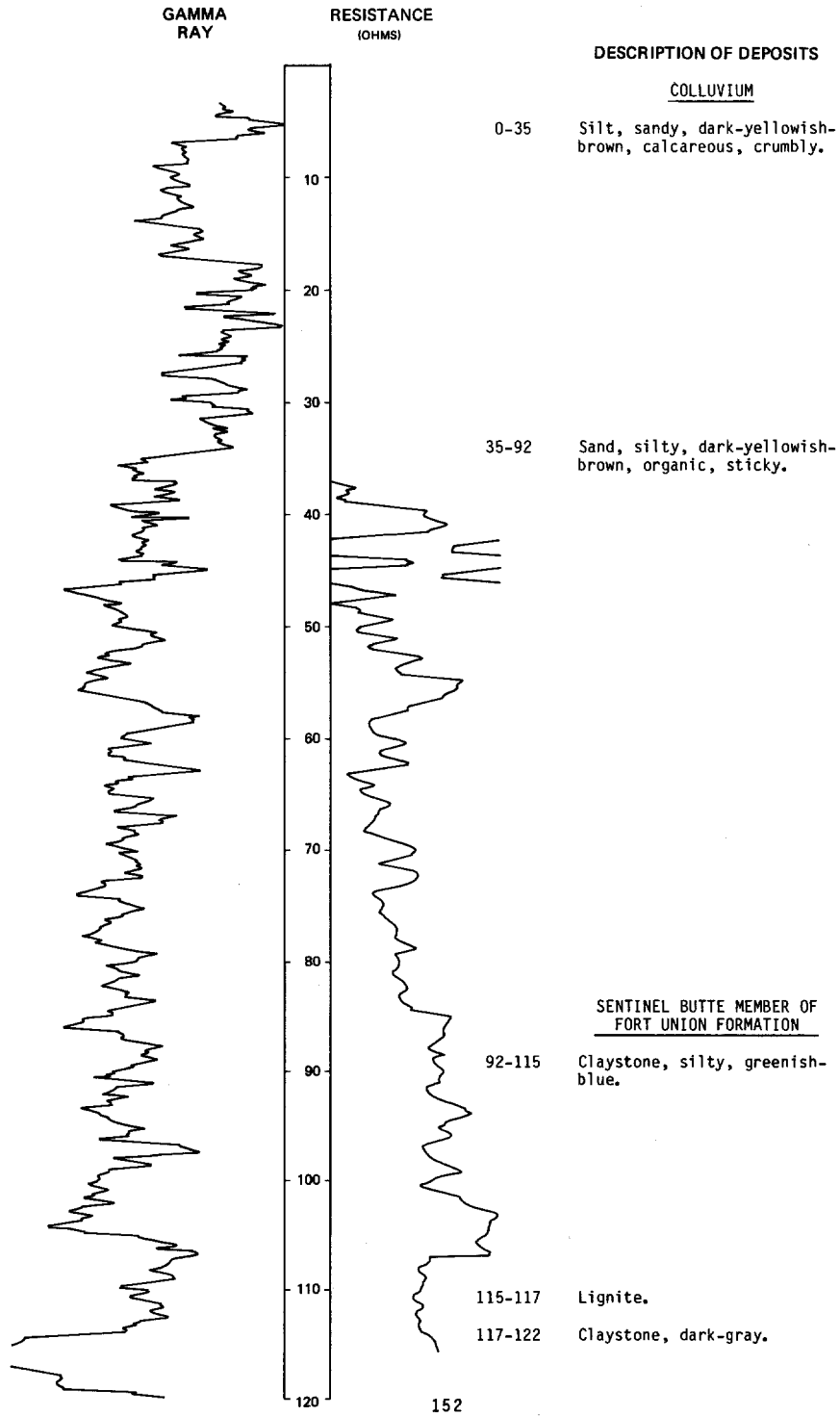
LOCATION: 149-101-34CCD

NDSWC 5623

DATE DRILLED: 10/11/79

ALTITUDE: 2275
(FT. NGVD)

DEPTH: 122
(FT)



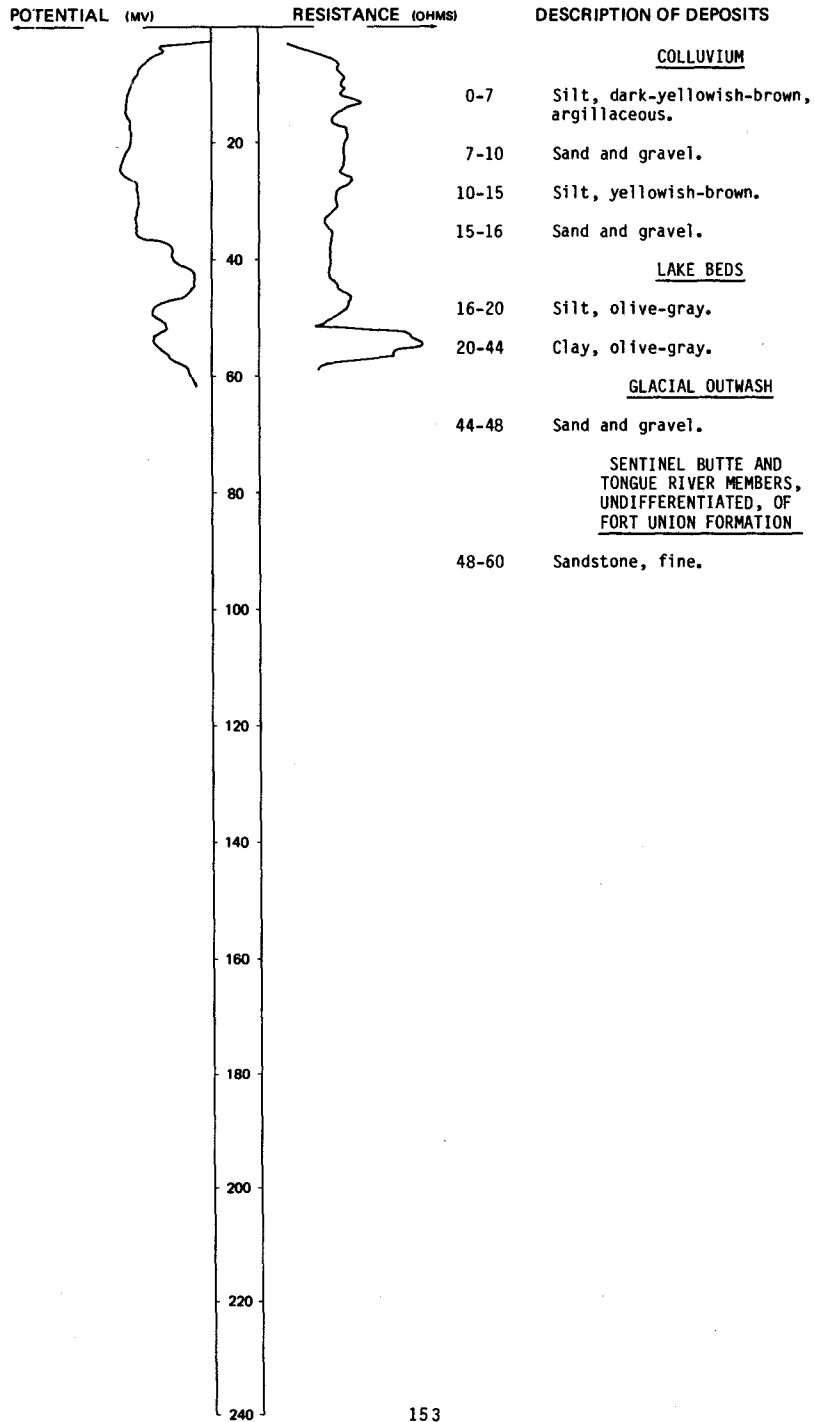
LOCATION: 149-102-03BCB

NDSWC 11562

DATE DRILLED: 5/07/81

ALTITUDE: 2140
(FT, NGVD)

DEPTH: 60
(FT)



149-102-03BCC
NDSWC 11564

Altitude: 2150 feet Date drilled: 5/07/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Silt, dark-yellowish-brown, argillaceous-----	25	25
	Sandstone, fine, lignitic-----	15	40

149-102-04AAD
NDSWC 11563

Altitude: 2140 feet Date drilled: 5/07/81

	Silt, dark-yellowish-brown, argillaceous-----	22	22
	Clay, sandy, olive-gray-----	7	29
	Claystone, gray, consolidated-----	11	40

149-102-11CCC1
(Log modified from Thompson Drilling Co.)

Altitude: 2210 feet Date drilled: 4/19/74

	Soil-----	3	3
	Sand, soft-----	12	15
	Sand, soft; water-----	25	40

149-102-11CCC2
(Log modified from Thompson Drilling Co.)

Altitude: 2210 feet Date drilled: 3/15/76

	Topsoil-----	3	3
	Sand, loose-----	13	16
	Sand, soft-----	25	41
	Clay-----	7	48
	Sand and gravel-----	8	56

149-102-11DCC
(Log modified from Thompson Drilling Co.)

Altitude: 2170 feet Date drilled: 8/27/75

	Topsoil-----	2	2
	Clay-----	13	15
	Sand, dirty, soft-----	10	25
	Sand, clean-----	10	35
	Clay-----	17	52
	Sand and pebbles-----	3	55
	Clay-----	1	56

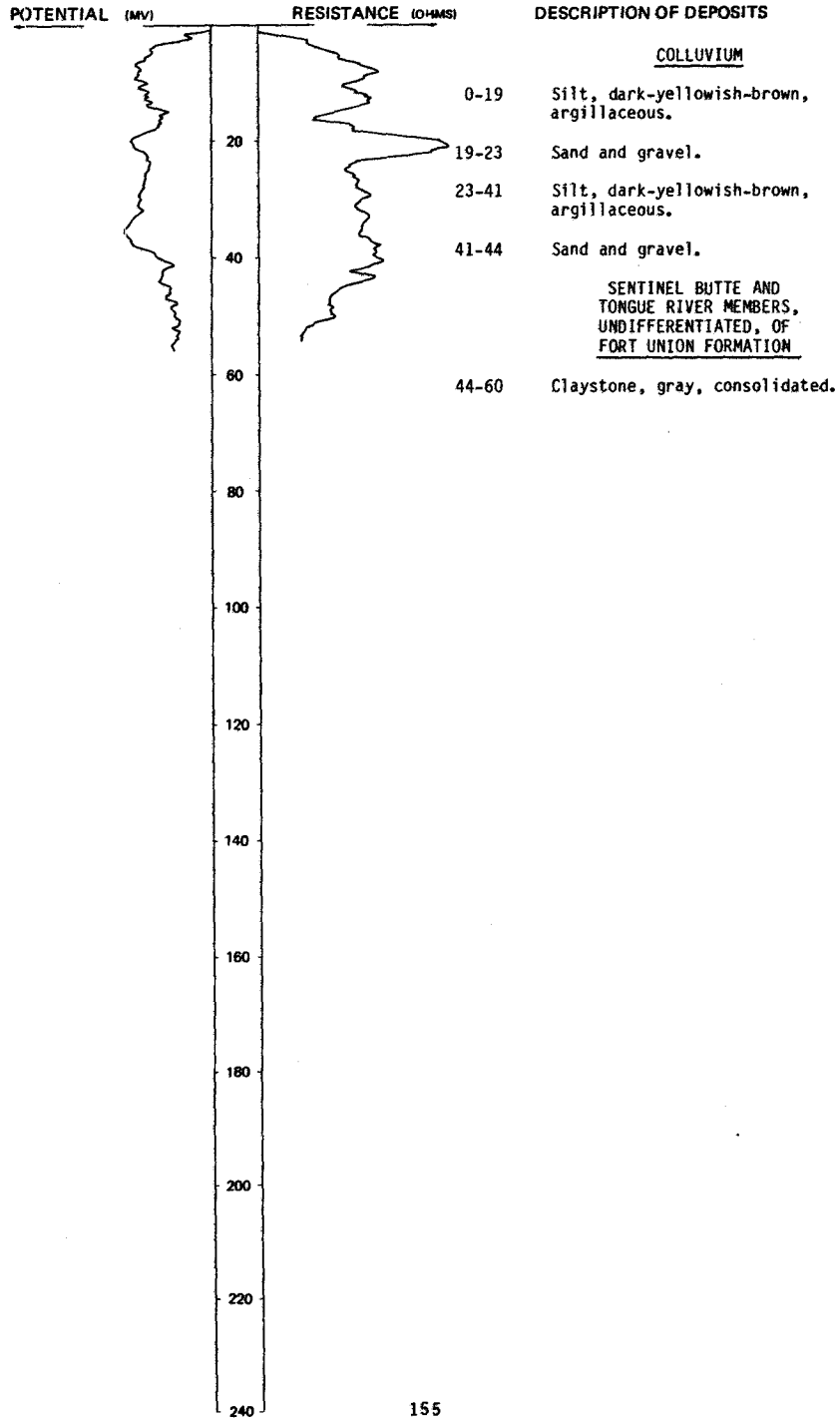
LOCATION: 149-102-14AAB

NDSWC 11561

DATE DRILLED: 5/07/81

ALTITUDE: 2180
(FT, NGVD)

DEPTH: 60
(FT)



149-102-31DAC
(Log modified from Harold Goodale)

Altitude: 2510 feet

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Fill-----	12	12
	Sandstone-----	3	15
	Sand-----	19	34
	Rock-----	2	36
	Shale-----	48	84
	Coal-----	2	86
	Shale-----	19	105
	Coal-----	13	118
	Shale-----	17	135
	Rock-----	1	136
	Shale-----	79	215
	Coal-----	3	218
	Shale-----	100	318
	Rock-----	4	322
	Shale-----	203	525
	Coal-----	10	535
	Shale-----	140	675
	Coal-----	10	685
	Shale-----	35	720
	Sand-----	1	721
	Shale-----	289	1010
	Rock-----	3	1013
	Shale-----	95	1108
	Rock-----	2	1110
	Shale-----	80	1190
	Coal-----	6	1196
	Shale-----	24	1220
	Shale, brown-----	20	1240
	Shale-----	45	1285
	Rock-----	4	1289
	Shale-----	6	1295
	Coal-----	3	1298
	Shale-----	67	1365
	Coal-----	5	1370
	Rock-----	2	1372
	Shale-----	33	1405
	Coal-----	10	1415
	Shale-----	102	1517
	Coal-----	8	1525
	Shale-----	40	1565
	Coal-----	8	1573
	Sand-----	47	1620
	Shale-----	15	1635
	Coal-----	5	1640
	Shale-----	60	1700
	Rock-----	5	1705
	Shale-----	35	1740
	Coal-----	15	1755
	Shale-----	15	1770
	Sand-----	10	1780
	Shale-----	5	1785
	Sand-----	10	1795
	Shale-----	10	1805
	Sand-----	110	1915
	Shale-----	5	1920

149-104-05CDC
(Log modified from Francis Boyce Water Well)

Altitude: 1947 feet

Date drilled: 8/10/67

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and yellow clay-----	5	5
	Clay, yellow-----	17	22
	Clay, yellow, and yellow sand-----	26	48
	Coal-----	9	57
	Clay, gray-----	8	65
	Sand, gray-----	3	68
	Clay, gray-----	20	88
	Rock, gray-----	2	90
	Clay, gray-----	11	101
	Rock, hard-----	2	103
	Clay or gray shale-----	9	112
	Coal-----	2	114
	Clay, gray-----	6	120
	Rock-----	15	135
	Clay or gray shale-----	46	181
	Rock-----	2	183
	Clay, gray-----	22	205
	Sandstone, gray-----	15	220
	Shale, gray-----	30	250
	Sandstone-----	80	330
	Shale, gray-----	116	446
	Coal-----	29	475
	Shale, gray-----	84	559
	Rock-----	2	561
	Shale, hard-----	20	581
	Sandstone; artesian water; 3 gallons per minute-----	20	601
	Shale, medium-hard-----	99	700
	Shale, gray, hard-----	42	742
	Coal-----	6	748
	Shale, hard-----	22	770
	Rock-----	4	774
	Shale, hard-----	38	812
	Shale, soft-----	6	818
	Shale, hard-----	7	825
	Sandstone; 4-1/2 gallons per minute-----	10	835

149-104-06ADB
(Log modified from Francis Boyce Water Well)

Altitude: 1902 feet

Date drilled: 7/06/71

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and brown clay-----	25	25
	Sand-----	36	61
	Gravel-----	26	87
	Clay, gray-----	36	123
	Coal-----	7	130
	Clay, gray-----	99	229
	Sandstone-----	1	230
	Clay, gray-----	28	258
	Coal-----	5	263
	Shale, gray-----	37	300
	Sandstone-----	2	302
	Shale, gray-----	68	370
	Coal-----	28	398
	Shale, gray-----	82	480
	Coal-----	16	496
	Clay, sandy, gray-----	14	510
	Sandstone-----	2	512
	Shale, gray-----	244	756
	Coal-----	4	760
	Sand, gray-----	20	780
	Shale, gray-----	87	867
	Coal-----	7	874
	Shale, gray-----	41	915
	Coal-----	7	922
	Shale, gray-----	9	931
	Sandstone-----	1	932
	Shale, gray-----	224	1156
	Coal-----	4	1160
	Clay, sandy, gray-----	30	1190
	Sandstone-----	2	1192
	Artesian water strata-----	28	1220

149-104-06DDD1
NDSWC 23

Altitude: 1960 feet

Date drilled: 6/07/57

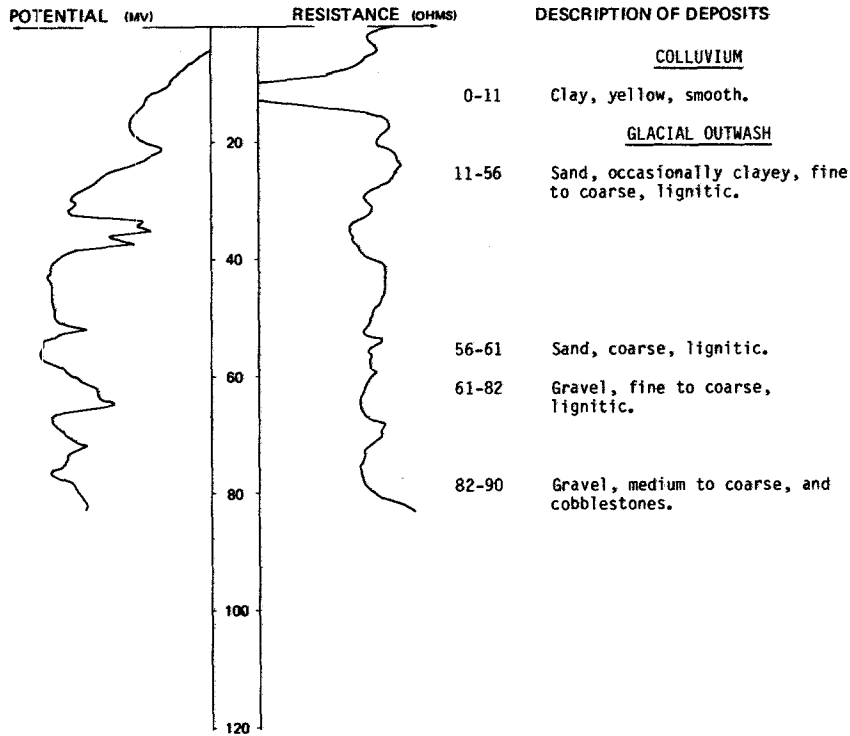
	Clay, sandy, yellow-----	19	19
	Sand, fine to medium, dirty-----	2	21
	Clay, sandy, yellow-----	21	42
	Clay, sandy, light-gray; some coal-----	21	63
	Sand, medium and coarse; some fine gravel and coal-----	7	70
	Clay, gray and green, smooth, hard; Fort Union Formation-----	10	80

LOCATION: 149-104-06DDD2
 ALTITUDE: 1960
 (FT, NGVD)

NDSWC 24

DATE DRILLED: 6/10/57

DEPTH: 90
 (FT)



149-104-28CDA
 (Log modified from Francis Boyce Water Well)

Altitude: 2075 feet

Date drilled: 7/17/71

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and brown sand-----	35	35
	Clay, gray-----	15	50
	Sand, gray-----	30	80
	Shale, gray-----	10	90
	Coal-----	5	95
	Shale, gray-----	16	111
	Coal-----	2	113
	Shale, gray-----	21	134
	Sandstone-----	1	135
	Sand, gray; water strata-----	18	153
	Shale, gray-----	5	158

149-104-28CDC
(Log modified from Francis Boyce Water Well)

Altitude: 2090 feet Date drilled: 11/03/79

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, brown, and clay-----	45	45
	Coal-----	3	48
	Clay, gray-----	87	135
	Sand, fine, gray-----	15	150
	Clay, gray-----	10	160

149-104-29ABB
(Log modified from Francis Boyce Water Well)

Altitude: 2040 feet Date drilled: 7/15/77

	Sand, brown, and clay-----	25	25
	Clay, gray, and sand; layers of coal-----	63	88
	Coal-----	10	98
	Clay, gray-----	2	100
	Coal-----	3	103

150-094-16ACC1
NDSWC 11360

Altitude: 1861 feet Date drilled: 9/11/80

	Sand and silt, very fine; 40 percent quartz and 60 percent dark grains-----	11	11
	Sand and gravel, very coarse to pebbly, rounded to angular-----	7	18
	Clay, medium-dark-gray, cohesive-----	8	26
	Sand, fine, gray, well-sorted, subangular-----	14	40

150-094-16ACC2
NDSWC 11361

Altitude: 1861 feet Date drilled: 9/11/80

	Clay, silty, dark-yellowish-brown-----	12	12
	Sand-----	1	13
	Sand and gravel, very coarse to pebbly, orange, rounded to angular; oxidized tint-----	2	15
	Clay, medium-dark-gray, cohesive; Sentinel Butte bedrock-----	4	19
	Lignite, brownish-black-----	1	20
	Sand, fine, gray, well-sorted, subangular-----	4	24
	Lignite, brownish-black-----	1	25
	Sand, fine, brownish-black, well-sorted, subangular-----	5	30
	Clay, medium-dark-gray, cohesive-----	10	40

150-095-14DCB
(Log modified from Thompson Drilling Co.)

Altitude: 2080 feet Date drilled: 12/13/72

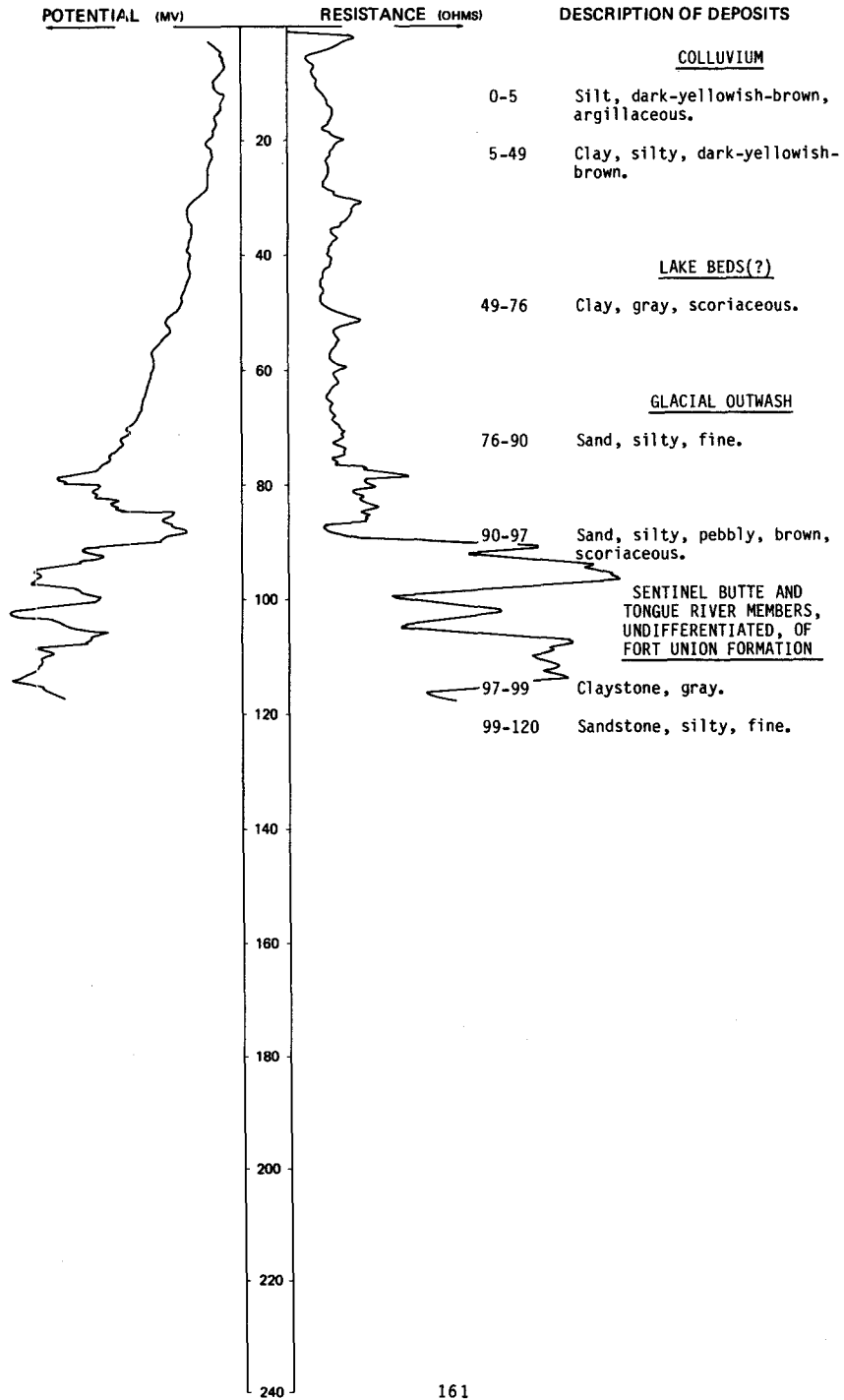
	Soil-----	3	3
	Clay, sandy-----	17	20
	Sand-----	15	35

LOCATION: 150-095-18DCD
ALTITUDE: 2245
(FT, NGVD)

NDSWC 11545

DATE DRILLED: 5/05/81

DEPTH: 120
(FT)



150-095-29CAC
(Log modified from Ralph Wold Well Drilling)

Altitude: 2300 feet Date drilled: 8/23/75

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	5	5
	Clay-----	45	50
	Coal-----	4	54
	Clay-----	6	60
	Rock-----	2	62
	Clay-----	10	72
	Coal-----	33	105
	Clay-----	20	125
	Clay, sandy, and shale-----	35	160
	Sand-----	4	164
	Clay-----	12	176
	Clay, sandy-----	34	210
	Sand and water-----	30	240

150-096-02CD
(Log modified from Thompson Drilling Co.)

Altitude: 2370 feet Date drilled: 9/08/73

	Clay-----	45	45
	Coal-----	10	55
	Clay-----	6	61
	Coal-----	3	64
	Clay-----	34	98
	Coal-----	2	100
	Clay-----	10	110
	Sand, coarse-----	3	113
	Clay-----	3	116
	Sand-----	10	126
	Coal-----	3	129
	Clay-----	13	142
	Coal-----	7	149
	Sand, hard-----	9	158
	Clay-----	14	172
	Coal-----	4	176
	Clay-----	20	196
	Sand-----	26	222
	Clay-----	6	228
	Sand, bluish-gray-----	44	272
	Clay-----	6	278
	Coal-----	2	280
	Clay-----	10	290
	Sand, coal, and water-----	10	300

LOCATION: 150-096-0588C

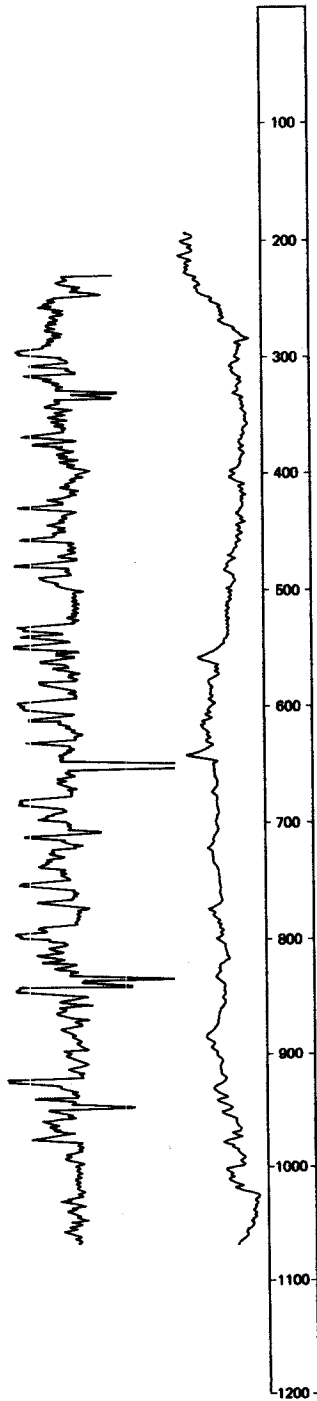
DATE DRILLED: 12/05/81

ALTITUDE: 2410
(FT, NGVD)

DEPTH: 1067
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

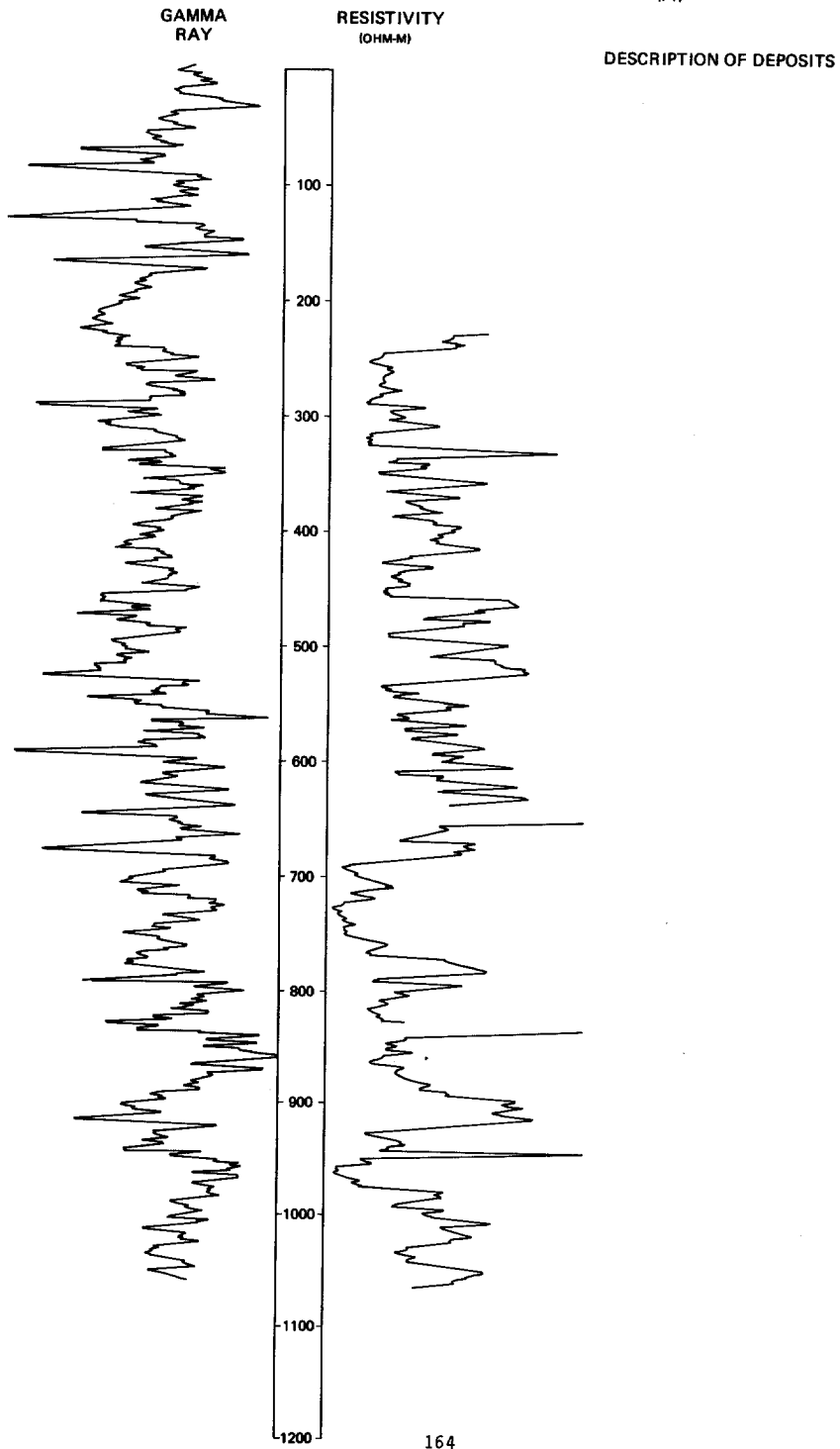
- 0-15 Colluvium.
SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 15-54 Claystone and sandstone.
- 54-124 Lignite and claystone.
- 124-275 Siltstone and sandstone.
TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 275-450 Lignite and claystone, gray.
- 450-680 Siltstone and sandstone, gray, carbonaceous, lignitic.
- 680-750 Siltstone and claystone, gray.
- 750-850 Siltstone, sandy, gray.
- 850-875 Claystone, silty, gray.
- 875-975 Sandstone and siltstone.
LOWER PART OF FORT UNION FORMATION(?)
- 975-1067 Sandstone, fine to medium, gray.

LOCATION: 150-096-0588C NDSWC 6050, Continued

DATE DRILLED: 12/05/81

ALTITUDE: 2410
(FT, NGVD)

DEPTH: 1067
(FT)

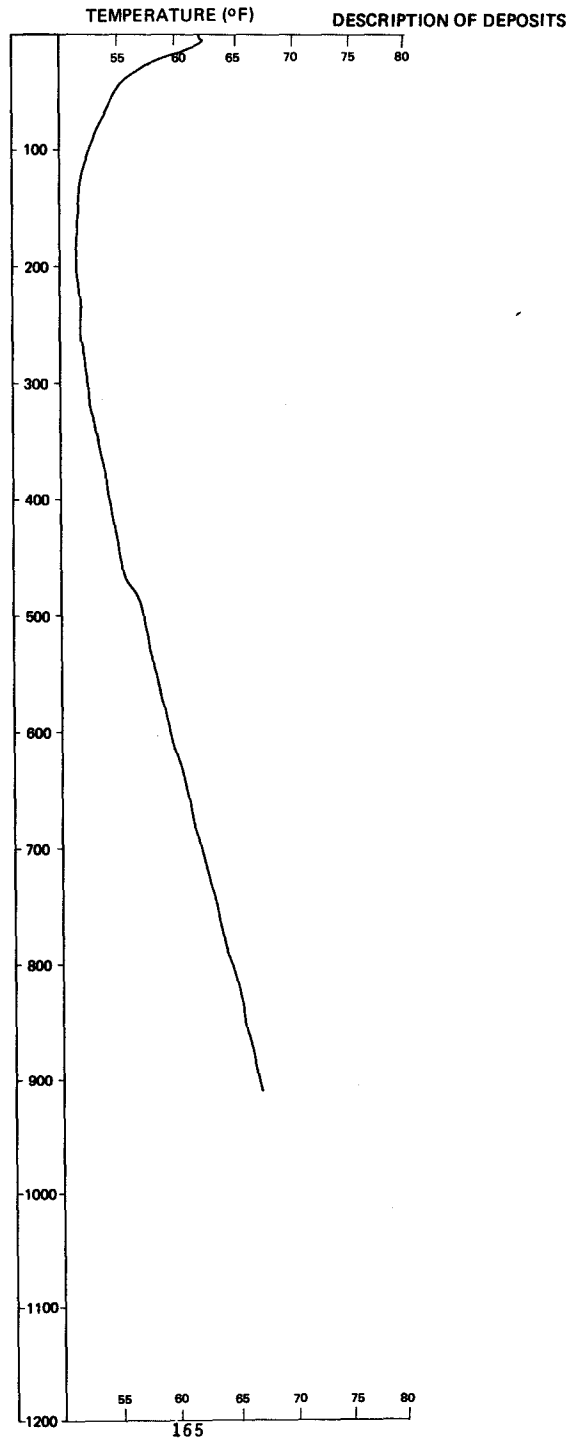


LOCATION: 150-096-0588C NDSWC 6050, Continued

DATE DRILLED: 12/05/81

ALTITUDE: 2410
(FT, NGVD)

DEPTH: 1067
(FT)



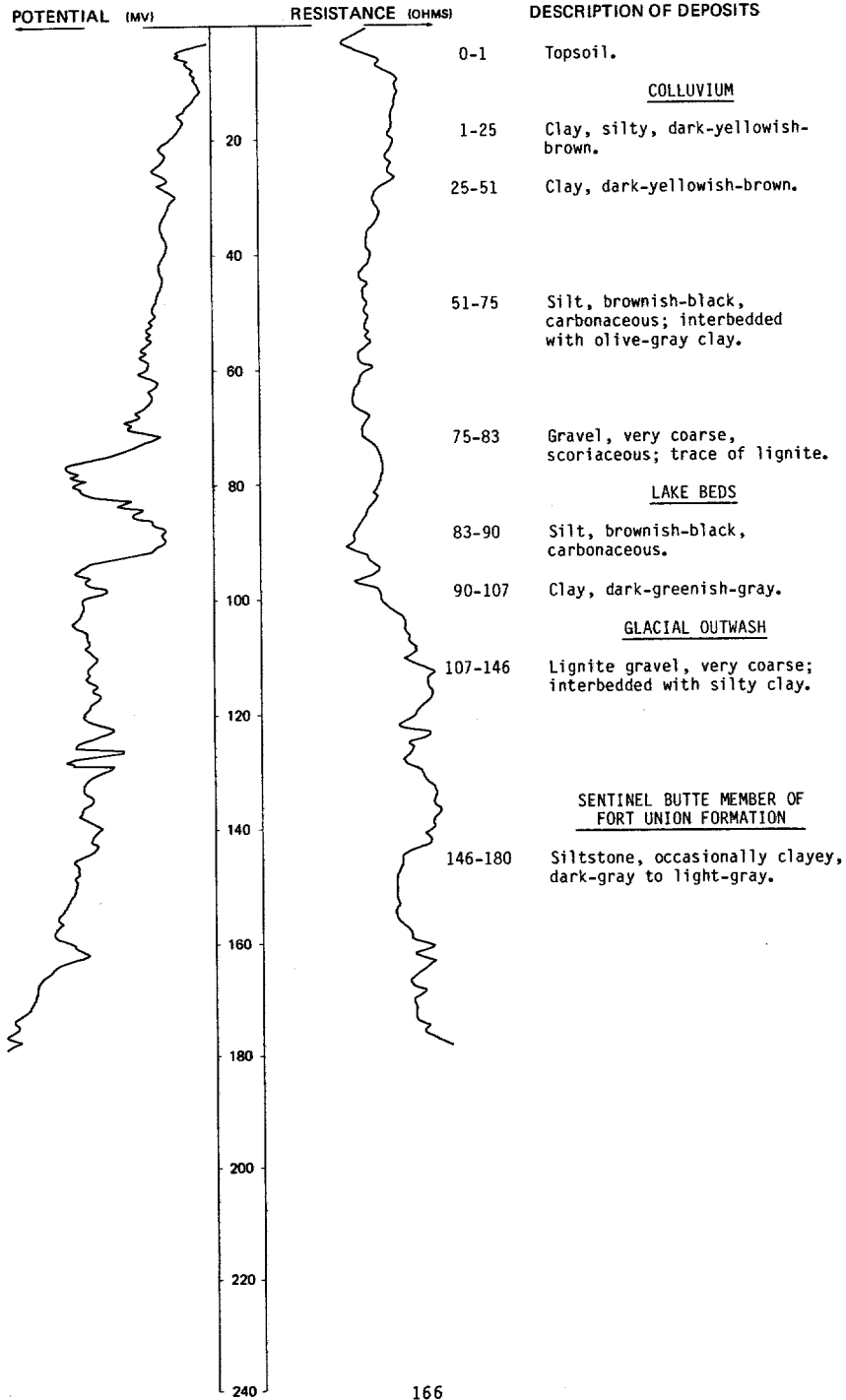
LOCATION: 150-096-10ABA

NDSWC 11368

DATE DRILLED: 9/16/80

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 180
(FT)



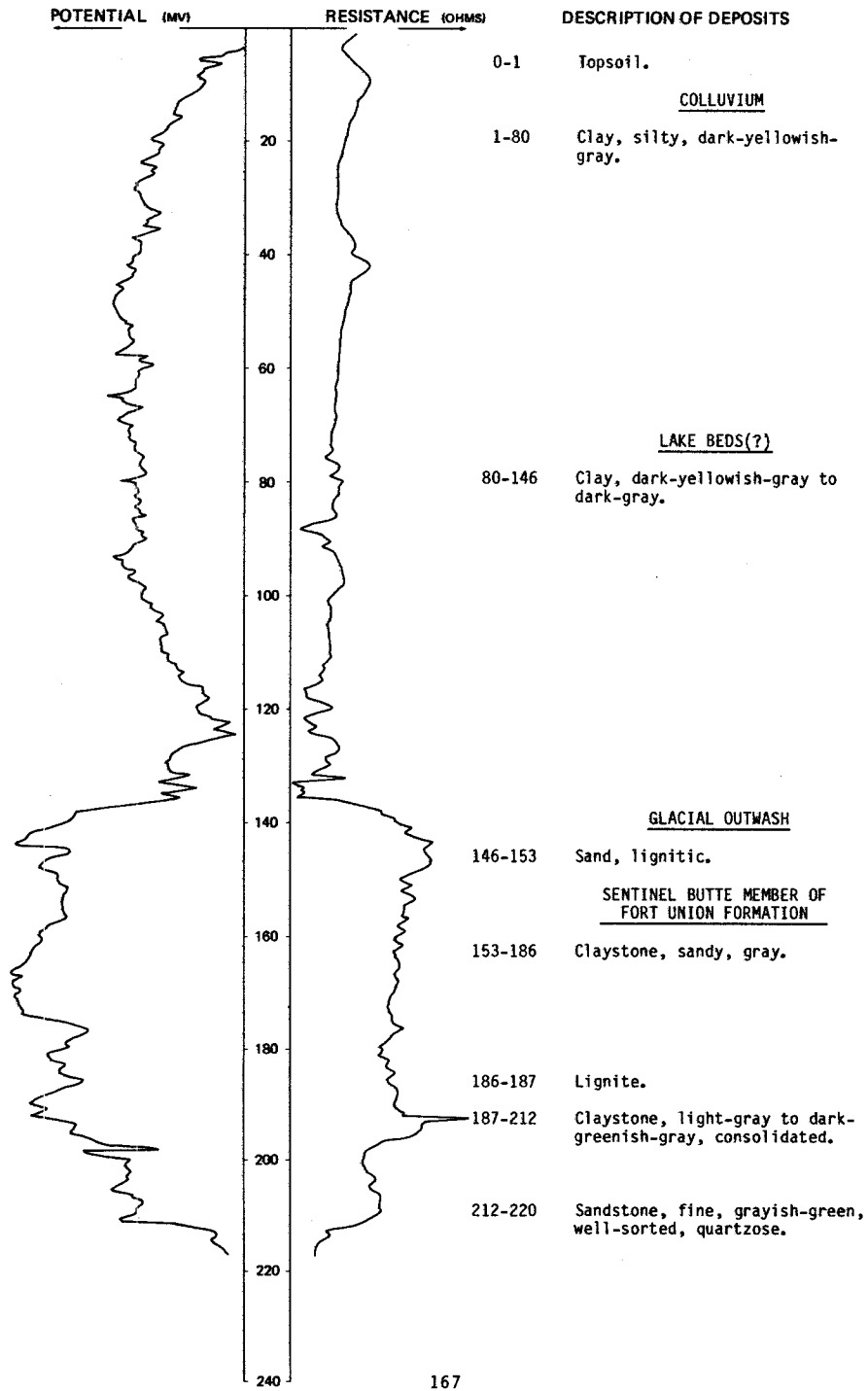
LOCATION: 150-096-10A80

NDSWC 11367

DATE DRILLED: 9/16/80

ALTITUDE: 2290
(FT, NGVD)

DEPTH: 220
(FT)



LOCATION: 150-096-18CDC

NDSWC 6045

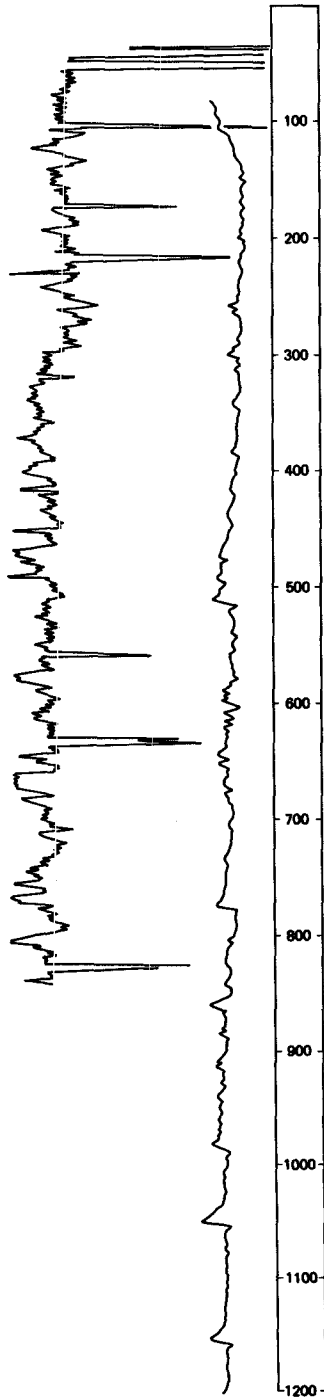
DATE DRILLED: 11/07/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1300
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

- 0-1 Topsoil.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 1-20 Siltstone, sandy, clayey, yellow.
- 20-21 Lignite.
- 21-60 Sandstone and siltstone, gray.
- 60-66 Lignite.
- 66-435 Siltstone and sandstone, fine to medium, gray, carbonaceous.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

- 435-437 Lignite.
- 437-490 Sandstone and siltstone, gray.
- 490-500 Lignite.
- 500-590 Sandstone and siltstone, fine to medium, gray.
- 590-600 Lignite.
- 600-680 Sandstone and siltstone.
- 680-718 Lignite and claystone.
- 718-784 Siltstone and claystone.
- 784-1120 Sandstone and siltstone, fine to medium, carbonaceous.

LOWER PART OF FORT UNION FORMATION

- 1120-1300 Siltstone and claystone, gray, carbonaceous.

LOCATION: 150-096-18CDC

DATE DRILLED: 11/07/81

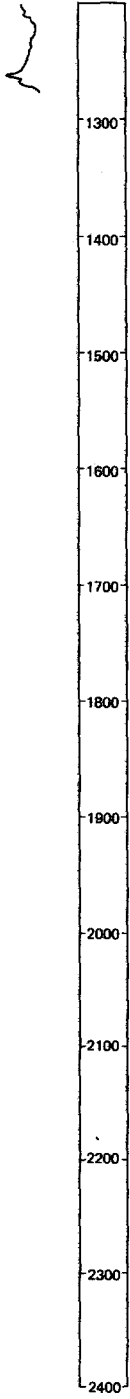
ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1300
(FT)

NEUTRON
(API)

S.P.
(MV)

DESCRIPTION OF DEPOSITS



LOCATION: 150-096-18CDC

NDSWC 6045, Continued

DATE DRILLED: 11/07/81

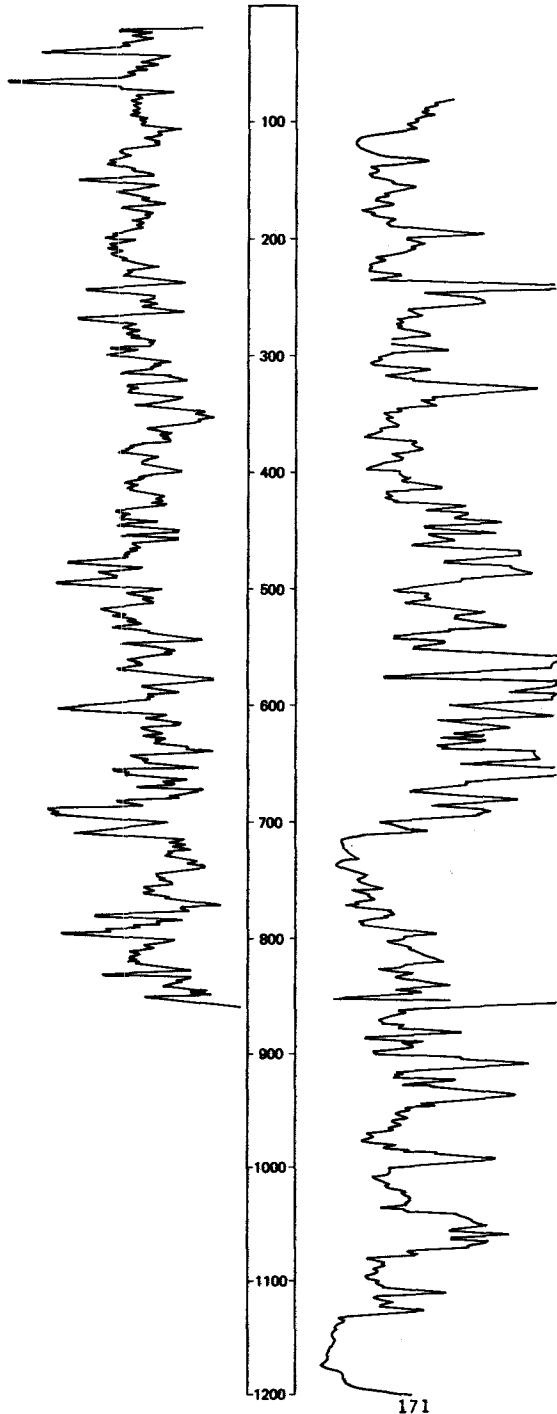
ALTITUDE: 2300
(FT. NGVD)

DEPTH: 1300
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



LOCATION: 150-096-18CDC

DATE DRILLED: 11/07/81

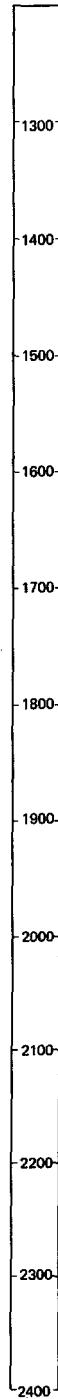
ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1300
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

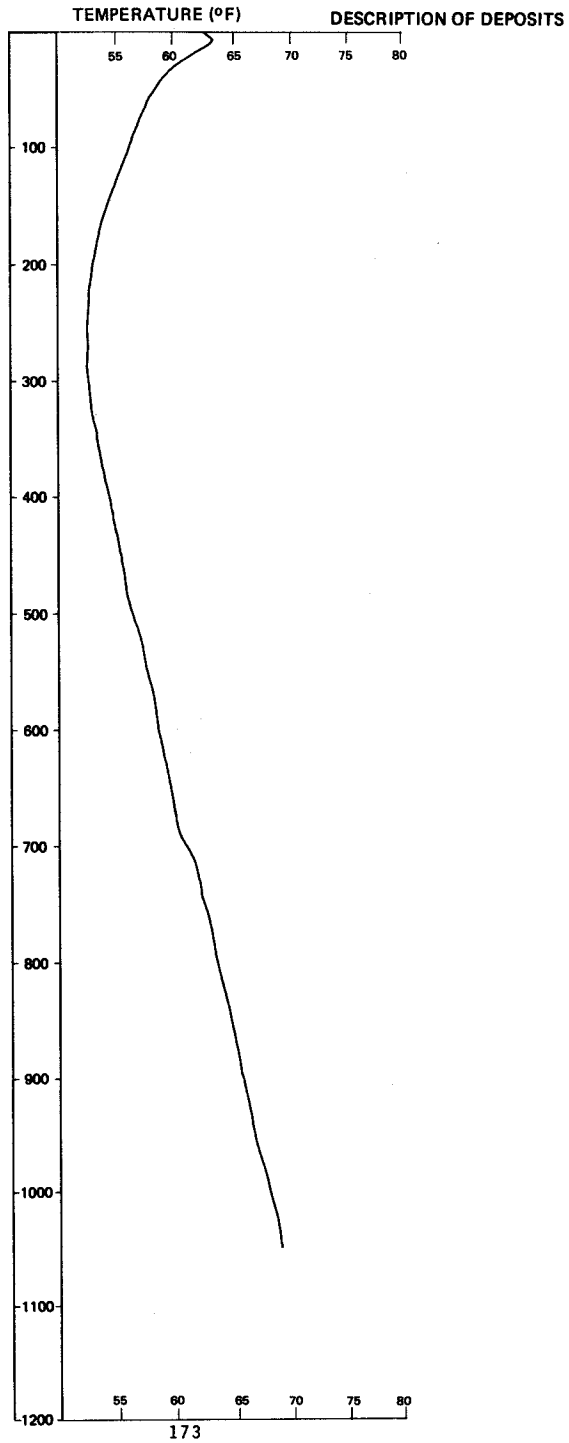


LOCATION: 150-096-18CDC

DATE DRILLED: 11/07/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1300
(FT)

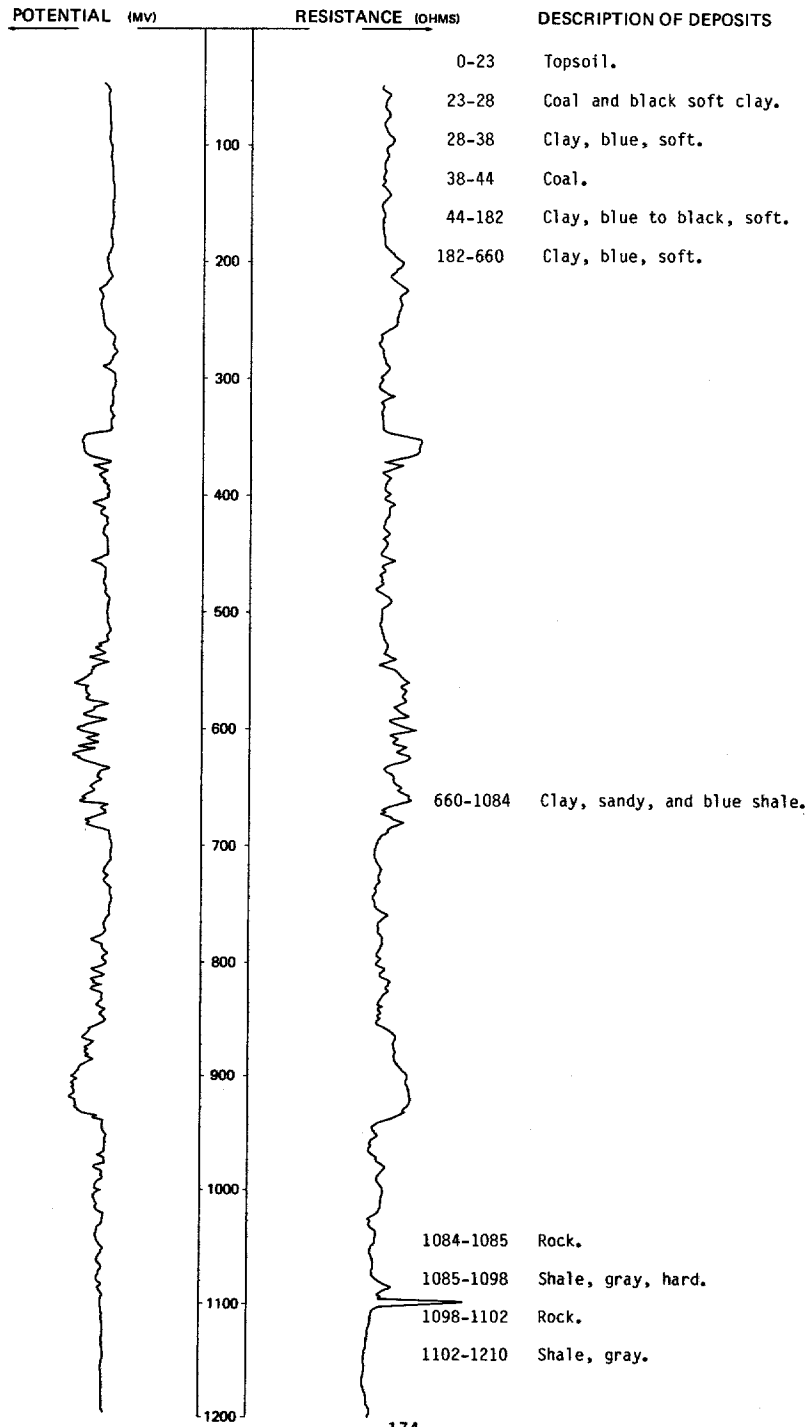


(Log modified from L.T.P. Enterprises Inc.)
LOCATION: 150-096-26DC8

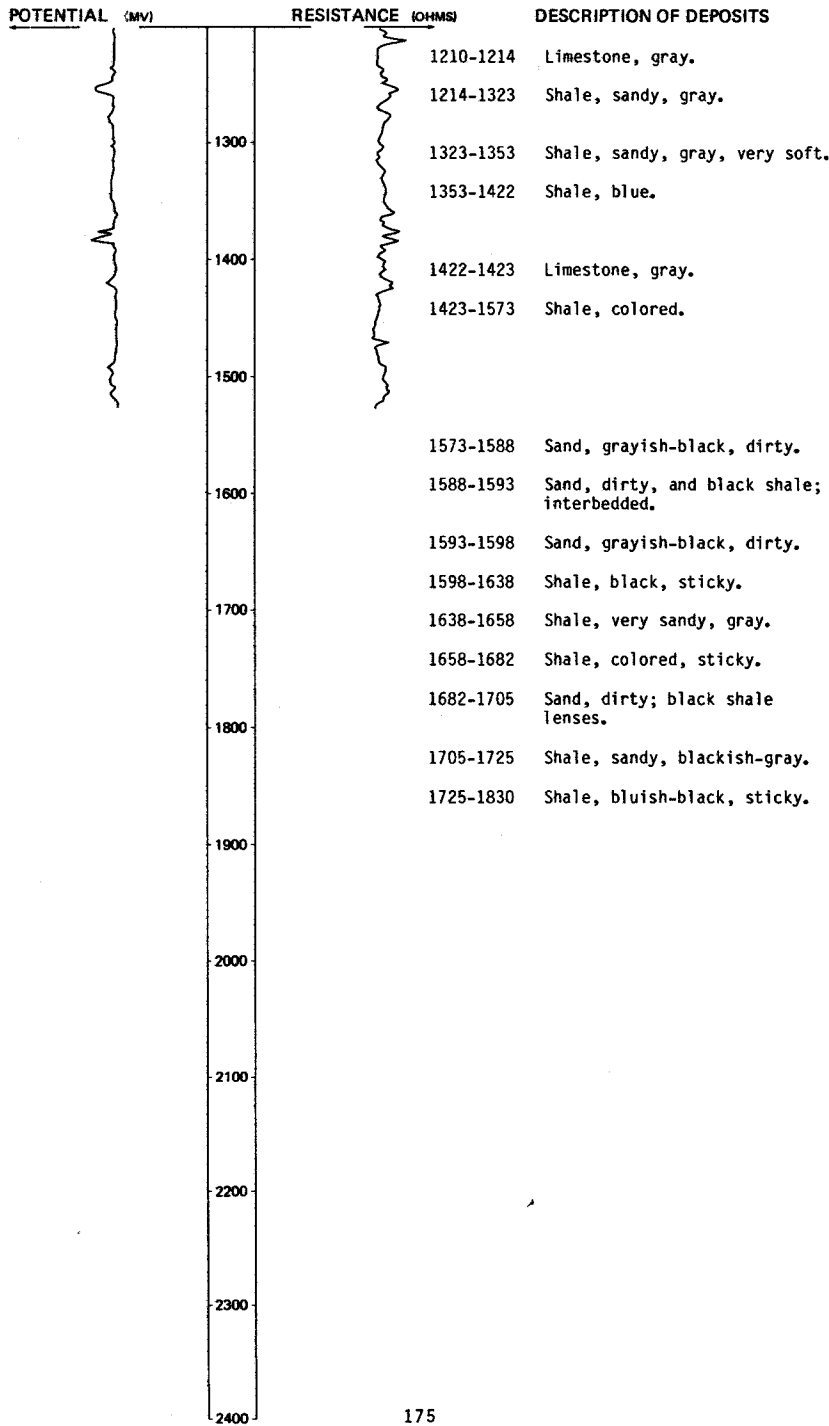
DATE DRILLED: 3/24/80

ALTITUDE: 2325
(FT, NGVD)

DEPTH: 1830
(FT)



(Log modified from L.T.P. Enterprises Inc.), Continued
 LOCATION: 150-096-26DCB DATE DRILLED: 3/24/80
 ALTITUDE: 2325 DEPTH: 1830
 (FT, NGVD) (FT)

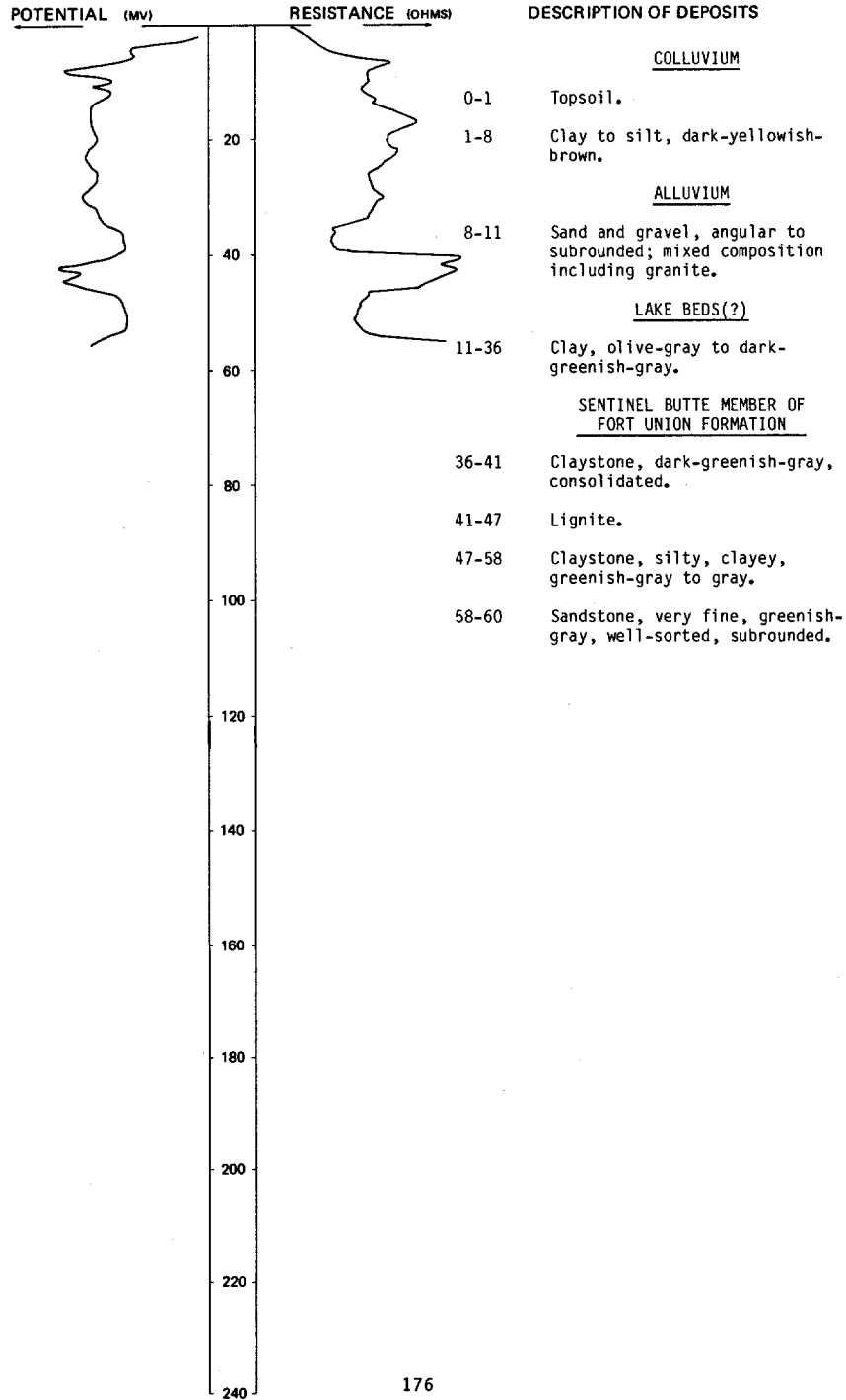


LOCATION: 150-096-27DAD

DATE DRILLED: 9/16/80

ALTITUDE: 2290
(FT, NGVD)

DEPTH: 60
(FT)



150-096-29CCD1
(Log modified from Thompson Drilling Co.)

Altitude: 2310 feet Date drilled: 9/30/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	50	50
	Sand-----	20	70
	Sand, fine, soft-----	55	125
	Clay, blue-----	5	130

150-096-29CCD2
(Log modified from Thompson Drilling Co.)

Altitude: 2310 feet Date drilled: 10/13/66

	Clay-----	6	6
	Coal, broken-----	3	9
	Clay-----	9	18
	Coal-----	6	24
	Clay-----	14	38
	Sand, yellow, hard-----	4	42
	Sand, brown-----	4	46
	Coal-----	5	51
	Clay-----	7	58
	Sand, gray-----	10	68
	Sandstone-----	3	71
	Sand, dirty, soft-----	65	136

150-097-09DC
(Log modified from Thompson Drilling Co.)

Altitude: 2250 feet Date drilled: 6/21/77

	Soil-----	3	3
	Sand-----	22	25
	Clay-----	11	36
	Coal-----	2	38
	Clay-----	5	43
	Sand, brown-----	33	76
	Clay-----	2	78
	Coal-----	4	82
	Clay-----	13	95
	Sand, gray-----	16	111
	Hard shell-----	2	113
	Sand, gray-----	17	130
	Sand, blue-----	5	135

150-097-14BAB
(Log modified from Thompson Drilling Co.)

Altitude: 2140 feet Date drilled: 1/ /75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay-----	19	21
	Sand-----	15	36
	Clay, sandy-----	12	48
	Gravel-----	2	50

150-097-15DCC
(Log modified from Thompson Drilling Co.)

Altitude: 2120 feet Date drilled: 7/25/73

	Soil-----	2	2
	Clay-----	43	45
	Sand; some water-----	15	60
	Clay-----	25	85
	Sand-----	33	118
	Coal-----	2	120

150-097-16BB
(Log modified from Thompson Drilling Co.)

Altitude: 2135 feet Date drilled: 6/23/77

	Soil-----	2	2
	Clay-----	17	19
	Coal-----	2	21
	Clay-----	13	34
	Sand, brown-----	31	65
	Clay-----	8	73
	Coal-----	2	75
	Clay-----	19	94
	Coal-----	2	96
	Clay-----	21	117
	Sand, gray-----	3	120
	Sand, blue-----	8	128

150-097-17DBA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2020 feet Date drilled: 7/03/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Till, sandy-----	22	22
	Gravel-----	6	28
	Sand-----	10	38
	Clay-----	4	42

150-097-18ADD1
(Log modified from Ralph Wold Well Drilling)

Altitude: 2075 feet Date drilled: 2/15/73

	Clay-----	12	12
	Coal-----	6	18
	Clay-----	32	50
	Sand-----	16	66
	Clay-----	5	71
	Coal-----	3	74
	Clay-----	6	80

150-097-18ADD2
(Log modified from Thompson Drilling Co.)

Altitude: 2075 feet Date drilled: 5/16/74

	Sand, soft-----	25	25
	Clay-----	17	42
	Sand, bluish-gray-----	13	55
	Sand, blue, cavy-----	10	65

150-097-18DAB
(Log modified from Thompson Drilling Co.)

Altitude: 2060 feet Date drilled: 5/17/74

	Soil-----	3	3
	Clay-----	32	35
	Hard shell-----	2	37
	Clay-----	5	42
	Sand, brown-----	4	46
	Sand, gray-----	9	55
	Water, blue-----	11	66
	Clay, blue-----	2	68
	Water and soft coal-----	2	70

150-097-20ADD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2120 feet

Date drilled: 2/20/73

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	12	12
	Clay-----	10	22
	Coal slack-----	2	24
	Clay-----	19	43
	Sand, yellow-----	5	48
	Sand, blue-----	14	62
	Clay-----	6	68
	Coal-----	6	74
	Clay-----	14	88
	Coal-----	4	92
	Clay-----	50	142
	Coal-----	3	145
	Clay-----	47	192
	Rock-----	1	193
	Clay-----	23	216
	Coal-----	8	224
	Clay-----	16	240

150-097-27CA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2240 feet

Date drilled: 3/12/73

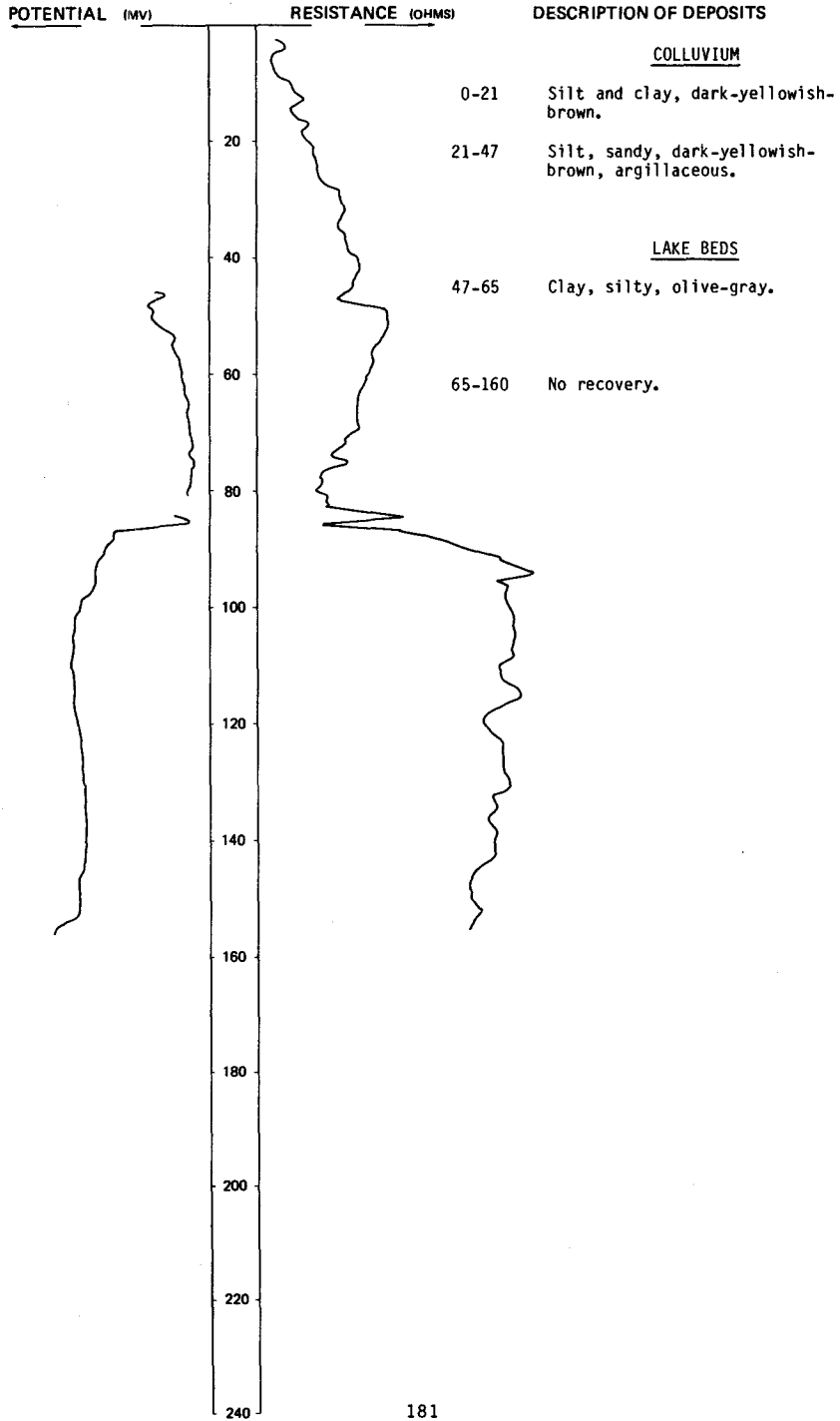
	Sand-----	18	18
	Clay-----	4	22
	Coal-----	3	25
	Clay, blue-----	11	36
	Rock-----	2	38
	Clay-----	30	68
	Coal-----	12	80
	Clay-----	38	118
	Coal-----	4	122
	Clay-----	112	234
	Rock-----	3	237
	Clay, sandy-----	43	280
	Coal-----	10	290
	Clay-----	52	342
	Coal-----	6	348
	Shale-----	17	365
	Clay-----	15	380

LOCATION: 150-098-02AAA
ALTITUDE: 2040
(FT, NGVD)

NDSWC 11735

DATE DRILLED: 9/23/81

DEPTH: 160
(FT)



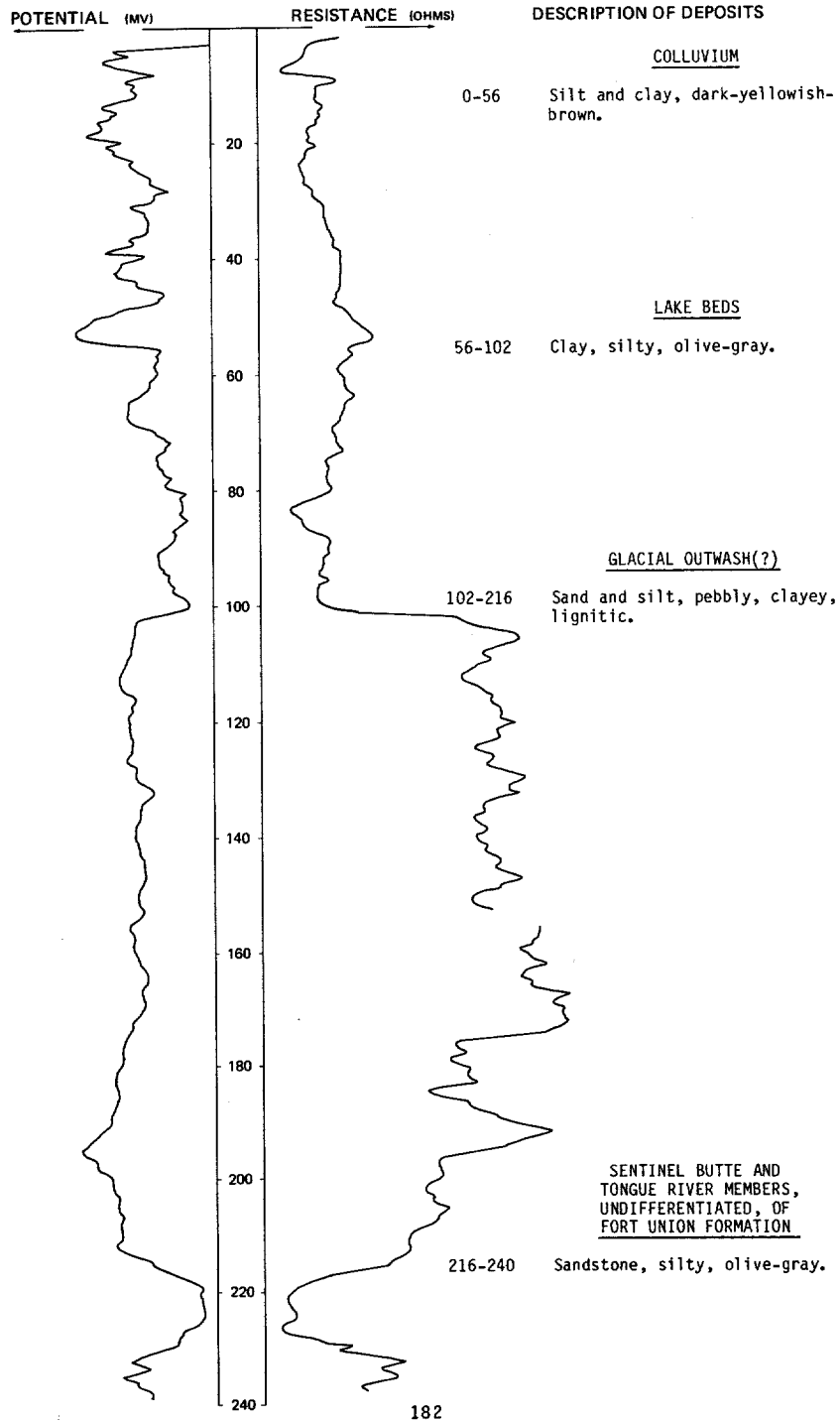
LOCATION: 150-098-02AAB

NDSWC 11736

DATE DRILLED: 9/23/81

ALTITUDE: 2040
(FT, NGVD)

DEPTH: 240
(FT)

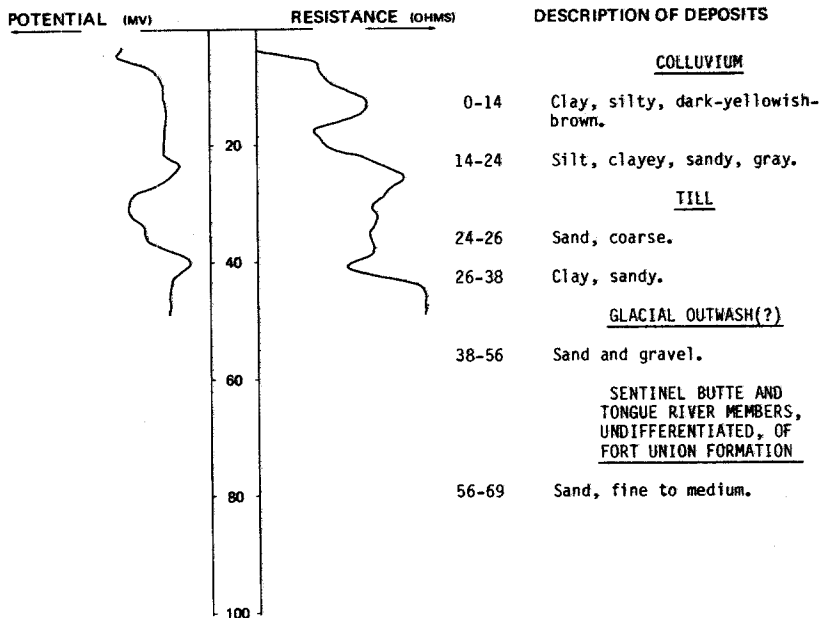


LOCATION: 150-098-03ABA
 ALTITUDE: 2020
 (FT, NGVD)

NDSWC 11733

DATE DRILLED: 9/22/81

DEPTH: 69
 (FT)

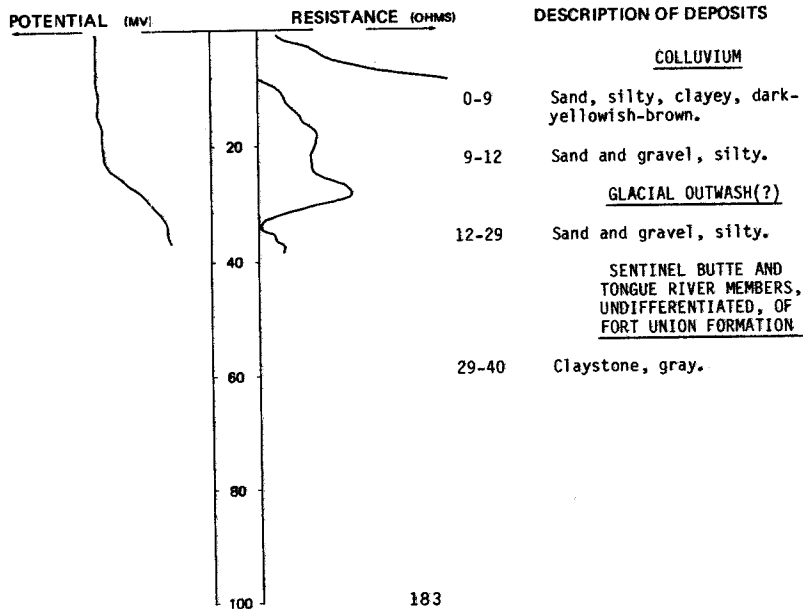


LOCATION: 150-098-03ABB
 ALTITUDE: 2020
 (FT, NGVD)

NDSWC 11734

DATE DRILLED: 9/22/81

DEPTH: 40
 (FT)



150-098-04BAA
NDSWC 11742

Altitude: 2030 feet

Date drilled: 9/23/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand and gravel-----	4	4
	Sand, fine to medium, consolidated-----	16	20

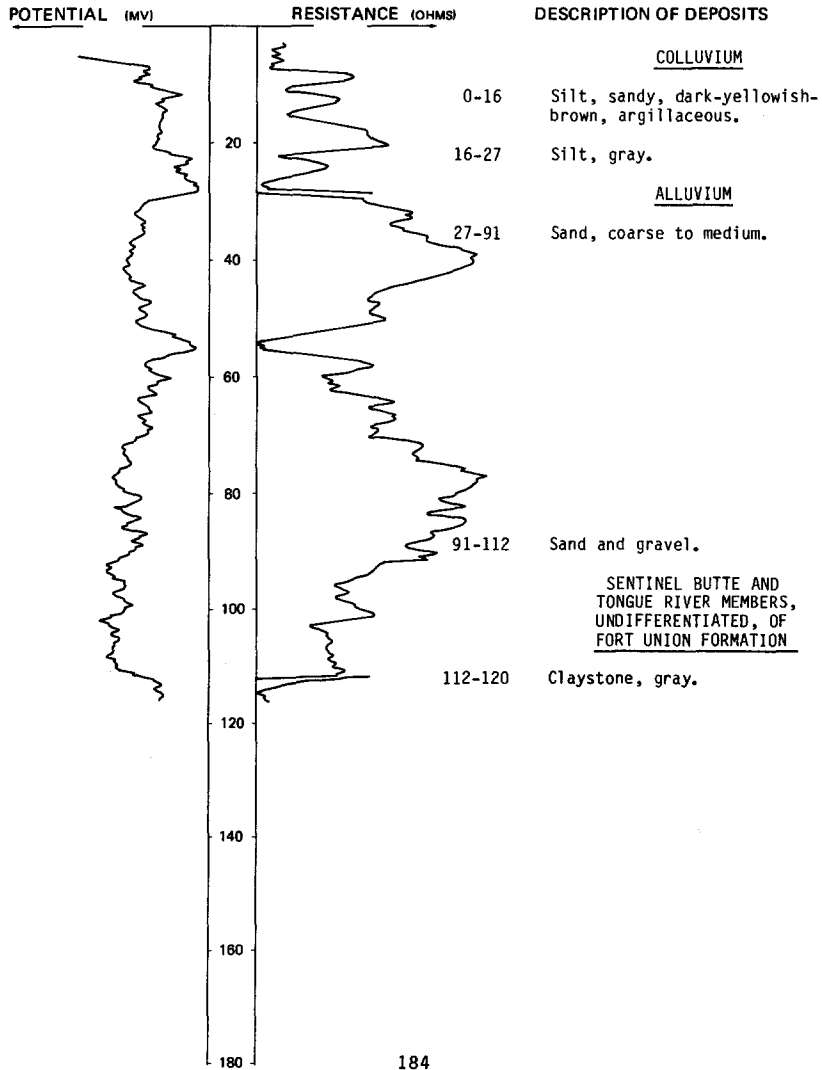
NDSWC 11743

LOCATION: 150-098-06AAA

DATE DRILLED: 9/23/81

ALTITUDE: 2046
(FT, NGVD)

DEPTH: 120
(FT)



150-098-06ABD
(Log modified from Russell Drilling Co.)

Altitude: 2065 feet Date drilled: 11/ /77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay, yellow-----	16	17
	Sand, yellow-----	3	20
	Clay, gray-----	30	50
	Sand and gravel-----	8	58
	Clay-----	28	86
	Sand, fine-----	4	90
	Gravel, coarse, and sand-----	25	115
	Till-----	35	150
	Bedrock-----	10	160

150-098-06ADA
NDSWC B

Altitude: 2050 feet Date drilled: 5/06/80

	Clay, sandy, yellowish-brown, semisoft-----	24	24
	Clay, sandy, yellowish-brown; siltier and softer than sand from 0 to 24 feet-----	34	58
	Sand, fine to medium; some gravel layers-----	5	63
	Sand, medium to coarse, well-rounded, and fine subrounded to subangular gravel-----	75	138
	Gravel, sandy; poor return-----	2	140
	Sand, medium to coarse, well-rounded; clay layers-----	3	143

150-098-06ADD2
NDSWC C

Altitude: 2040 feet Date drilled: 5/06/80

	Clay, sandy, yellowish-brown, firm; lenses of coarse gravel and pebbles-----	23	23
	Clay, sandy, dark-olive-gray, firm-----	20	43
	Sand, fine to coarse, well-rounded; some fine gravel-----	32	75
	Clay, sandy-----	2	77
	Sand, fine to coarse, subrounded; some medium to coarse angular gravel; some 1/2- to 1-inch pebbles-----	33	110
	Sand, coarse, well-rounded-----	18	128
	Clay, sandy, light-gray, smooth, sticky-----	15	143

150-098-06BAB
NDSWC 11745

Altitude: 2140 feet Date drilled: 9/24/81

	Topsoil, dark-brown-----	2	2
	Sand, silty, dark-yellowish-brown, argillaceous-----	8	10
	Sand and gravel, oxidized-----	3	13
	Sandstone, medium, consolidated-----	14	27
	Claystone, dark-yellowish-brown-----	1	28
	Claystone, brown-----	12	40

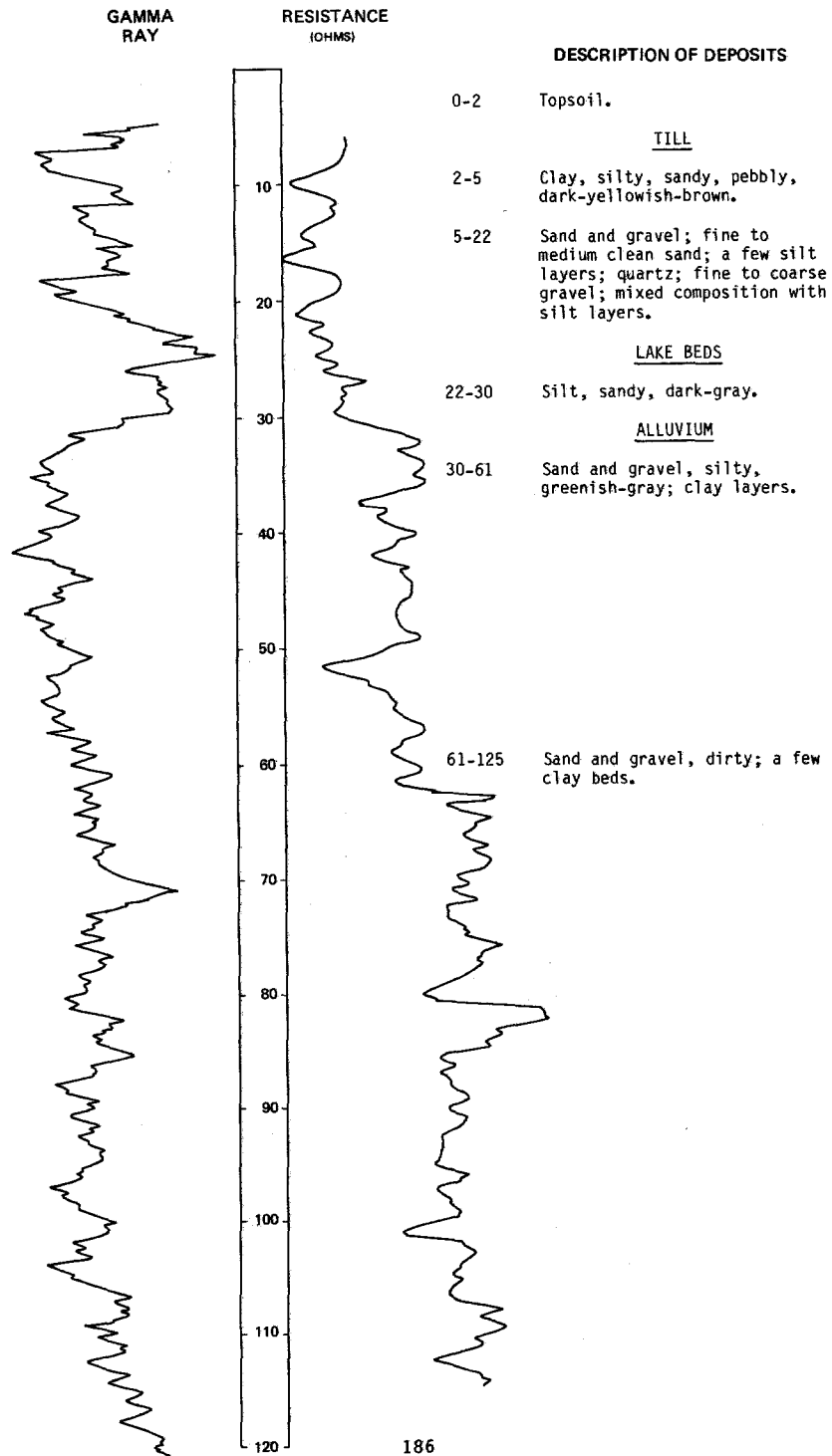
LOCATION: 150-098-06DAA1

NDSWC 5615

DATE DRILLED: 10/05/79

ALTITUDE: 2045
(FT, NGVD)

DEPTH: 162
(FT)



LOCATION: 150-098-06DAA1 NDSWC 5615, Continued

DATE DRILLED: 10/05/79

ALTITUDE: 2045
(FT, NGVD)

DEPTH: 162
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION



125-136 Claystone, carbonaceous; thin lignite beds.
136-162 Claystone, dark-greenish-gray to light-grayish-green, tight.

150-098-06DAA2
NDSWC A

Altitude: 2046 feet

Date drilled: 5/05/80

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, fine to medium; fine to coarse gravel; and pebbles; pebbles and gravel are medium rounded-----	14	14
	Sand, fine to medium, moderately well rounded-----	20	34
	Clay-----	3	37
	Sand, fine; some lignite-----	27	64
	Sand, medium; lenses of medium gravel-----	9	73
	Sand, fine to medium-----	10	83
	Sand, medium, and medium to coarse gravel; some 1/2-inch pebbles-----	50	133
	Sand, medium; clay lenses-----	3	136
	Clay, sandy-----	7	143

150-098-06DDD1
NDSWC 1447

Altitude: 2040 feet

Date drilled: 11/12/58

	Clay, sandy, gray and brown-----	12	12
	Till; brownish-gray clay; and fine gravel-----	10	22
	Clay, sandy, gray-----	10	32

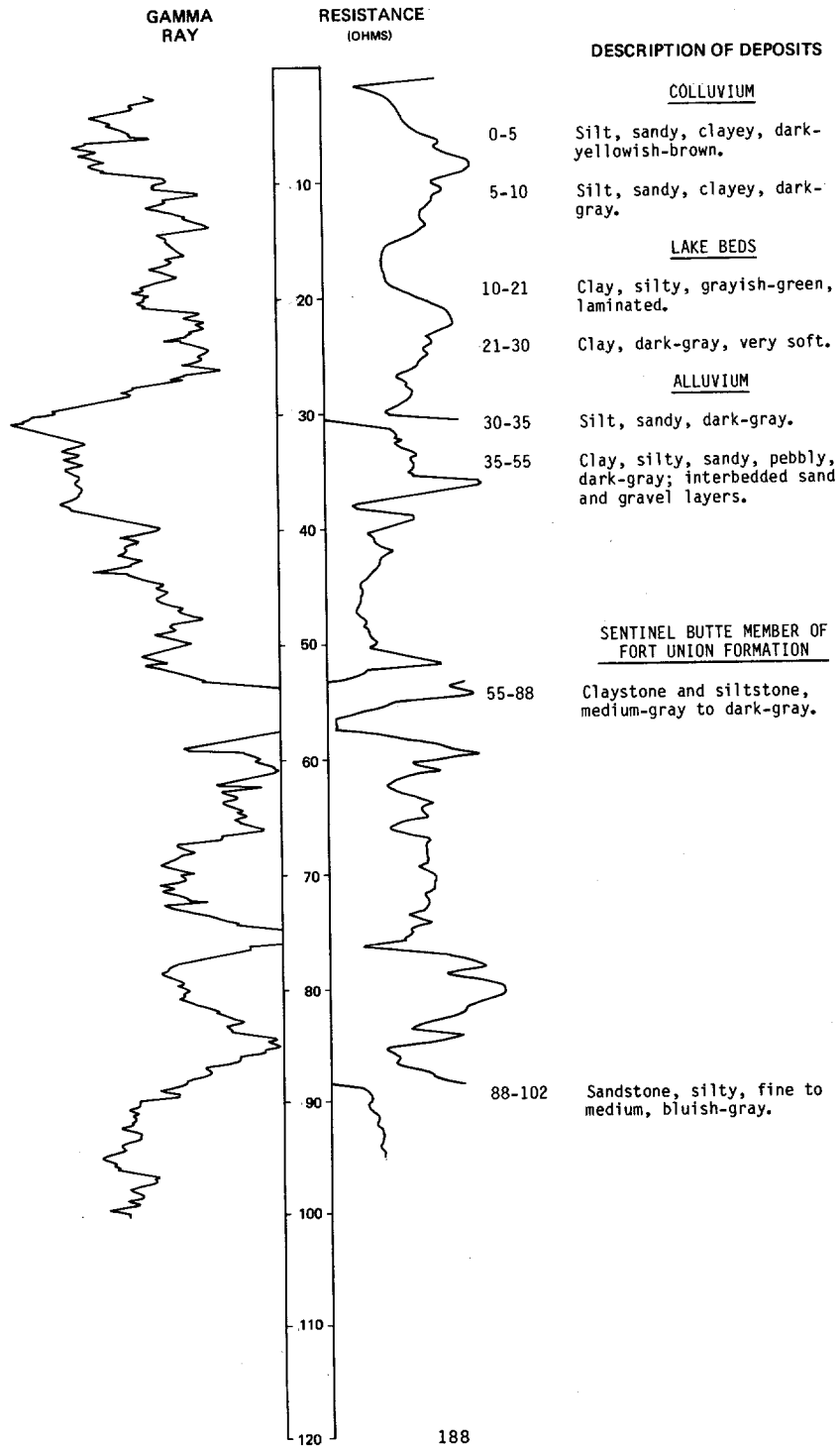
LOCATION: 150-098-06DDD2

NDSWC 5607

DATE DRILLED: 10/03/79

ALTITUDE: 2040
(FT, NGVD)

DEPTH: 102
(FT)



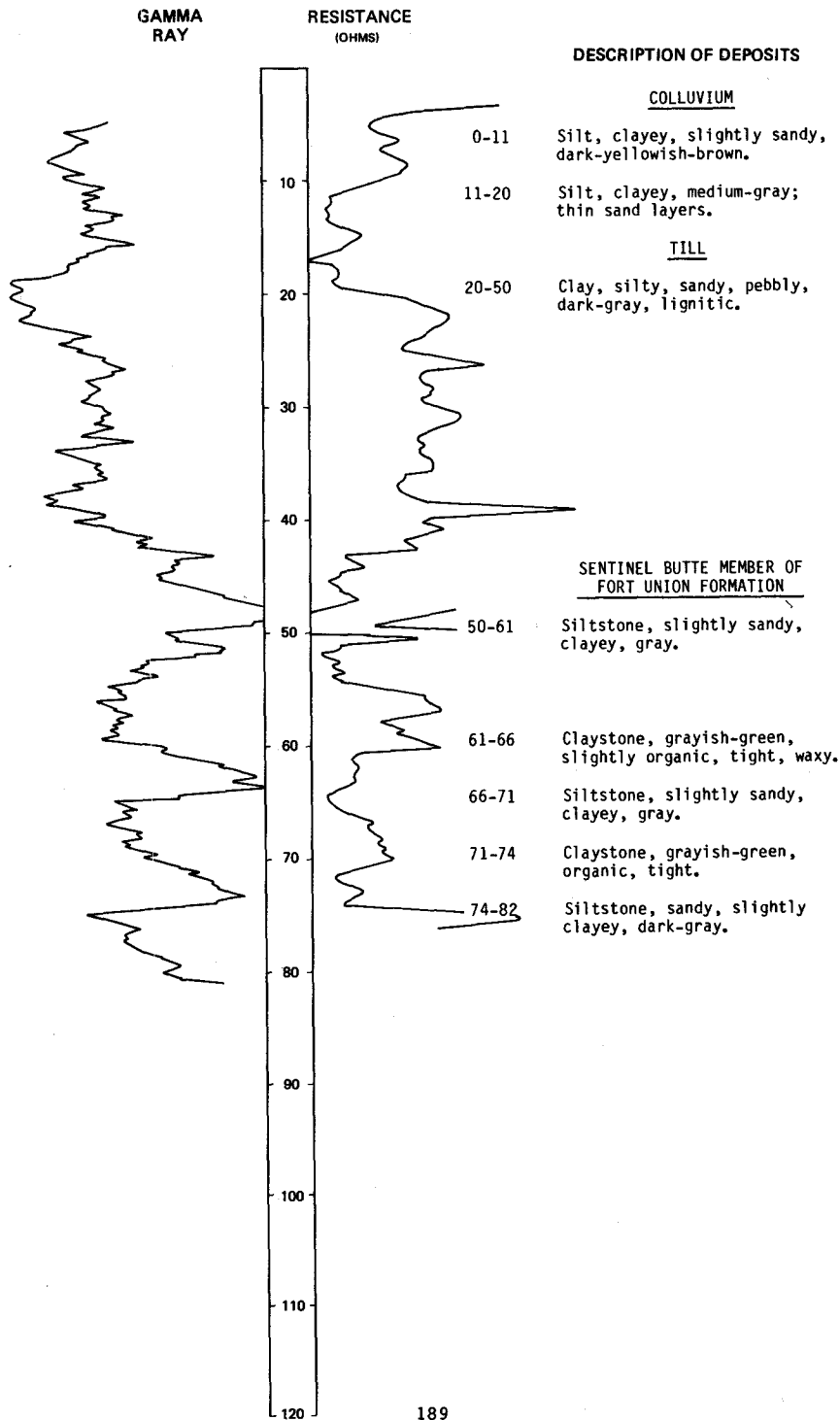
LOCATION: 150-098-07ADA2

NDSWC 5606

DATE DRILLED: 10/03/79

ALTITUDE: 2040
(FT, NGVD)

DEPTH: 82
(FT)



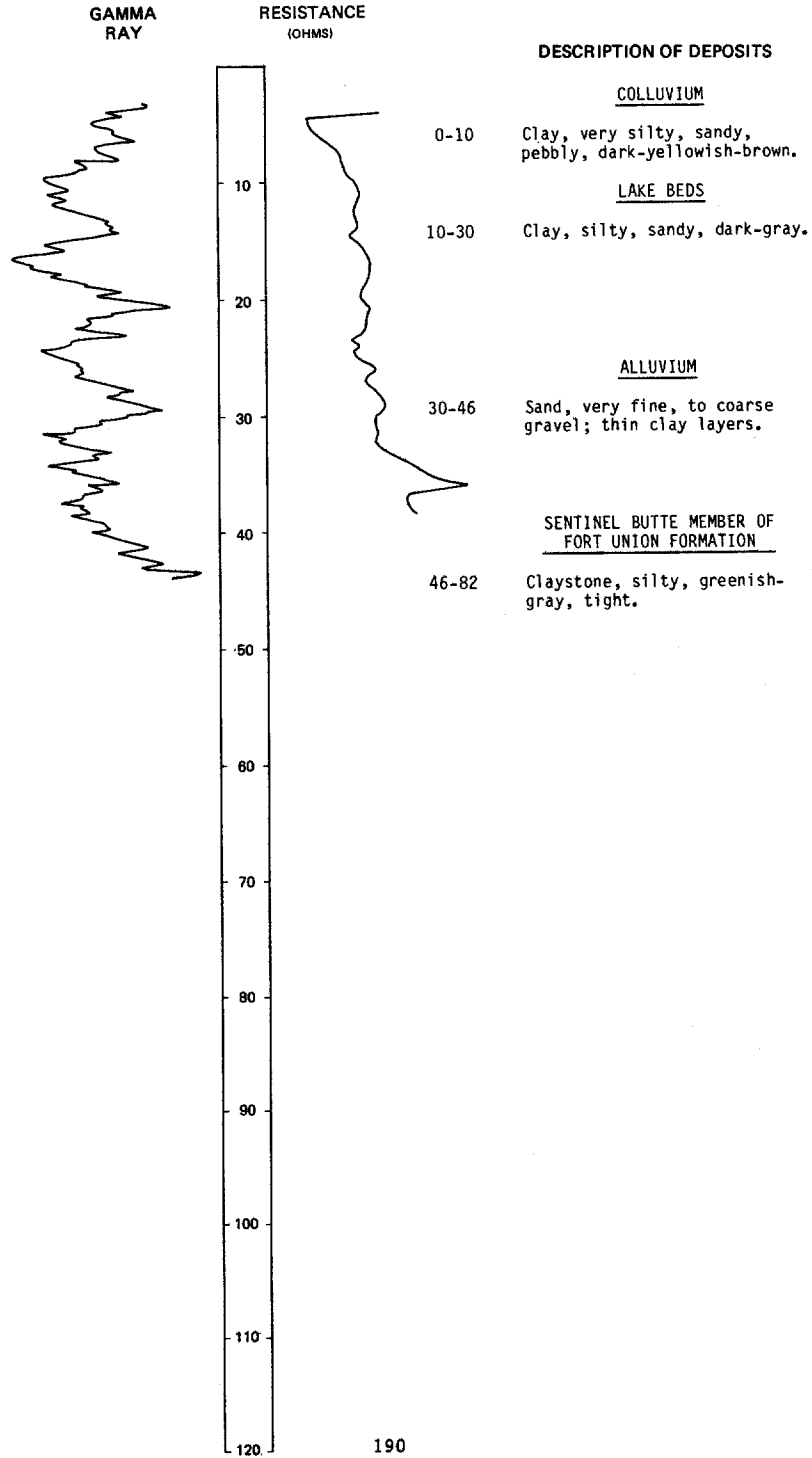
LOCATION: 150-098-07CDD

NDSWC 5605

DATE DRILLED: 10/03/79

ALTITUDE: 2043
(FT, NGVD)

DEPTH: 82
(FT)



150-098-07DAD
NDSWC 1446

Altitude: 2036 feet

Date drilled: 11/12/58

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellowish-gray, and fine to coarse gravel-----	12	12
	Till, gray, and gravel-----	4	16
	Sand, fine to coarse, dirty; some coal-----	7	23
	Silt; very fine light-gray sand; and gravel-----	19	42

150-098-14DDC
NDSWC 11544

Altitude: 2010 feet

Date drilled: 5/05/81

	Silt, dark-yellowish-brown-----	11	11
	Sand and gravel, scoriaceous-----	6	17
	Sand, very fine, argillaceous-----	3	20
	Claystone, sandy, dark-greenish-gray-----	20	40

150-098-16CBA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2130 feet

Date drilled: 5/20/75

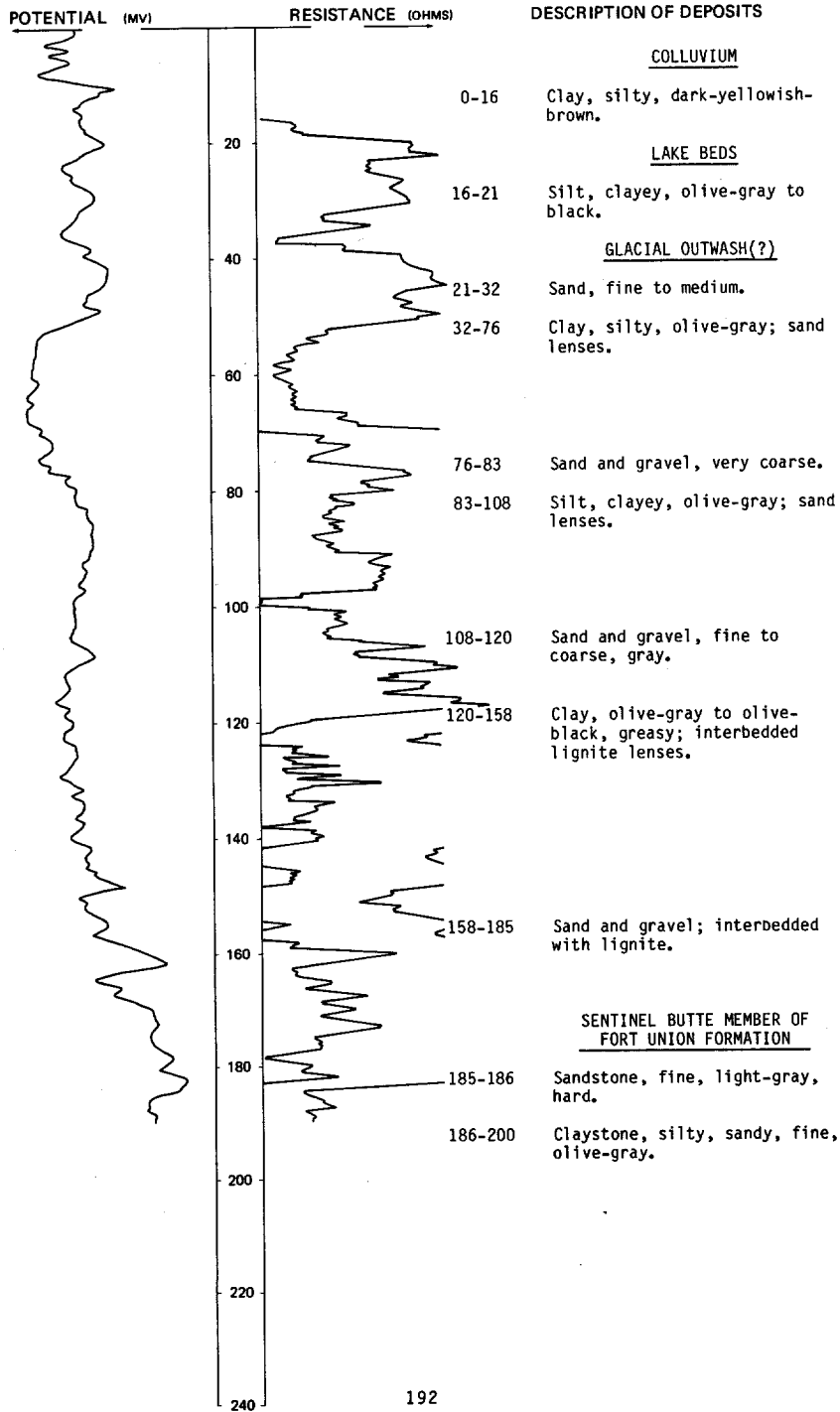
	Clay, sandy-----	22	22
	Gravel, coarse-----	6	28
	Sand, fine-----	66	94
	Clay-----	1	95
	Coal-----	6	101
	Clay-----	17	118
	Sand, medium-----	18	136
	Coal-----	4	140
	Clay, sandy-----	10	150

LOCATION: 150-098-16CCC
 ALTITUDE: 2045
 (FT, NGVD)

NDSWC 11340

DATE DRILLED: 9/04/80

DEPTH: 200
 (FT)



150-098-16CDD
(Log modified from Kieson Drilling)

Altitude: 2120 feet Date drilled: 4/29/71

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Sand, brown-----	15	17
	Sand, coarse, brown-----	42	59
	Sand, brown-----	29	88
	Coal-----	3	91
	Clay, gray-----	8	99
	Rock-----	3	102
	Clay, gray-----	21	123
	Rock-----	2	125
	Clay, sandy, gray-----	12	137
	Clay, sandy, fine, gray-----	21	158
	Clay, gray-----	2	160

150-098-17CCC
(Log modified from Thompson Drilling Co.)

Altitude: 2045 feet Date drilled: 10/18/74

	Topsoil-----	2	2
	Clay, hard-----	8	10
	Clay-----	4	14
	Sand, firm-----	14	28
	Sand, soft-----	8	36
	Coal-----	1	37
	Quicksand-----	5	42
	Clay-----	101	143
	Coal-----	4	147
	Clay-----	13	160
	Sand, firm-----	45	205
	Sand, gray, soft-----	10	215
	Sand, blue, soft-----	5	220

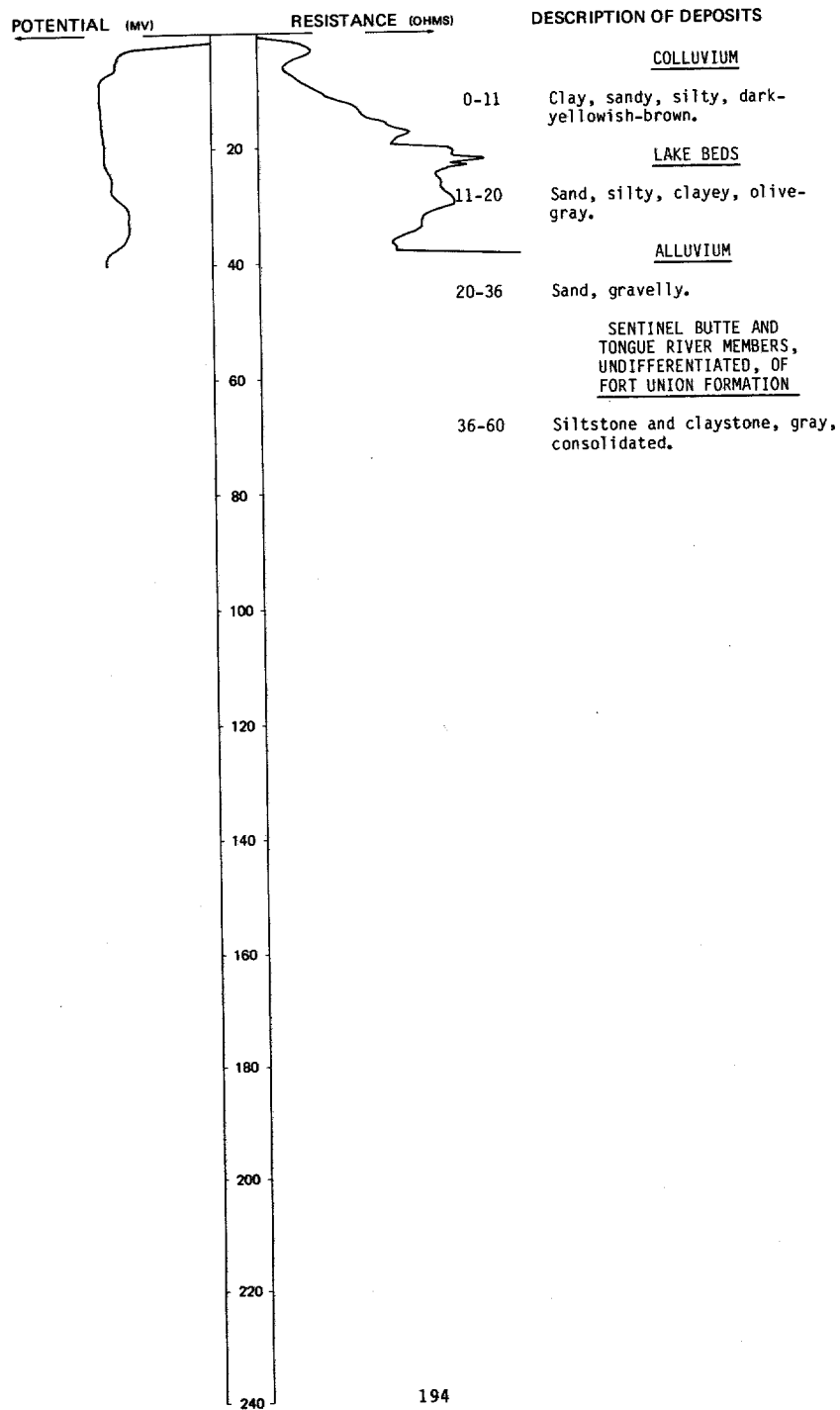
NDSWC 11731

LOCATION: 150-098-17CDC

DATE DRILLED: 9/22/81

ALTITUDE: 2050
(FT, NGVD)

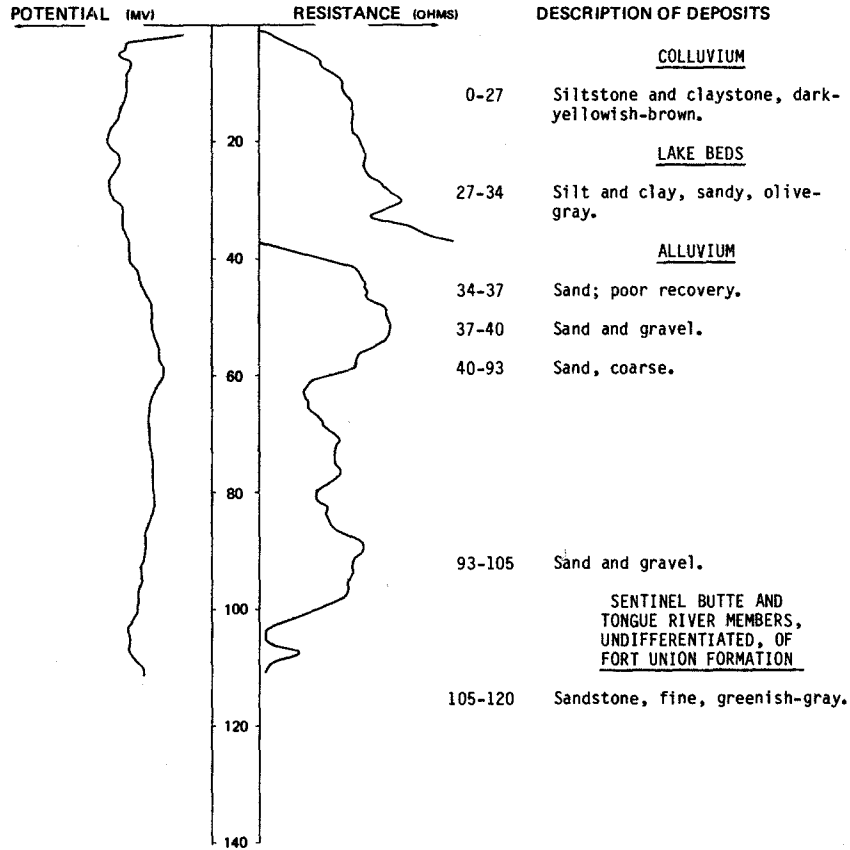
DEPTH: 60
(FT)



LOCATION: 150-098-17DCD
 ALTITUDE: 2047
 (FT, NGVD)

NDSWC 11732

DATE DRILLED: 9/22/81
 DEPTH: 120
 (FT)



150-098-18CBA
 (Log modified from Thompson Drilling Co.)

Altitude: 2065 feet

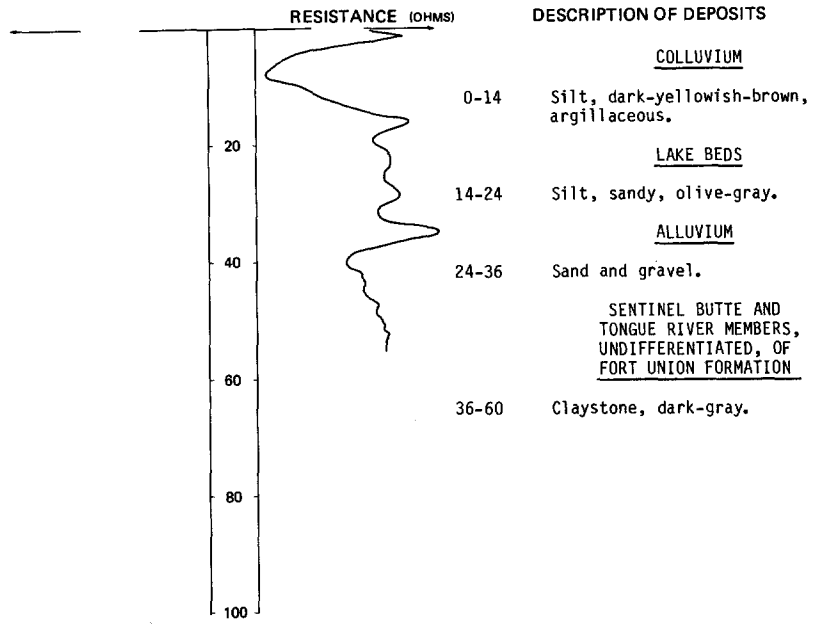
Date drilled: 6/16/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	3	3
	Sand-----	21	24
	Coal-----	1	25
	Clay-----	12	37
	Sand, gray-----	3	40
	Clay-----	23	63
	Coal; water-----	7	70
	Clay-----	20	90
	Sand; water-----	10	100

LOCATION: 150-098-18DDC
 ALTITUDE: 2051
 (FT, NGVD)

NDSWC 11730

DATE DRILLED: 9/22/81
 DEPTH: 60
 (FT)



150-098-19AB
 (Log modified from Layne Wells)

Altitude: 2045 feet Date drilled: 12/ /57

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	3	3
	Clay, sandy-----	4	7
	Sand, coarse-----	7	14
	Clay, blue-----	9	23
	Sand, fine-----	9	32
	Sand, coarse-----	3	35
	Sand, fine, and gravel-----	5	40
	Sand, fine-----	4	44
	Sand, fine, and coarse gravel-----	16	60
	Sand, fine-----	19	79

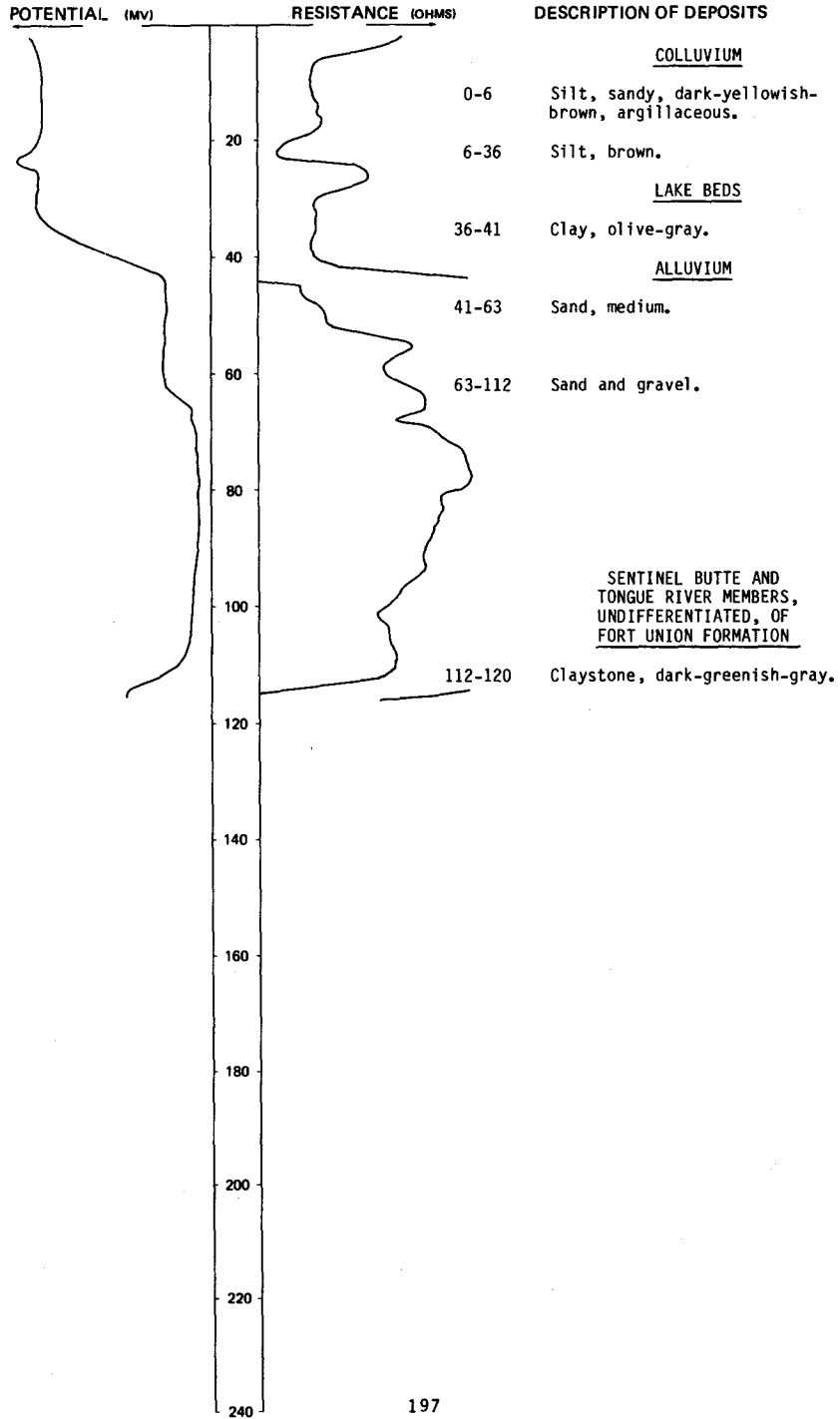
NDSWC 11728

LOCATION: 150-098-19CCB

DATE DRILLED: 9/22/81

ALTITUDE: 2064
(FT. NGVD)

DEPTH: 120
(FT)



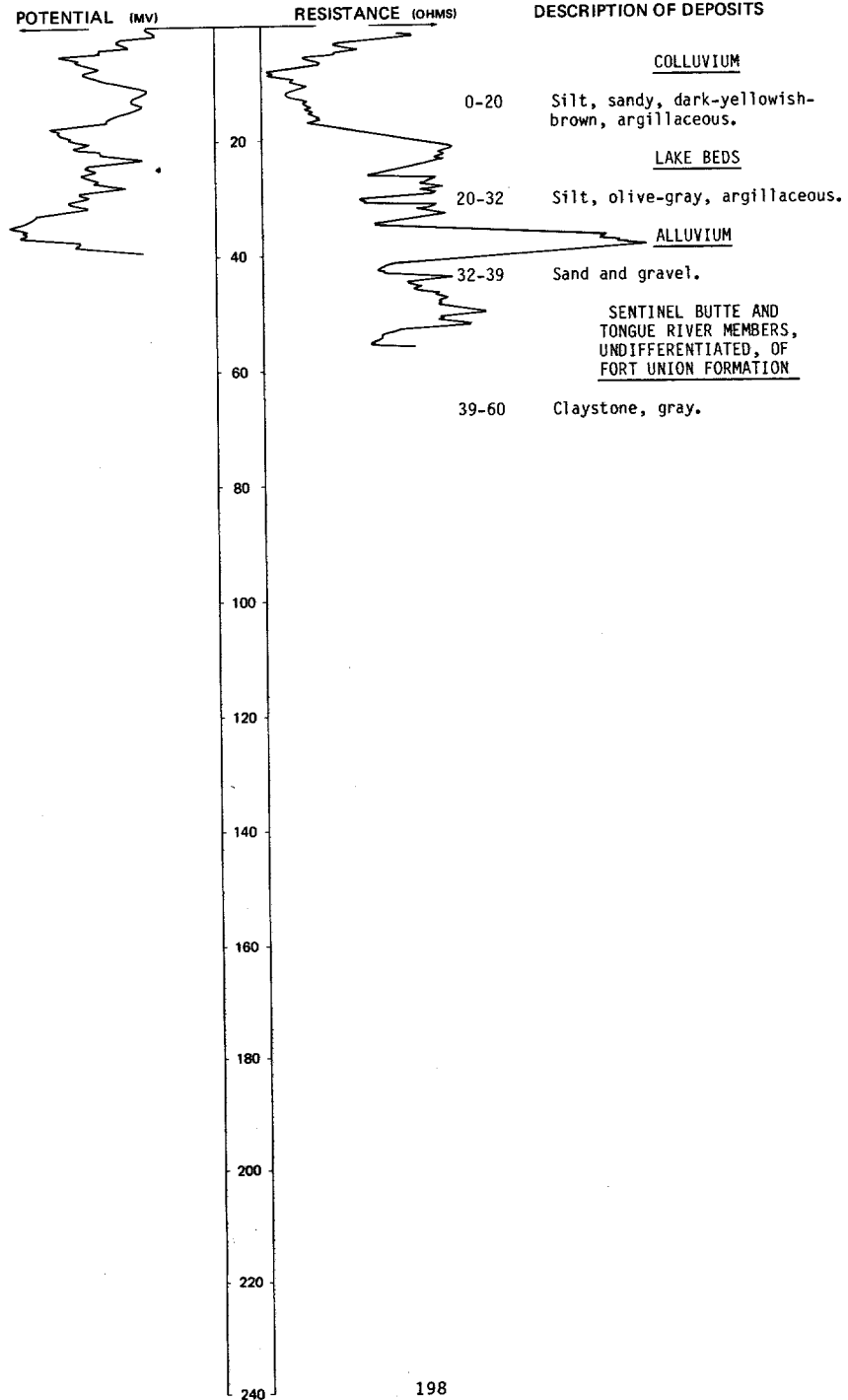
LOCATION: 150-098-20BBB

NDSWC 11556

DATE DRILLED: 5/06/81

ALTITUDE: 2055
(FT, NGVD)

DEPTH: 60
(FT)



150-098-21ACD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2125 feet

Date drilled: 8/04/80

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand-----	85	85
	Coal-----	2	87
	Clay-----	38	125
	Coal-----	20	145
	Clay-----	25	170
	Rock-----	1	171
	Sand-----	10	181
	Clay, sandy-----	79	260
	Coal-----	8	268
	Clay-----	37	305
	Sand-----	40	345
	Rock-----	1	346
	Clay, sandy-----	10	356
	Rock-----	1	357
	Clay, sandy-----	59	416
	Coal-----	6	422
	Clay-----	5	427
	Rock-----	2	429
	Clay-----	11	440
	Coal-----	3	443
	Clay-----	33	476
	Coal-----	2	478
	Clay-----	47	525
	Coal-----	2	527
	Clay-----	40	567
	Rock-----	2	569
	Clay-----	71	640
	Rock-----	3	643
	Clay-----	17	660
	Coal-----	5	665
	Clay-----	195	860
	Rock-----	1	861
	Clay-----	29	890
	Rock-----	2	892
	Clay, sandy-----	72	964
	Rock-----	2	966
	Clay-----	19	985
	Coal-----	20	1005
	Clay-----	63	1068
	Rock-----	7	1075
	Clay-----	32	1107
	Coal-----	5	1112
	Sand-----	35	1147
	Rock-----	2	1149
	Clay, sandy-----	51	1200
	Rock-----	3	1203
	Clay, sandy-----	7	1210
	Rock-----	2	1212
	Clay-----	98	1310
	Clay, sandy-----	155	1465
	Clay-----	25	1490
	Coal; clay streaks-----	55	1545
	Clay, sandy-----	77	1622
	Rock-----	2	1624
	Sand-----	36	1660
	Clay-----	60	1720
	Coal-----	5	1725
	Sand-----	85	1810

150-098-22BCC
(Log modified from Thompson Drilling Co.)

Altitude: 2100 feet

Date drilled: 5/ /74

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	58	58
	Clay-----	3	61
	Coal-----	4	65
	Clay-----	16	81
	Sand-----	9	90
	Clay-----	5	95
	Sand, gray, soft-----	10	105
	Sand, bluish-gray; water-----	5	110

LOCATION: 150-098-23AAB

NDSWC 5608

DATE DRILLED: 10/03/79

ALTITUDE: 2002
(FT, NGVD)

DEPTH: 162
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS

COLLUVIUM

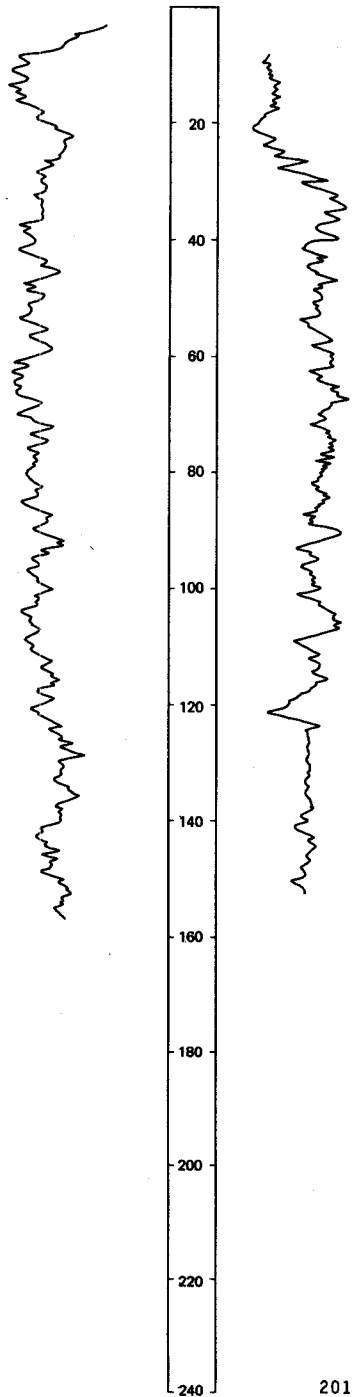
0-8 Silt, clayey, dark-yellowish-brown.

ALLUVIUM

8-117 Sand and gravel, fine to very coarse; mixed composition; numerous thin clay layers.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

117-162 Siltstone, sandy to very sandy, dark-gray, lignitic.



150-098-23ABB
NDSWC 11543

Altitude: 2010 feet

Date drilled: 5/05/81

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Silt, dark-yellowish-brown, argillaceous-----	18	18
	Sand and gravel-----	3	21
	Claystone, olive-gray-----	1	22
	Coal, silty-----	1	23
	Claystone, sandy, dark-greenish-gray-----	17	40

150-098-24DBB
(Log modified from Thompson Drilling Co.)

Altitude: 2030 feet

Date drilled: 2/03/73

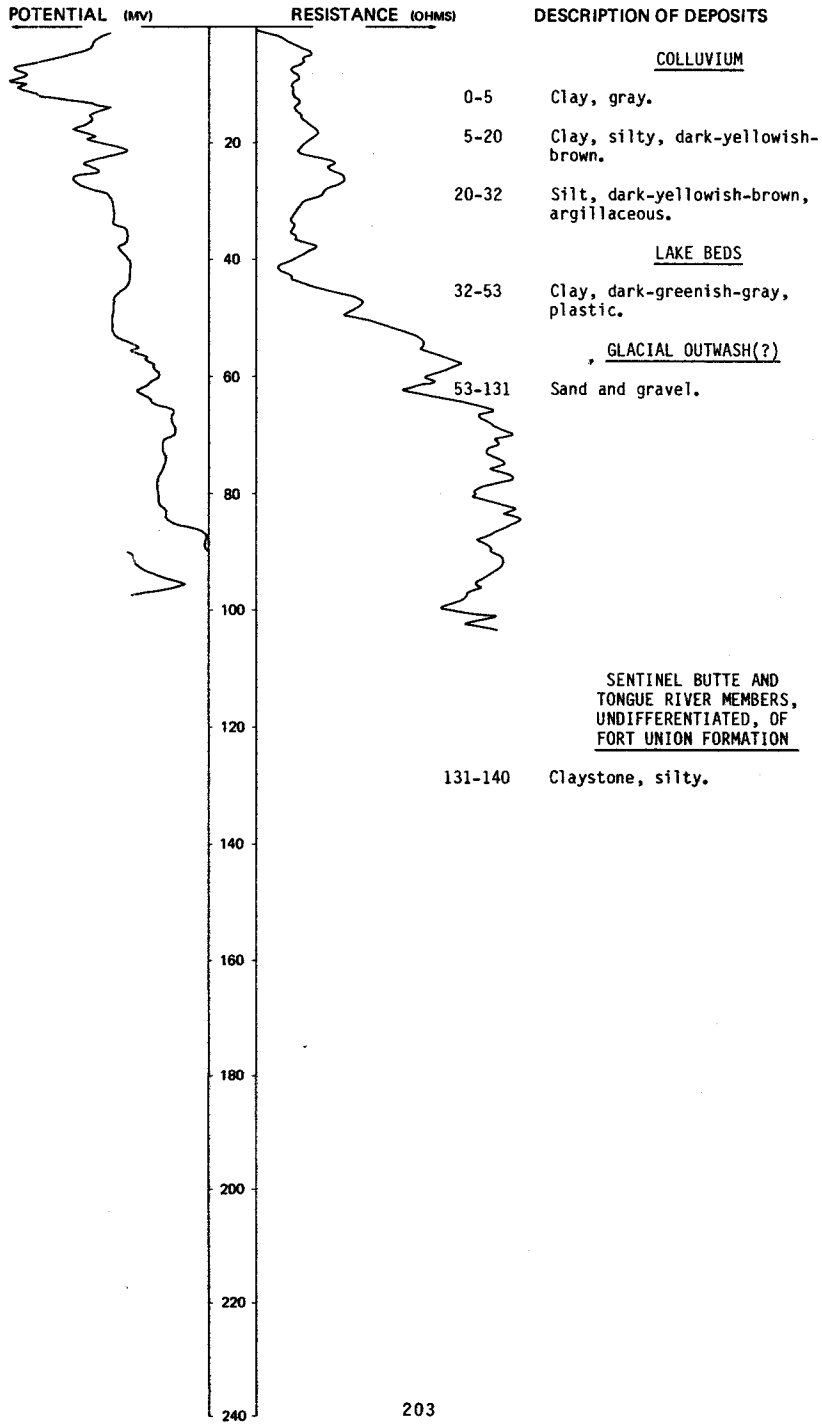
	Sand-----	30	30
	Quicksand and gravel-----	48	78
	Gravel and sand-----	5	83

LOCATION: 150-098-28ABB
ALTITUDE: 2059
(FT, NGVD)

NDSWC 11542

DATE DRILLED: 5/05/81

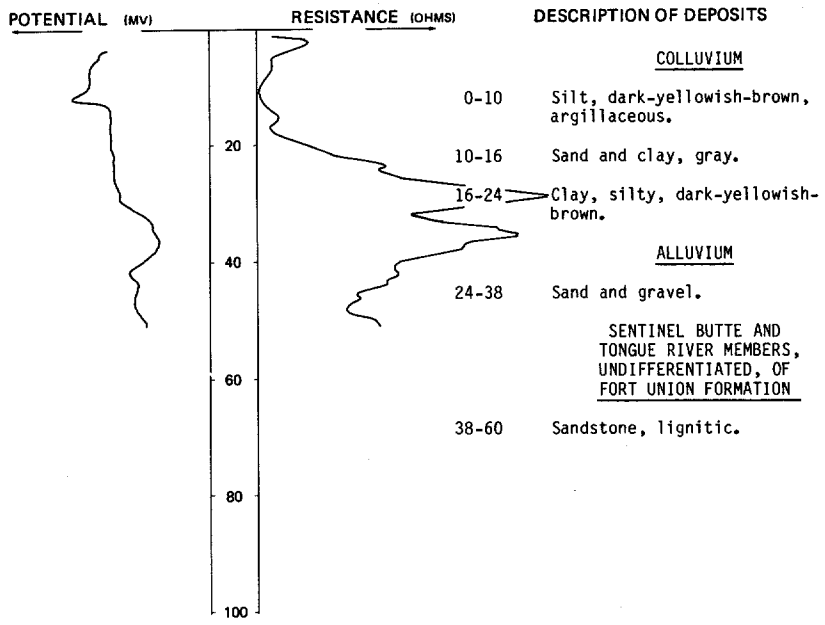
DEPTH: 140
(FT)



LOCATION: 150-098-30BBC
 ALTITUDE: 2060
 (FT. NGVD)

NDSWC 11727

DATE DRILLED: 9/22/81
 DEPTH: 60
 (FT)



150-098-30CBB
 (Log modified from Thompson Drilling Co.)

Altitude: 2065 feet Date drilled: 5/17/75

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	3	3
	Clay-----	15	18
	Sand, soft-----	22	40
	Sand; layers of gravel-----	70	110
	Clay-----	15	125
	Coal and water-----	5	130

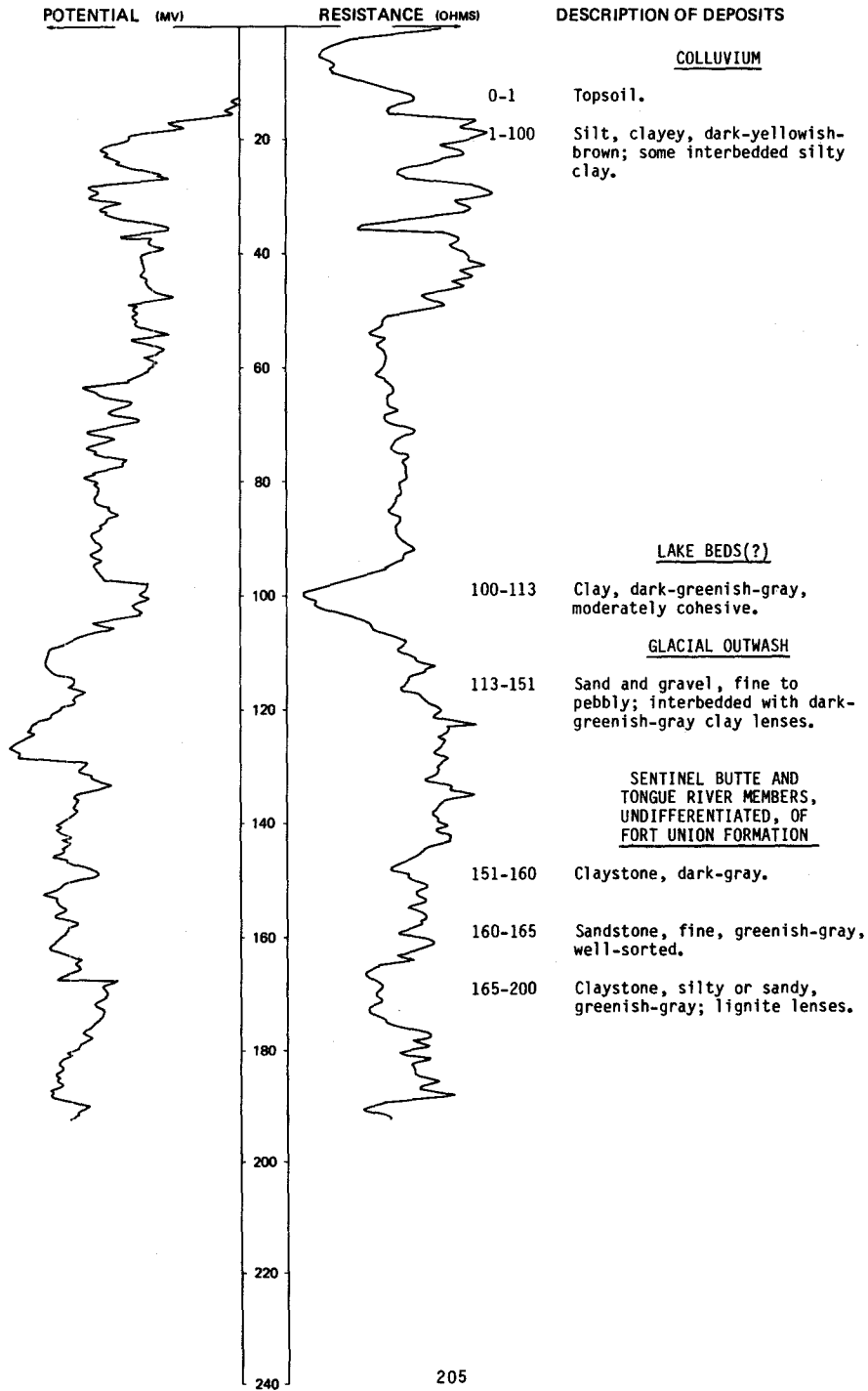
LOCATION: 150-098-34BCC

NDSWC 11365

DATE DRILLED: 9/16/80

ALTITUDE: 2105
(FT. NGVD)

DEPTH: 200
(FT)



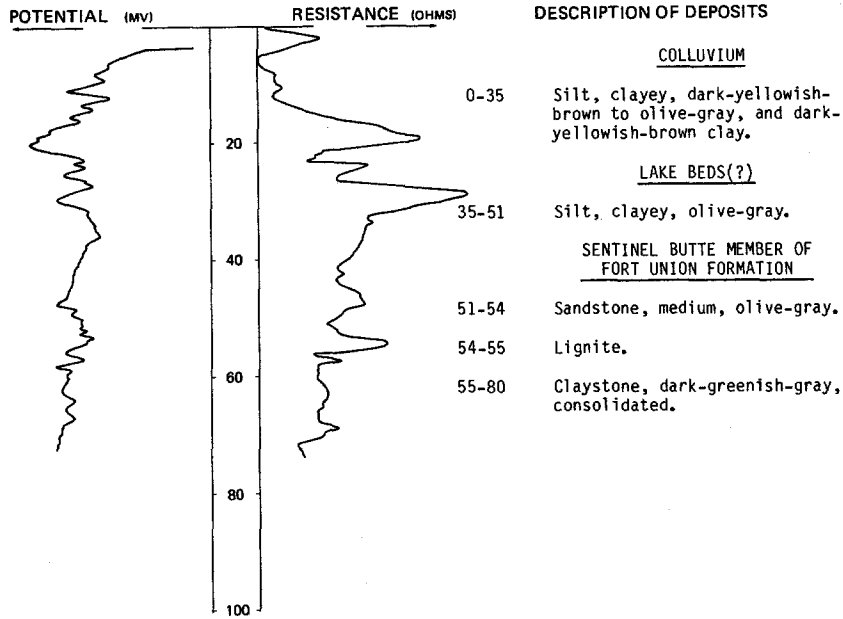
LOCATION: 150-098-34CAD

NDSWC 11363

DATE DRILLED: 9/15/80

ALTITUDE: 2060
(FT, NGVD)

DEPTH: 80
(FT)



150-098-34CCA
(Log modified from Kieson Drilling)

Altitude: 2155 feet

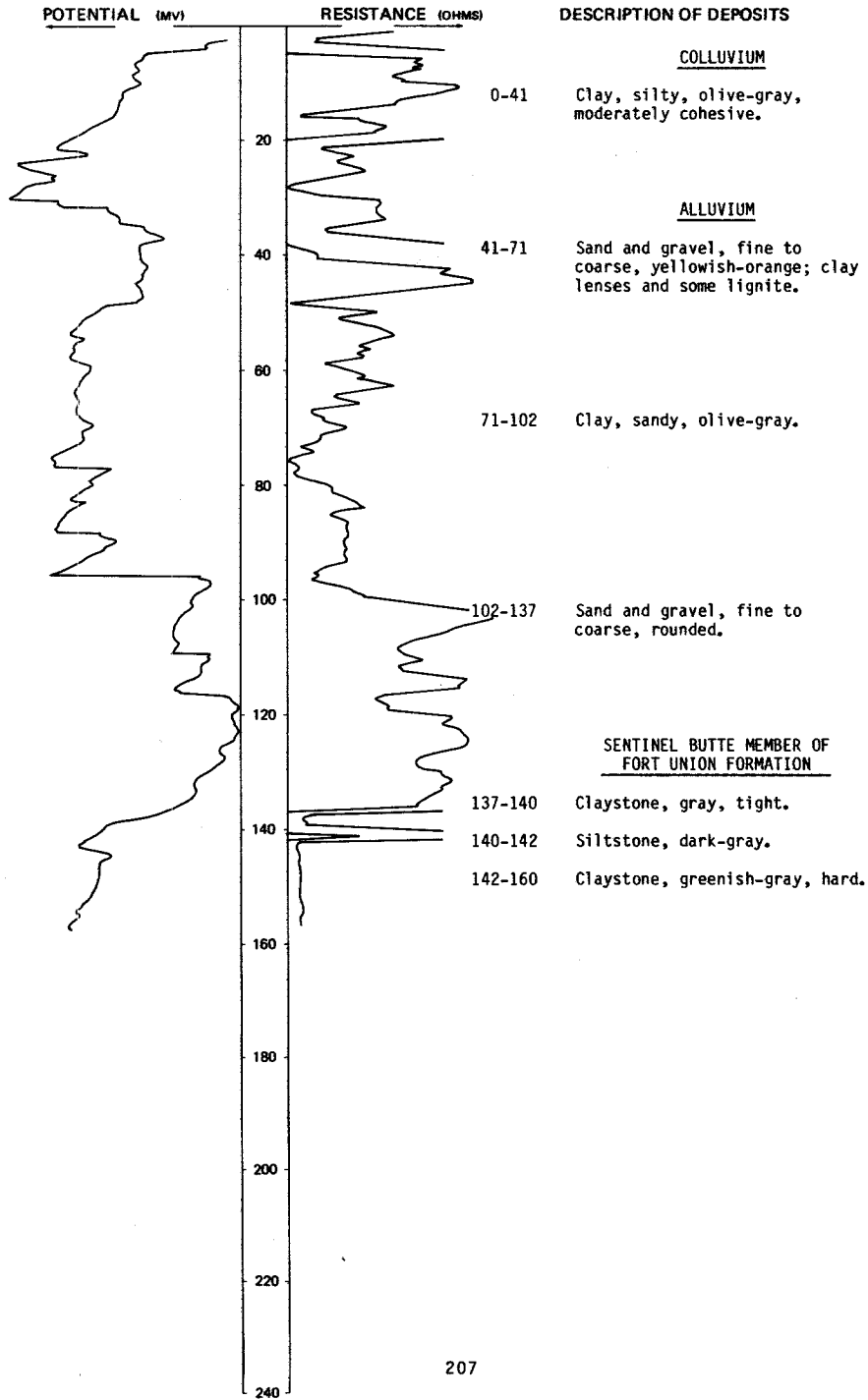
Date drilled: 10/23/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay, sandy-----	22	24
	Sand-----	19	43
	Clay, sandy-----	10	53
	Coal-----	2	55
	Clay-----	35	90
	Coal-----	1	91
	Clay-----	3	94
	Coal-----	2	96
	Clay-----	5	101
	Coal-----	2	103
	Clay-----	27	130
	Coal-----	2	132
	Clay-----	25	157
	Coal-----	2	159
	Clay-----	7	166
	Coal-----	1	167
	Clay-----	7	174
	Coal-----	7	181
	Clay-----	19	200
	Coal-----	4	204
	Clay-----	31	235
	Clay, sandy-----	1	236
	Sand-----	15	251
	Clay-----	4	255

LOCATION: 150-099-02CCC
ALTITUDE: 2090
(FT, NGVD)

NDSWC 11369

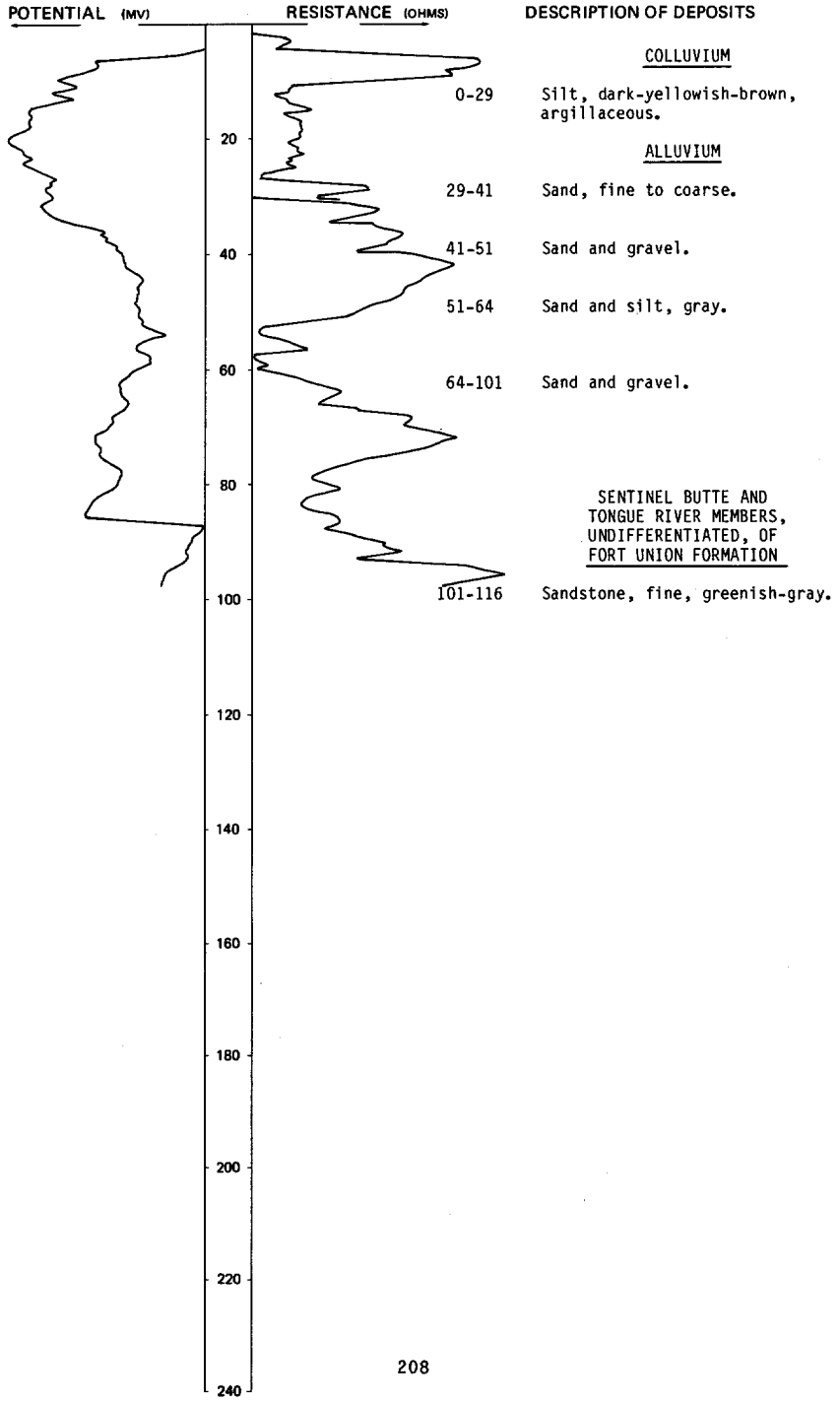
DATE DRILLED: 9/17/80
DEPTH: 160
(FT)



LOCATION: 150-099-02CDC
ALTITUDE: 2094
(FT, NGVD)

NDSWC 11566

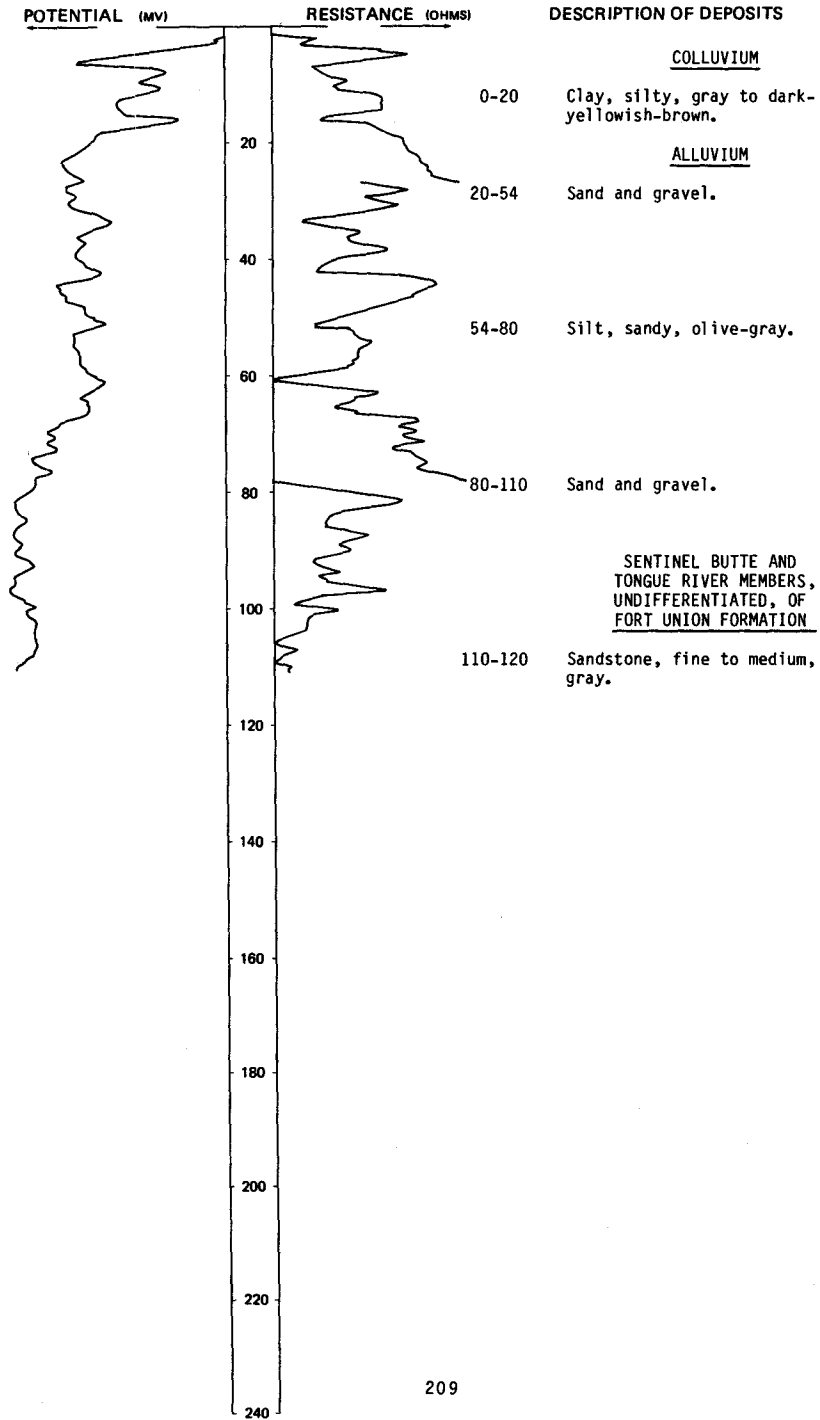
DATE DRILLED: 5/11/81
DEPTH: 116
(FT)



LOCATION: 150-099-02DCC
ALTITUDE: 2088
(FT, NGVD)

NDSWC 11567

DATE DRILLED: 5/11/81
DEPTH: 120
(FT)



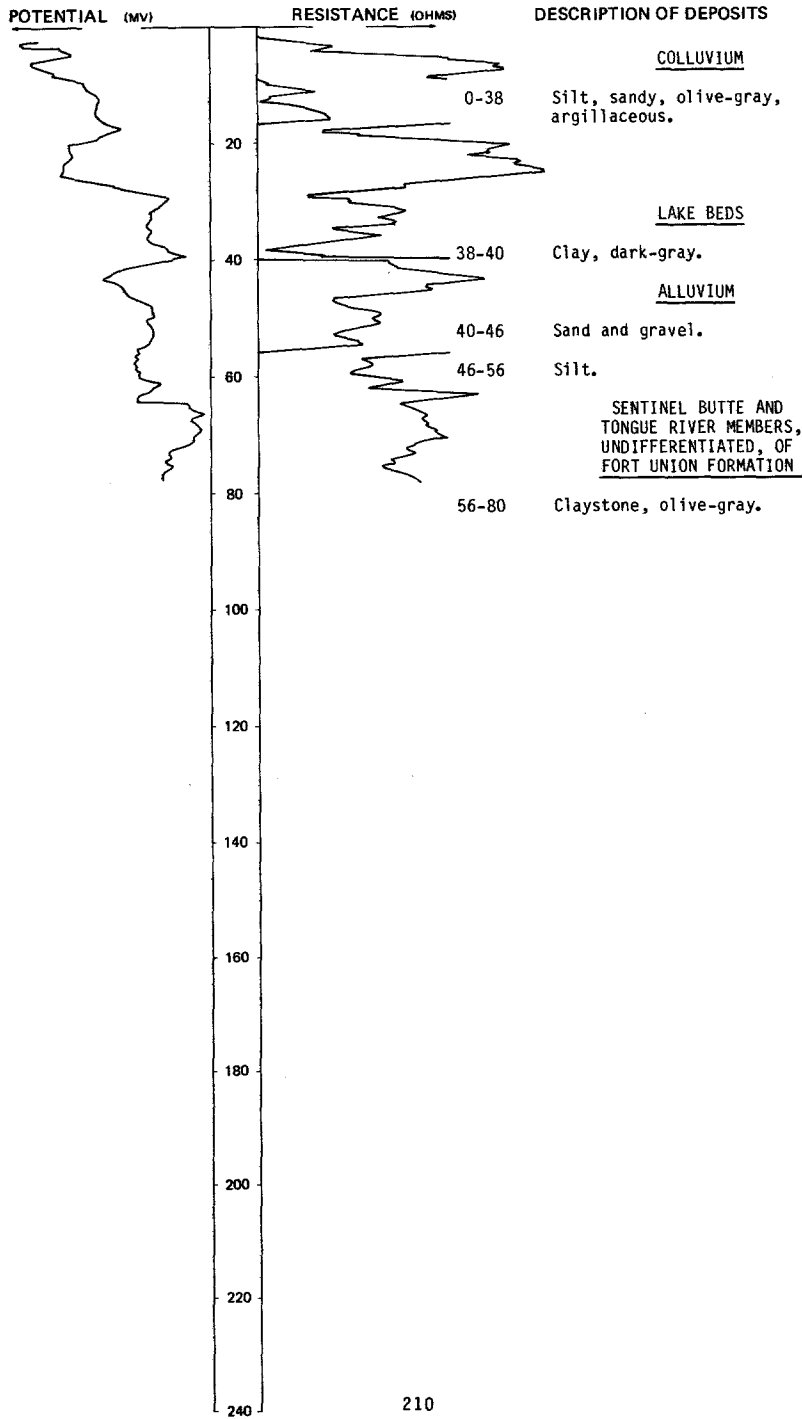
LOCATION: 150-099-10AAA

NDSWC 11565

DATE DRILLED: 5/08/81

ALTITUDE: 2112
(FT, NGVD)

DEPTH: 80
(FT)



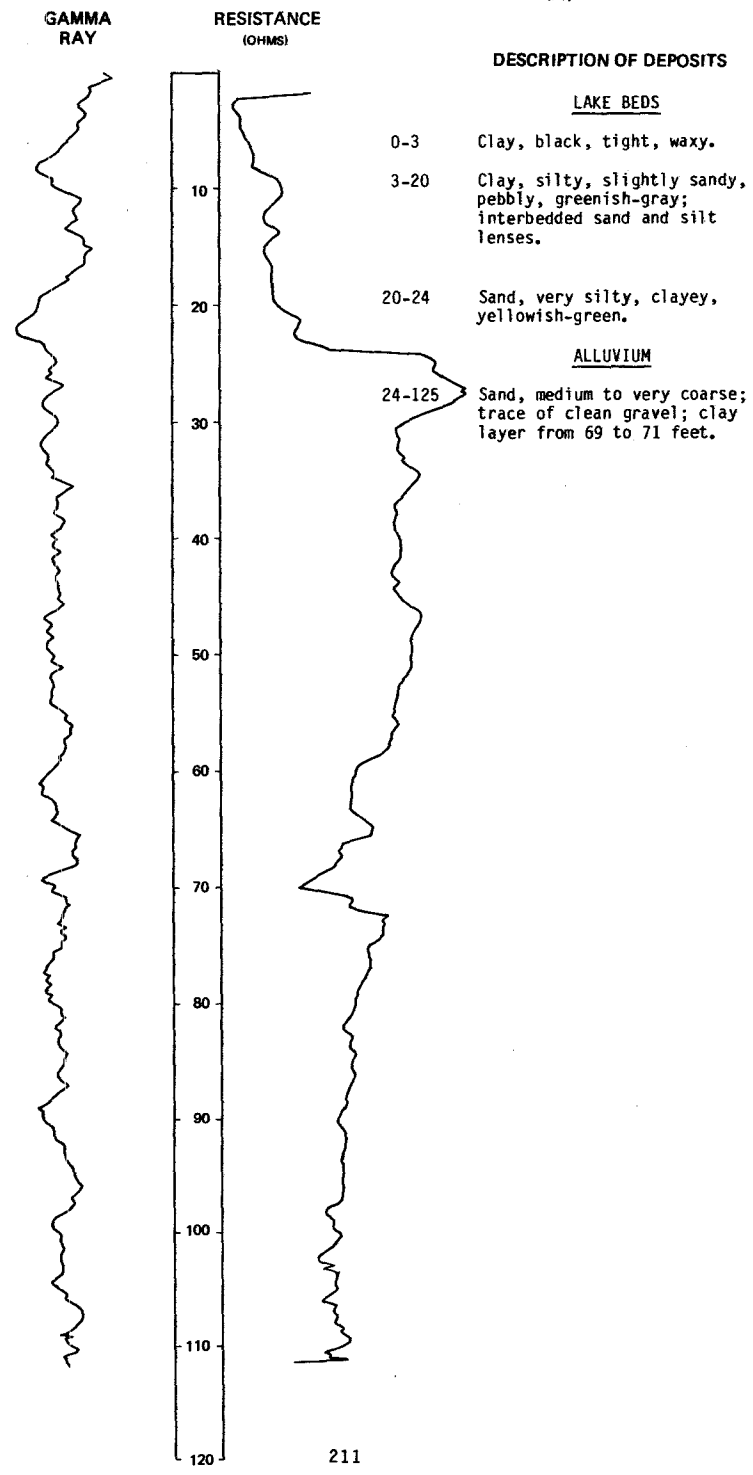
LOCATION: 150-099-15DDD

NDSWC 5600

DATE DRILLED: 10/01/79

ALTITUDE: 2079
(FT, NGVD)

DEPTH: 182
(FT)



LOCATION: 150-099-15DDD

DATE DRILLED: 10/01/79

ALTITUDE: 2079
(FT, NGVD)

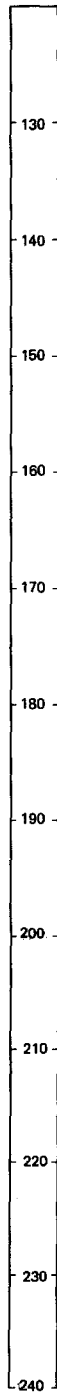
DEPTH: 182
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION



125-140 Sandstone, silty, fine to medium, yellowish-brown to bluish-gray, well-sorted; 99 percent quartz.

140-162 Siltstone, dark-gray to bluish-gray, slightly friable.

162-182 Claystone, very silty, dark-gray; variegated with greenish-gray silt.

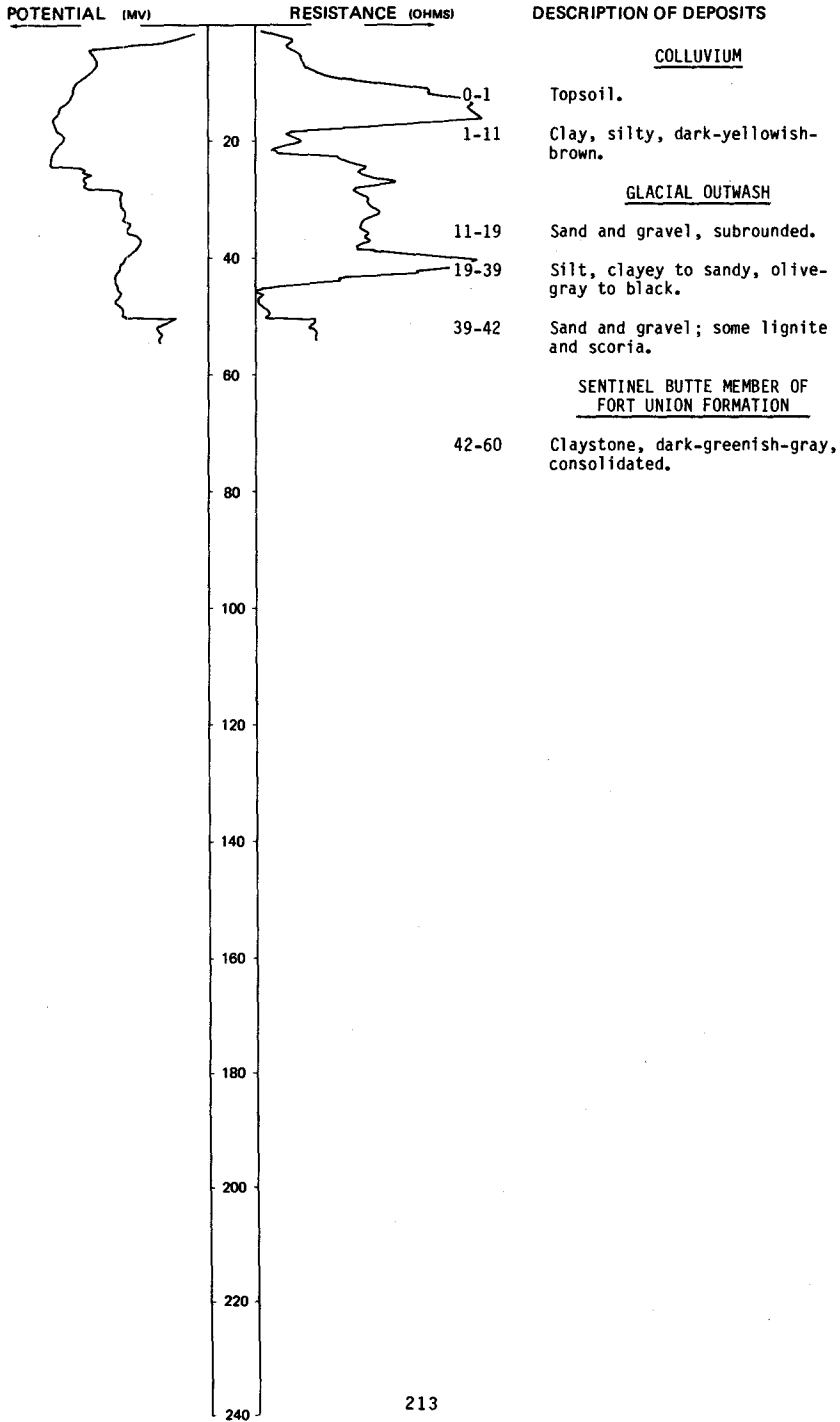
LOCATION: 150-099-20ADA

NDSWC 11370

DATE DRILLED: 9/17/80

ALTITUDE: 2129
(FT, NGVD)

DEPTH: 60
(FT)



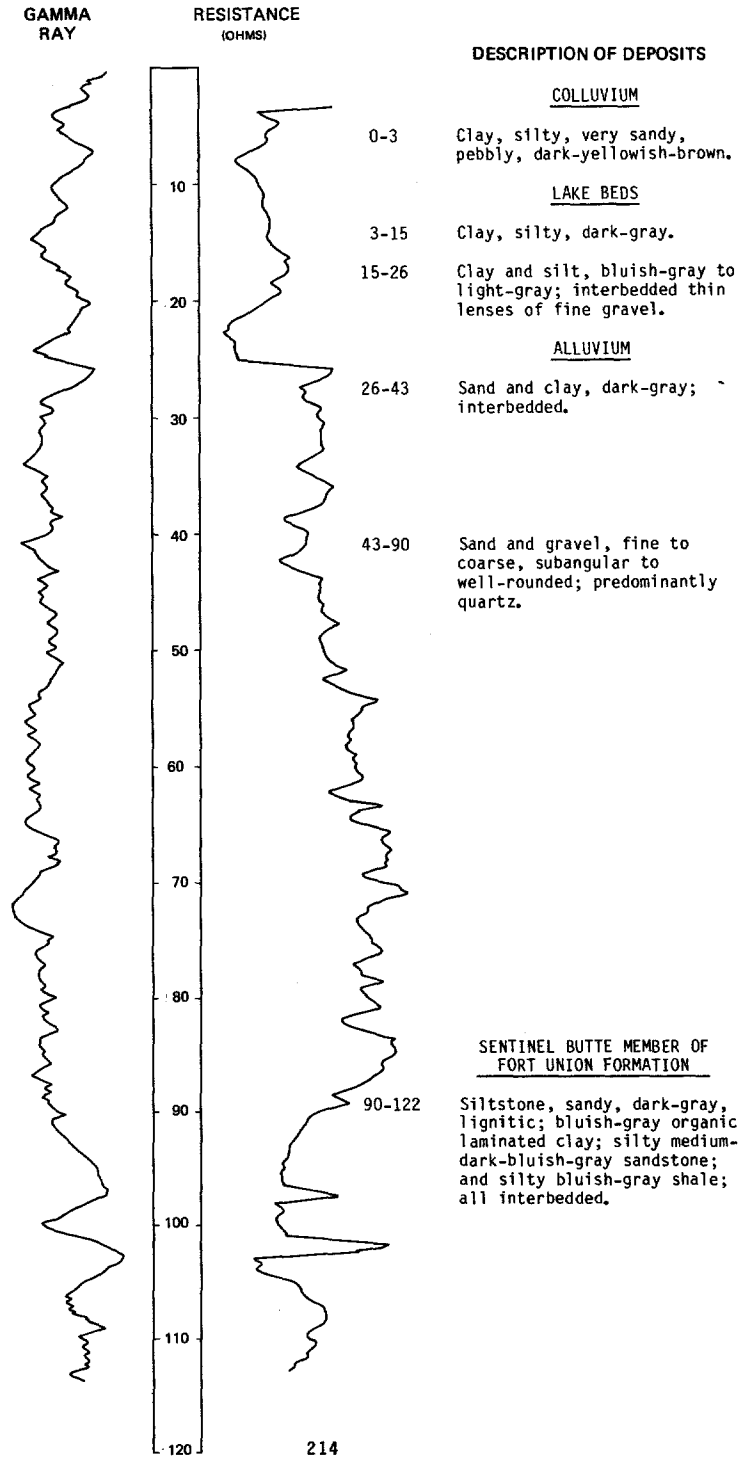
LOCATION: 150-099-22ABA

NDSWC 5603

DATE DRILLED: 10/02/79

ALTITUDE: 2080
(FT, NGVD)

DEPTH: 122
(FT)



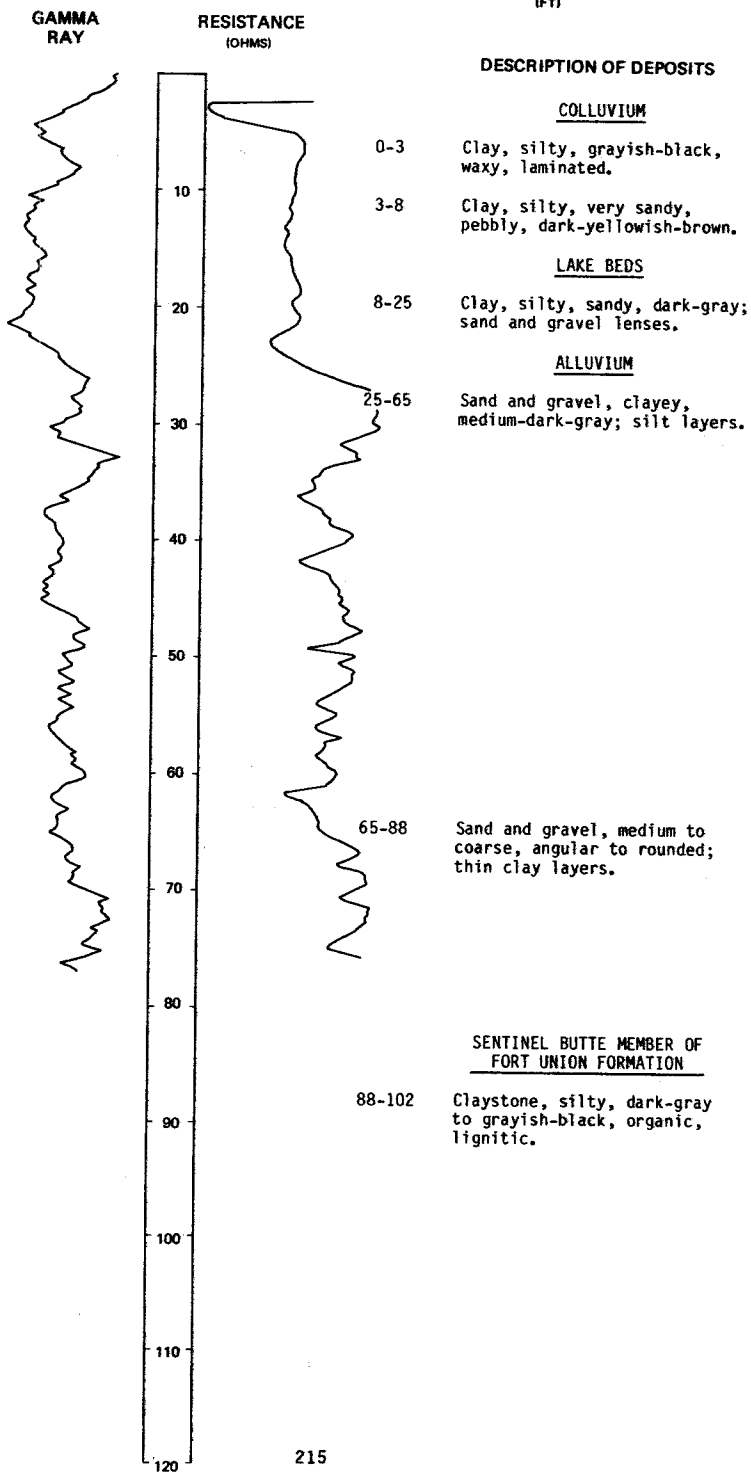
LOCATION: 150-099-22ABB

NDSWC 5604

DATE DRILLED: 10/02/79

ALTITUDE: 2087
(FT. NGVD)

DEPTH: 102
(FT)



LOCATION: 150-099-22BBA1, 2, 3 NDSWC 5782, 5782A, 5782B

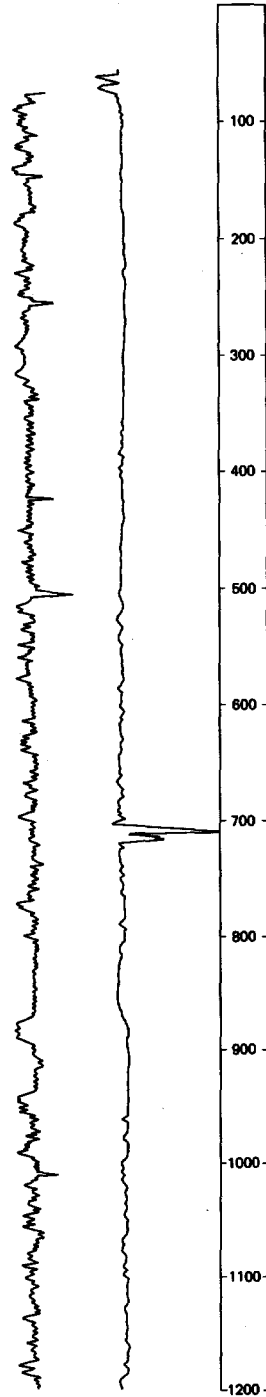
DATE DRILLED: 9/01/80

ALTITUDE: 2187
(FT, MGVVD)

DEPTH: 2100
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

- 0-40 Till.
SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 40-185 Siltstone and sandstone, gray, lignitic.
TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 185-195 Lignite.
- 195-320 Siltstone and claystone, gray.
- 320-325 Lignite.
- 325-440 Siltstone and sandstone, gray, carbonaceous.
- 440-500 Claystone, gray, carbonaceous.
- 500-775 Siltstone and sandstone, fine to medium, gray, lignitic.
- 775-780 Lignite.
- 780-880 Sandstone, silty, fine to medium, greenish-gray.
LOWER PART OF FORT UNION FORMATION
- 880-945 Claystone, silty, gray.
- 945-1100 Siltstone, sandy, gray, lignitic.
- 1100-1180 Siltstone, clayey, greenish-gray.
- 1180-1190 Lignite and claystone.
- 1190-1250 Siltstone and sandstone, gray.

NDSWC 5782, 5782A, 5782B, Continued
LOCATION: 150-099-22BBA1, 2, 3

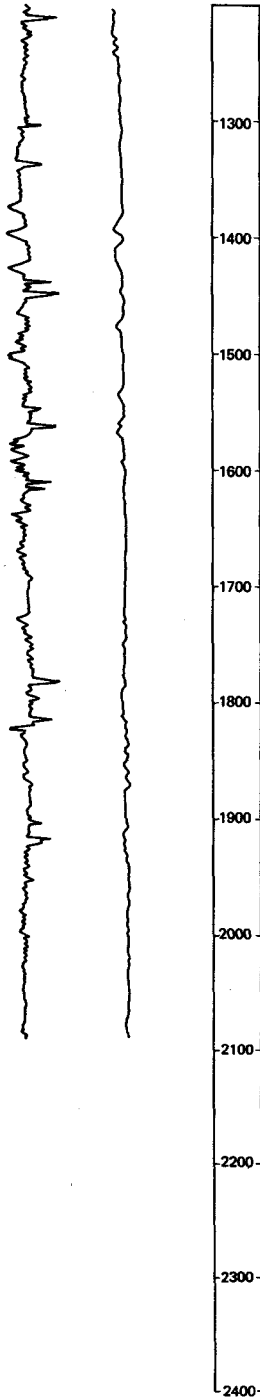
DATE DRILLED: 9/01/80

ALTITUDE: 2187
(FT, NGVD)

DEPTH: 2100
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued

1250-1375 Siltstone and claystone, gray.

1375-1440 Sandstone and lignite.

1440-1575 Siltstone and sandstone, fine to medium, gray; lignite from 1502 to 1510 feet.

HELL CREEK AND FOX HILLS
FORMATIONS, UNDIFFERENTIATED

1575-1590 Claystone, lignitic.

1590-1770 Claystone, silty, gray.

1770-1830 Sandstone, silty, gray.

1830-1965 Sandstone, silty, clayey, gray.

PIERRE SHALE

1965-2100 Shale, black, fissile.

NDSWC 5782, 5782A, 5782B, Continued
LOCATION: 150-099-22BBA1, 2, 3

DATE DRILLED: 9/01/80

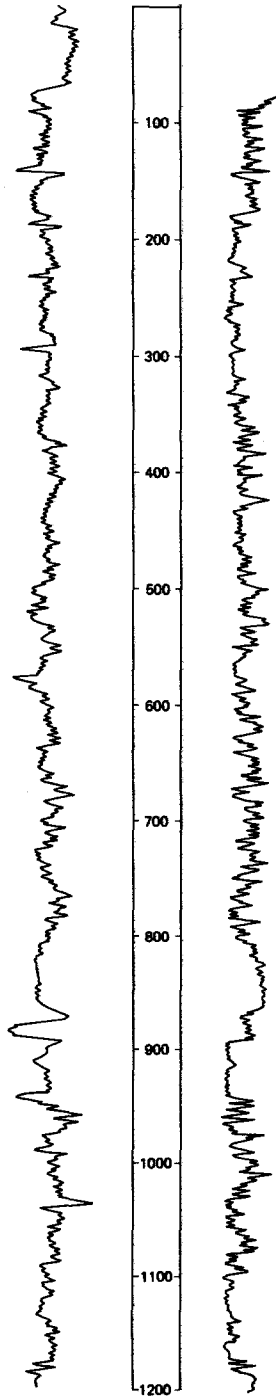
ALTITUDE: 2187
(FT, NGVD)

DEPTH: 2100
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



218

NDSWC 5782, 5782A, 5782B, Continued
LOCATION: 150-099-22BBA1, 2, 3

DATE DRILLED: 9/01/80

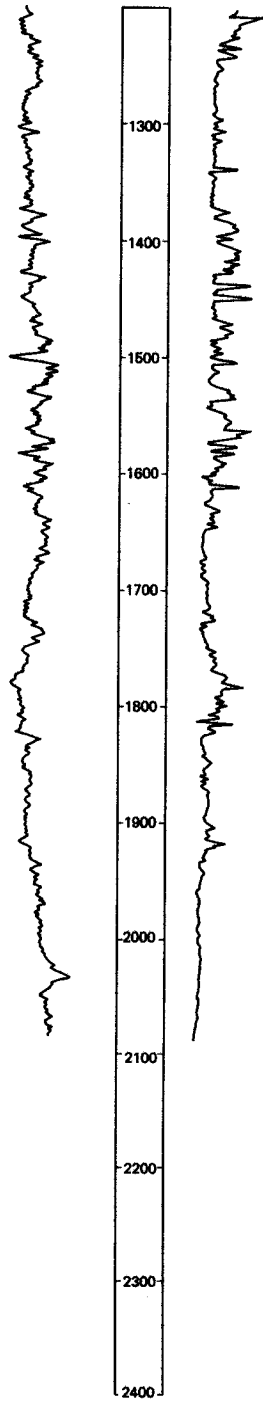
ALTITUDE: 2187
(FT, NGVD)

DEPTH: 2100
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



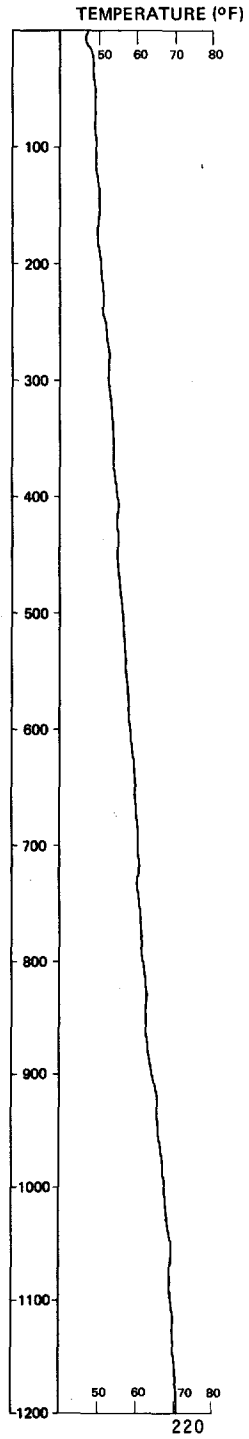
NDSWC 5782, Continued

LOCATION: 150-099-22BBA1

DATE DRILLED: 9/01/80

ALTITUDE: 2187
(FT, NGVD)

DEPTH: 2100
(FT)



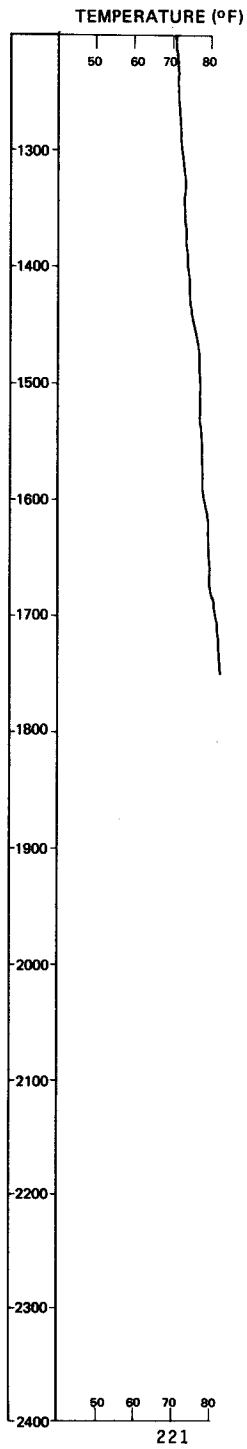
DESCRIPTION OF DEPOSITS

LOCATION: 150-099-2288A1 NDSWC 5782, Continued

ALTITUDE: 2187
(FT, NGVD)

DATE DRILLED: 9/01/80

DEPTH: 2100
(FT)



DESCRIPTION OF DEPOSITS



150-099-23BAA
NDSWC 5602

Altitude: 2098 feet

Date drilled: 10/02/79

<u>GEOLOGIC</u> <u>SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS</u> <u>(FEET)</u>	<u>DEPTH</u> <u>(FEET)</u>
	Clay, silty, dark-yellowish-brown-----	15	15
	Sand and gravel, fine to coarse; interbedded with clay-----	27	42
	Shale, silty, dark-gray, and sandy grayish- black lignitic silt-----	20	62

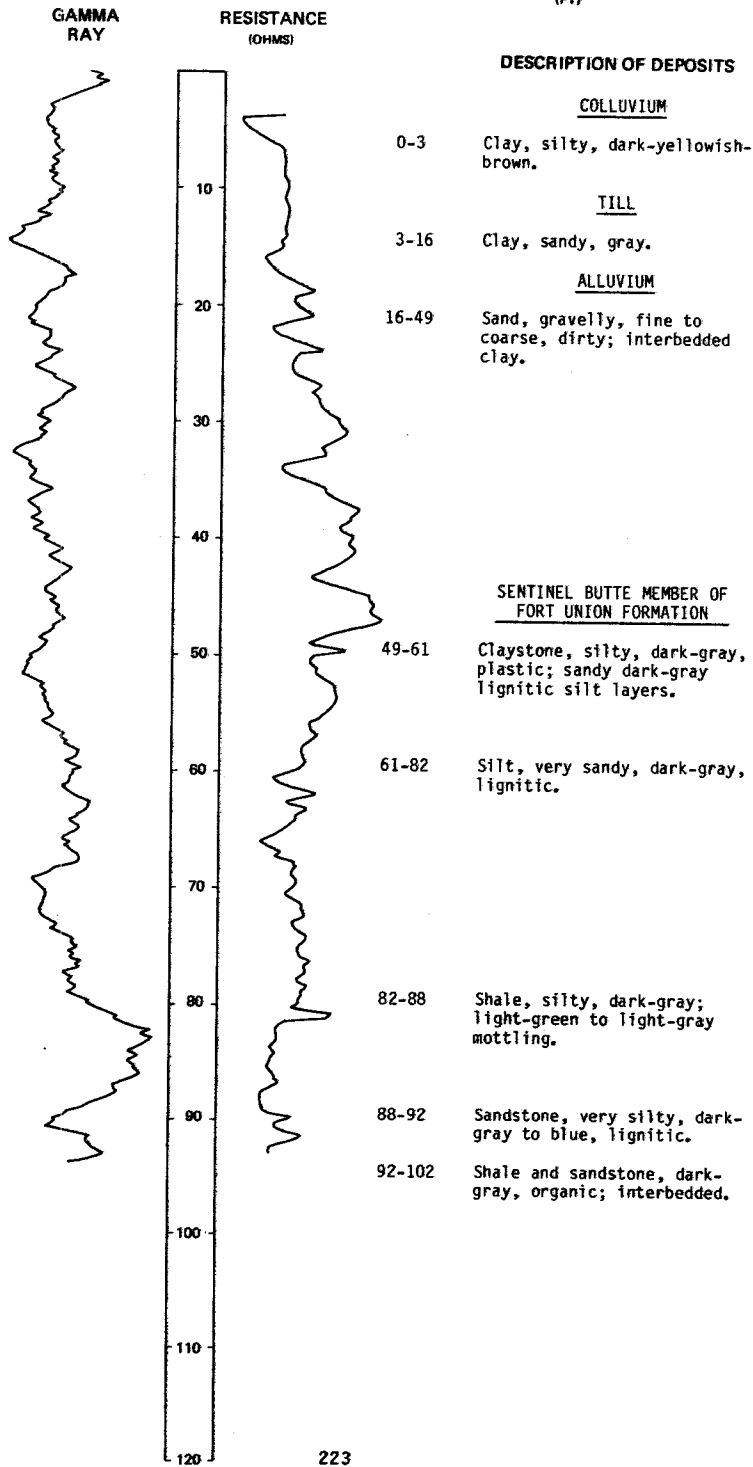
LOCATION: 150-099-238BA

NDSWC 5601

DATE DRILLED: 10/02/79

ALTITUDE: 2081
(FT, NGVD)

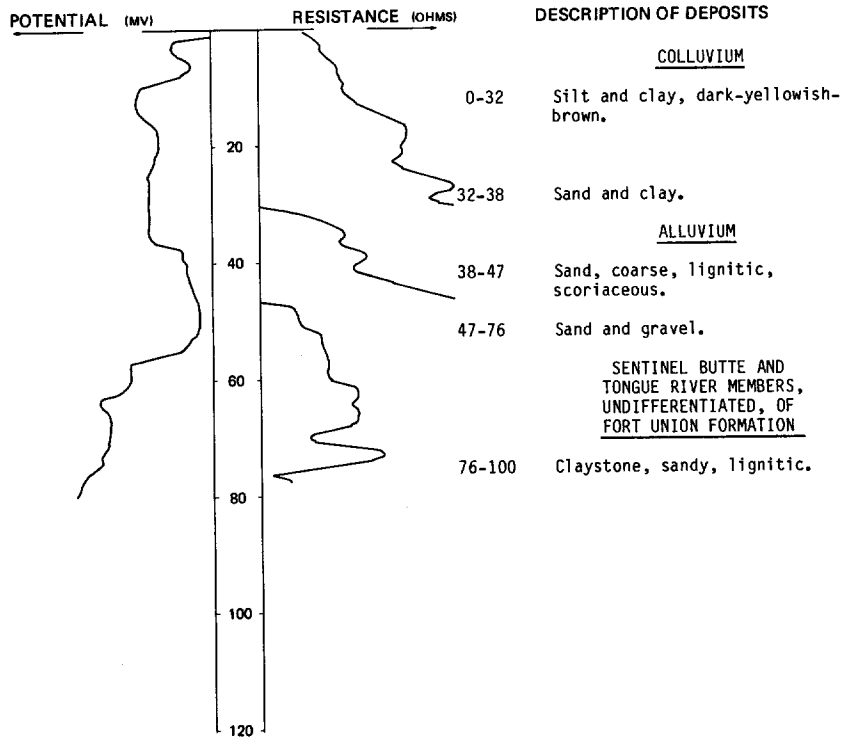
DEPTH: 102
(FT)



LOCATION: 150-099-24DAA
 ALTITUDE: 2063
 (FT, NGVD)

NDSWC 11729

DATE DRILLED: 9/22/81
 DEPTH: 100
 (FT)



150-099-24DBB
 (Log modified from C. A. Simpson & Son)

Altitude: 2120 feet

Date drilled: 11/02/47

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay, yellow, hard-----	7	8
	Clay, sandy, yellow, hard-----	20	28
	Sand, fine, yellow, muddy-----	16	44
	Clay, sandy, blue-----	5	49
	Sand and gravel-----	11	60

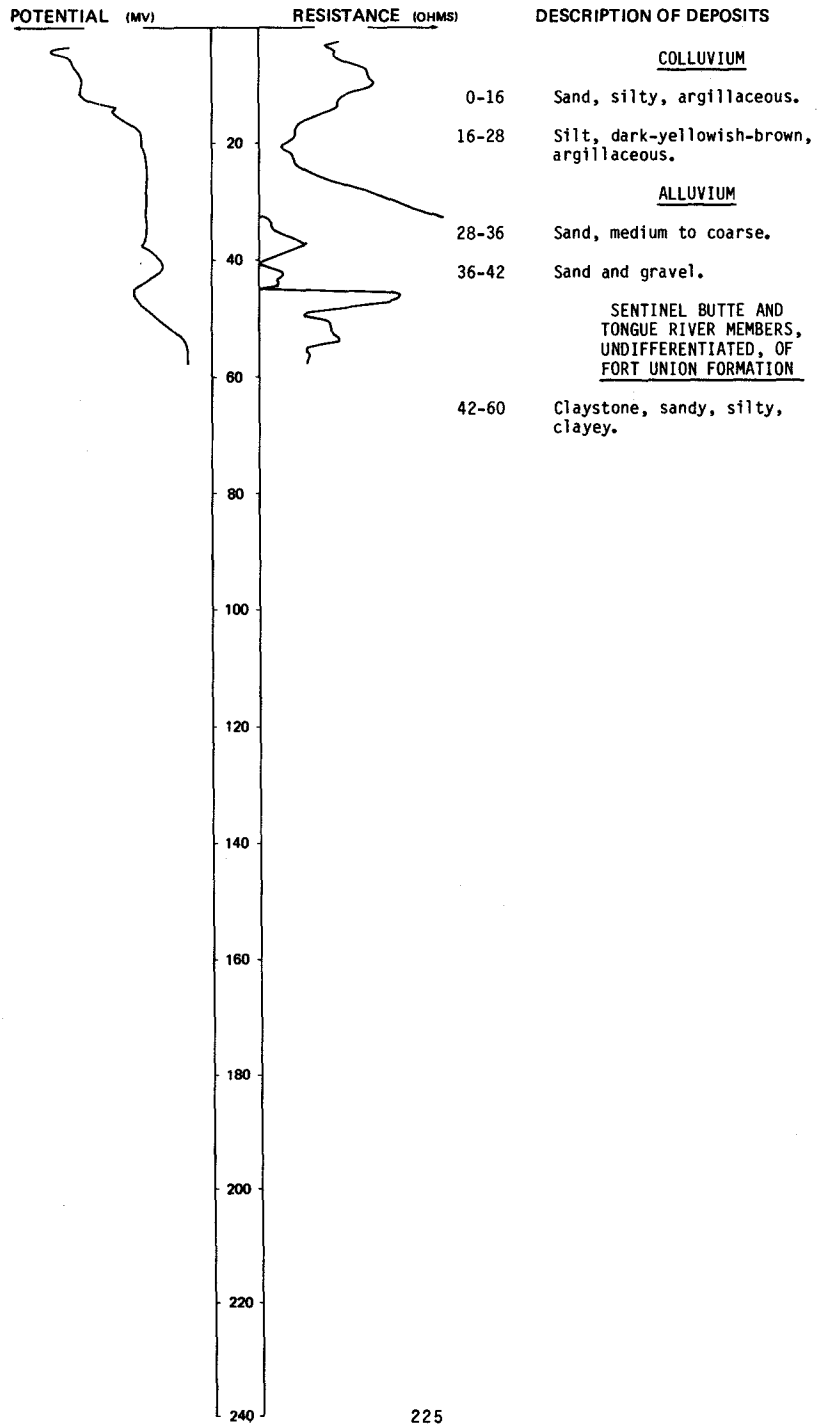
LOCATION: 150-099-25ADD

NDSWC 11726

DATE DRILLED: 9/22/81

ALTITUDE: 2068
(FT, NGVD)

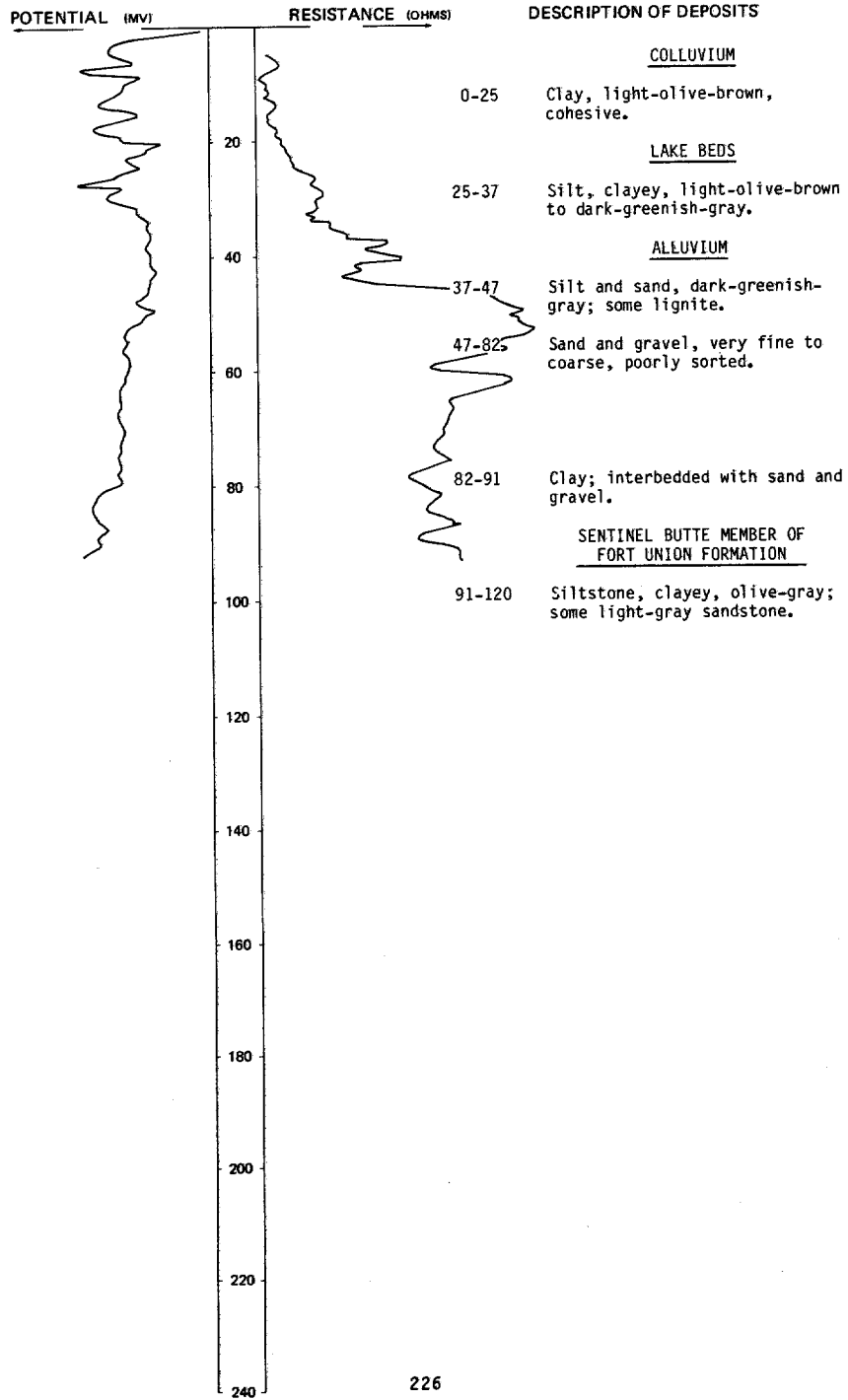
DEPTH: 60
(FT)



LOCATION: 150-099-25CDC
ALTITUDE: 2075
(FT, NGVD)

NDSWC 11341

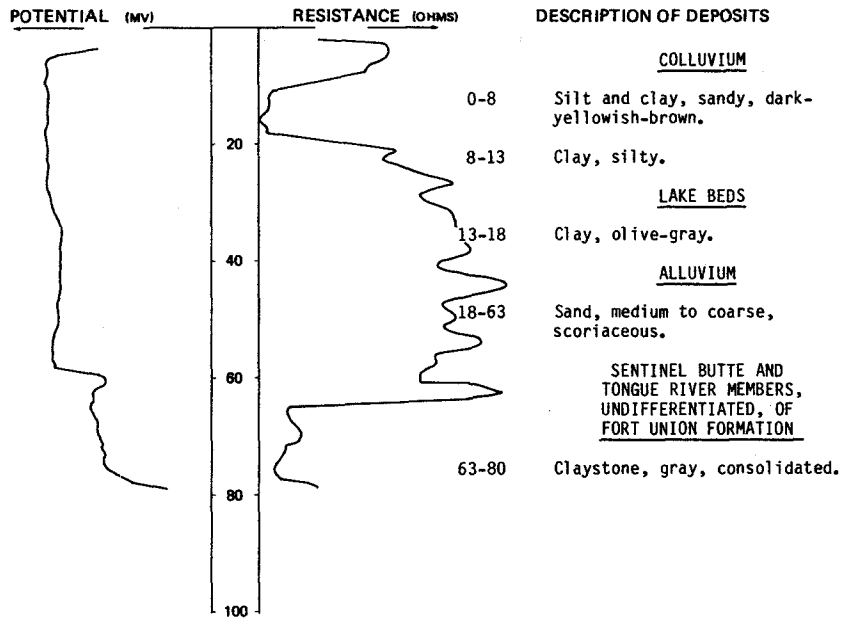
DATE DRILLED: 9/05/80
DEPTH: 120
(FT)



LOCATION: 150-099-250AD
 ALTITUDE: 2070
 (FT, NGVD)

NDSWC 11725

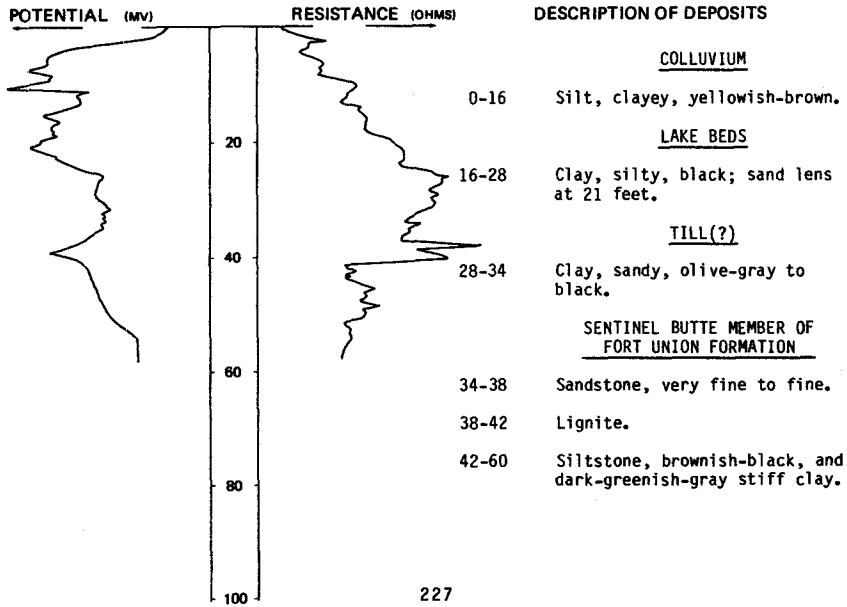
DATE DRILLED: 9/22/81
 DEPTH: 80
 (FT)



LOCATION: 150-099-260DD
 ALTITUDE: 2076
 (FT, NGVD)

NDSWC 11342

DATE DRILLED: 9/05/80
 DEPTH: 60
 (FT)



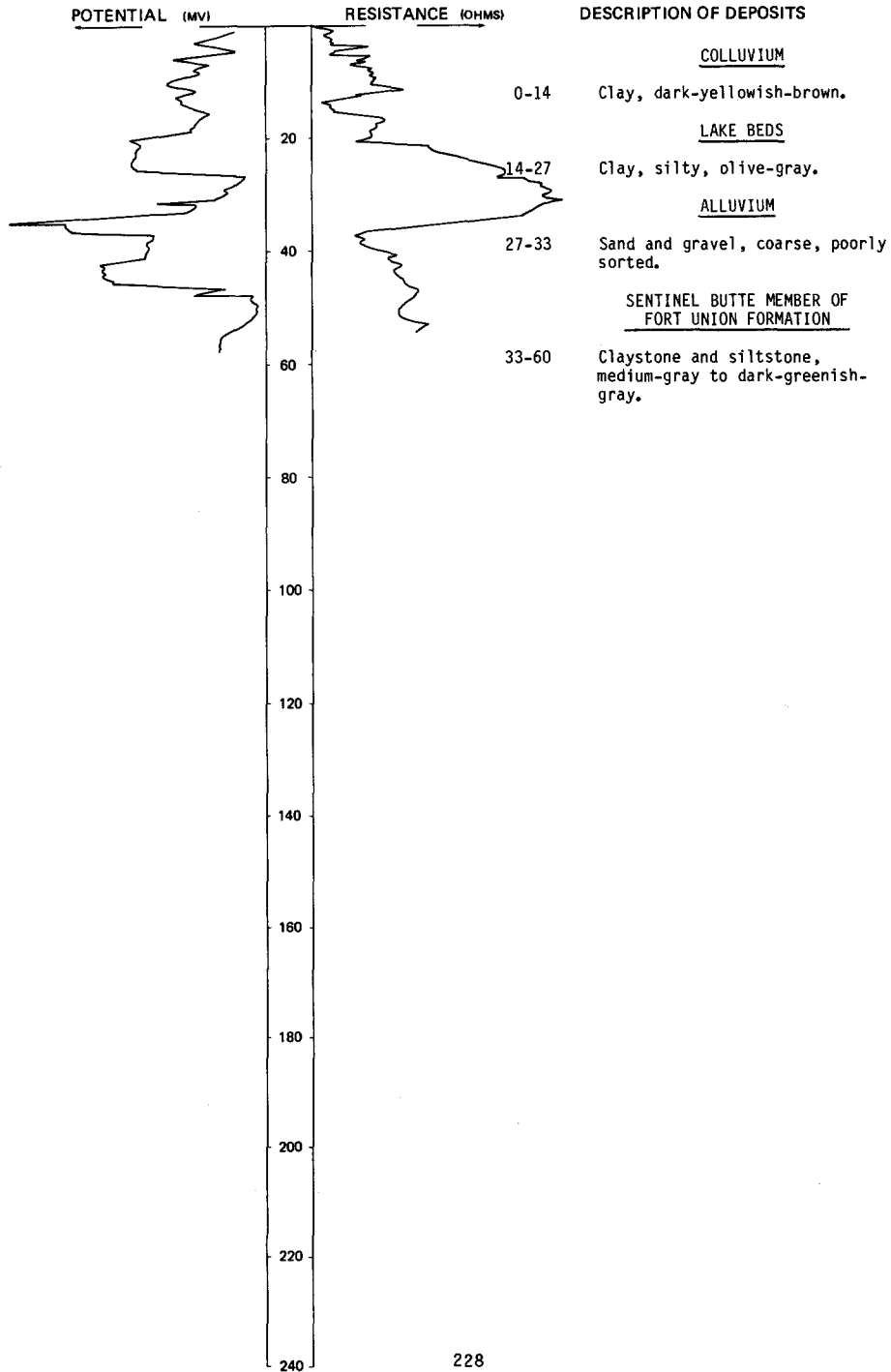
LOCATION: 150-099-27DDD

NDSWC 11345

DATE DRILLED: 9/08/80

ALTITUDE: 2076
(FT, NGVD)

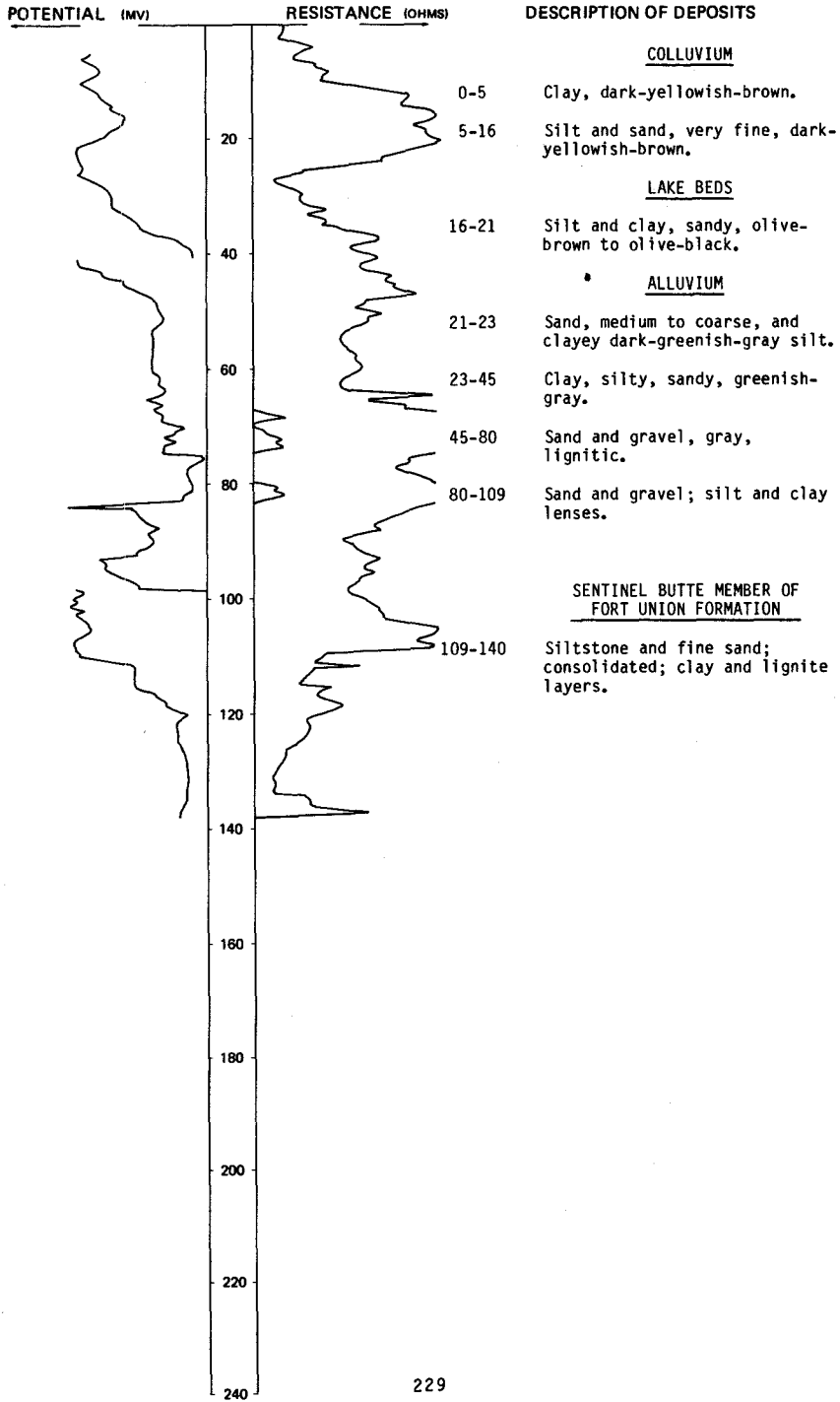
DEPTH: 60
(FT)



LOCATION: 150-099-35BBA
ALTITUDE: 2078
(FT, NGVD)

NDSWC 11344

DATE DRILLED: 9/08/80
DEPTH: 140
(FT)



150-099-35DDD
(Log modified from Thompson Drilling Co.)

Altitude: 2100 feet

Date drilled: 12/15/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Sand-----	15	17
	Clay-----	5	22
	Sand-----	5	27
	Hard shell-----	2	29
	Sand-----	47	76
	Clay-----	9	85
	Coal; water-----	3	88

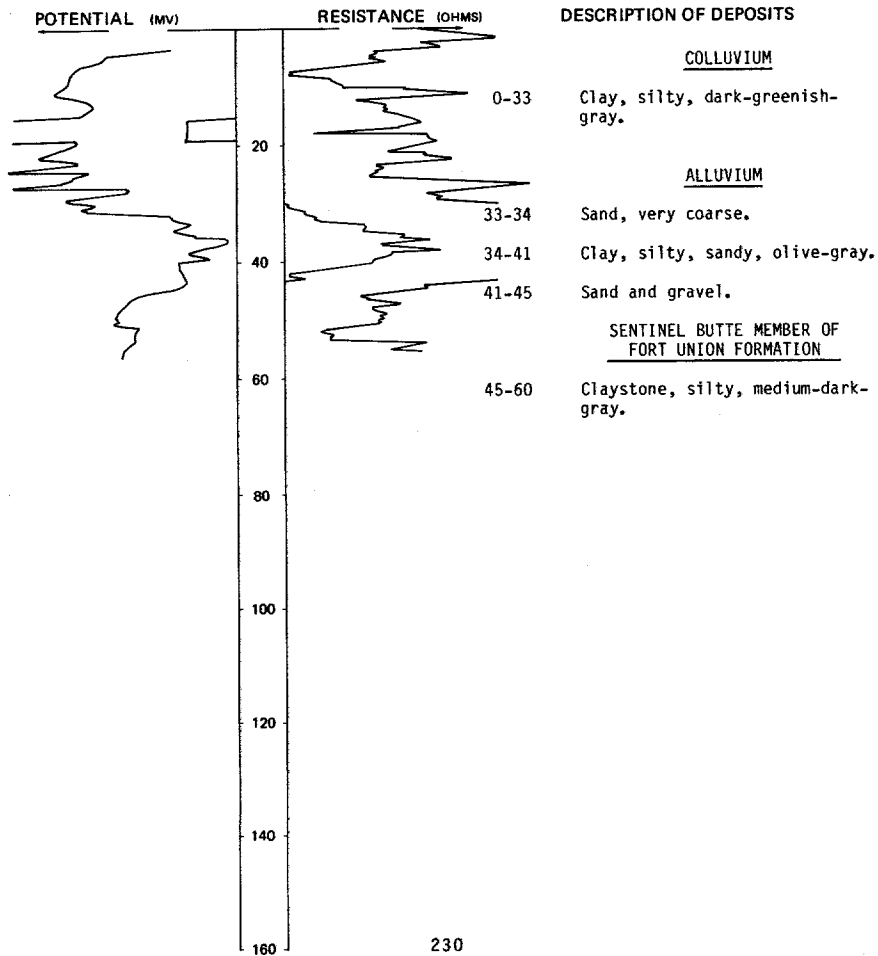
NDSWC 11346

LOCATION: 150-099-36AAB

DATE DRILLED: 9/08/80

ALTITUDE: 2080
(Ft. NGVD)

DEPTH: 60
(Ft)



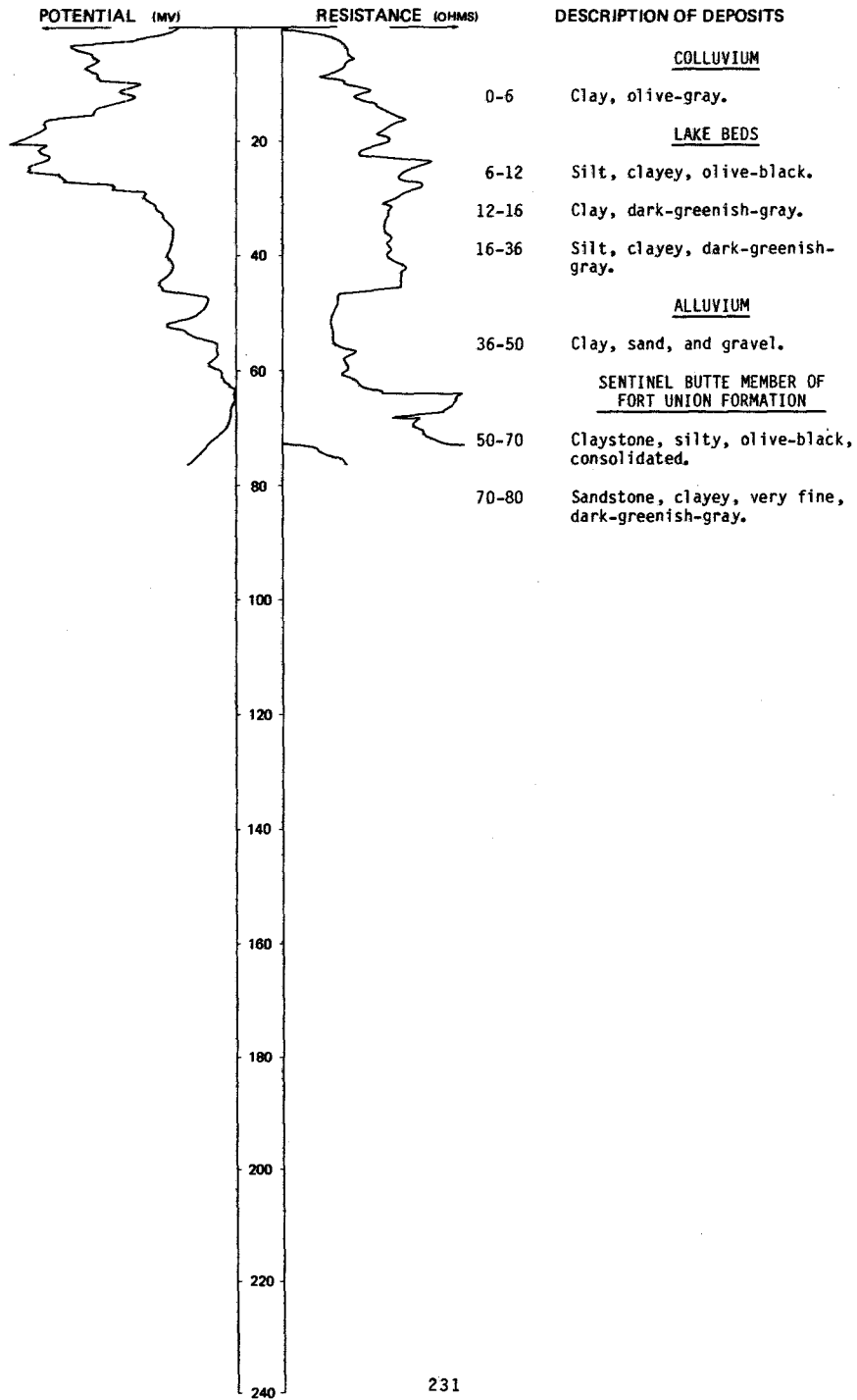
LOCATION: 150-099-36ABA

NDSWC 11343

DATE DRILLED: 9/08/80

ALTITUDE: 2080
(FT, NGVD)

DEPTH: 80
(FT)



150-100-05CAA
(Log modified from Thompson Drilling Co.)

Altitude: 2210 feet Date drilled: 10/27/65

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay overburden-----	37	37
	Coal-----	3	40
	Clay-----	5	45
	Sand-----	3	48
	Clay-----	55	103
	Coal-----	2	105
	Clay-----	5	110
	Sand, hard-----	3	113
	Clay-----	57	170
	Sand, very hard-----	2	172
	Sand, soft-----	13	185

150-100-14DCC
(Log modified from Thompson Drilling Co.)

Altitude: 2255 feet Date drilled: 5/01/76

	Topsoil-----	4	4
	Clay, blue-----	21	25
	Clay, gritty-----	8	33
	Sand, gray-----	12	45
	Sand, hard-----	2	47
	Sand, gray-----	18	65
	Sand, brown-----	4	69
	Sand, gray, soft-----	6	75
	Sand, blue; water-----	15	90

150-100-14DDB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2245 feet Date drilled: 3/28/73

	Topsoil-----	6	6
	Sand-----	24	30
	Sand, yellow-----	1	31
	Clay-----	12	43
	Sand, blue-----	27	70

150-100-18DAA
(Log modified from Thompson Drilling Co.)

Altitude: 2325 feet Date drilled: 6/02/75

	Topsoil-----	10	10
	Sand-----	60	70
	Sand, soft-----	10	80
	Sand, hard-----	7	87
	Sand, blue; water-----	8	95

150-100-26CBA
(Log modified from Thompson Drilling Co.)

Altitude: 2340 feet

Date drilled: 8/25/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay-----	3	5
	Clay, brown, gritty-----	3	8
	Clay, brown-----	13	21
	Clay, gray-----	39	60
	Clay, sandy-----	5	65
	Clay-----	19	84
	Coal-----	1	85
	Clay-----	51	136
	Hard shell-----	1	137
	Clay-----	23	160
	Coal-----	5	165
	Clay-----	15	180
	Sand-----	5	185
	Clay-----	10	195
	Hard shell-----	3	198
	Clay-----	2	200
	Coal-----	1	201
	Clay-----	7	208
	Sand-----	3	211
	Clay-----	10	221
	Coal-----	3	224
	Clay-----	31	255
	Coal-----	1	256
	Clay-----	29	285
	Coal-----	1	286
	Clay-----	29	315
	Sand, blue; water-----	8	323

150-100-27AAA
(Log modified from Thompson Drilling Co.)

Altitude: 2295 feet

Date drilled: 8/16/76

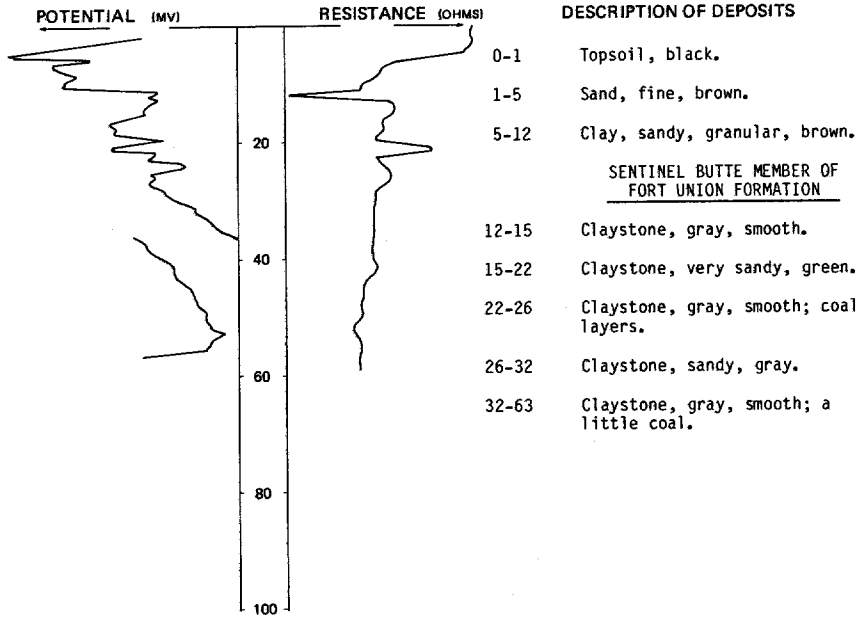
	Clay-----	42	42
	Coal-----	1	43
	Clay-----	42	85
	Shell-----	2	87
	Clay-----	15	102
	Clay; cleaner drilling-----	11	113
	Clay-----	4	117
	Hard shell-----	9	126
	Coal-----	4	130
	Clay-----	17	147
	Coal-----	2	149
	Clay-----	15	164
	Clay, brown-----	2	166
	Clay, green-----	35	201
	Clay, gritty-----	2	203
	Clay-----	10	213
	Clay, gritty-----	2	215
	Coal-----	1	216
	Clay-----	3	219
	Coal-----	1	220
	Clay-----	12	232
	Clay, gritty-----	6	238
	Coal-----	1	239
	Clay-----	28	267
	Sand, blue; water-----	3	270

LOCATION: 150-101-05888
 ALTITUDE: 2190
 (FT, NGVD)

NDSWC 1835

DATE DRILLED: 10/12/60

DEPTH: 63
 (FT)



150-101-05888
 NDSWC 1833

Altitude: 2225 feet

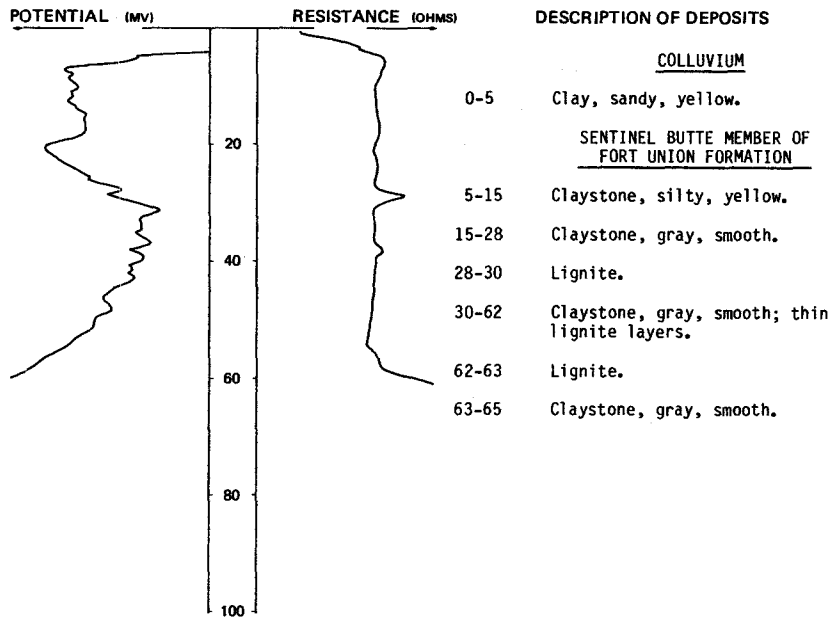
Date drilled: 10/11/60

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, black-----	2	2
	Clay, sandy, yellow; some rocks-----	10	12
	Clay, gray, smooth-----	4	16
	Clay, gray, smooth; some gravel-----	7	23
	Coal-----	6	29
	Clay, gray, smooth-----	13	42

LOCATION: 150-101-05CBA
 ALTITUDE: 2187
 (FT, NGVD)

NDSWC 1849

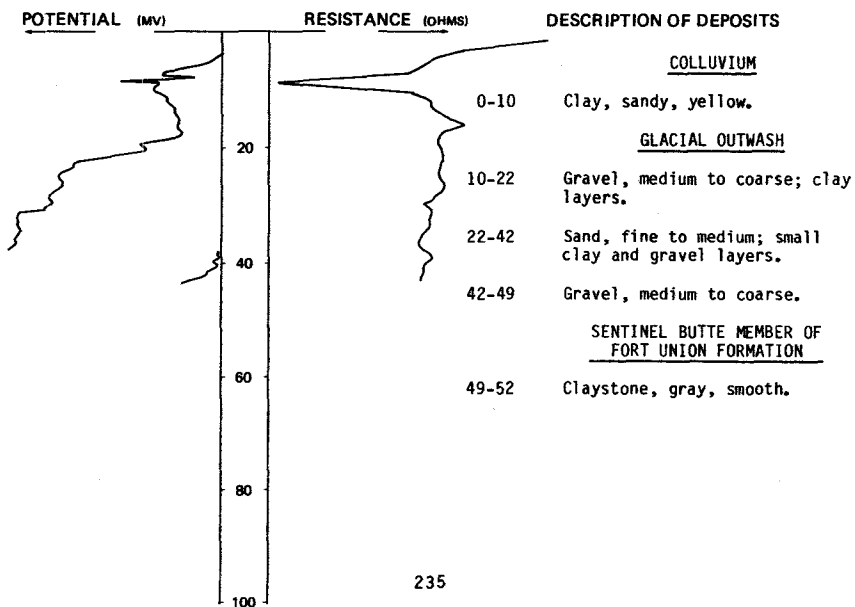
DATE DRILLED: 10/22/60
 DEPTH: 65
 (FT)



LOCATION: 150-101-05CCA
 ALTITUDE: 2160
 (FT, NGVD)

NDSWC 1850

DATE DRILLED: 10/22/60
 DEPTH: 52
 (FT)



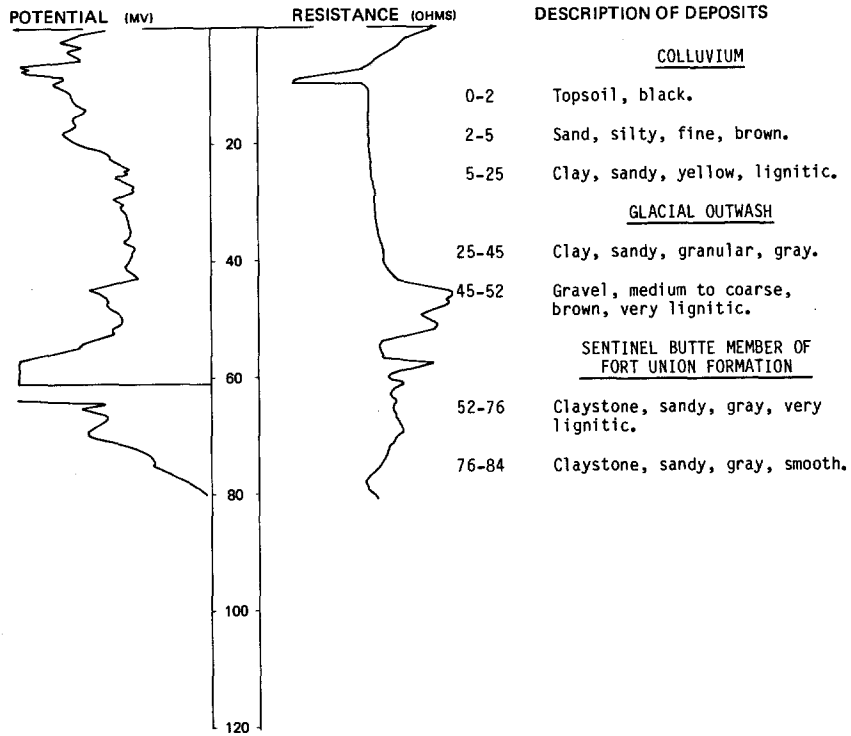
NDSWC 1834

LOCATION: 150-101-05CCC2

DATE DRILLED: 10/12/60

ALTITUDE: 2140
(FT, NGVD)

DEPTH: 84
(FT)



150-101-05CCD
(Log modified from Dakota Drilling Co.)

Altitude: 2150 feet

Date drilled: 6/15/75

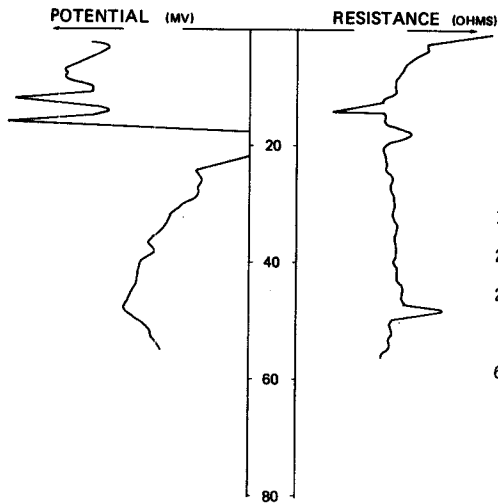
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Till, black-----	6	6
	Quicksand, red-----	21	27
	Clay, gray-----	4	31
	Coal, lignite-----	5	36
	Clay, gray, sticky-----	8	44
	Sand and coal-----	5	49

LOCATION: 150-101-07AAA
 ALTITUDE: 2135
 (FT. NGVD)

NDSWC 1832

DATE DRILLED: 10/10/60

DEPTH: 63
 (FT)



DESCRIPTION OF DEPOSITS

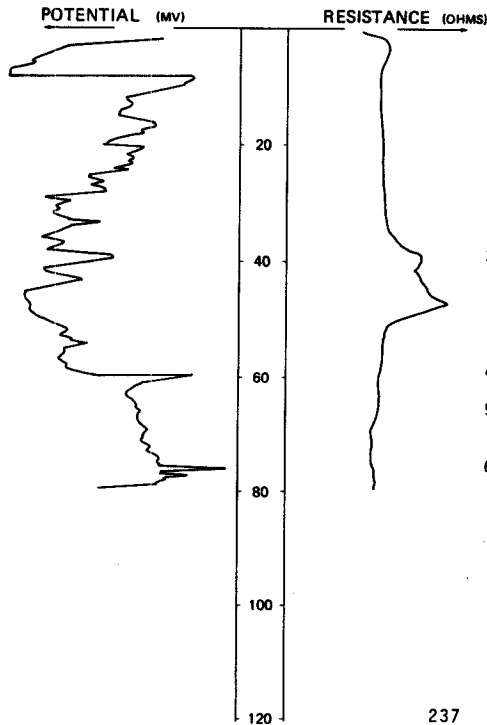
- COLLUVIUM
- 0-17 Clay, sandy, gravelly, gray; lignite fragments.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 17-20 Claystone, sandy, gray, smooth.
- 20-22 Lignite.
- 22-60 Claystone, sandy, gray; interbedded lignite seams.
- 60-63 Claystone, sandy, light-gray.

LOCATION: 150-101-07BBA
 ALTITUDE: 2150
 (FT. NGVD)

NDSWC 1837

DATE DRILLED: 10/13/60

DEPTH: 84
 (FT)



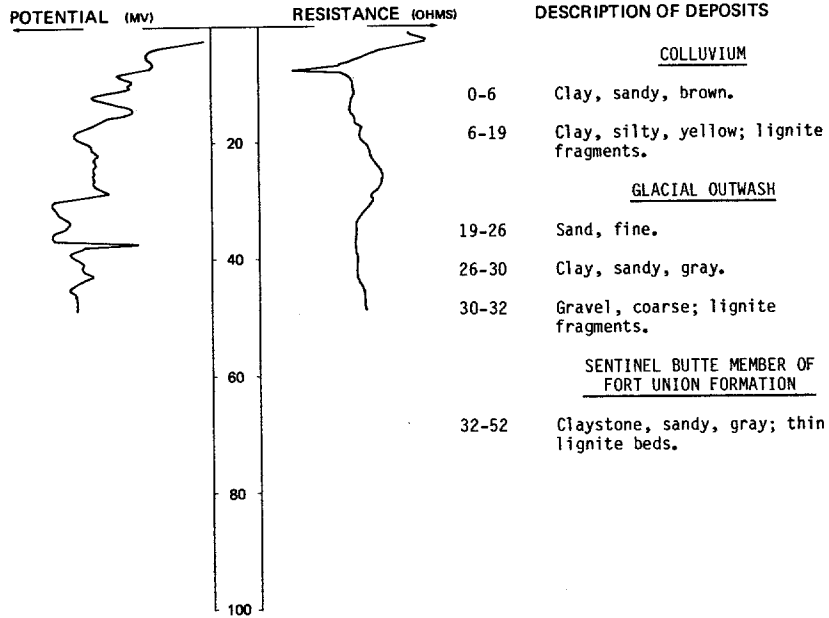
DESCRIPTION OF DEPOSITS

- COLLUVIUM
- 0-10 Clay, sandy, brown.
- GLACIAL OUTWASH
- 10-39 Clay, sandy, granular, gray.
- 39-49 Gravel, coarse, brown, iron-stained.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 49-51 Lignite.
- 51-65 Claystone, sandy, gray to olive-gray.
- 65-84 Claystone, gray, smooth; lignite fragments.

LOCATION: 150-101-08AAA
 ALTITUDE: 2163
 (FT, NGVD)

NDSWC 1842

DATE DRILLED: 10/18/60
 DEPTH: 52
 (FT)



150-101-08CBC
 NDSWC 1840

Altitude: 2145 feet

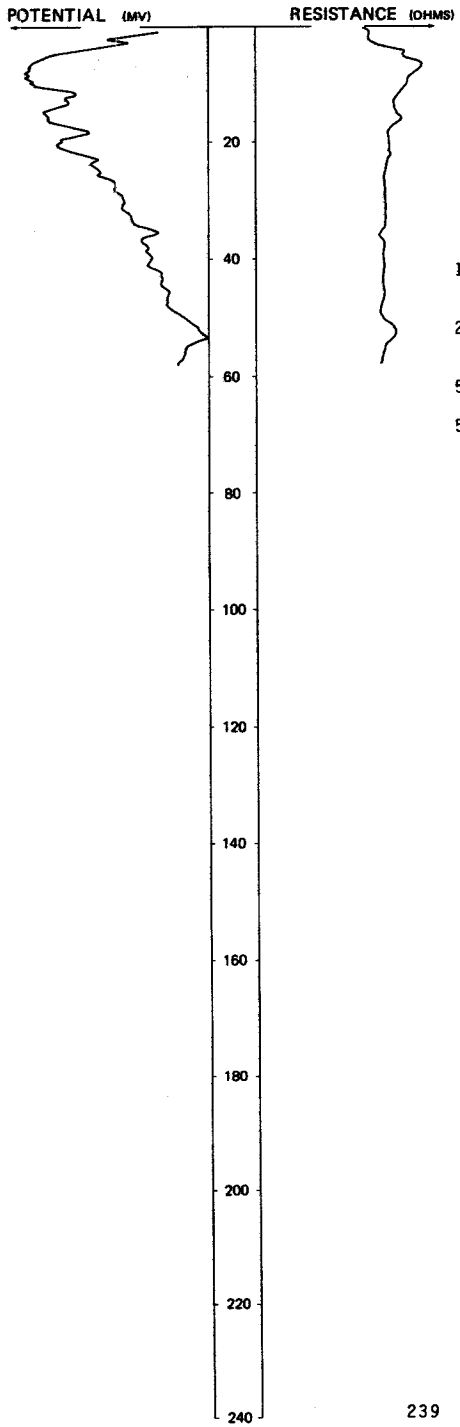
Date drilled: 10/17/60

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, black-----	1	1
	Clay, sandy, brown-----	4	5
	Till; a little coal-----	6	11
	Sand, medium to coarse; clay layers and some fine gravel-----	19	30
	Clay, gray, smooth; Fort Union Formation-----	10	40
	Coal-----	3	43
	Clay, gray, smooth; a little coal-----	20	63

LOCATION: 150-101-09AAD
ALTITUDE: 2165
(FT, NGVD)

NDSWC 1843

DATE DRILLED: 10/18/60
DEPTH: 63
(FT)



DESCRIPTION OF DEPOSITS

- COLLUVIUM
- 0-6 Clay, silty, light-gray.
- GLACIAL OUTWASH
- 6-13 Gravel, coarse, clayey, sandy.
- SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 13-22 Lignite and interbedded clay beds; gray.
- 22-53 Claystone, greenish-gray to gray, smooth; some lignite.
- 53-57 Lignite.
- 57-63 Claystone, gray, smooth.

150-101-10DDD
NDSWC 11592

Altitude: 2200 feet

Date drilled: 5/20/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Silt, sandy, dark-yellowish-brown, argillaceous-----	3	3
	Sand and gravel-----	5	8
	Clay, olive-gray-----	4	12
	Lignite-----	4	16
	Claystone, dark-gray-----	4	20

150-101-11CCB
NDSWC 1844

Altitude: 2200 feet

Date drilled: 10/18/60

	Topsoil, black-----	1	1
	Till, grayish-yellow-----	9	10
	Lignite-----	6	16
	Clay, sandy, green; coal layers-----	21	37
	Clay, gray, smooth-----	5	42

150-101-14ADD
NDSWC 11591

Altitude: 2230 feet

Date drilled: 5/20/81

	Silt, dark-yellowish-brown-----	3	3
	Sand, pebbly, very coarse-----	4	7
	Lignite and carbonaceous silt-----	1	8
	Claystone, dark-yellowish-brown-----	4	12
	Claystone, dark-gray-----	9	21
	Sandstone, fine-----	8	29
	Lignite-----	8	37
	Claystone, gray, consolidated-----	23	60

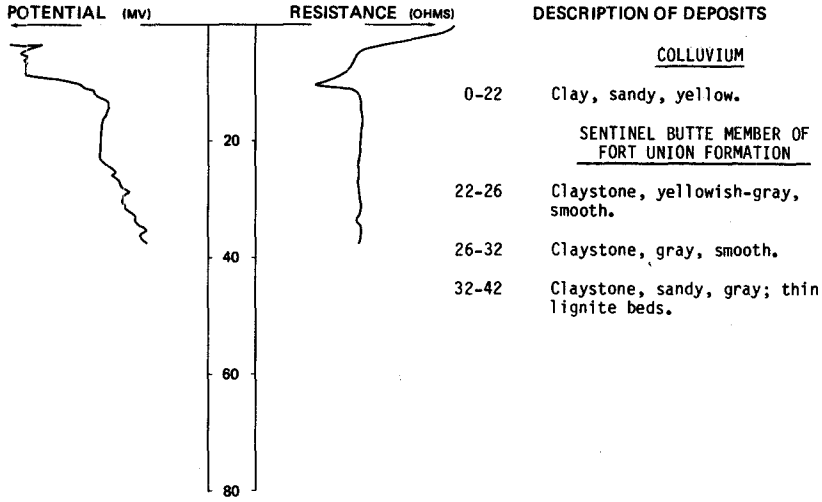
NDSWC 1841

LOCATION: 150-101-18DAD

DATE DRILLED: 10/18/60

ALTITUDE: 2210
(FT, NGVD)

DEPTH: 42
(FT)



150-101-21DAA
(Log modified from Thompson Drilling Co.)

Altitude: 2225 feet

Date drilled: 11/26/74

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	2	2
	Clay-----	6	8
	Sand-----	4	12
	Clay-----	13	25
	Sand, soft-----	11	36
	Clay-----	4	40
	Sand-----	8	48
	Coal; water-----	2	50

150-101-24ABA
NDSWC 11799

Altitude: 2275 feet

Date drilled: 10/22/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, fine to medium, brown-----	11	11
	Clay, silty, dark-yellowish-brown-----	9	20
	Sand, fine to medium-----	12	32
	Sand and clay, olive-gray; interbedded-----	10	42
	Sand, fine to medium-----	16	58
	Clay, medium-gray; bedrock-----	7	65

150-101-31AAA
(Log modified from Thompson Drilling Co.)

Altitude: 2210 feet

Date drilled: 7/10/75

	Soil-----	2	2
	Sand-----	15	17
	Clay-----	31	48
	Sand-----	10	58
	Clay-----	22	80

150-101-31DDD
NDSWC 1836

Altitude: 2210 feet

Date drilled: 10/19/60

	Topsoil, brown-----	2	2
	Sand, fine, brown-----	3	5
	Clay, sandy, granular, yellow-----	6	11
	Sand, fine, yellowish-brown-----	4	15
	Clay, granular, yellow-----	7	22
	Clay, sandy, grayish-yellow-----	6	28
	Clay, gray, smooth-----	4	32
	Lignite-----	4	36
	Clay, gray, smooth-----	19	55
	Clay, sandy, gray, smooth; thin lignite beds-----	8	63

150-102-02DAD
NDSWC 1839

Altitude: 2115 feet

Date drilled: 10/14/60

	Topsoil, black-----	1	1
	Clay, silty, yellow-----	4	5
	Till, yellow-----	6	11
	Gravel, medium to coarse; small layers of clay-----	10	21
	Gravel, medium to coarse, and sand-----	7	28
	Till; a little coal-----	22	50
	Gravel, medium to coarse-----	1	51
	Clay, gray, smooth; sandy layers-----	13	64
	Clay, gray, smooth; mixed coal layers-----	10	74

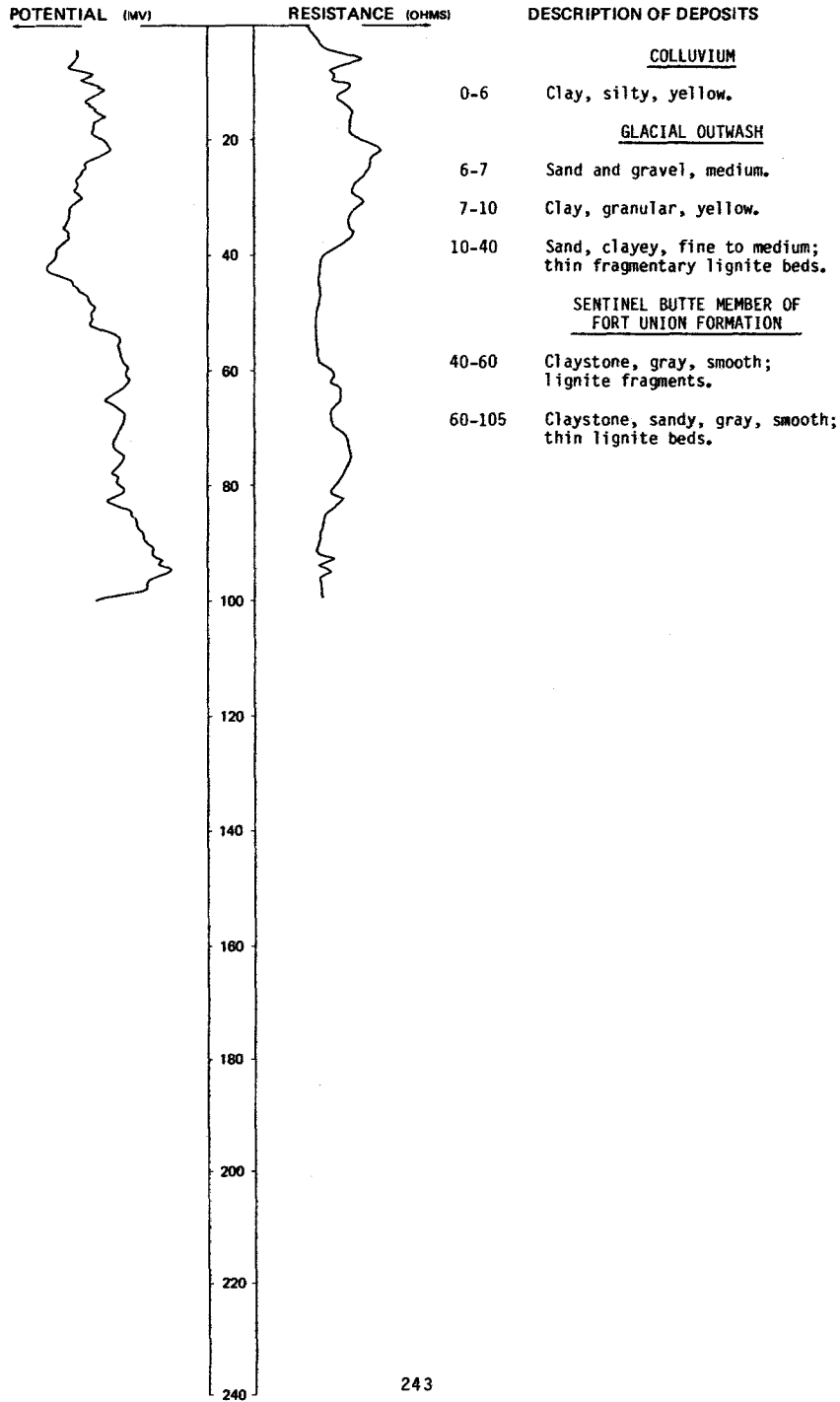
LOCATION: 150-102-0200A

NDSWC 1838

DATE DRILLED: 10/13/60

ALTITUDE: 2105
(FT, NGVD)

DEPTH: 105
(FT)



150-102-07BBA
NDSWC 1837

Altitude: 2045 feet

Date drilled: 10/13/60

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, black-----	1	1
	Clay, sandy, brown; looks like till-----	9	10
	Till, gray; a little coal-----	31	41
	Gravel, coarse, dark-brown; a little coal-----	8	49
	Coal-----	2	51
	Clay, sandy, green-----	7	58
	Clay, sandy, gray-----	7	65
	Clay, gray, smooth-----	14	79
	Clay, gray, smooth; a little coal-----	5	84

150-102-15ACB
(Log modified from Mon-Dak Drilling Co.)

Altitude: 2160 feet

Date drilled: 6/07/72

	Topsoil-----	1	1
	Shale, brown-----	14	15
	Sand and gravel-----	2	17
	Coal streaks and gray shale-----	48	65

150-102-15BDC
(Log modified from Mon-Dak Drilling Co.)

Altitude: 2120 feet

Date drilled: 6/11/72

	Topsoil-----	1	1
	Shale, brown-----	13	14
	Sand and fine gravel-----	4	18
	Shale, brown, and coal streaks-----	30	48
	Gravel, sand, and coal-----	6	54
	Shale, gray-----	5	59

150-102-19DDD
(Log modified from Francis Boyce Water Well)

Altitude: 2100 feet

Date drilled: 12/23/66

	Topsoil and yellow clay-----	10	10
	Clay, yellow, and gravel-----	15	25
	Clay-----	7	32
	Gravel, fine-----	11	43
	Coal-----	1	44
	Clay, gray-----	37	81
	Rock-----	4	85
	Shale, gray-----	16	101
	Coal-----	2	103
	Shale, gray-----	38	141
	Coal-----	3	144
	Shale, gray-----	36	180
	Coal-----	8	188
	Shale, soft-----	12	200
	Coal-----	3	203
	Shale, gray-----	10	213
	Rock-----	1	214
	Shale-----	4	218
	Rock-----	1	219
	Sandstone, gray-----	7	226

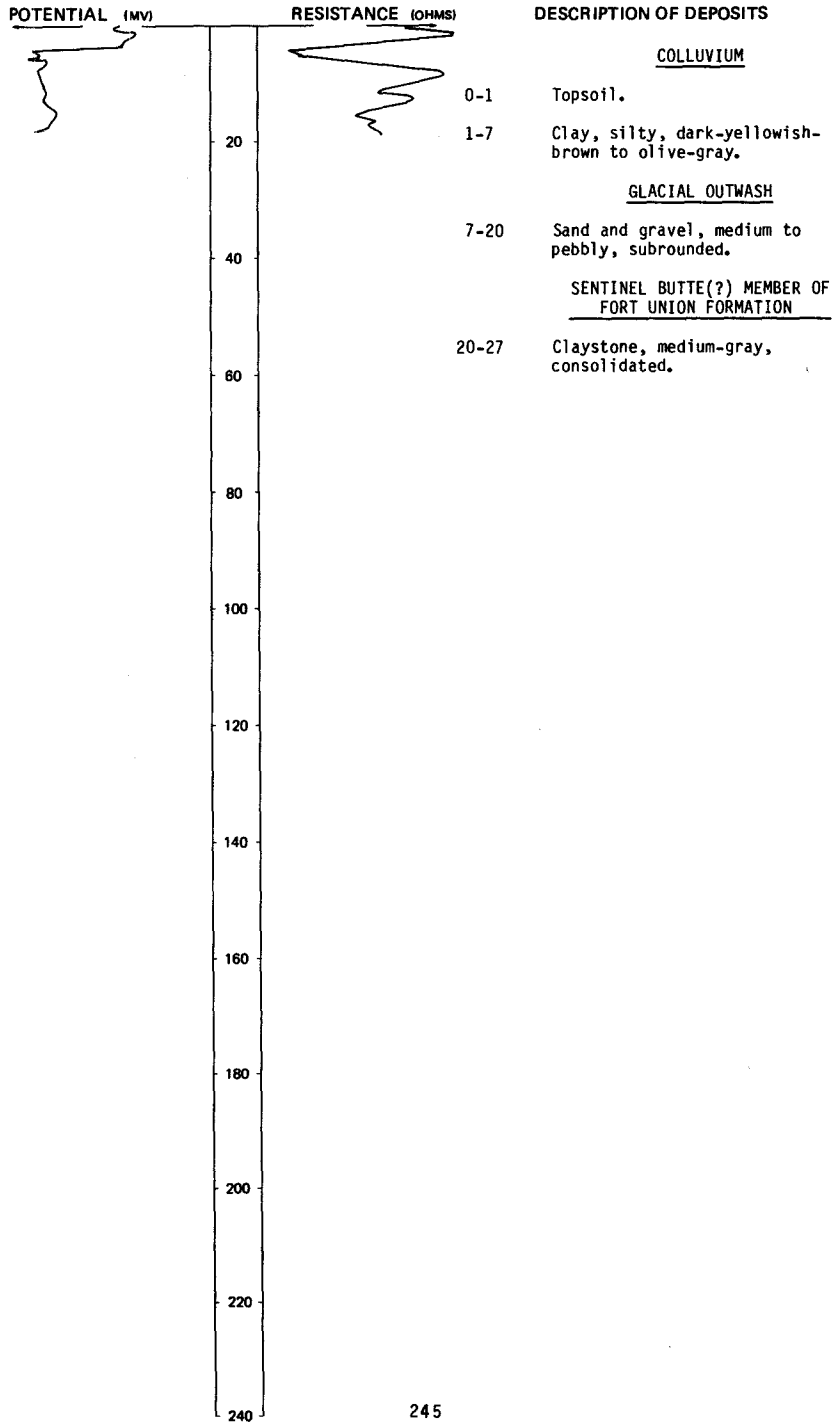
LOCATION: 150-103-01DBD

NDSWC 11382

DATE DRILLED: 9/23/80

ALTITUDE: 2020
(FT. NGVD)

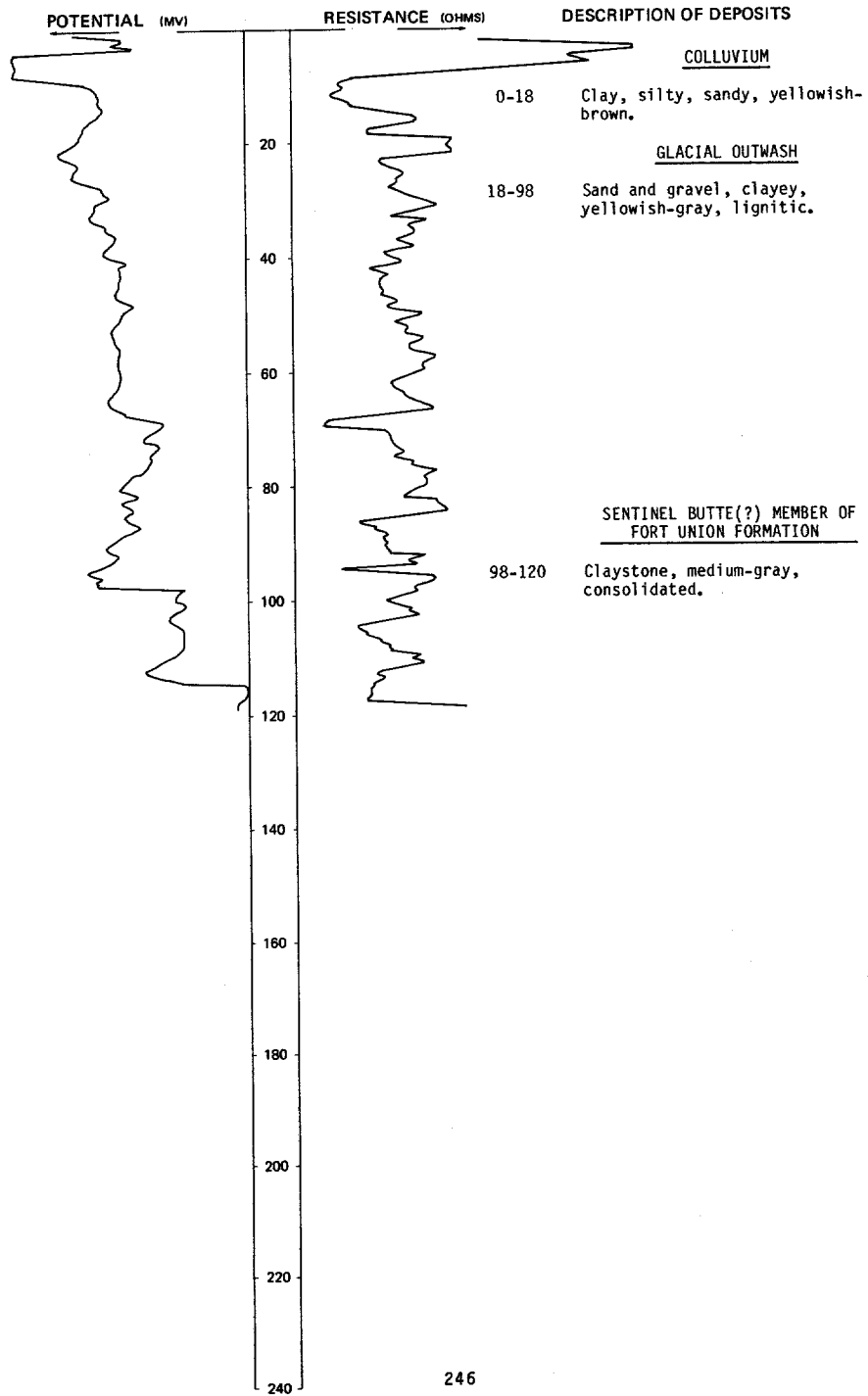
DEPTH: 27
(FT)



LOCATION: 150-103-01DDA
ALTITUDE: 2015
(FT, NGVD)

NDSWC 11383

DATE DRILLED: 9/23/80
DEPTH: 120
(FT)



LOCATION: 150-103-03AAC

NDSWC 5941

DATE DRILLED: 7/07/81

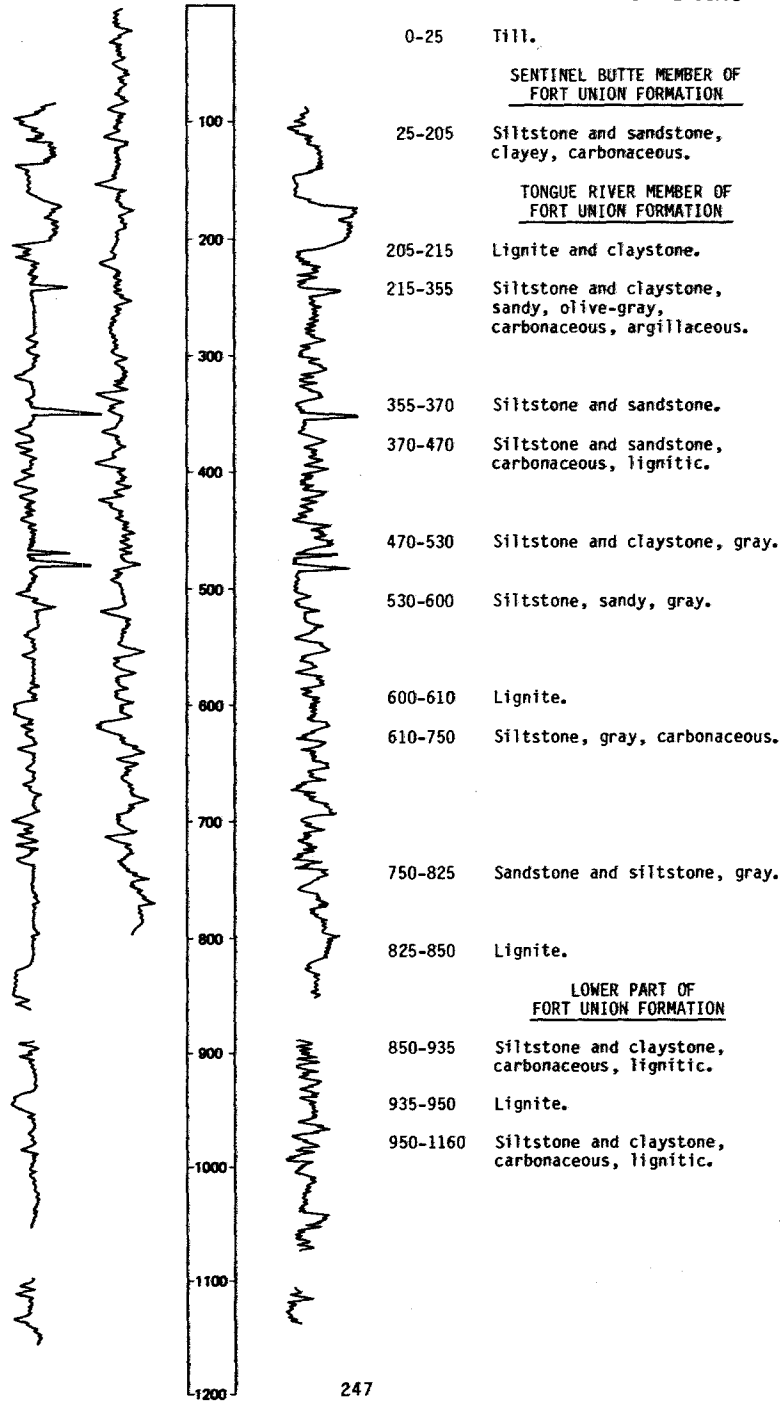
ALTITUDE: 2230
(FT, NGVD)

DEPTH: 1160
(FT)

NEUTRON GAMMA
(API) RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

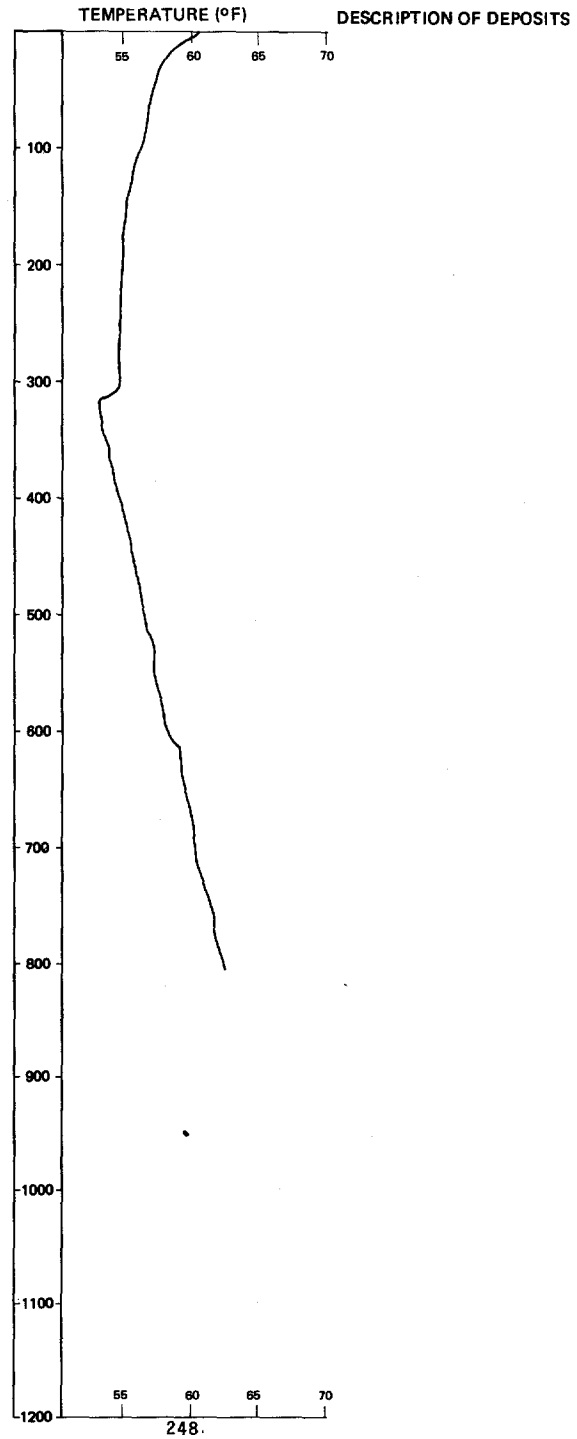


LOCATION: 150-103-03AAC NDSWC 5941, Continued

DATE DRILLED: 7/07/81

ALTITUDE: 2230
(FT, NGVD)

DEPTH: 1160
(FT)



248.

150-103-23CDD
(Log modified from Francis Boyce Water Well)

Altitude: 2220 feet

Date drilled: 11/11/70

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	3	3
	Clay, gravel, and sandy clay-----	33	36
	Clay, gray-----	16	52
	Coal-----	3	55
	Shale, gray-----	108	163
	Coal-----	6	169
	Shale, gray-----	83	252
	Coal-----	4	256
	Shale, gray-----	99	355
	Coal-----	2	357
	Shale, gray-----	26	383
	Rock-----	6	389
	Shale, gray-----	111	500
	Shale, gray; thin rock layers-----	101	601
	Rock-----	4	605
	Sandstone, fine, and gray shale; thin layers-----	25	630
	Shale, gray, hard-----	128	758
	Rock-----	6	764
	Shale, gray, hard-----	97	861
	No description available-----	589	1450

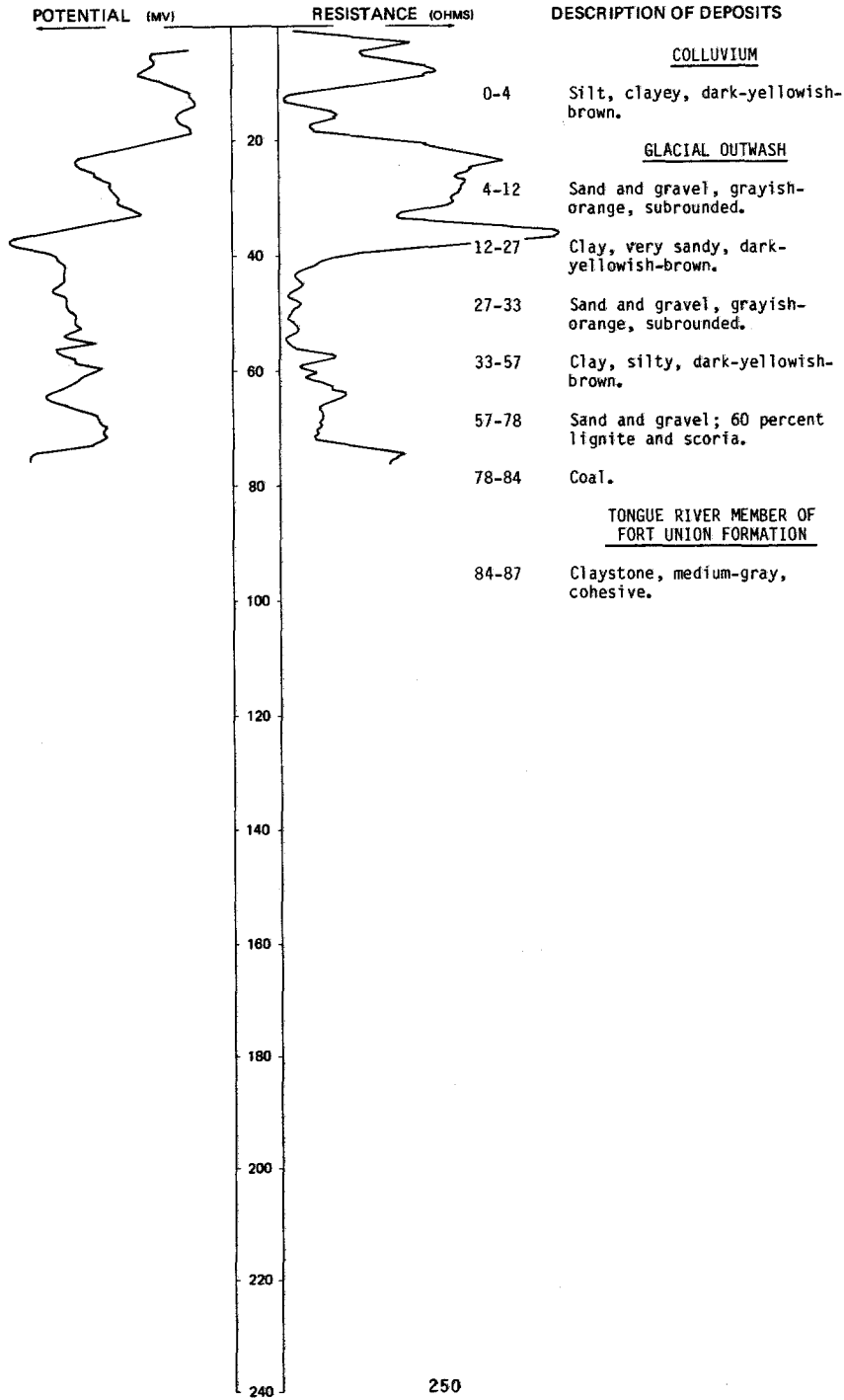
LOCATION: 150-104-01BBB

NDSWC 11387

DATE DRILLED: 9/24/80

ALTITUDE: 1914
(FT, NGVD)

DEPTH: 87
(FT)

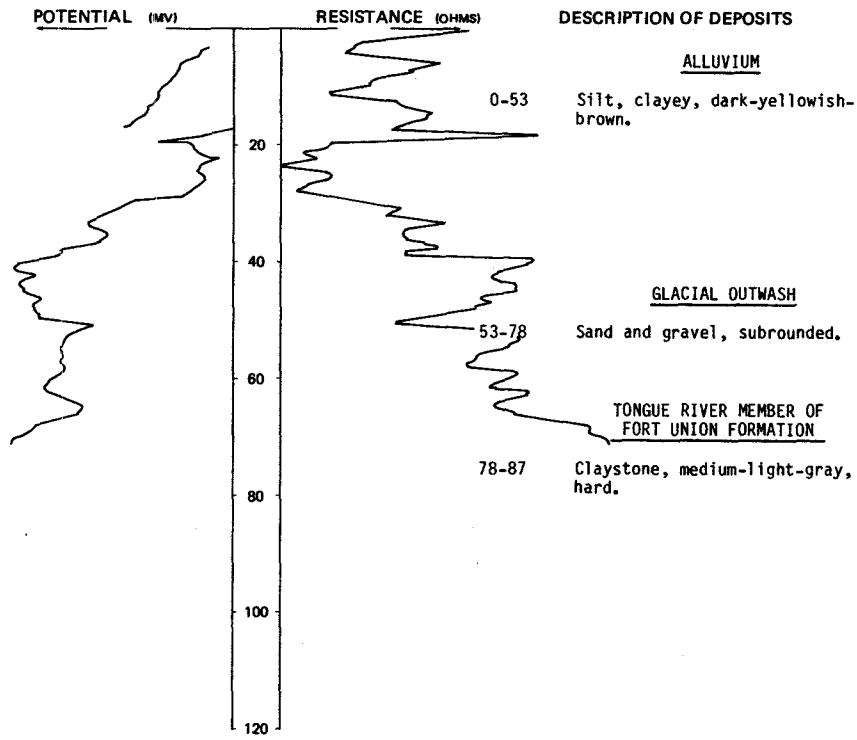


LOCATION: 150-104-02AAD
 ALTITUDE: 1920
 (FT, NGVD)

NDSWC 11386

DATE DRILLED: 9/24/80

DEPTH: 87
 (FT)



150-104-02ABB
 NDSWC 1275

Altitude: 1877 feet

Date drilled: 1/08/57

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, brown, smooth-----	5	5
	Sand, medium to coarse-----	21	26
	Gravel, medium to coarse, and coal-----	16	42

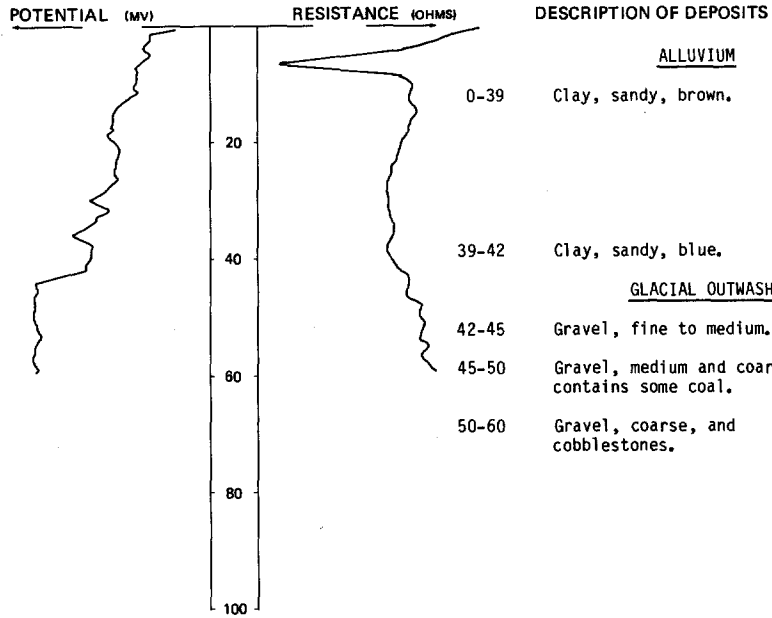
LOCATION: 150-104-02ACC

NDSWC 15

DATE DRILLED: 5/10/57

ALTITUDE: 1895
(FT, NGVD)

DEPTH: 60
(FT)



150-104-02ADA1
NDSWC 11388

Altitude: 1925 feet

Date drilled: 9/24/80

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	1	1
	Silt, clayey, dark-yellowish-brown-----	58	59
	Sand and gravel; medium sand to pebbly subangular gravel-----	27	86

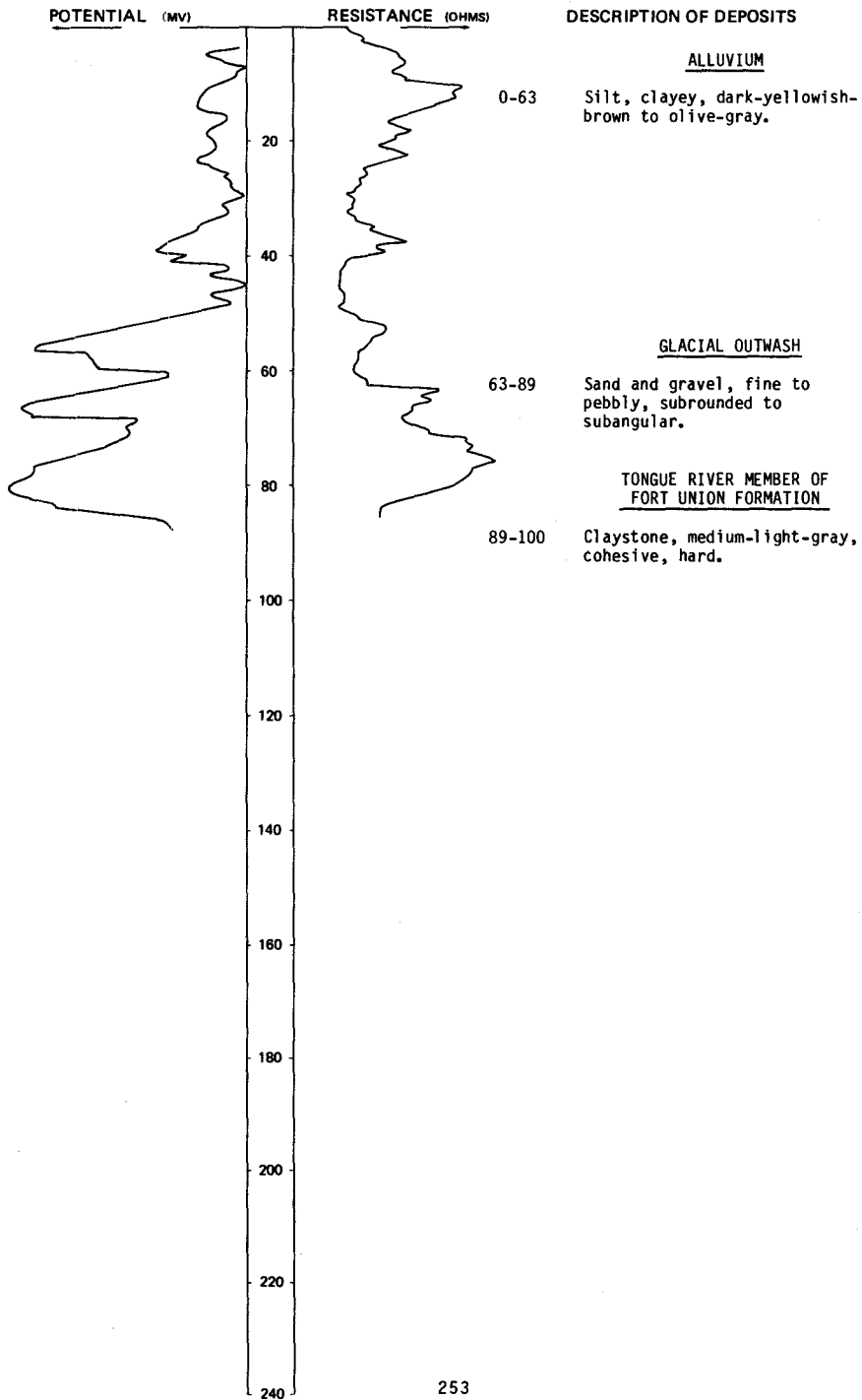
LOCATION: 150-104-02ADA2

NDSWC 11392

DATE DRILLED: 9/26/80

ALTITUDE: 1925
(FT, NGVD)

DEPTH: 100
(FT)



150-104-02ADB
NDSWC 16

Altitude: 1917 feet

Date drilled: 5/17/57

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow-----	23	23
	Gravel, fine to medium-----	8	31
	Clay, sandy, yellow-----	21	52
	Sand, fine-----	9	61
	Gravel, coarse, and cobbles-----	3	64

150-104-02ADD
(Log modified from Francis Boyce Water Well)

Altitude: 1940 feet

Date drilled: 1/23/67

	Topsoil, clay, and gravel-----	15	15
	Sand and fine gravel-----	27	42
	Clay, mixed-----	48	90
	Sand and gravel-----	10	100
	Shale, gray-----	26	126
	Coal-----	5	131
	Shale, hard-----	19	150
	Sandstone-----	20	170
	Shale-----	10	180
	Rock-----	1	181
	Shale, hard-----	11	192
	Sandstone-----	13	205
	Shale-----	10	215
	Coal-----	8	223
	Shale-----	127	350
	Shale and thin layers of coal-----	150	500
	Shale; brown and gray layers-----	45	545
	Shale, hard-----	10	555
	Sandstone-----	25	580
	Coal-----	13	593
	Shale, hard-----	28	621
	Sandstone; 10 gallons per minute-----	29	650
	Shale, hard-----	5	655

150-104-02BDC
NDSWC 1274

Altitude: 1875 feet

Date drilled: 1/03/58

	Clay, brown, smooth-----	7	7
	Sand, fine to medium; a little coal-----	7	14
	Sand, medium to coarse-----	14	28
	Gravel, coarse-----	18	46
	Clay, light-gray; bedrock-----	6	52

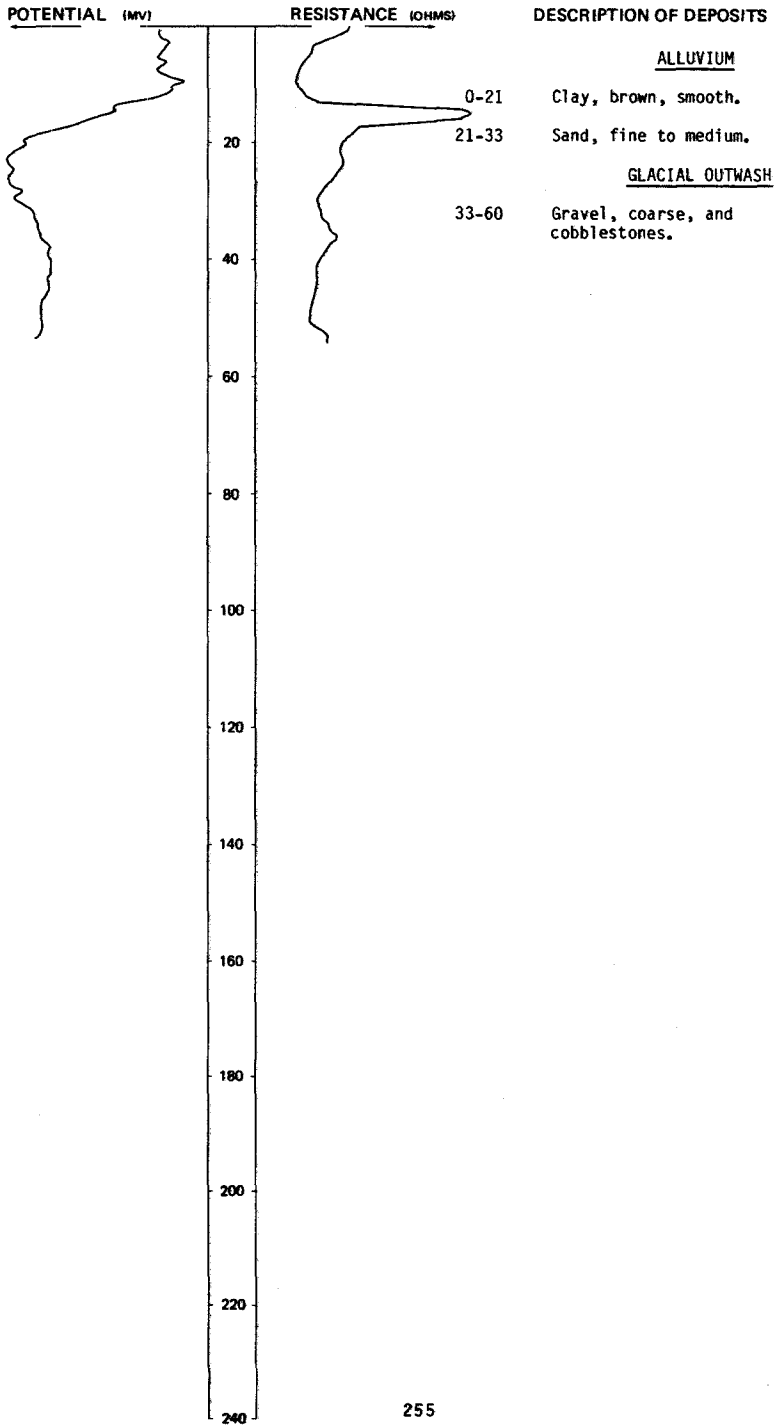
LOCATION: 150-104-02BDD

NDSWC 14

DATE DRILLED: 5/09/57

ALTITUDE: 1890
(FT, NGVD)

DEPTH: 60
(FT)



150-104-04ABB
(Log modified from Boyce Drilling, Inc.)

Altitude: 1885 feet

Date drilled: 7/25/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy-----	85	85
	Gravel-----	12	97
	Sand, gray-----	21	118
	Coal-----	7	125
	Clay, gray-----	35	160
	Coal-----	10	170
	Clay, gray-----	130	300
	Sand, fine, gray-----	40	340
	Clay, gray-----	65	405
	Coal-----	10	415
	Clay, gray-----	160	575
	Sandstone-----	1	576
	Clay, gray-----	174	750
	Sandstone-----	2	752
	Clay, sandy, gray-----	63	815
	Sandstone-----	2	817
	Clay, sandy-----	523	1340
	Sand-----	40	1380
	Clay-----	5	1385

150-104-04BBB
(Log modified from Boyce Drilling, Inc.)

Altitude: 1893 feet

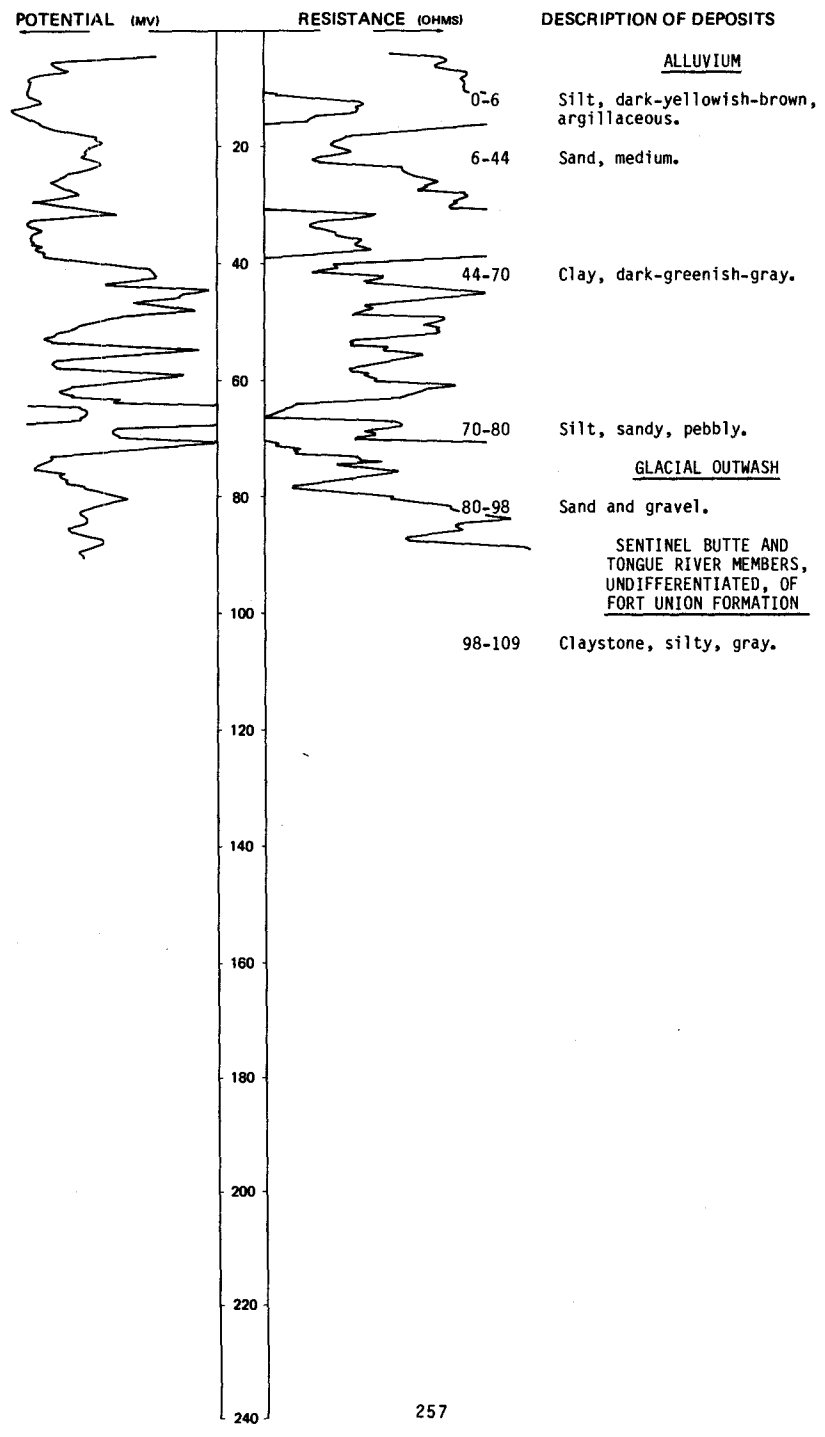
Date drilled: 2/14/77

	Clay and sand-----	40	40
	Clay, gray, and scoria-----	8	48
	Coal-----	7	55
	Clay, gray; interbedded with coal-----	119	174
	Sandstone-----	10	184
	Clay, gray; coal interbeds-----	17	201
	Rock-----	102	303
	Clay, gray; interbedded with coal-----	201	504
	Sand-----	16	520
	Clay, gray; interbedded with coal-----	62	582
	Rock-----	3	585
	Clay, gray; interbedded with coal-----	229	814
	Rock-----	3	817
	Clay, gray-----	6	823
	Coal-----	9	832
	Clay, gray-----	52	884
	Sand-----	45	929
	Clay; interbedded with coal-----	179	1108
	Clay, sandy-----	15	1123
	Coal-----	7	1130
	Clay; coal interbeds-----	160	1290
	Sand-----	50	1340

LOCATION: 150-104-05DDD
ALTITUDE: 1889
(FT, NGVD)

NDSWC 11581

DATE DRILLED: 5/14/81
DEPTH: 109
(FT)



150-104-09CBB
(Log modified from Boyce Drilling, Inc.)

Altitude: 1886 feet Date drilled: 2/01/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, brown, and brown clay-----	41	41
	Gravel-----	2	43
	Clay, gray-----	62	105
	Sandstone-----	1	106
	Shale, gray-----	18	124
	Coal-----	11	135
	Shale, gray; layers of coal-----	196	331
	Sandstone-----	1	332
	Shale, gray-----	18	350
	Sand, fine, gray-----	20	370
	Sandstone-----	1	371
	Shale, gray-----	5	376
	Coal-----	8	384
	Shale, gray; coal layers-----	51	435
	Coal-----	19	454
	Shale, gray; coal layers-----	52	506
	Sandstone-----	1	507
	Shale, gray-----	593	1100
	Sandstone-----	3	1103
	Shale, gray, and sandy clay-----	222	1325
	Sand, gray-----	10	1335
	Sandstone-----	1	1336
	Sand, dark-gray; water-----	29	1365

150-104-10ADD
NDSWC 1278

Altitude: 1885 feet Date drilled: 1/20/57

	Clay, yellow, smooth-----	14	14
	Gravel, medium to coarse-----	14	28
	Gravel, coarse-----	35	63
	Gravel, coarse, and cobblestones-----	11	74

150-104-10BAB
(Log modified from Boyce Drilling, Inc.)

Altitude: 1894 feet Date drilled: 5/26/77

	Sand, clayey-----	30	30
	Gravel-----	10	40
	Clay, gray-----	40	80
	Sand, fine-----	45	125
	Clay, gray-----	5	130
	Coal-----	3	133
	Clay, gray-----	37	170
	Coal-----	10	180
	Clay, gray; interbedded with coal-----	366	546
	Sandstone-----	2	548
	Clay, gray; interbedded with coal-----	130	678
	Sandstone-----	1	679
	Clay, sandy, gray-----	41	720
	Clay, gray-----	166	886
	Coal-----	14	900
	Clay, gray; interbedded with sand-----	430	1330
	Sand, gray-----	50	1380
	Sandstone-----	2	1382
	Clay, gray-----	18	1400

150-104-10DAA1
NDSWC 1279

Altitude: 1870 feet

Date drilled: 1/22/58

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow, smooth-----	31	31
	Gravel, fine to medium-----	4	35
	Gravel, coarse-----	17	52

150-104-10DAA2
(Log modified from Francis Boyce Water Well)

Altitude: 1895 feet

Date drilled: 5/07/67

Topsoil and sandy clay-----	27	27
Sand, brown-----	11	38
Gravel-----	1	39
Sand and trace of gravel-----	3	42
Gravel-----	10	52
Sand, crusted-----	6	58
Gravel, sand, and traces of coal and silt-----	20	78

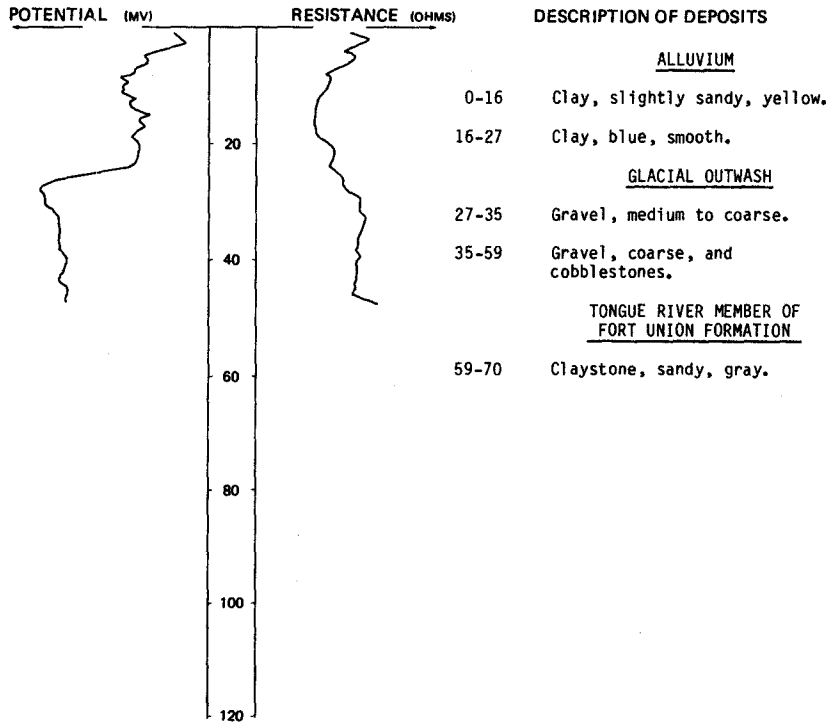
LOCATION: 150-104-10DAC

NDSWC 11

DATE DRILLED: 5/01/57

ALTITUDE: 1885
(FT, NGVD)

DEPTH: 70
(FT)



150-104-10DCD
NDSWC 1280

Altitude: 1877 feet

Date drilled: 1/27/58

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow, smooth-----	24	24
	Sand, medium to coarse-----	7	31
	Gravel, fine to coarse-----	11	42

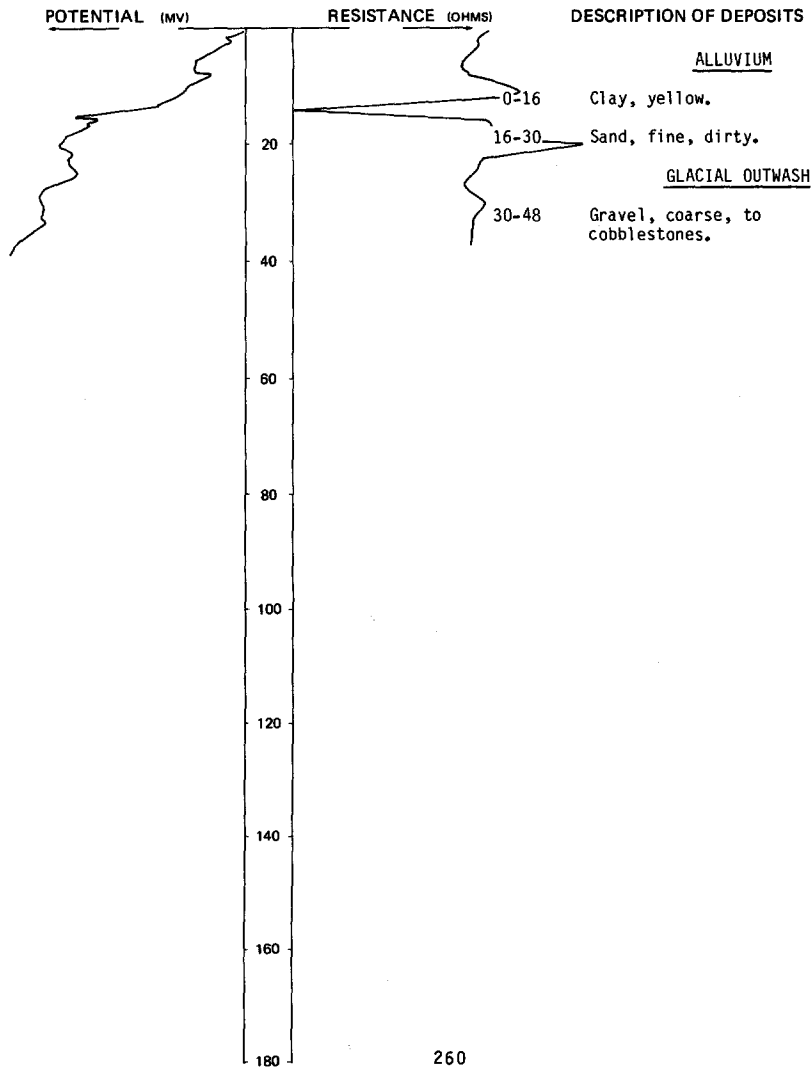
NDSWC 12

LOCATION: 150-104-10DDA

DATE DRILLED: 5/04/57

ALTITUDE: 1895
(FT. NGVD)

DEPTH: 48
(FT)



150-104-1188D
NDSWC 27

Altitude: 1882 feet

Date drilled: 6/13/57

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow, smooth-----	11	11
	Clay, yellow; some fine to medium gravel-----	4	15
	Clay, yellow, smooth-----	19	34
	Sand, fine to medium-----	8	42
	Gravel, fine to medium-----	4	46
	Gravel, medium to coarse-----	14	60

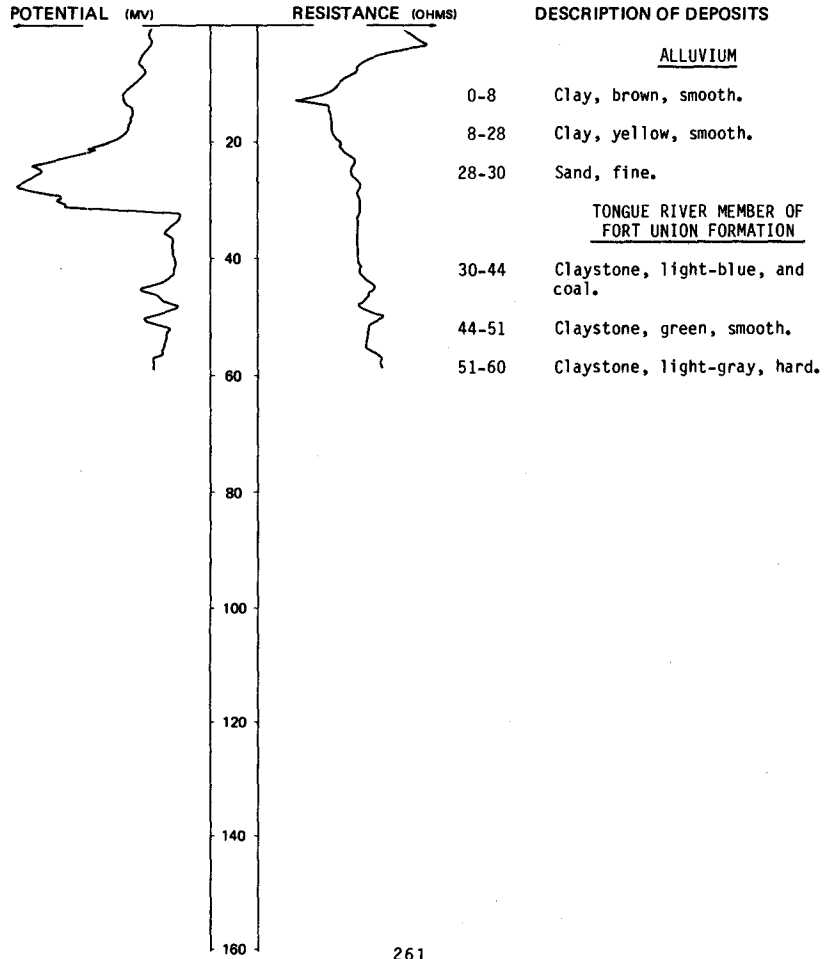
NDSWC 13

LOCATION: 150-104-11CCB

DATE DRILLED: 5/07/57

ALTITUDE: 1930
(FT, NGVD)

DEPTH: 60
(FT)



150-104-14BCA
(Log modified from Boyce Drilling, Inc.)

Altitude: 2092 feet

Date drilled: 8/30/67

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	3	3
	Clay, sandy, yellowish-brown-----	40	43
	Coal-----	3	46
	Shale, gray-----	76	122
	Coal-----	3	125
	Shale, gray-----	25	150
	Coal-----	6	156
	Shale, gray-----	69	225
	Clay, sandy-----	30	255
	Coal-----	8	263
	Shale-----	33	296
	Coal-----	7	303
	Sandstone-----	15	318
	Coal-----	5	323
	Shale; interbedded sandstone-----	31	354
	Rock-----	1	355
	Shale, blue, crumbly-----	38	393
	Rock-----	1	394
	Sandstone-----	14	408
	Rock, soft-----	2	410
	Shale, sandy, white-----	20	430
	Rock-----	1	431
	Shale-----	6	437
	Coal-----	13	450
	Clay(?)-----	12	462
	Coal-----	8	470
	Rock-----	8	478
	Shale, hard-----	64	542
	Shale, soft-----	28	570
	Shale; interbedded with coal-----	56	626
	Sandstone-----	10	636
	Coal-----	5	641
	Sandstone-----	10	651
	Shale, hard-----	11	662
	Sandstone-----	22	684
	Shale, rock-----	9	693
	Shale, hard-----	103	796
	Rock-----	11	807
	Shale, hard-----	21	828
	Rock-----	1	829
	Shale, hard-----	40	869
	Rock-----	2	871
	Shale, hard-----	20	891
	Rock-----	1	892
	Shale, hard-----	38	930
	Rock-----	5	935
	Shale, hard-----	18	953
	Sandstone-----	37	990
	Shale, hard-----	280	1270

150-104-15AAA
NDSWC 28

Altitude: 1900 feet

Date drilled: 6/14/57

	Topsoil, black-----	2	2
	Clay, yellow; a little fine gravel-----	9	11
	Clay, yellow, smooth-----	32	43
	Gravel, coarse, and mud-----	17	60

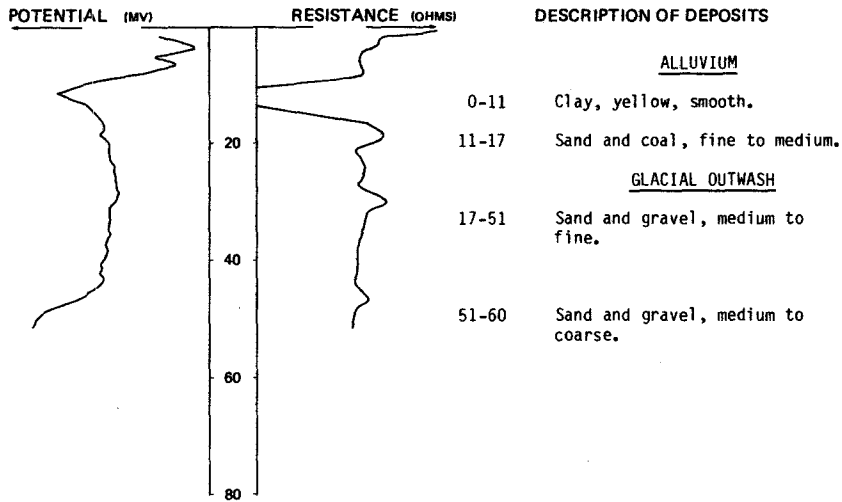
NDSWC 25

LOCATION: 150-104-15ACB

DATE DRILLED: 6/11/57

ALTITUDE: 1885
(FT, NGVD)

DEPTH: 60
(FT)



150-104-16BBB

(Log modified from Boyce Drilling, Inc.)

Altitude: 1889 feet

Date drilled: 3/ /77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil and sandy clay-----	85	85
	Gravel-----	10	95
	Clay, gray-----	144	239
	Rock-----	2	241
	Clay, gray-----	164	405
	Coal-----	13	418
	Clay, gray; interbedded with sandstone-----	37	455
	Clay, gray; interbedded with rock-----	184	639
	Coal-----	6	645
	Shale, gray; interbedded with rock-----	230	875
	Coal-----	10	885
	Shale, gray, hard-----	180	1065
	Rock-----	3	1068
	Clay, gray, hard-----	155	1223
	Rock-----	1	1224
	Shale; interbedded with sandstone-----	61	1285
	Sandstone-----	48	1333

150-104-19ABA

(Log modified from Gulbraa Drilling Co.)

Altitude: 1890 feet

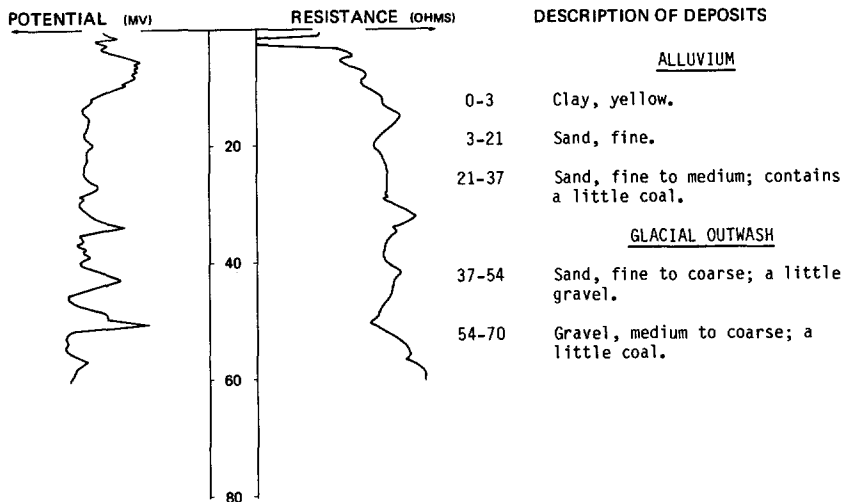
Date drilled: 4/18/68

	Clay, sandy-----	18	18
	Sand-----	65	83
	Gravel and sand; water-----	10	93

LOCATION: 150-104-19CBC
 ALTITUDE: 1892
 (FT, NGVD)

NDSWC 19

DATE DRILLED: 5/24/57
 DEPTH: 70
 (FT)



150-104-19DDC1
 NDSWC 1-860

Altitude: 1891 feet

Date drilled: 3/21/67

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, silty, black-----	1	1
	Clay, sandy, silty, yellowish-brown-----	8	9
	Sand, fine to medium-----	17	26
	Sand, fine to coarse; lots of coal and about 25 percent gravel-----	5	31
	Clay, sandy, silty, olive-gray; sand layers and a little coal-----	24	55
	Gravel, fine to coarse-----	1	56
	Sand, fine to coarse; about 25 percent fine to coarse gravel; a little coal-----	4	60
	Gravel, fine to coarse; sand and a little coal-----	9	69
	Gravel, fine to coarse; sand and lots of coal-----	7	76
	Sand, fine to coarse; gravel and a little coal-----	8	84
	Gravel, fine to coarse; drills like it is cemented-----	3	87
	Clay, sandy, silty, light-gray to bluish-gray; Fort Union bedrock-----	18	105

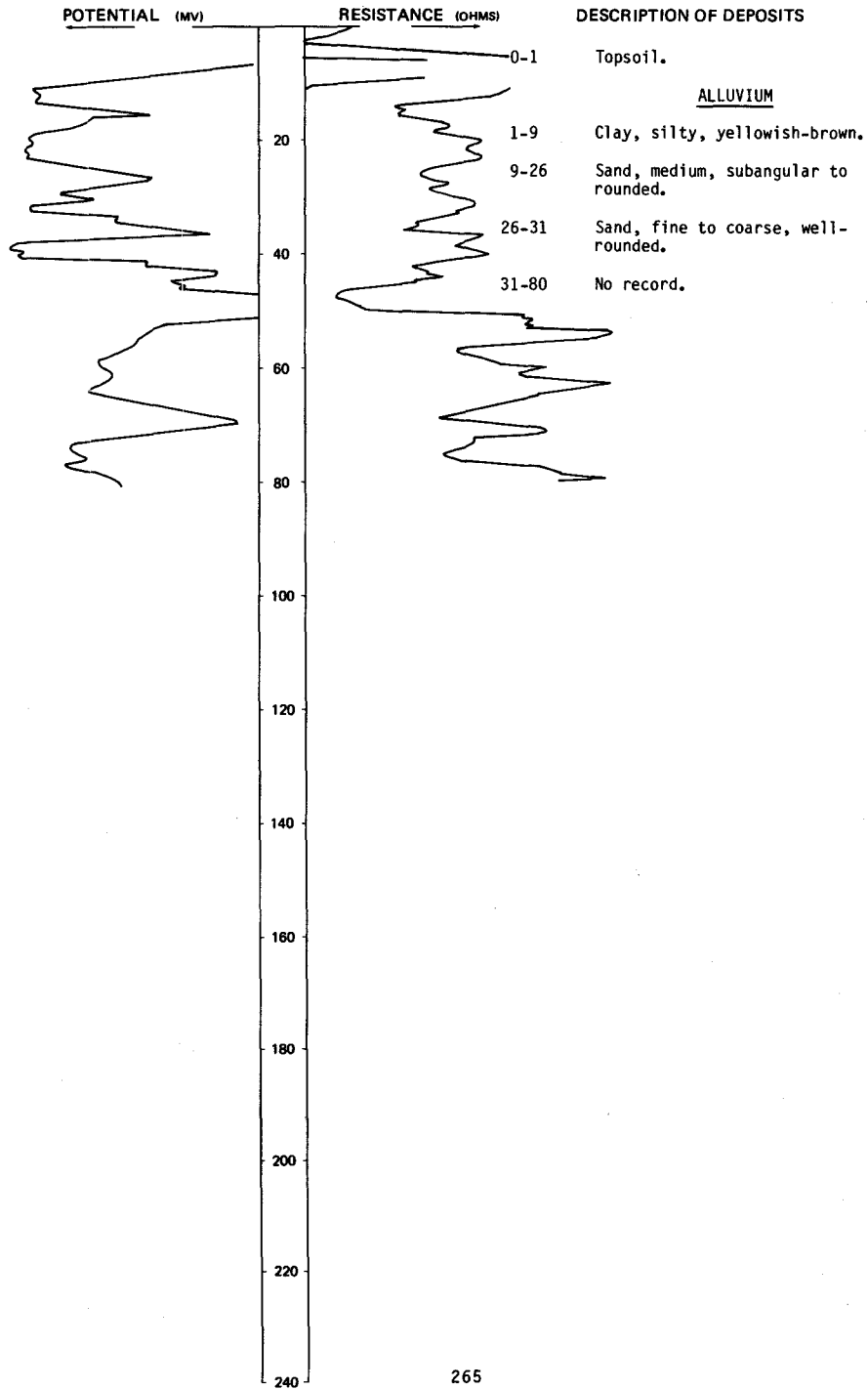
LOCATION: 150-104-19DDC2

NDSWC 3-860

DATE DRILLED: 3/21/67

ALTITUDE: 1887
(FT. NGVD)

DEPTH: 80
(FT)



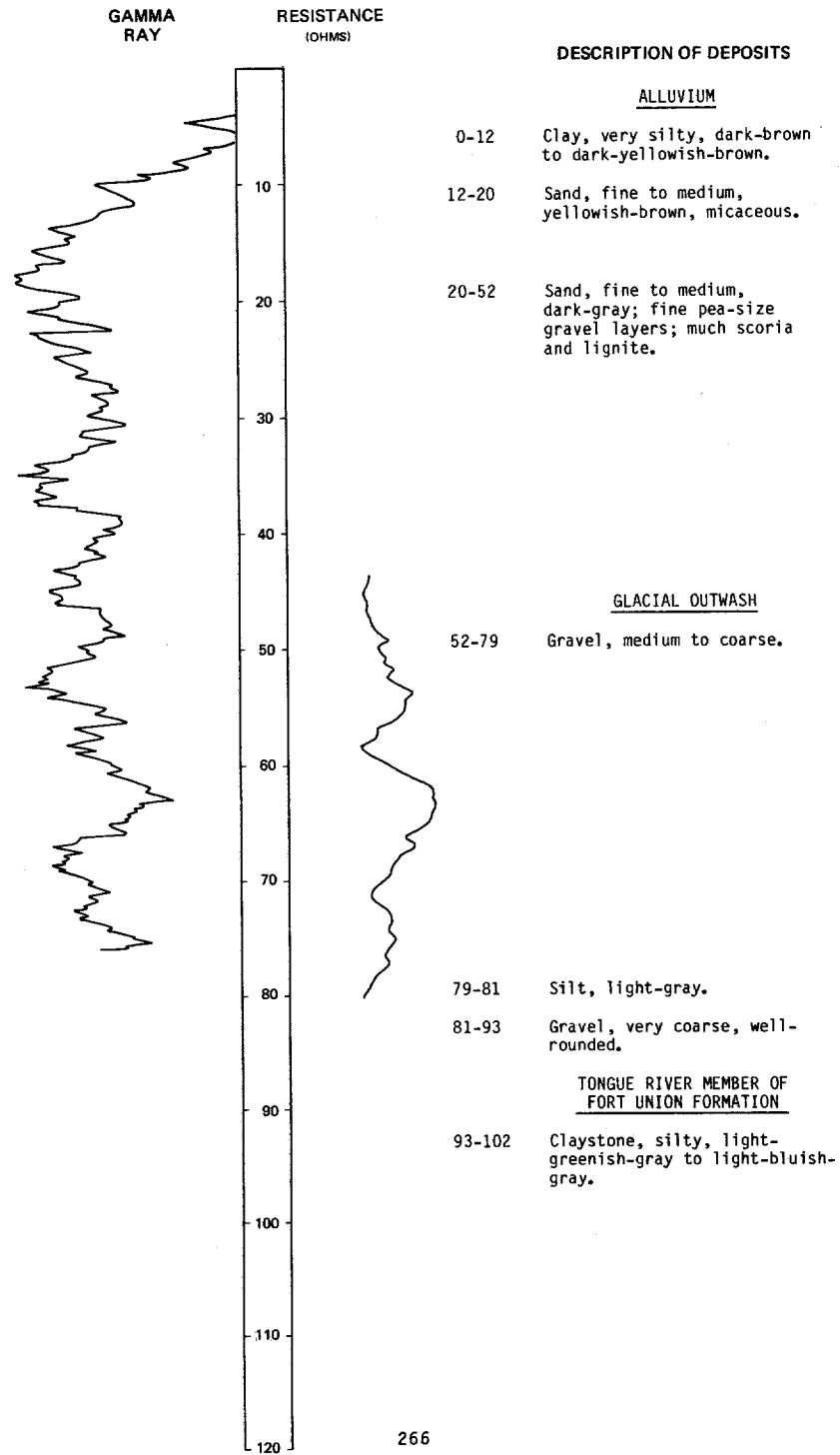
NDSWC 5622

LOCATION: 150-104-19DDD

DATE DRILLED: 10/11/79

ALTITUDE: 1892
(FT, NGVD)

DEPTH: 102
(FT)



150-104-20ABC
NDSWC 1281

Altitude: 1875 feet

Date drilled: 2/04/58

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, brown, smooth-----	12	12
	Sand, fine to coarse; a little sandy gray clay and coal-----	24	36
	Sand, medium to coarse, and coal-----	27	63

150-104-20BBC1
(Log modified from Mann Drilling Co.)

Altitude: 1887 feet

Date drilled: 10/24/66

	Silt, sandy-----	20	20
	Gravel-----	4	24
	Sand-----	40	64
	Gravel-----	26	90
	Clay-----	2	92
	Gravel-----	6	98
	Bedrock-----	2	100

150-104-20BBC2
NDSWC 860

Altitude: 1885 feet

Date drilled: 3/09/67

	Topsoil, sandy, silty-----	1	1
	Sand, fine to medium-----	1	2
	Clay, silty, sandy, light-olive-gray-----	3	5
	Clay, sandy, silty, yellowish-brown-----	7	12
	Clay, sandy, silty, olive-gray-----	2	14
	Sand, fine to medium-----	5	19
	Gravel, fine to coarse-----	2	21
	Sand, fine to coarse; lots of coal-----	30	51
	Gravel, fine to coarse-----	3	54
	Sand, fine to coarse; lots of coal and layers of silty clay-----	9	63
	Gravel, fine to coarse; a little coal-----	11	74

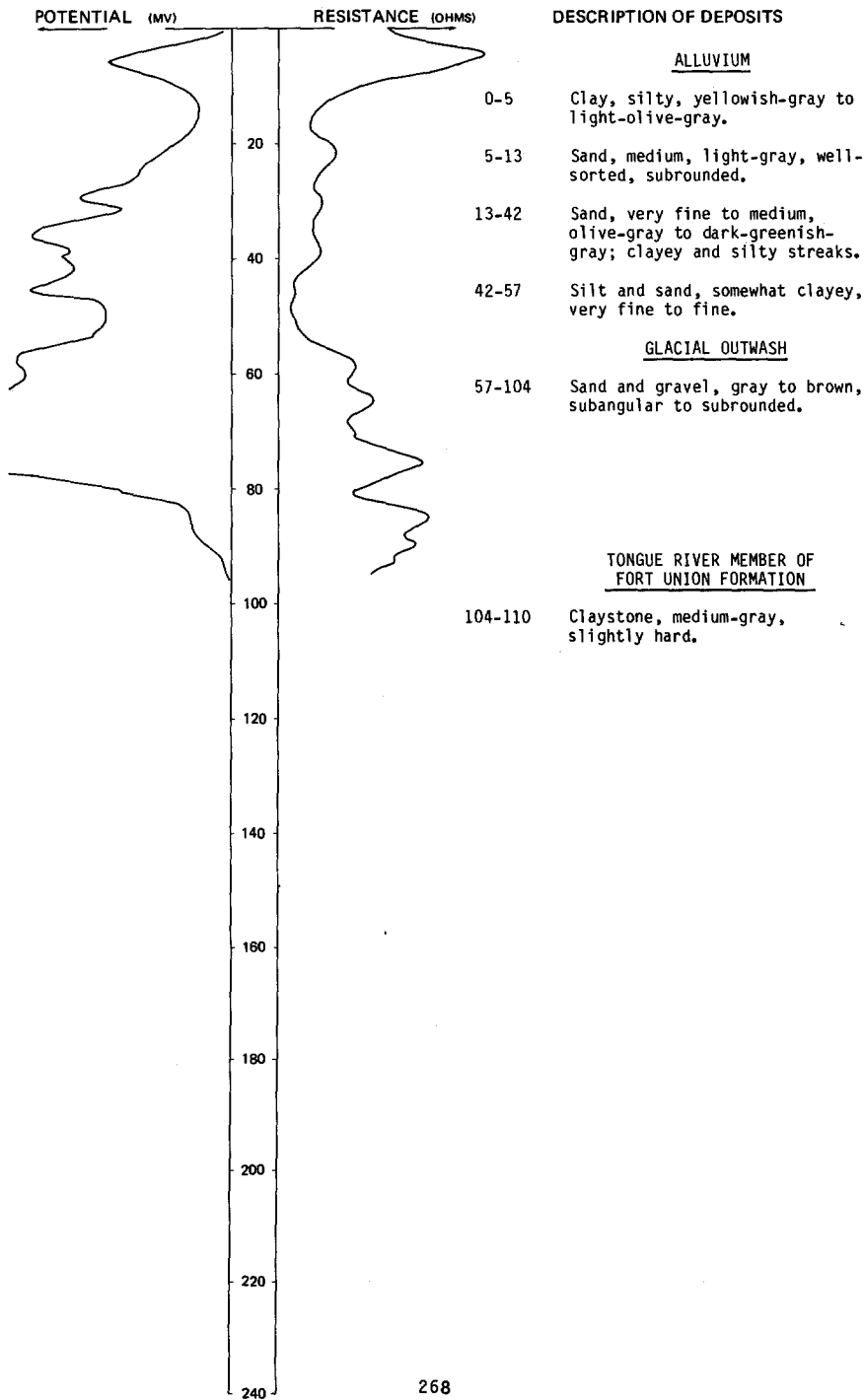
LOCATION: 150-104-20CBB

NDSWC

DATE DRILLED: 10/24/66

ALTITUDE: 1892
(FT, NGVD)

DEPTH: 110
(FT)



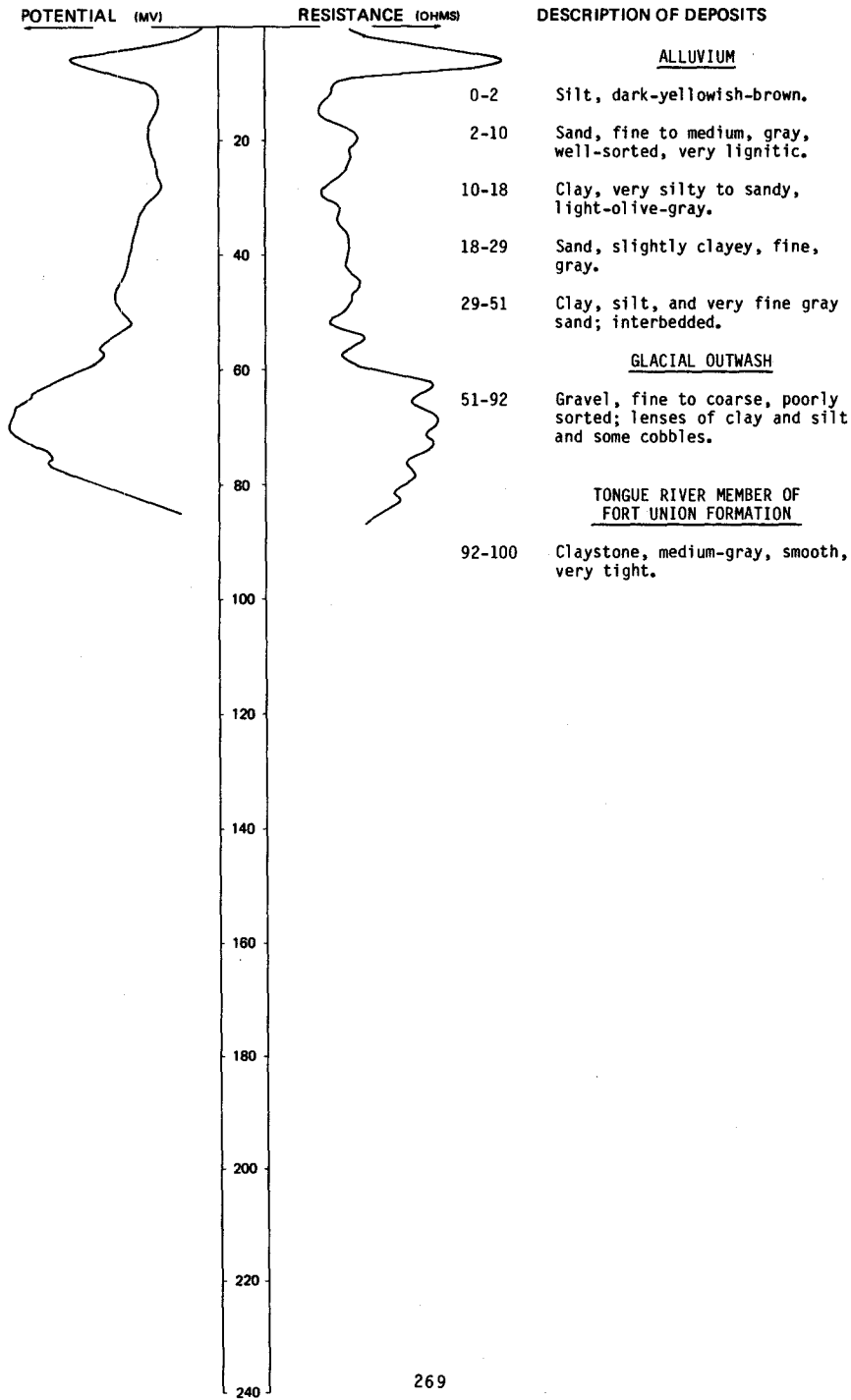
LOCATION: 150-104-20CCC1

NDSWC 67-458

DATE DRILLED: 10/23/66

ALTITUDE: 1890
(FT, NGVD)

DEPTH: 100
(FT)

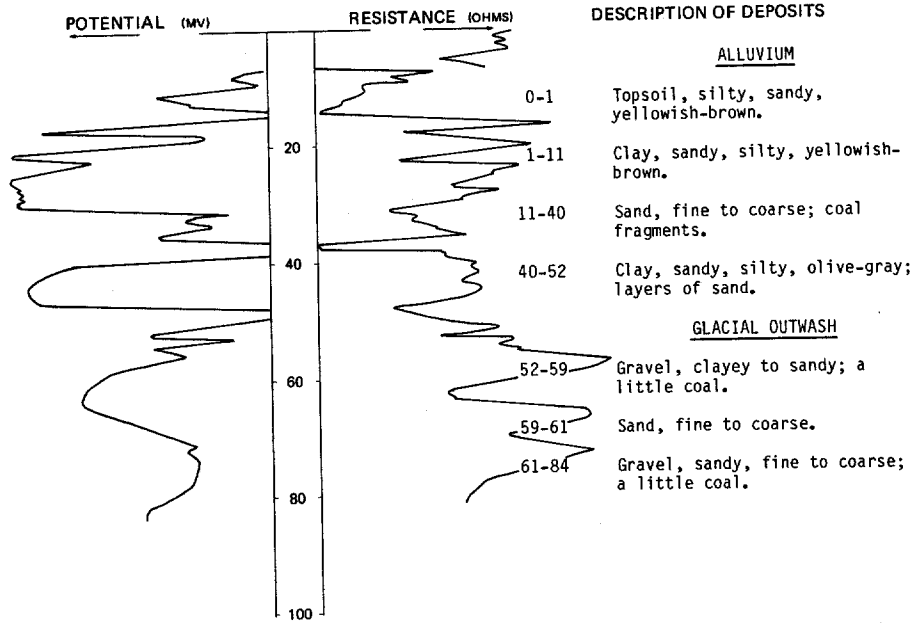


LOCATION: 150-104-20CCC2
 ALTITUDE: 1890
 (FT, NGVD)

NDSWC 4-860

DATE DRILLED: 3/28/67

DEPTH: 84
 (FT)



150-104-20CCC3
 NDSWC 4-A860

Altitude: 1890 feet

Date drilled: 3/28/67

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, sandy, silty, yellowish-brown-----	11	11
	Sand, fine to coarse; coal fragments-----	29	40

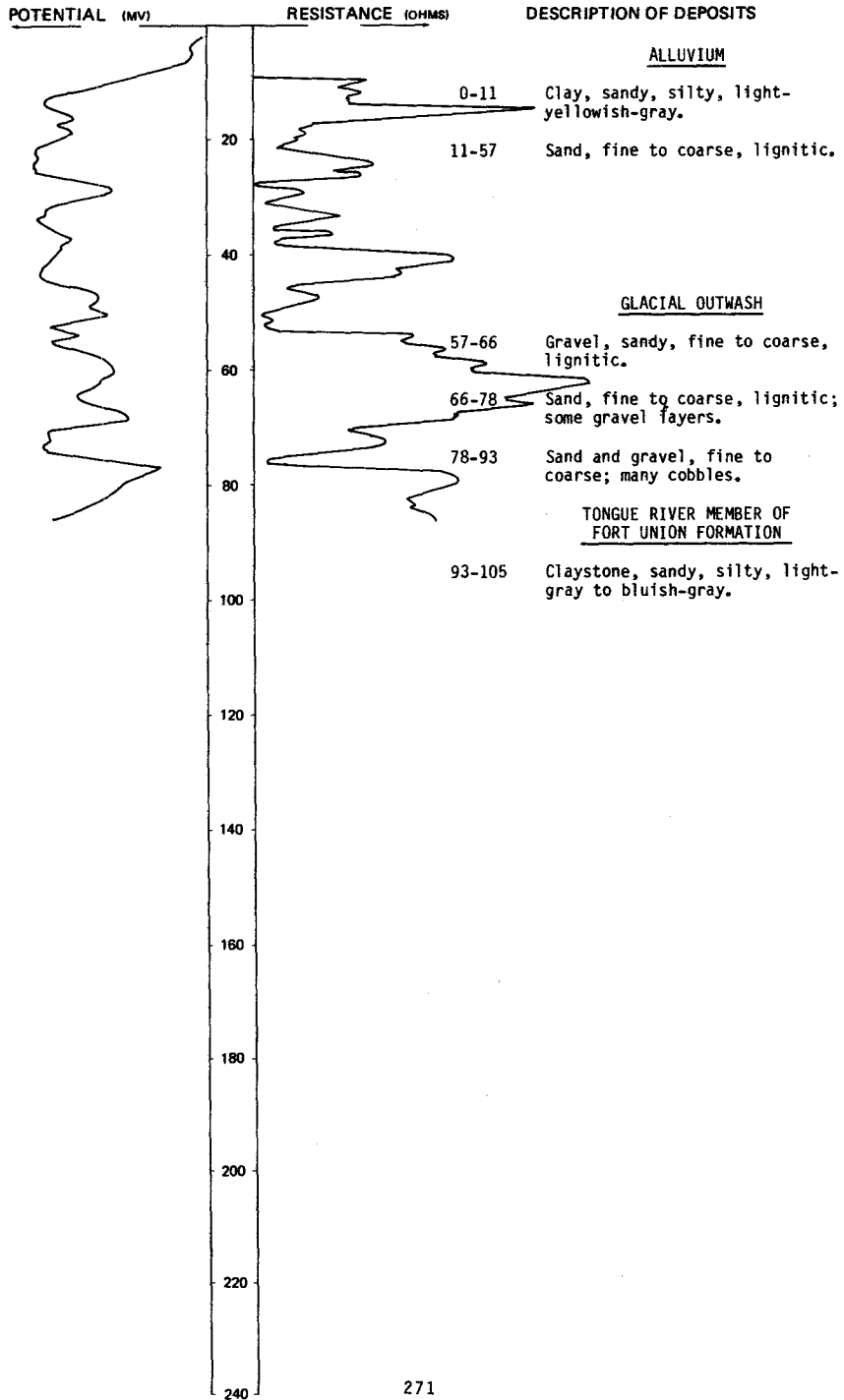
LOCATION: 150-104-20CDA

NDSWC 6-860

DATE DRILLED: 3/29/67

ALTITUDE: 1885
(FT, NGVD)

DEPTH: 105
(FT)



150-104-21CAD
(Log modified from E. C. Gendron & Sons)

Altitude: 1900 feet		Date drilled: 4/24/69	
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay and sand-----	18	18
	Sand-----	74	92
	Sand and gravel-----	8	100
	Clay-----	2	102

150-104-21CDB
(Log modified from Boyce Drilling, Inc.)

Altitude: 1900 feet		Date drilled: 8/23/77	
	Sandstone, brown-----	53	53
	Clay, gray-----	7	60
	Coal-----	8	68
	Clay, gray-----	102	170
	Sand, gray-----	30	200
	Clay, gray-----	50	250
	Sandstone-----	1	251
	Clay, gray; layers of sand-----	106	357
	Coal-----	8	365
	Clay, gray-----	30	395
	Sand-----	35	430
	Coal-----	15	445
	Clay, sandy, gray-----	164	609
	Sandstone-----	1	610
	Clay, sandy, gray; interbedded with sandstone-----	435	1045
	Sandstone-----	15	1060
	Clay, gray; interbedded with sandstone-----	225	1285
	Sand, gray-----	40	1325
	Clay, gray-----	20	1345

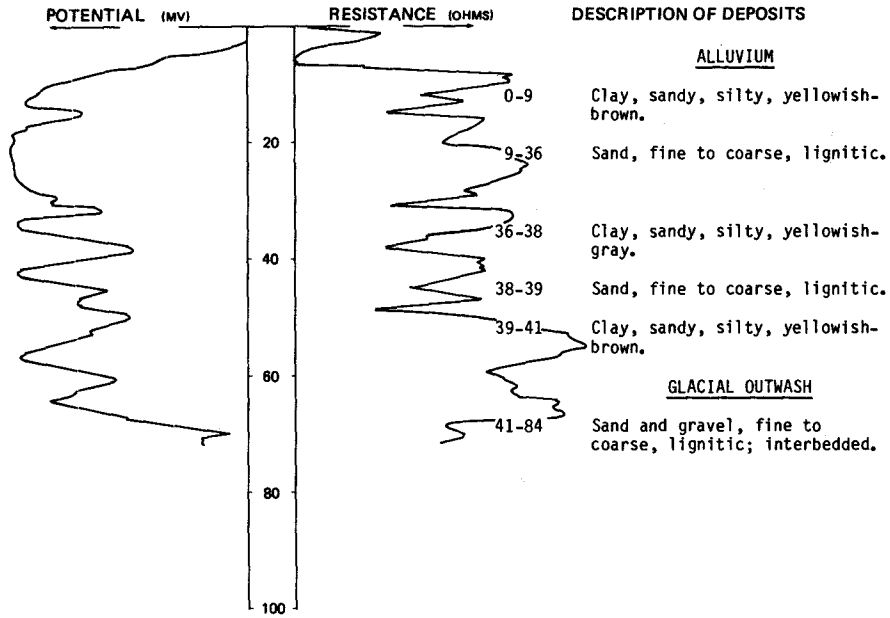
LOCATION: 150-104-298BB

NDSWC 5-860

DATE DRILLED: 3/28/69

ALTITUDE: 1890
(FT, NGVD)

DEPTH: 84
(FT)



150-104-298BC1
NDSWC 20

Altitude: 1885 feet

Date drilled: 5/27/57

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow, smooth-----	21	21
	Sand, fine to medium; a little coal-----	22	43
	Clay, sandy, gray-----	3	46
	Gravel, fine to medium; shale pebbles; and coal-----	15	61
	Gravel, medium to coarse; shale pebbles; and a little coal-----	24	85

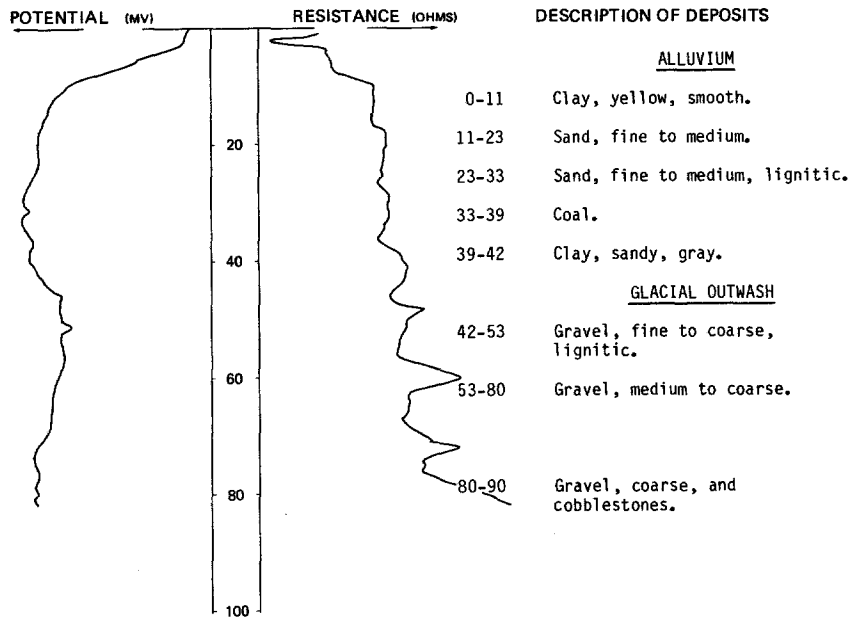
LOCATION: 150-104-29BBC2

NDSWC 21

DATE DRILLED: 5/28/57

ALTITUDE: 1890
(FT, NGVD)

DEPTH: 90
(FT)



150-104-29BCB
(Log modified from Mann Drilling Co.)

Altitude: 1890 feet

Date drilled: 10/24/66

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	6	6
	Silt, sandy-----	36	42
	Gravel-----	30	72
	Sand-----	3	75
	Gravel-----	15	90
	Fort Union bedrock-----	10	100

150-104-29CCB
NDSWC 1283

Altitude: 1885 feet

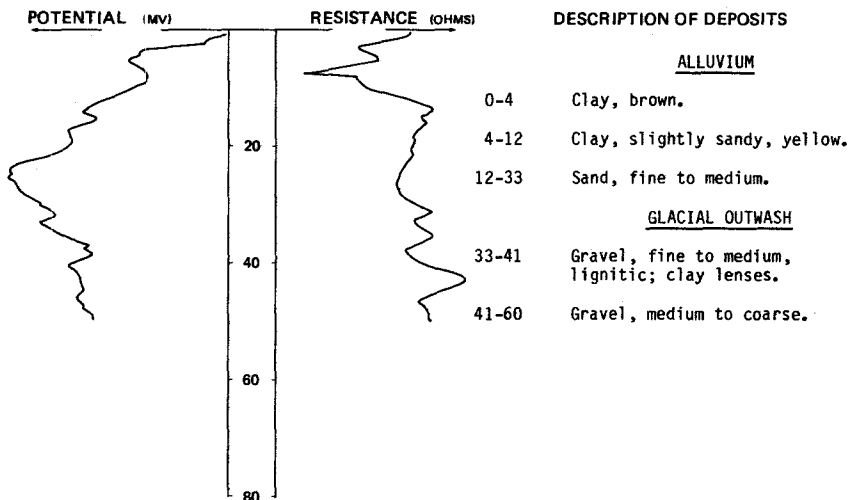
Date drilled: 4/14/58

Clay, yellow, smooth-----	12	12
Sand, medium to coarse, and a lot of coal-----	31	43
Gravel, medium to coarse, and coal-----	15	58
Shale-----	5	63

LOCATION: 150-104-29CCC
 ALTITUDE: 1890
 (FT, NGVD)

NDSWC 22

DATE DRILLED: 5/28/57
 DEPTH: 60
 (FT)



150-104-30AAA
 NDSWC 18

Altitude: 1890 feet

Date drilled: 5/22/57

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, yellow-----	6	6
	Sand, fine to medium, and a little coal-----	26	32
	Clay, light-blue, smooth-----	14	46
	Gravel, medium to coarse; shale pebbles; and coal-----	24	70

150-104-30ABB
 NDSWC 17

Altitude: 1885 feet

Date drilled: 5/18/57

	Clay, yellow-----	6	6
	Sand, fine to medium, and a little coal-----	48	54
	Gravel, fine to medium, and a little sandy gray clay-----	7	61
	Gravel, medium to coarse-----	9	70
	Gravel, coarse-----	27	97

150-104-30ABC
 NDSWC 1282

Altitude: 1890 feet

Date drilled: 4/11/58

	Clay, gray, smooth-----	8	8
	Sand, fine to coarse, and coal-----	23	31
	Gravel, medium to coarse-----	32	63
	Gravel, medium to coarse, and coal-----	18	81
	Clay, smooth-----	3	84

LOCATION: 151-095-040BD1, 2 NDSWC 5939, 6164

DATE DRILLED: 6/30/81

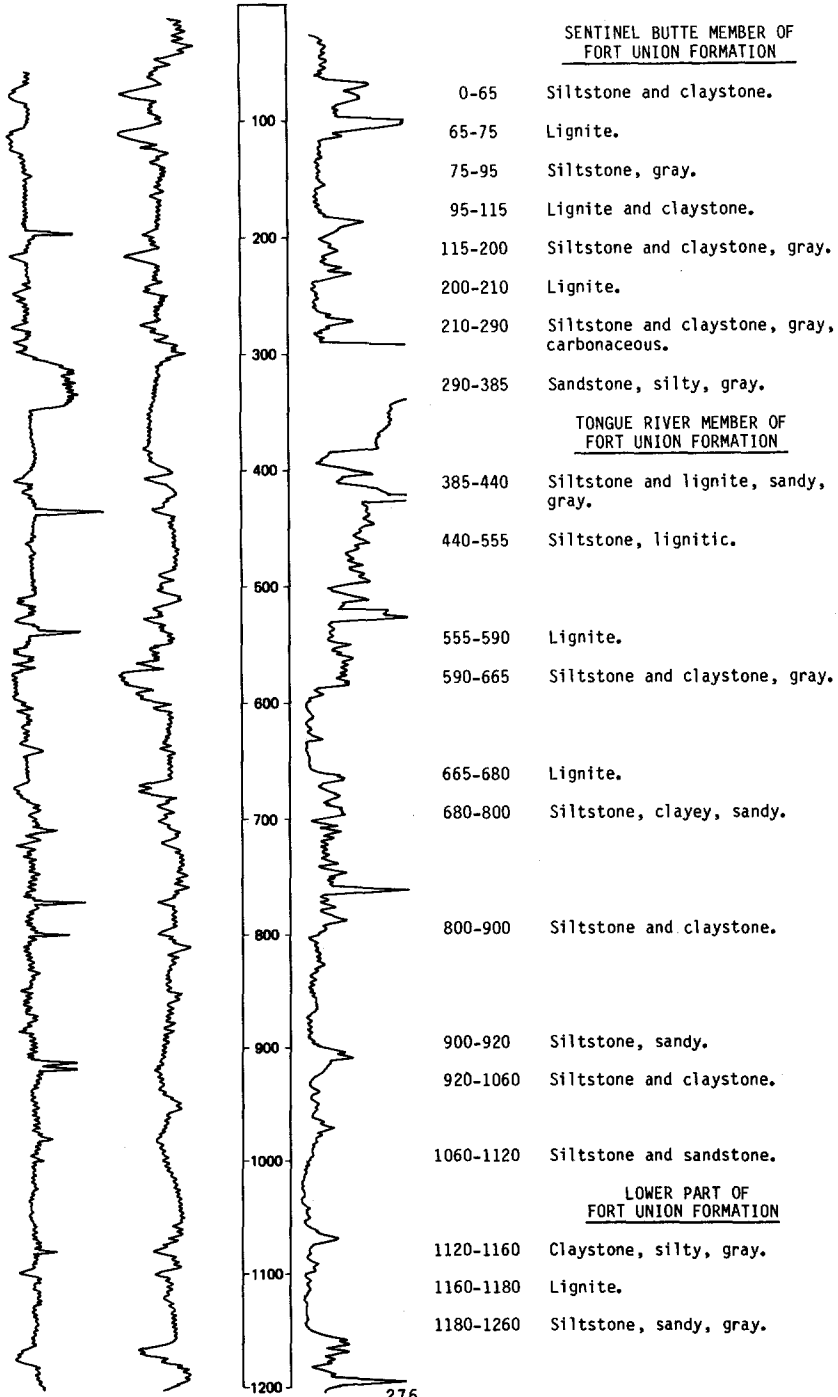
ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1620
(FT)

NEUTRON GAMMA
(API) RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



NDSWC 5939, 6164, Continued
LOCATION: 151-095-04DBD1, 2

DATE DRILLED: 6/30/81

ALTITUDE: 2300
(FT. NGVD)

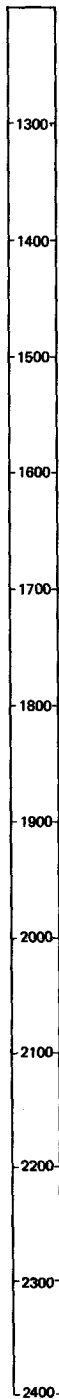
DEPTH: 1620
(FT)

NEUTRON GAMMA
(API) RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued



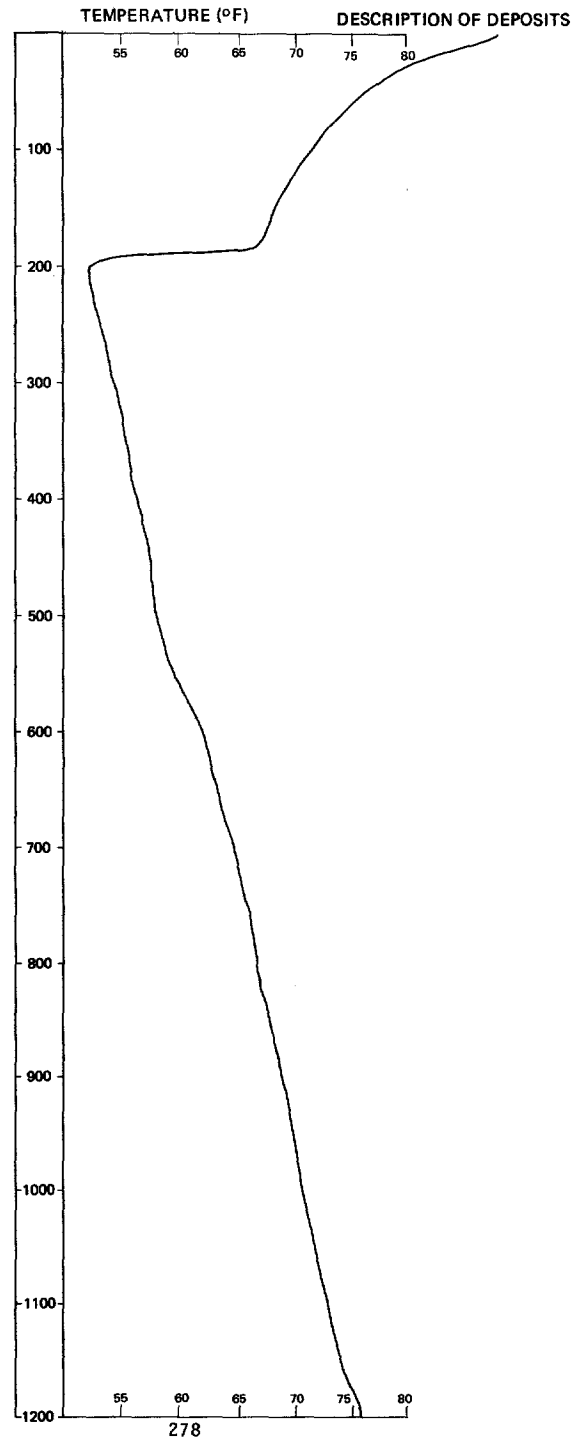
- 1260-1275 Claystone, brown, carbonaceous.
- 1275-1380 Sandstone, silty, fine, greenish-gray.
- 1380-1450 Sandstone and siltstone, fine, gray.
- 1450-1620 Siltstone and claystone, gray.

LOCATION: 151-095-04DBD2 NDSWC 6164, Continued

DATE DRILLED: 6/30/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1620
(FT)

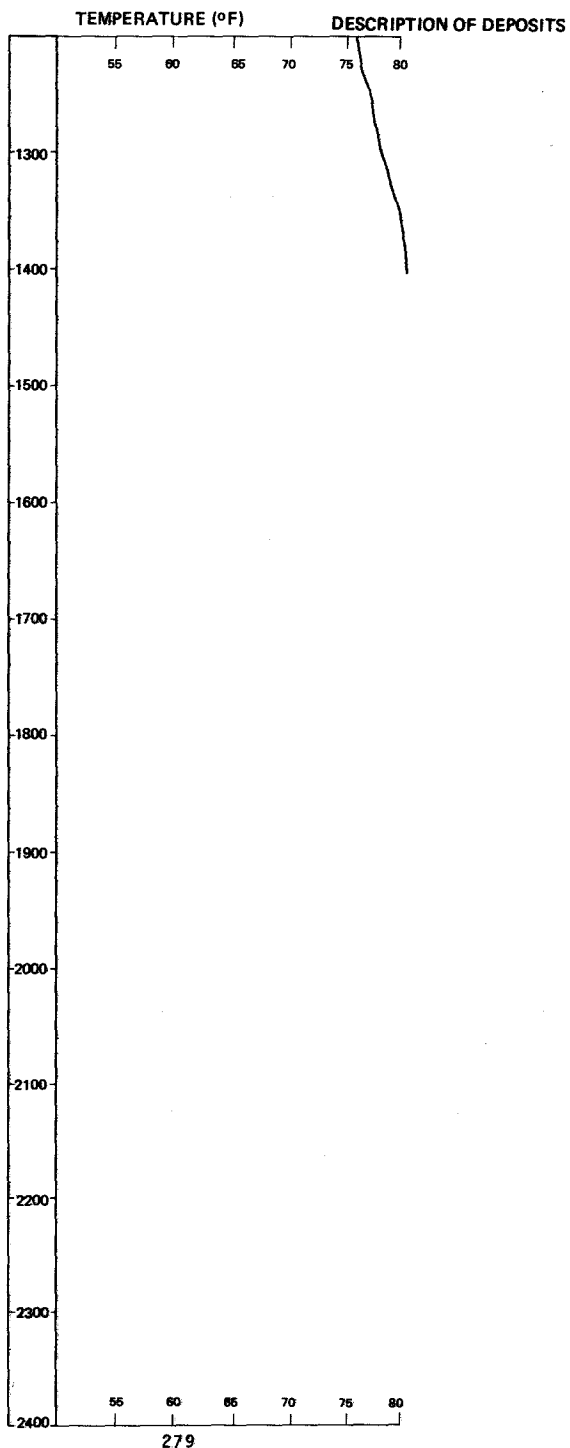


LOCATION: 151-095-0408D2

DATE DRILLED: 6/30/81

ALTITUDE: 2300
(FT, NGVD)

DEPTH: 1620
(FT)



151-095-29ABB
(Log modified from Kieson Drilling)

Altitude: 2440 feet Date drilled: 2/12/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay-----	13	14
	Clay, sandy, gray-----	12	26
	Scoria-----	2	28
	Coal-----	3	31
	Clay, gray-----	8	39
	Clay, sandy-----	8	47
	Sand, yellow-----	4	51
	Coal-----	2	53
	Clay, gray-----	12	65
	Sand, coarse-----	8	73
	Coal-----	7	80

151-095-29BCB
(Log modified from Thompson Drilling Co.)

Altitude: 2340 feet Date drilled: 4/08/76

	Clay soil-----	3	3
	Clay, blue-----	25	28
	Sand, gray-----	17	45
	Sand, brown-----	13	58
	Sand, gray-----	17	75
	Sand, blue-----	5	80

151-095-36ABA
(Log modified from Aberle Well Co.)

Altitude: 2290 feet Date drilled: 5/22/73

	Topsoil-----	2	2
	Clay, yellow-----	26	28
	Sand-----	1	29
	Clay, yellow-----	11	40

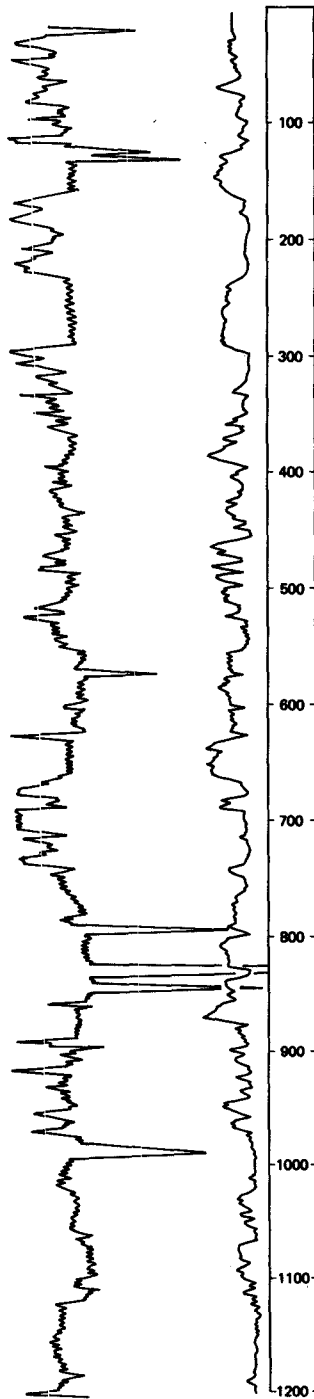
LOCATION: 151-095-36BBA

DATE DRILLED: 5/28/82

ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)

NEUTRON
(API) S.P.
(MV)



DESCRIPTION OF DEPOSITS

- 0-1 Topsoil.
- SENTINEL BUTTE MEMBER OF
 FORT UNION FORMATION
- 1-122 Siltstone and claystone,
 sandy, olive-gray.
- 122-163 Sandstone, silty, fine to
 medium, greenish-gray;
 limestone at 130 feet.
- 163-235 Claystone and lignite, silty,
 sandy.
- 235-296 Sandstone, silty, fine to
 medium.
- TONGUE RIVER MEMBER OF
 FORT UNION FORMATION
- 296-310 Lignite.
- 310-370 Siltstone and claystone, gray,
 carbonaceous.
- 370-412 Sandstone, silty, fine.
- 412-550 Siltstone and claystone,
 sandy, gray.
- 550-680 Sandstone, silty, fine, gray.
- 680-720 Claystone and lignite.
- 720-890 Siltstone and sandstone, fine;
 hard limestone.
- 890-1000 Siltstone and claystone,
 sandy, olive-gray,
 carbonaceous.
- LOWER PART OF
 FORT UNION FORMATION
- 1000-1280 Siltstone and claystone,
 sandy, olive-gray.

LOCATION: 151-095-36BBA

DATE DRILLED: 5/28/82

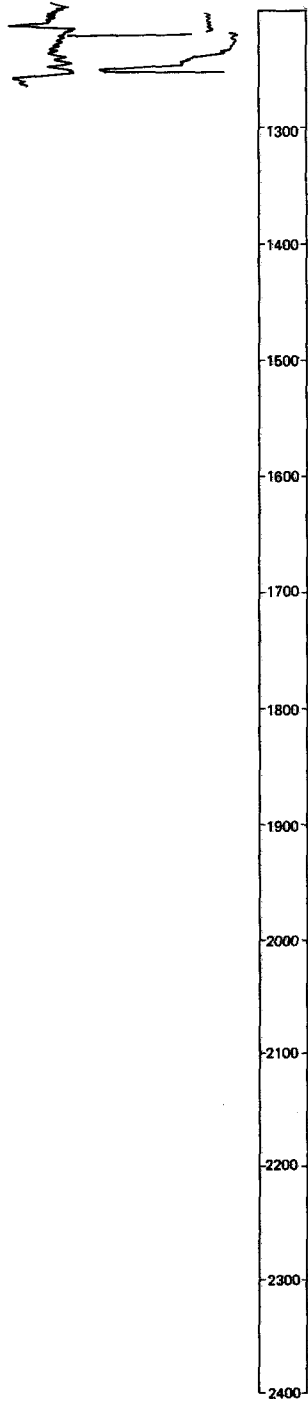
ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)

NEUTRON
(API)

S.P.
(MV)

DESCRIPTION OF DEPOSITS



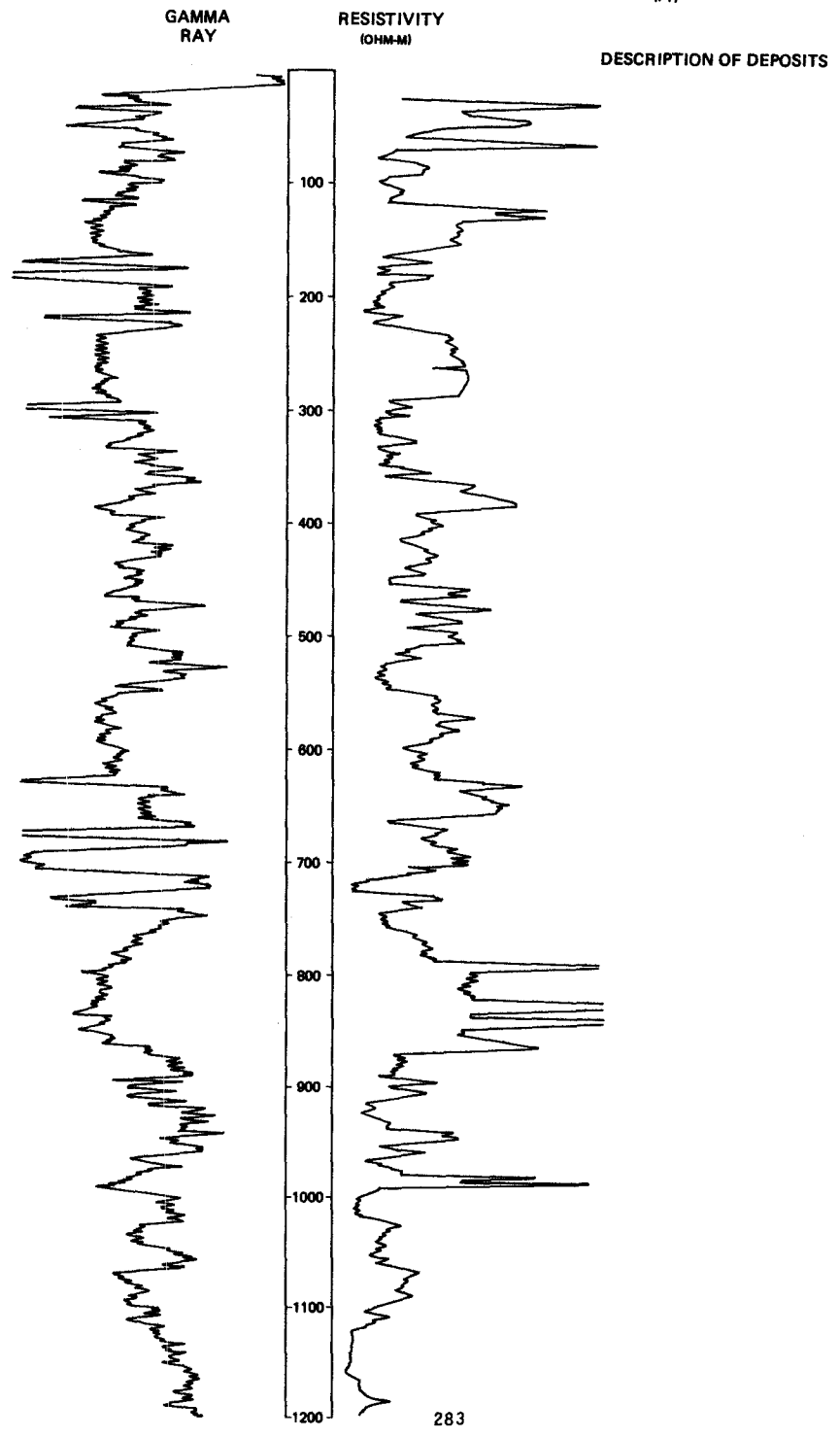
LOCATION: 151-095-36BBA

NDSWC 6053, Continued

DATE DRILLED: 5/28/82

ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)



NDSNC 6053, Continued

LOCATION: 151-095-36BBA

DATE DRILLED: 5/28/82

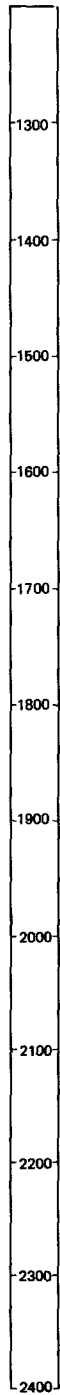
ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



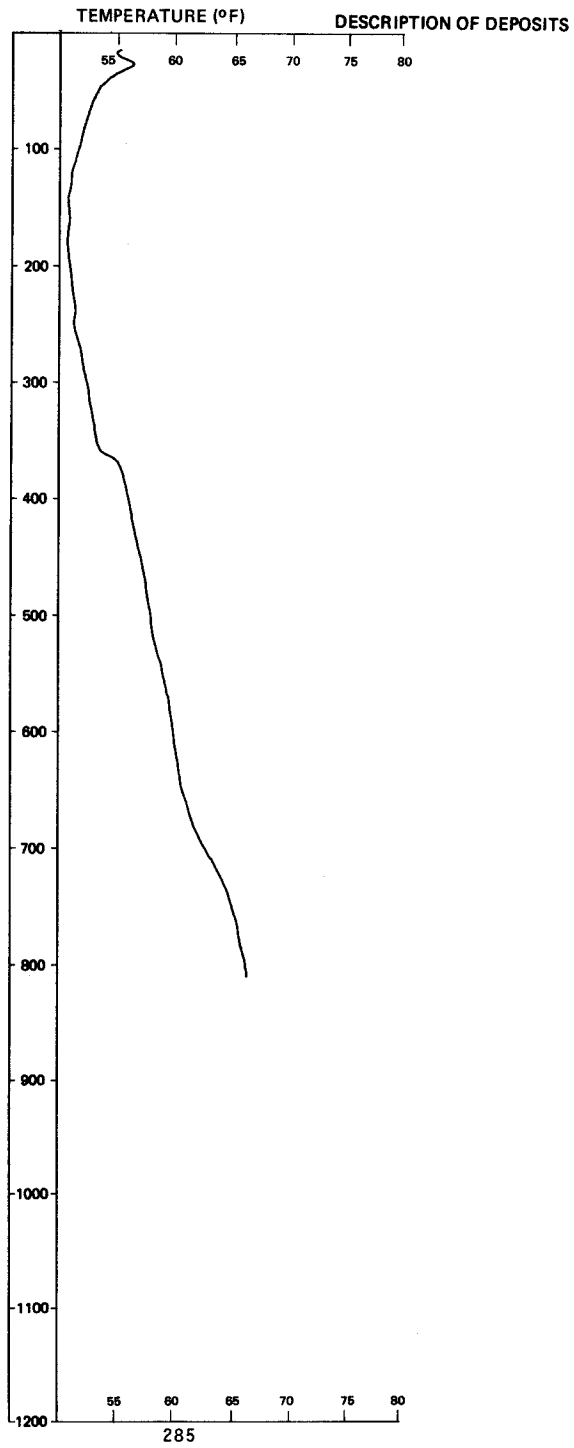
284

LOCATION: 151-095-3688A NDSWC 6053, Continued

DATE DRILLED: 5/28/82

ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)

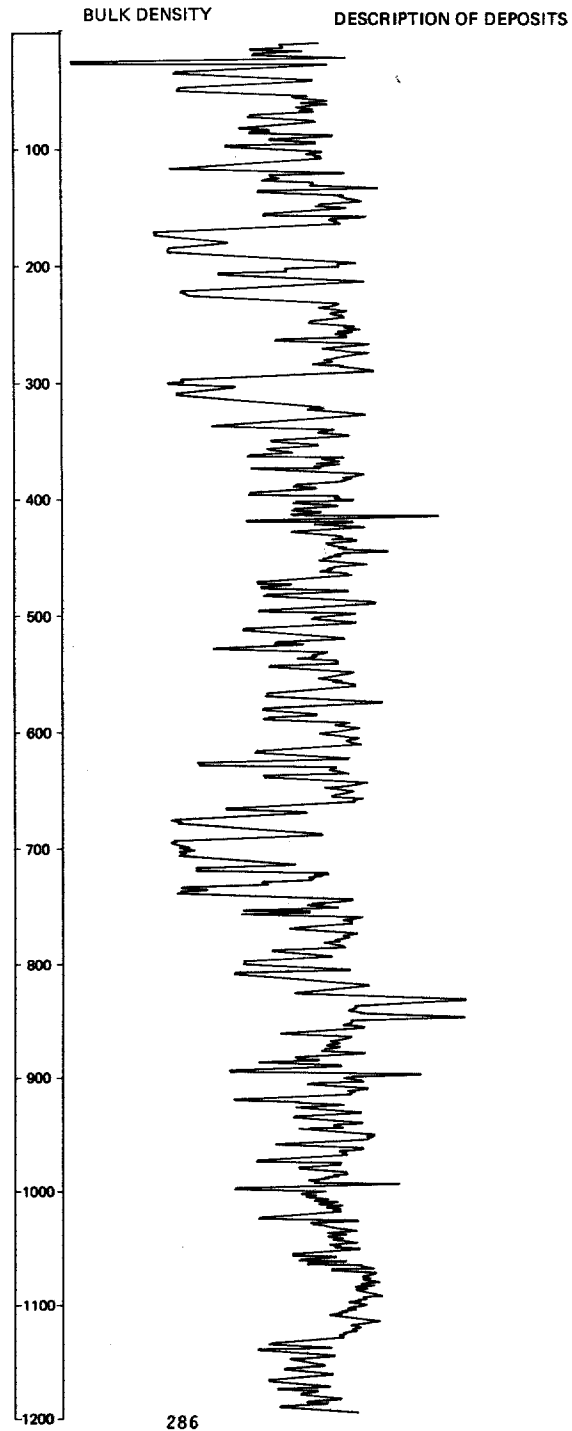


LOCATION: 151-095-3688A

DATE DRILLED: 5/28/82

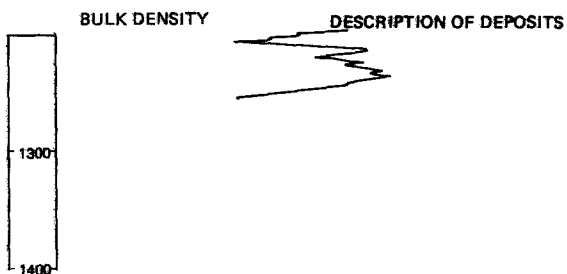
ALTITUDE: 2262
(FT, NGVD)

DEPTH: 1280
(FT)



LOCATION: 151-095-36BBA NDSWC 6053, Continued
 ALTITUDE: 2262 (FT. NGVD)

DATE DRILLED: 5/28/82
 DEPTH: 1280 (FT)



151-096-02AD
 (Log modified from Thompson Drilling Co.)

Altitude: 2385 feet Date drilled: 8/19/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
Soil-----		2	2
Clay-----		53	55
Coal-----		10	65
Clay-----		45	110
Hard shell-----		5	115
Clay-----		5	120
Sand-----		55	175

151-096-09ABB
 (Log modified from B & K Water Well Drilling Co.)

Altitude: 2285 feet Date drilled: 5/07/76

Topsoil-----		2	2
Clay, brown-----		8	10
Sand, brown, and clay-----		3	13
Sand, brown-----		65	78
Clay, sandy, gray-----		3	81
Sand, grayish-blue-----		11	92
Coal-----		3	95
Sand, blue-----		14	109
Clay-----		1	110

151-096-10CDD
(Log modified from Kieson Drilling)

Altitude: 2300 feet Date drilled: 6/21/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay, sandy-----	8	10
	Sand-----	20	30
	Gravel and sand-----	4	34
	Sand-----	1	35
	Sand, coarse-----	5	40
	Sand-----	10	50
	Clay-----	3	53
	Sand-----	8	61
	Gravel and sand-----	6	67
	Sand, coarse, and gravel-----	9	76
	Coal-----	1	77
	Gravel-----	3	80
	Clay, sandy-----	7	87
	Sand-----	10	97
	Clay-----	3	100

151-096-11BCD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2290 feet Date drilled: 8/22/74

	Clay, sandy-----	6	6
	Gravel-----	2	8
	Sand, yellow-----	7	15
	Sand, gray-----	45	60
	Sand, blue-----	10	70

151-096-14BDA
(Log modified from Kieson Drilling)

Altitude: 2330 feet Date drilled: 2/16/76

	Topsoil-----	2	2
	Clay, sandy-----	18	20
	Coal-----	1	21
	Clay-----	9	30
	Sand, coarse-----	9	39
	Clay-----	9	48
	Coal-----	4	52
	Clay-----	7	59
	Coal-----	3	62
	Sand-----	5	67
	Clay-----	3	70

151-096-24BBB
NDSWC 1494

Altitude: 2018 feet Date drilled: 4/16/59

	Topsoil, sandy, brown-----	4	4
	Clay, brown, smooth-----	8	12
	Clay, yellow, smooth-----	41	53
	Clay, yellow, and fine gravel-----	9	62
	Clay, brown, black, and yellow-----	21	83
	Clay, sandy, blue and black-----	26	109
	Clay, sandy, gray-----	28	137

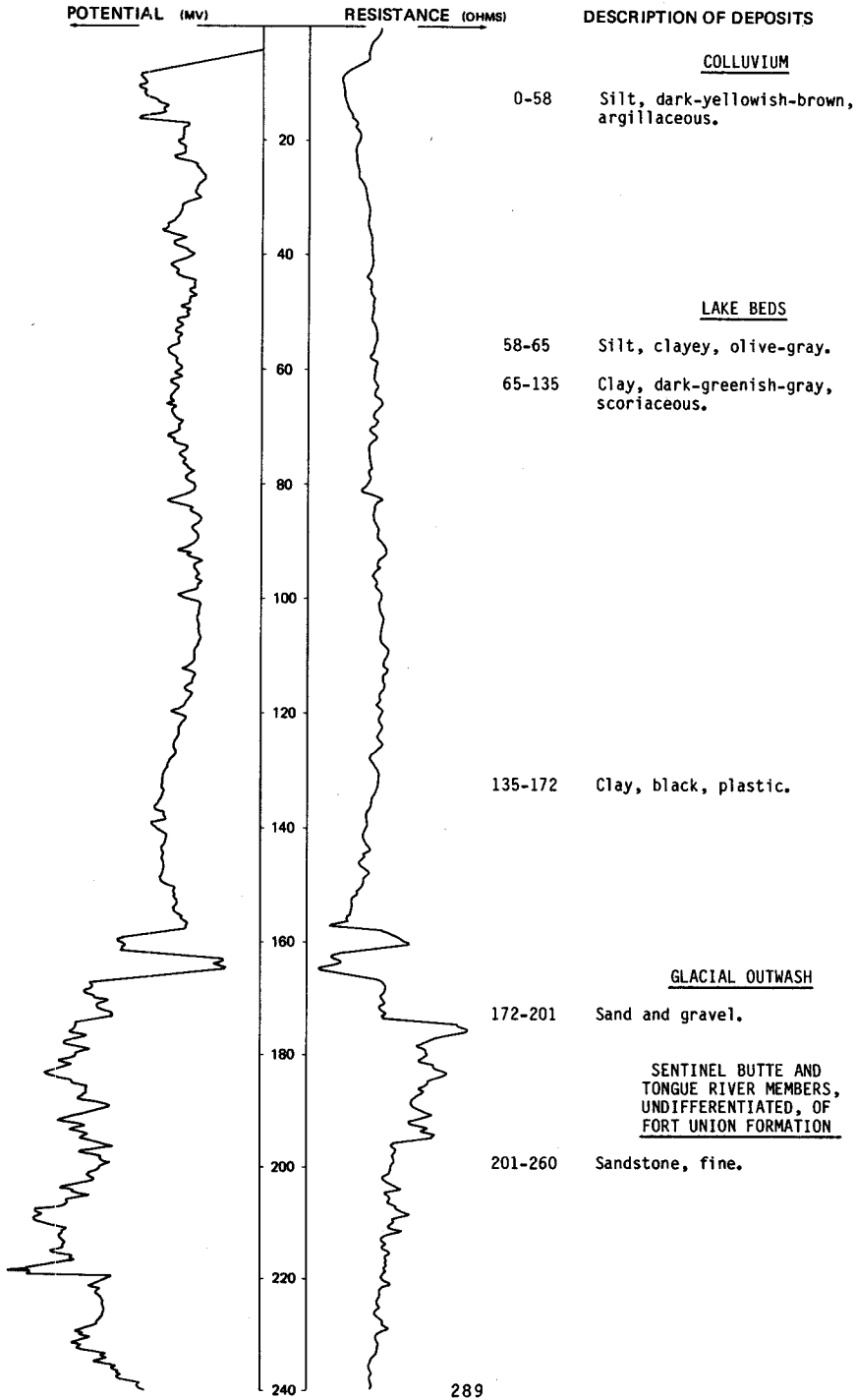
LOCATION: 151-096-28CCD

NDSWC 11546

DATE DRILLED: 5/05/81

ALTITUDE: 2260
(FT. NGVD)

DEPTH: 260
(FT)

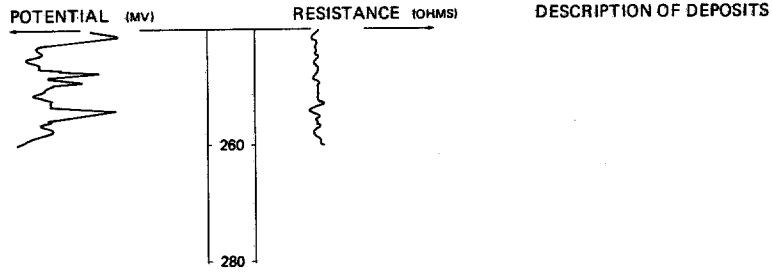


LOCATION: 151-096-28CCD

DATE DRILLED: 5/05/81

ALTITUDE: 2260
(FT, NGVD)

DEPTH: 260
(FT)



151-096-29DDD
(Log modified from Kieson Drilling)

Altitude: 2270 feet

Date drilled: 1/30/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay and sand-----	14	15
	Coal-----	4	19
	Clay-----	7	26
	Coal-----	4	30

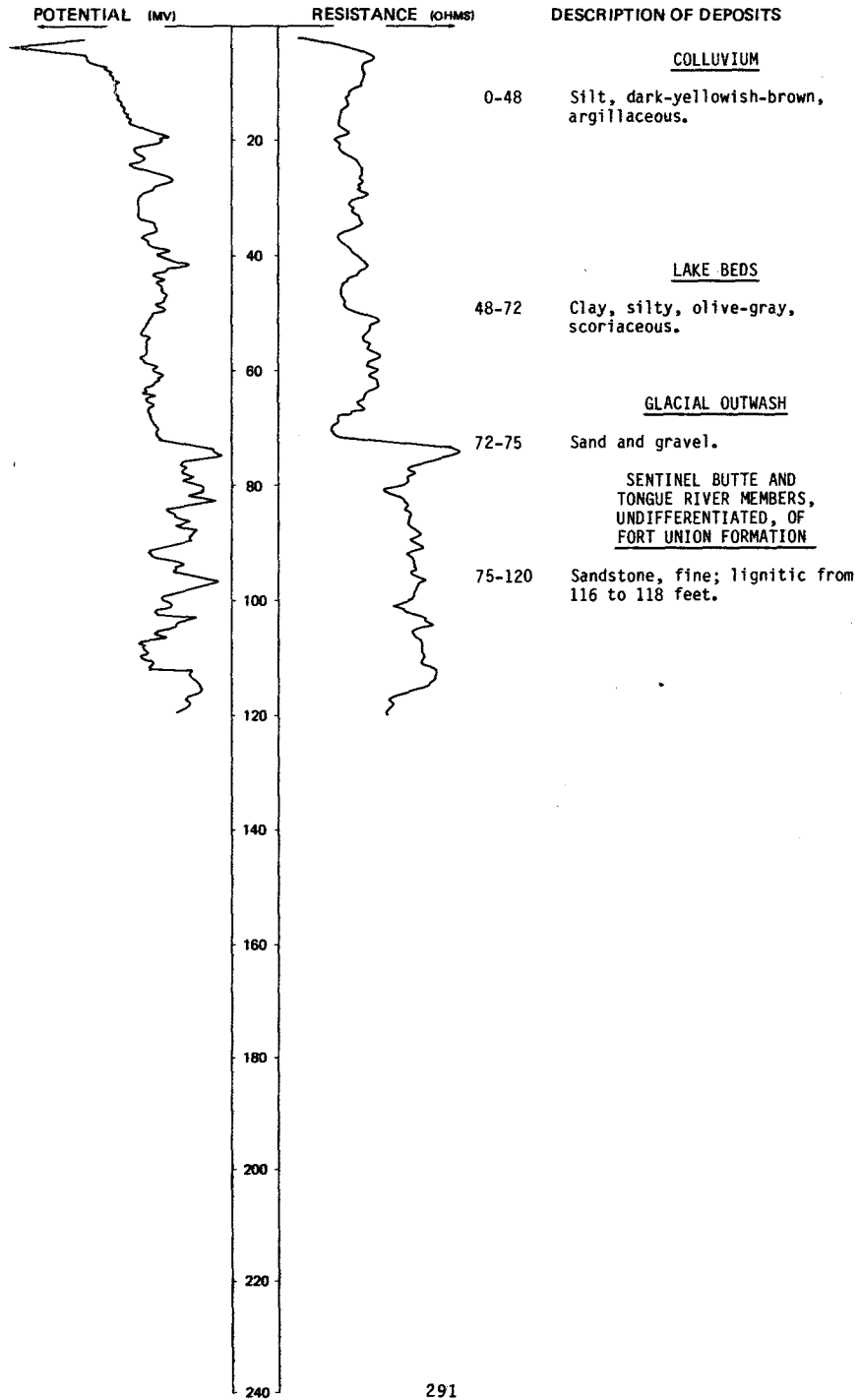
LOCATION: 151-096-30AAA

NDSWC 11547

DATE DRILLED: 5/05/81

ALTITUDE: 2259
(FT, NGVD)

DEPTH: 120
(FT)



LOCATION: 151-096-36AAA

NDSWC 6051

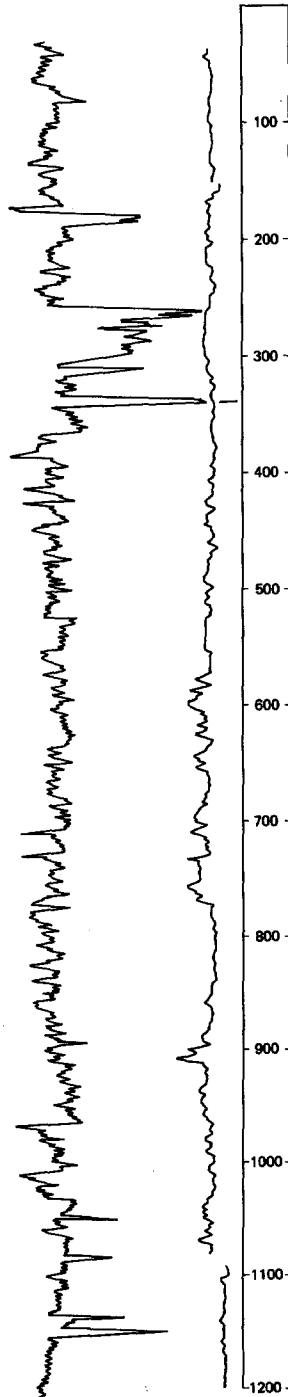
DATE DRILLED: 12/08/81

ALTITUDE: 2490
(FT, NGVD)

DEPTH: 1300
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

0-12	Colluvium.
	<u>SENTINEL BUTTE MEMBER OF FORT UNION FORMATION</u>
12-225	Siltstone and sandstone, fine to medium, gray, lignitic.
225-250	Claystone and lignite.
250-375	Siltstone and sandstone.
	<u>TONGUE RIVER MEMBER OF FORT UNION FORMATION</u>
375-410	Claystone and lignite.
410-525	Siltstone and claystone, greenish-gray, bentonitic, lignitic.
525-715	Siltstone and sandstone, gray, lignitic.
715-850	Claystone and lignite.
850-965	Siltstone and sandstone, fine to medium.
965-975	Lignite.
975-1150	Siltstone and claystone, sandy, gray.
	<u>LOWER PART OF FORT UNION FORMATION</u>
1150-1300	Siltstone and claystone, greenish-gray.

LOCATION: 151-096-36AAA

DATE DRILLED: 12/08/81

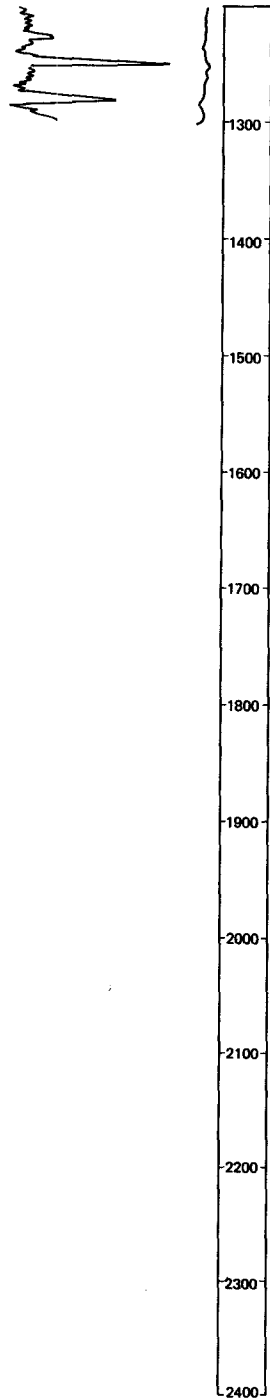
ALTITUDE: 2490
(FT. NGVD)

DEPTH: 1300
(FT)

NEUTRON
(API)

S.P.
(MV)

DESCRIPTION OF DEPOSITS

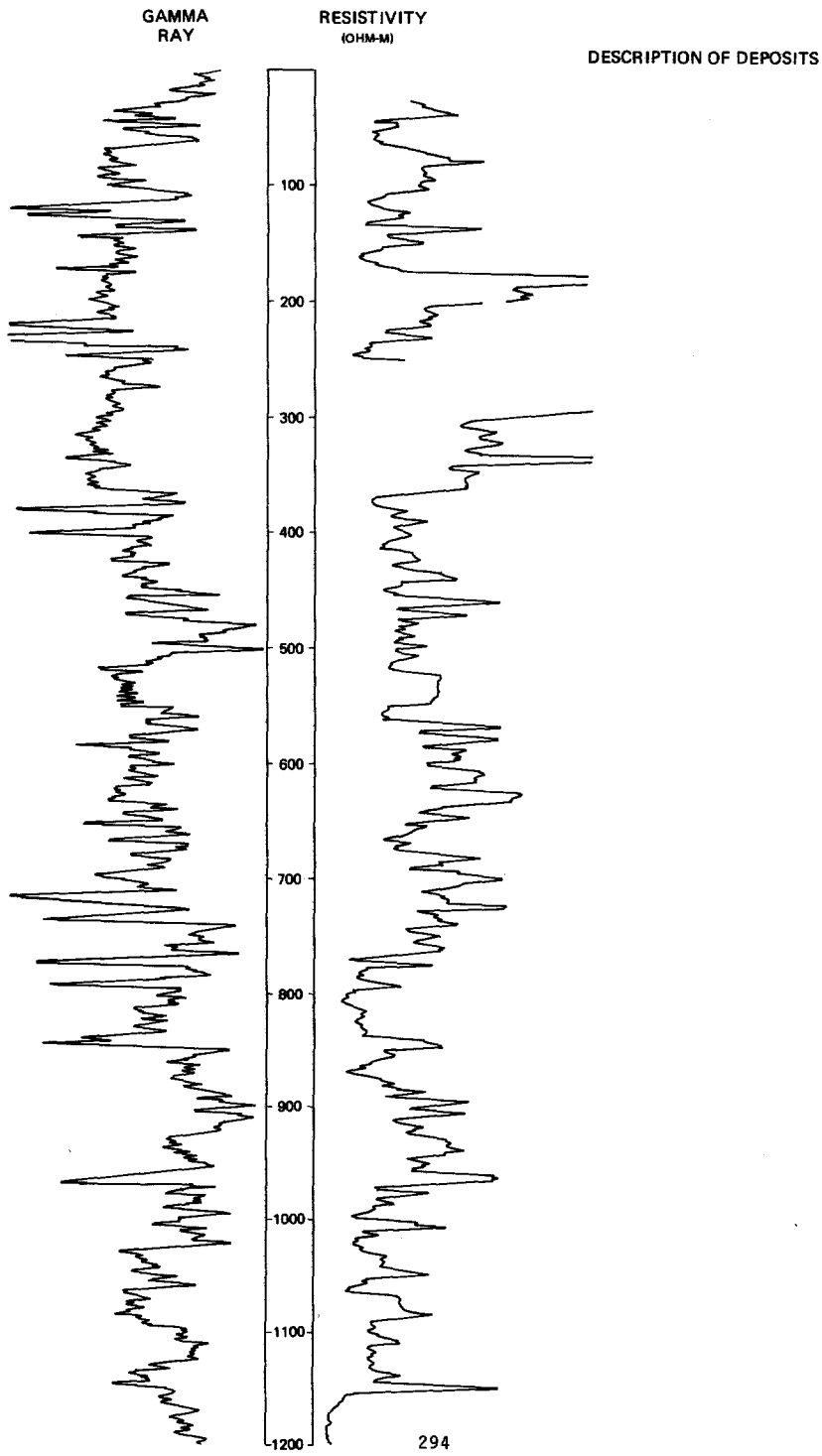


LOCATION: 151-096-36AAA

DATE DRILLED: 12/08/81

ALTITUDE: 2490
(FT, NGVD)

DEPTH: 1300
(FT)

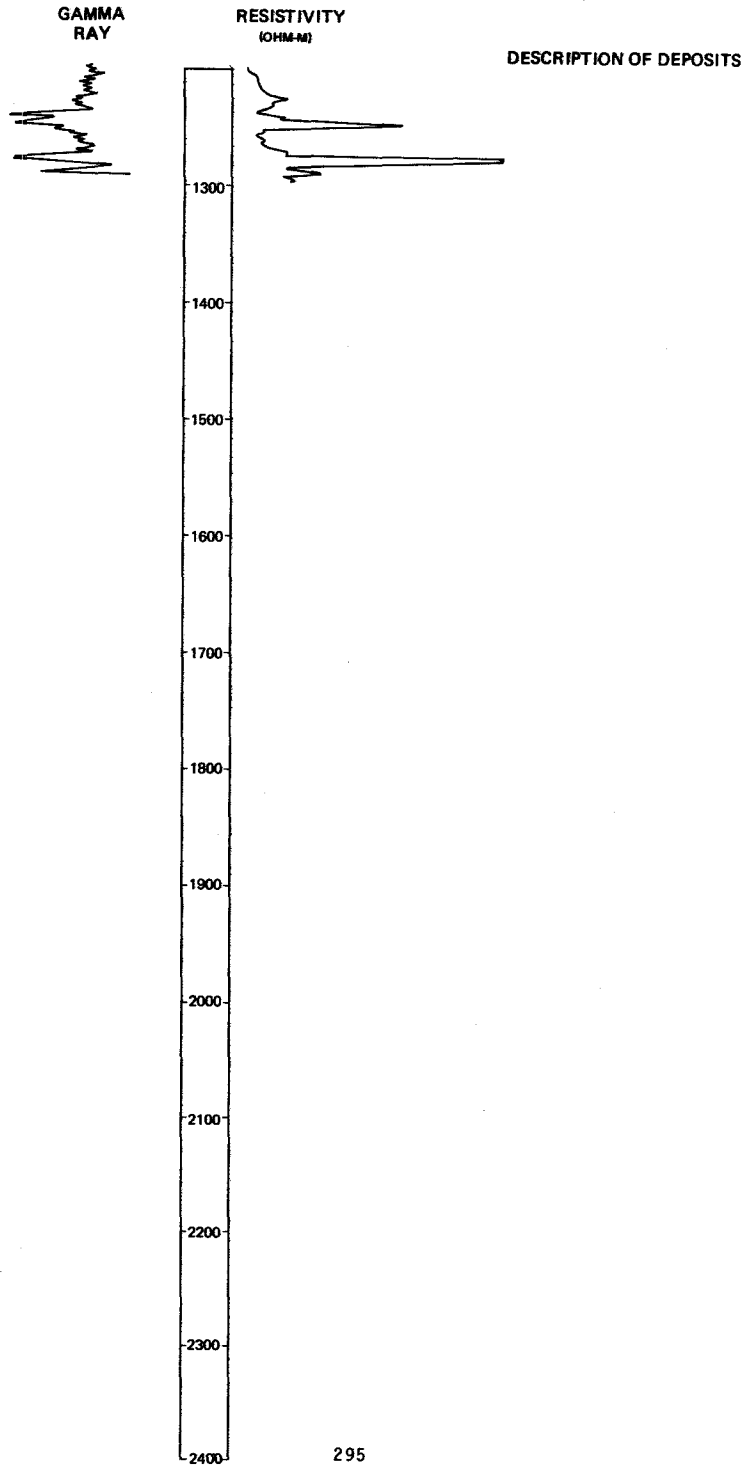


LOCATION: 15I-096-36AAA

DATE DRILLED: 12/08/81

ALTITUDE: 2490
(FT, NGVD)

DEPTH: 1300
(FT)

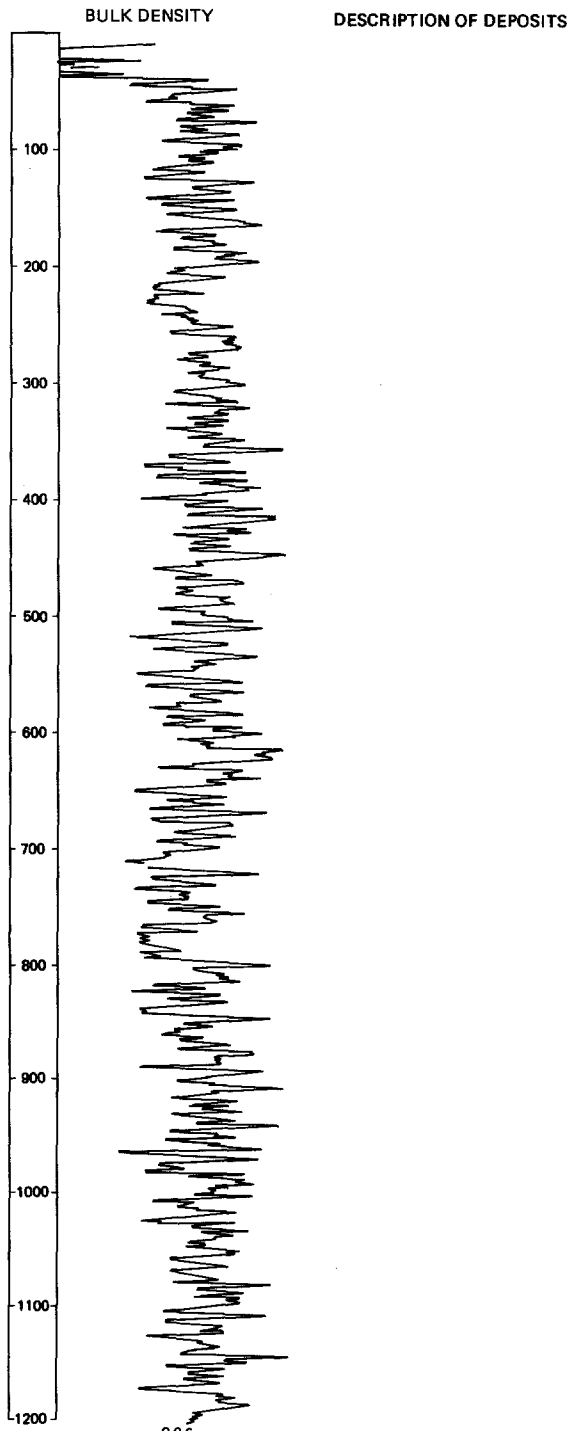


LOCATION: 151-096-36AAA

DATE DRILLED: 12/08/81

ALTITUDE: 2490
(FT. NGVD)

DEPTH: 1300
(FT)

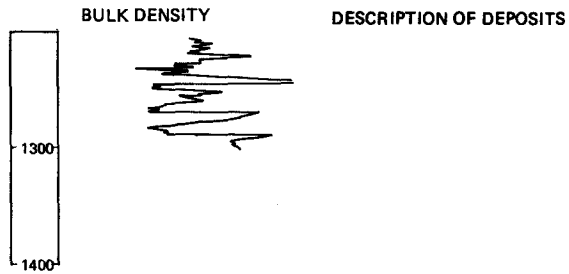


LOCATION: 151-096-36AAA NDSWC 6051, Continued

DATE DRILLED: 12/08/81

ALTITUDE: 2490
(FT. NGVD)

DEPTH: 1300
(FT)



151-097-20BDD
(Log modified from Thompson Drilling Co.)

Altitude: 2220 feet

Date drilled: 9/13/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	3	3
	Clay-----	3	6
	Coal-----	4	10
	Clay-----	15	25
	Sand-----	18	43
	Coal-----	6	49
	Clay-----	3	52
	Sand-----	73	125
	Hard shell-----	4	129
	Sand, dirty-----	16	145
	Sand, clean-----	10	155
	Clay-----	2	157
	Sand, blue-----	3	160
	Coal-----	5	165
	Clay-----	8	173

151-097-33CB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2240 feet

Date drilled: 9/20/73

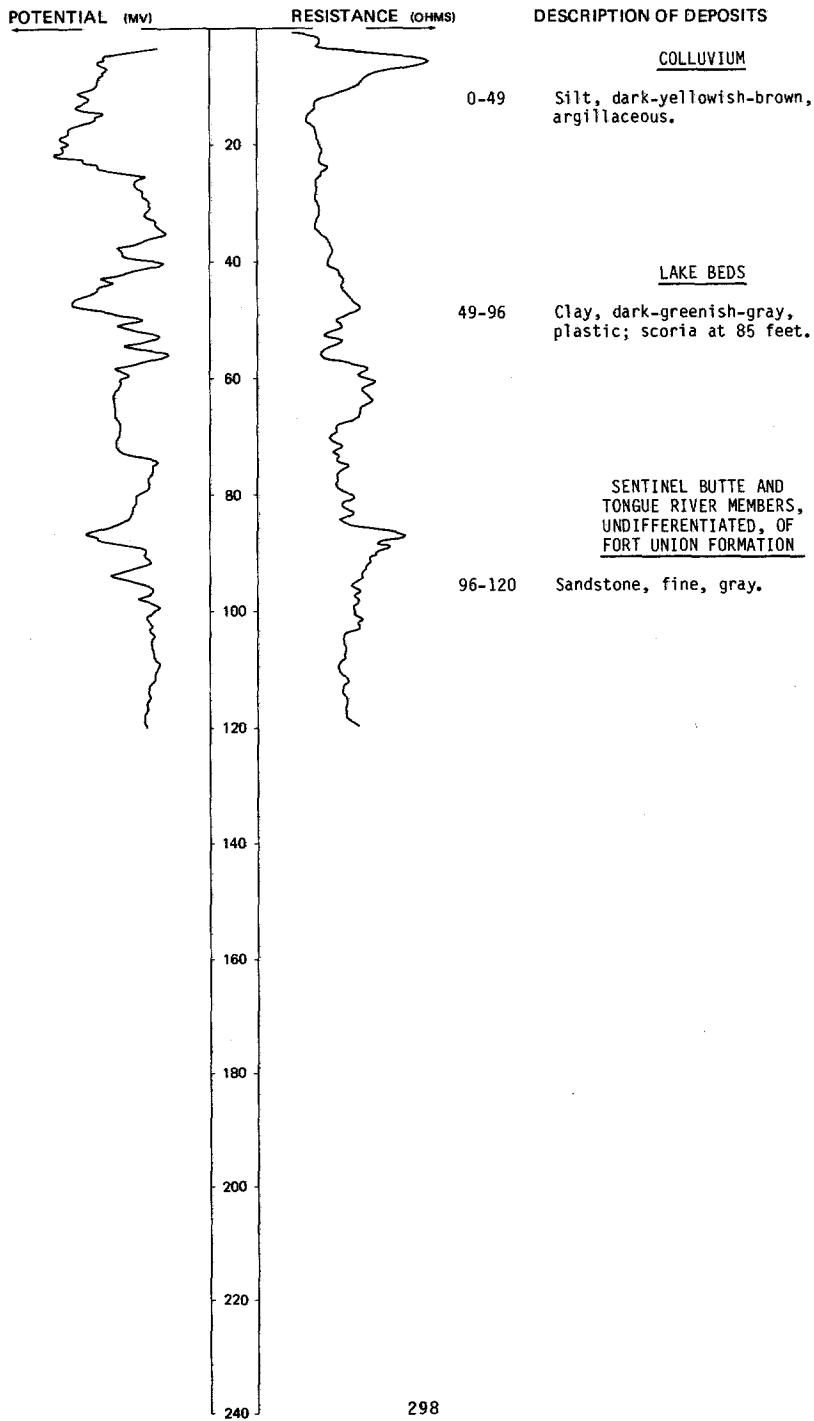
	Sand-----	6	6
	Scoria till-----	8	14
	Clay-----	4	18
	Sand-----	16	34
	Clay-----	6	40

LOCATION: 151-098-04CDD
ALTITUDE: 2003
(FT, NGVD)

NDSWC 11593

DATE DRILLED: 5/20/81

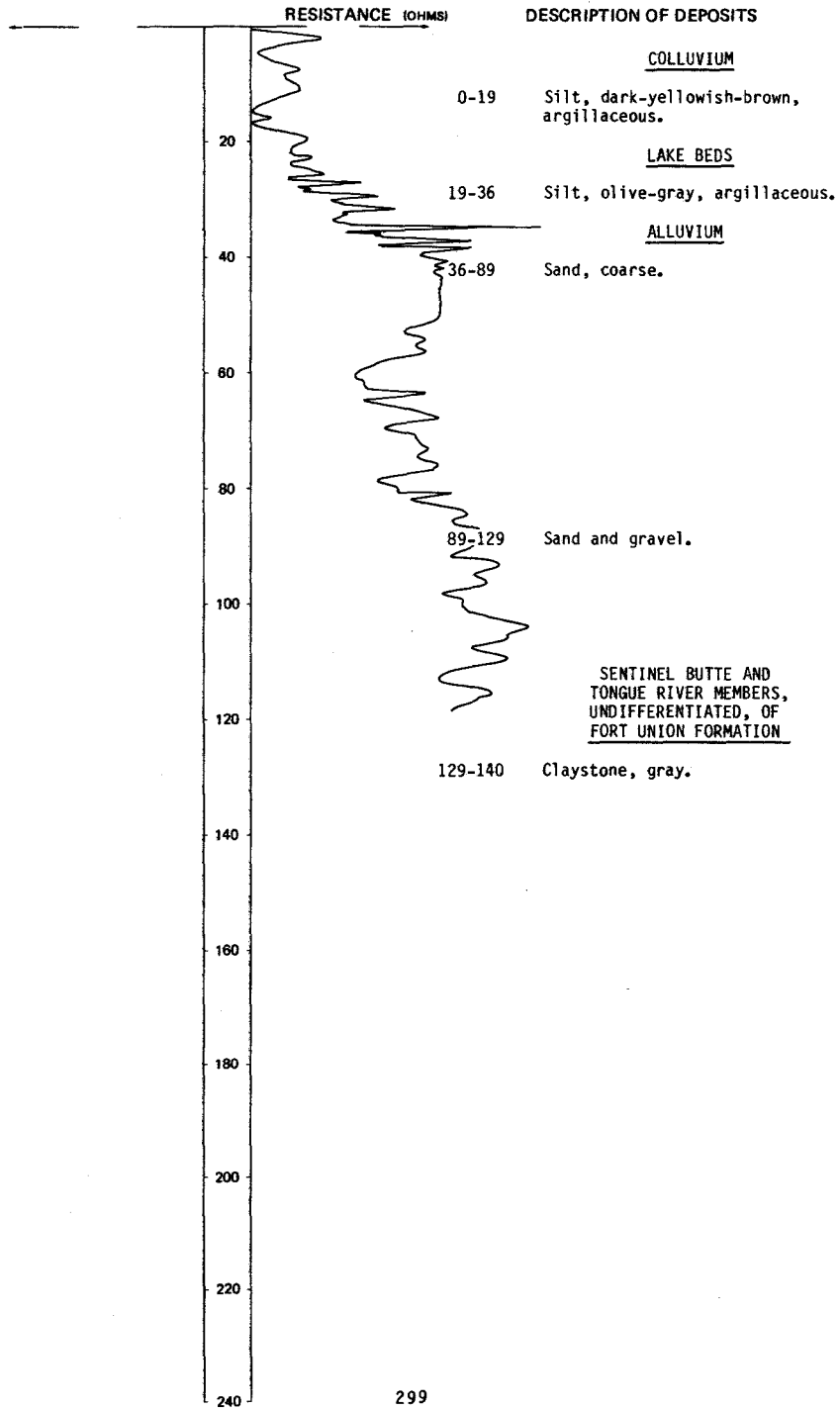
DEPTH: 120
(FT)



LOCATION: 151-098-04DDC
ALTITUDE: 1985
(FT, NGVD)

NDSWC 11594

DATE DRILLED: 5/20/81
DEPTH: 140
(FT)



151-098-05CCD
(Log modified from Thompson Drilling Co.)

Altitude: 2130 feet Date drilled: 2/19/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Soil-----	3	3
	Clay-----	27	30
	Scoria-----	2	32
	Clay-----	26	58
	Coal-----	7	65
	Clay-----	10	75
	Sand-----	5	80
	Coal-----	4	84
	Clay-----	26	110
	Sand, soft, clean; water-----	25	135

151-098-08BCB
(Log modified from Thompson Drilling Co.)

Altitude: 2110 feet Date drilled: 8/10/74

	Soil-----	2	2
	Clay-----	12	14
	Clay, bentonitic, soft-----	6	20
	Clay-----	22	42
	Coal-----	6	48
	Clay-----	7	55
	Clay, muddy, soft-----	5	60
	Sand-----	10	70
	Coal-----	5	75
	Clay-----	21	96
	Sand, dirty-----	14	110
	Sand, clean-----	5	115

151-098-09AAA
NDSWC 1490

Altitude: 1983 feet Date drilled: 4/13/59

	Topsoil, sandy, brown-----	2	2
	Clay, sandy, light-brown-----	3	5
	Till, yellow to buff, oxidized, and fine sand; scoria pebbles-----	16	21
	Till, gray, and fine sand; scoria and carbonate pebbles-----	8	29
	Sand, fine to coarse, and fine gravel; lignite and subangular scoria pebbles-----	11	40
	Clay, sandy, light-gray; scoria and lignite fragments-----	24	64
	Sand, fine to medium; fine grains of lignite-----	19	83
	Sand, coarse, and fine gravel; scoria and subangular lignite pebbles-----	45	128
	Clay, sandy, light-gray; Fort Union Formation-----	8	136

151-098-09BAA
NDSWC 1491

Altitude: 2003 feet

Date drilled: 4/14/59

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil, sandy, brown-----	4	4
	Clay, silty and sandy, light-olive-gray; scoria and lignite fragments-----	48	52
	Clay, gray to blue, smooth-----	13	65
	Clay, silty, gray-----	28	93
	Clay, sandy, light-gray; lignite fragments-----	13	106
	Clay, sandy, shale-like, gray; Fort Union Formation-----	10	116

151-098-10BBB
NDSWC 1489

Altitude: 1983 feet

Date drilled: 4/10/59

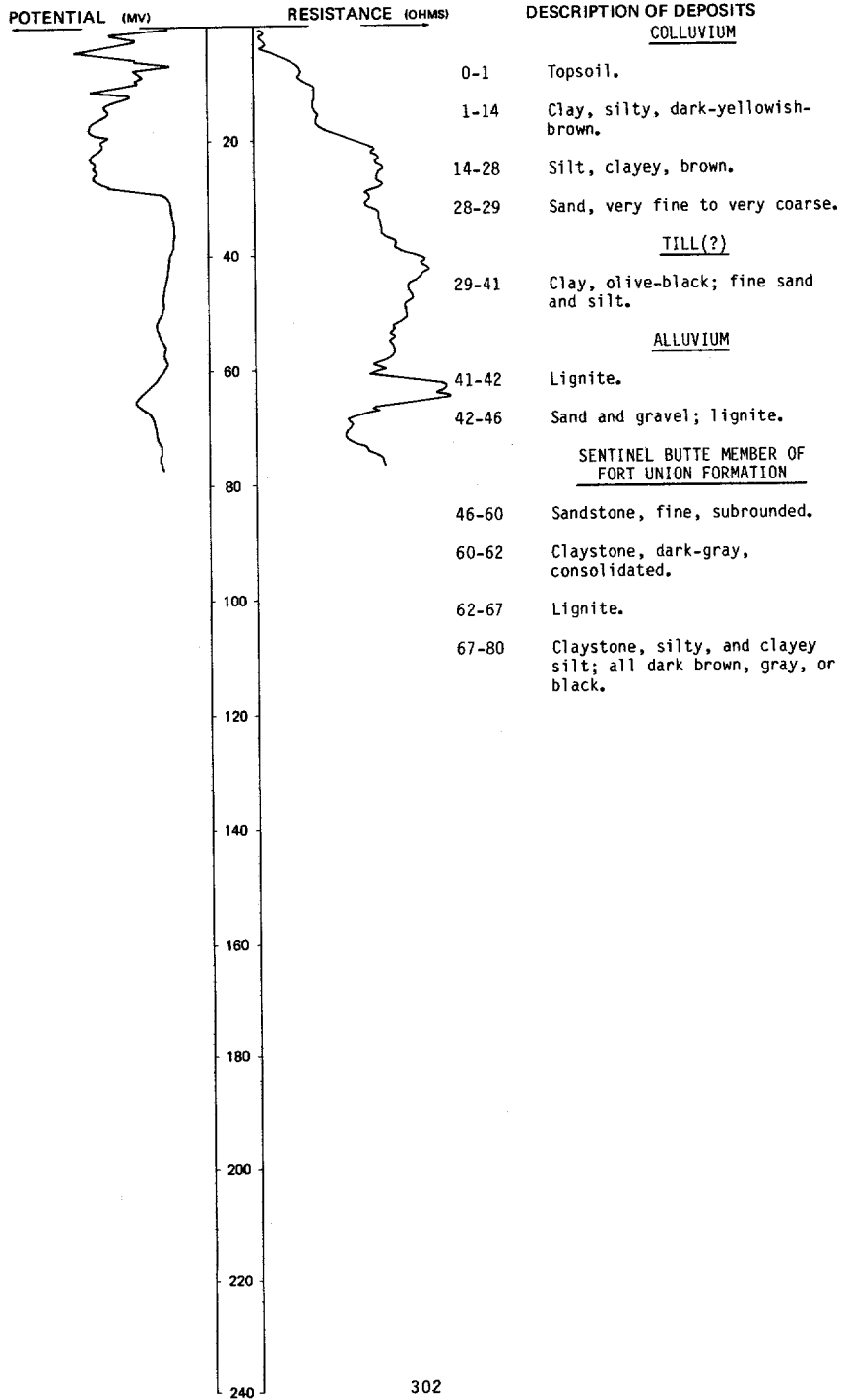
	Topsoil, sandy, brown-----	2	2
	Clay, silty and sandy, olive-gray-----	9	11
	Sand, fine to coarse, and dark-gray dirty clay; scoria and lignite fragments-----	28	39
	Sand, fine, dirty; scoria and lignite fragments-----	12	51
	Clay, silty and sandy, olive-gray-----	23	74
	Sand, coarse, to coarse gravel; scoria and lignite fragments-----	25	99
	Clay, sandy, light-gray; Fort Union Formation-----	17	116

LOCATION: 151-098-22DAA

DATE DRILLED: 9/09/80

ALTITUDE: 2020
(FT. NGVD)

DEPTH: 80
(FT)



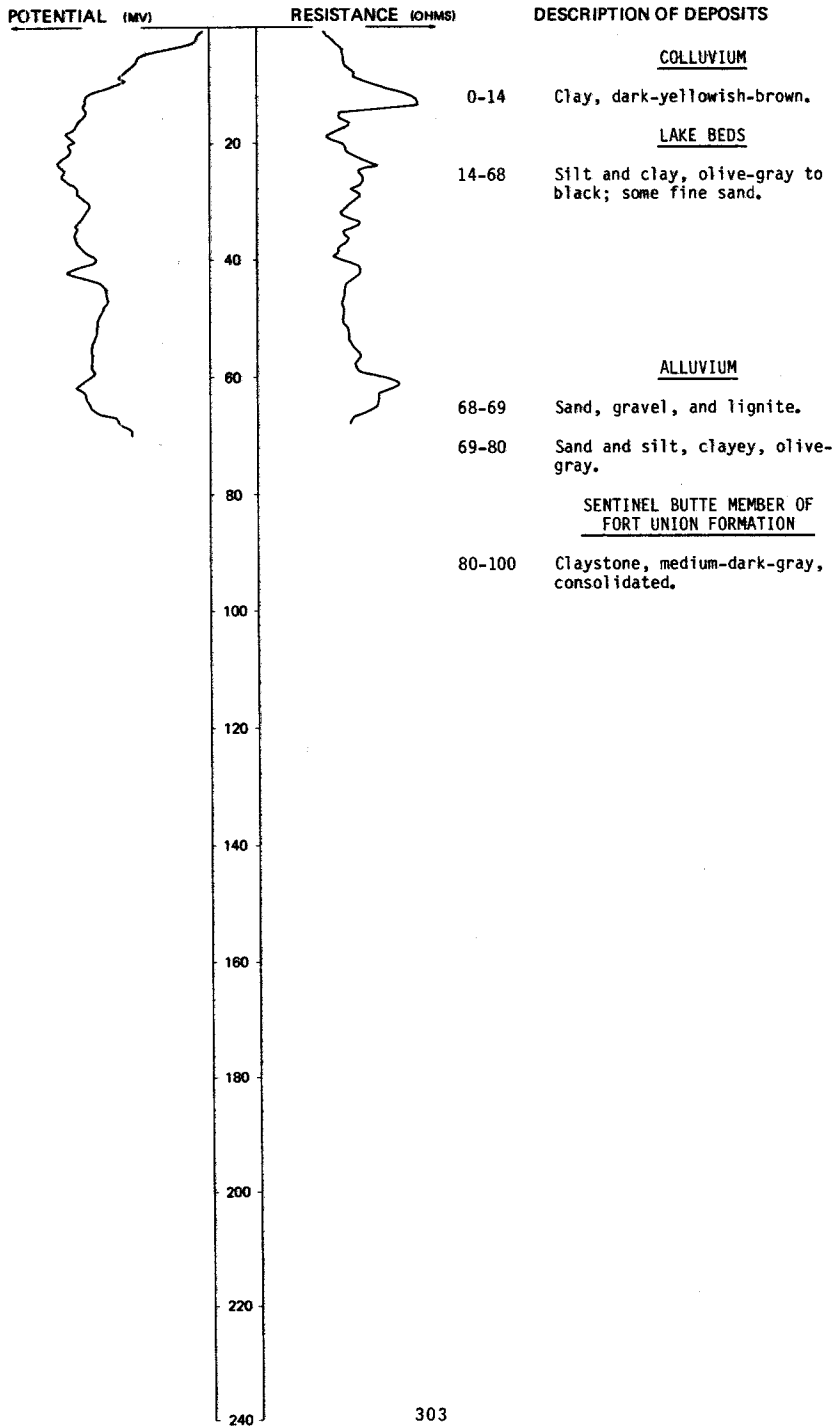
LOCATION: 151-098-26CBC

NDSWC 11348

DATE DRILLED: 9/09/80

ALTITUDE: 2025
(FT. NGVD)

DEPTH: 100
(FT)

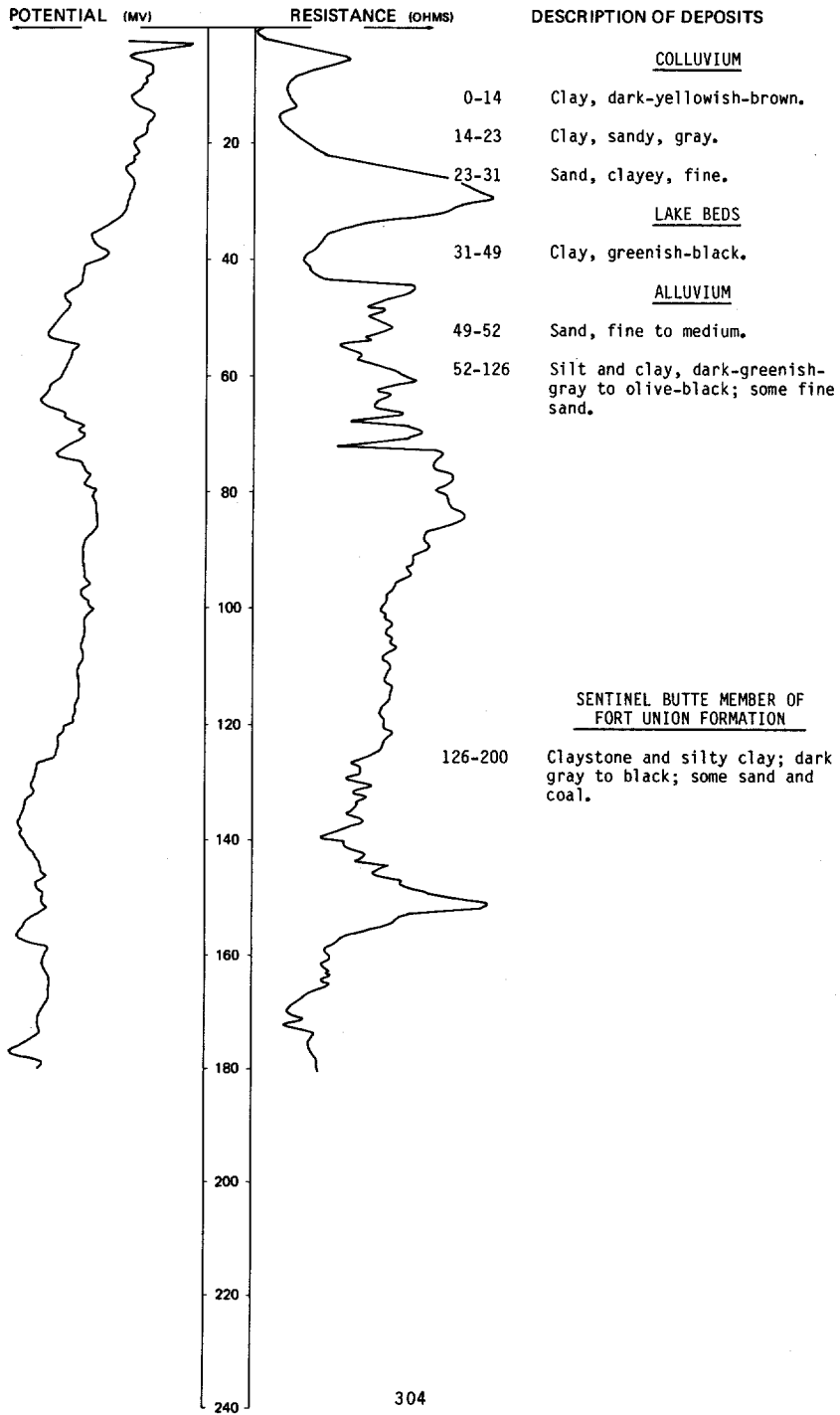


LOCATION: 151-098-27AAA
ALTITUDE: 2025
(FT, NGVD)

NDSWC 11349

DATE DRILLED: 9/09/80

DEPTH: 200
(FT)



151-098-29CCB1
NDSWC 1449

Altitude: 2025 feet

Date drilled: 11/13/58

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, light-bluish-gray; large proportion of fresh blue shale flakes-----	7	7
	Sand, very fine to fine; shale flakes-----	3	10
	Clay, slightly sandy, yellow to blue, oxidized-----	12	22
	Sand, fine; includes clay-----	4	26
	Clay, silty, gray to bluish-gray, smooth; a few lignite fragments-----	21	47
	Clay, sandy, gray, and medium sand-----	5	52
	Clay, silty, gray-----	11	63
	Sand, coarse, clean, and fine to medium gravel-----	36	99
	Clay, silty, gray-----	6	105

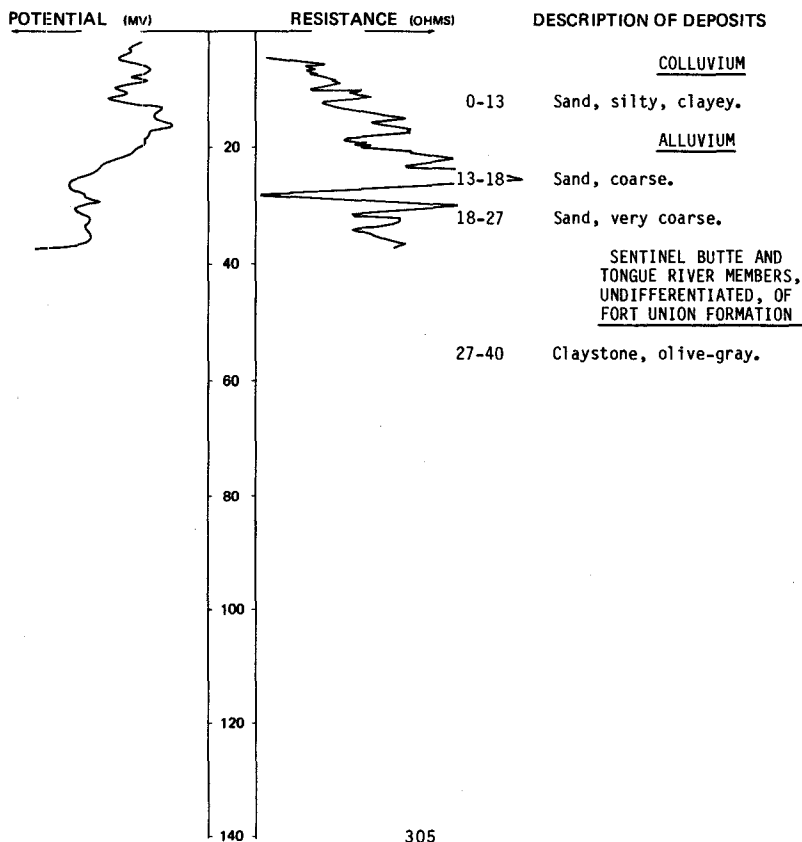
NDSWC 11746

LOCATION: 151-098-29CCB2

DATE DRILLED: 9/24/81

ALTITUDE: 2026
(FT. NGVD)

DEPTH: 40
(FT)



151-098-30ADD
NDSWC 1492

Altitude: 2020 feet

Date drilled: 4/14/59

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, sandy, brown-----	1	1
	Clay, sandy, yellow to brown-----	4	5
	Sand, fine, dirty-----	6	11
	Clay, sandy, gray; scoria fragments-----	8	19
	Sand, fine, dirty; lignite grains and scoria fragments-----	23	42
	Clay, sandy, gray; scoria and lignite fragments-----	11	53
	Lignite-----	11	64
	Clay, gray, smooth; scoria and lignite-----	10	74
	Clay, sandy, gray; Fort Union Formation-----	10	84

151-098-30DAA
NDSWC 1450

Altitude: 2020 feet

Date drilled: 11/21/58

Clay, blue, smooth-----	6	6
Sand, fine to coarse-----	92	98
Clay, sandy, gray-----	7	105

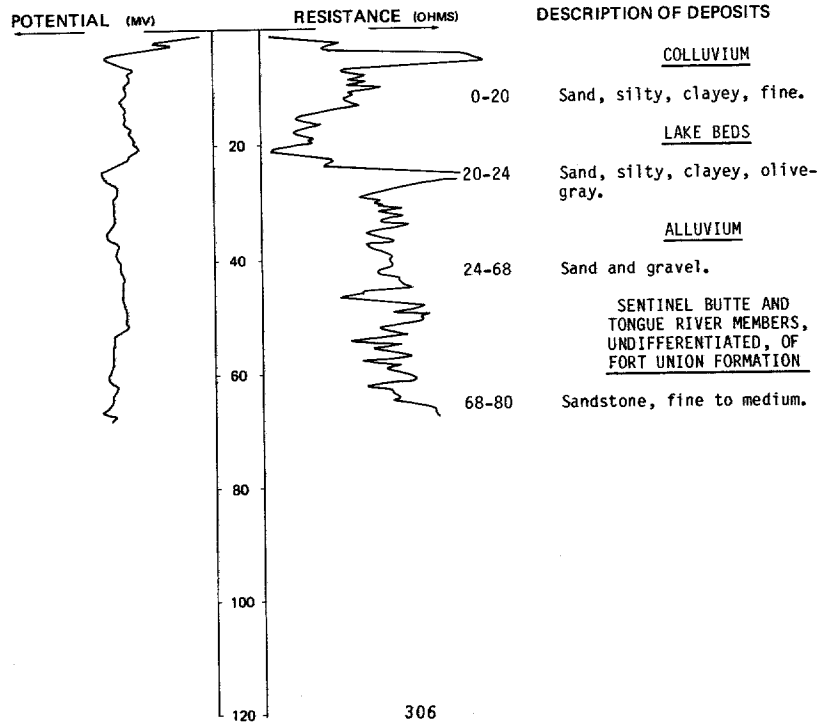
NDSWC 11744

LOCATION: 151-098-310CC

DATE DRILLED: 9/24/81

ALTITUDE: 2050
(FT. NGVD)

DEPTH: 80
(FT)



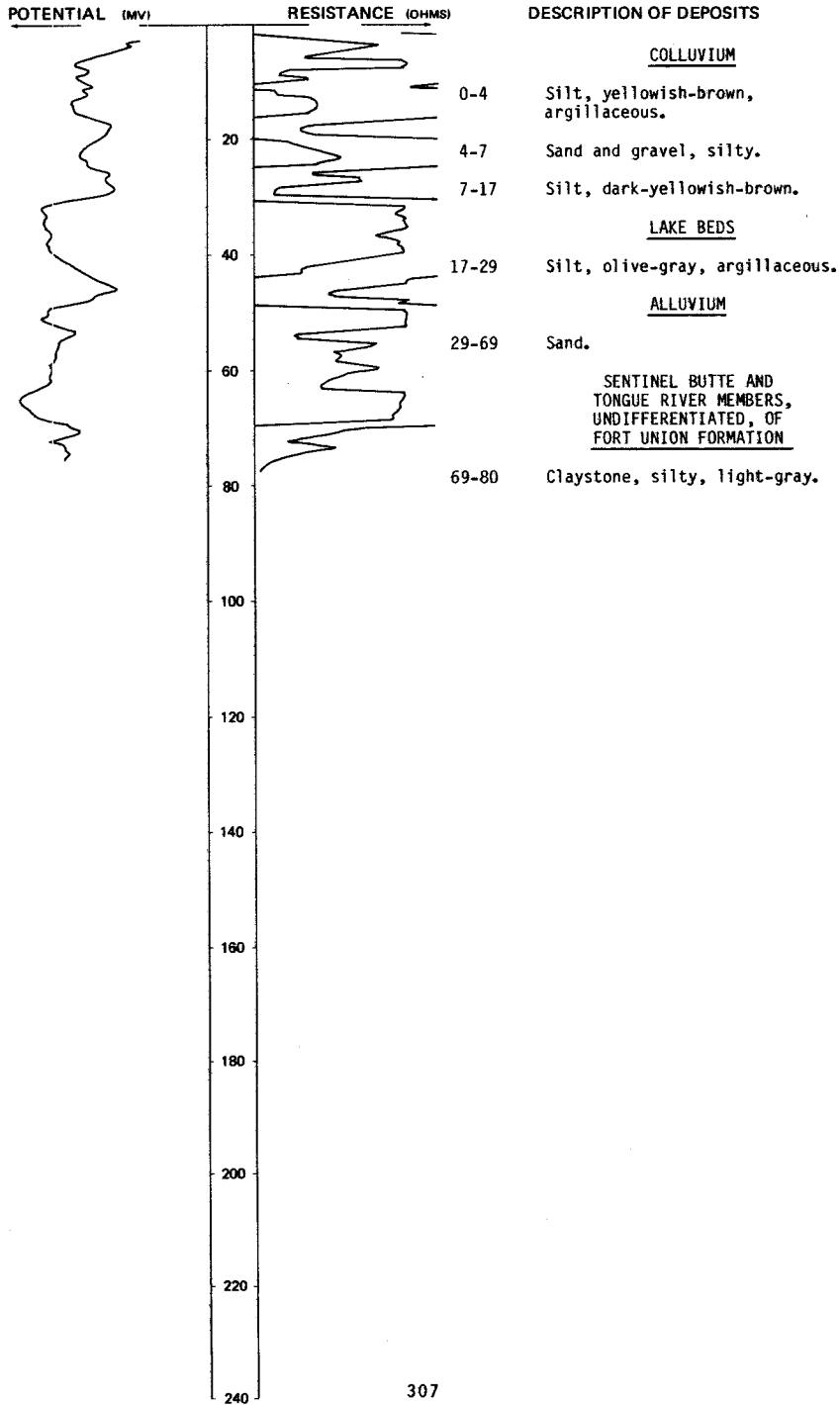
LOCATION: 151-098-310DA

NDSWC 11557

DATE DRILLED: 5/06/81

ALTITUDE: 2045
(FT, NGVD)

DEPTH: 80
(FT)



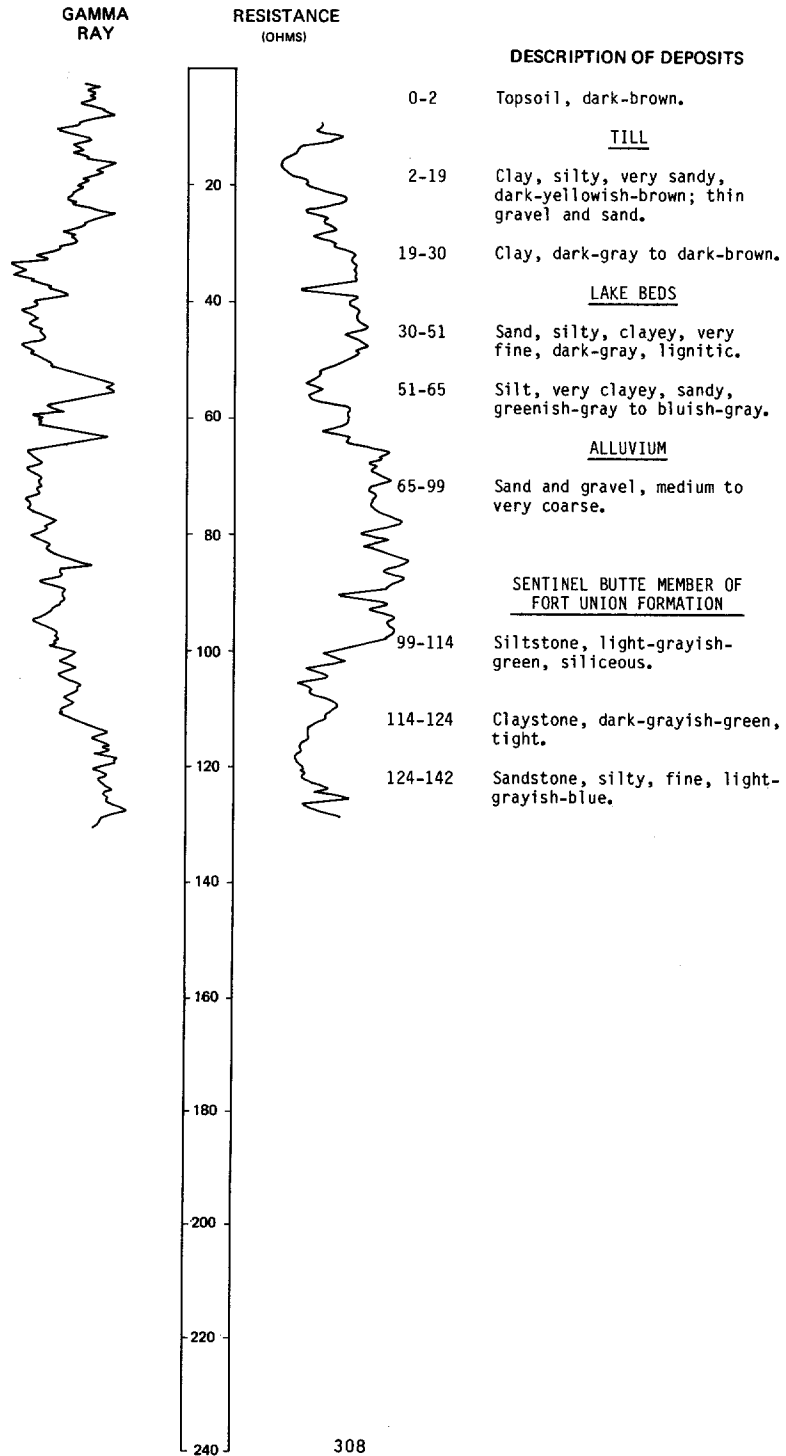
LOCATION: 151-098-31DDC

NDSWC 5614

DATE DRILLED: 10/05/79

ALTITUDE: 2052
(FT, NGVD)

DEPTH: 142
(FT)



151-098-32CCC
NDSWC E

Altitude: 2060 feet

Date drilled: 5/08/80

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, fine to medium; some yellowish-brown gravel-----	6	6
	Clay, yellowish-brown, hard, brittle-----	12	18
	Sand, fine, yellowish-brown-----	15	33
	Boulder-----	1	34
	Sand, medium to coarse, and fine brown subrounded gravel; gravel predominantly rock fragments; some pebbles and cobbles-----	11	45
	Clay, silty, light-olive-gray, soft; drills hard-----	8	53
	Lignite-----	10	63
	Clay, slightly silty, olive-gray, firm, sticky; some reddish brown-----	20	83

151-098-33CCC
NDSWC 11741

Altitude: 2060 feet

Date drilled: 9/23/81

Topsoil-----	3	3
Sand and gravel, brown-----	1	4
Sandstone, fine to medium-----	10	14
Claystone, medium-gray-----	6	20

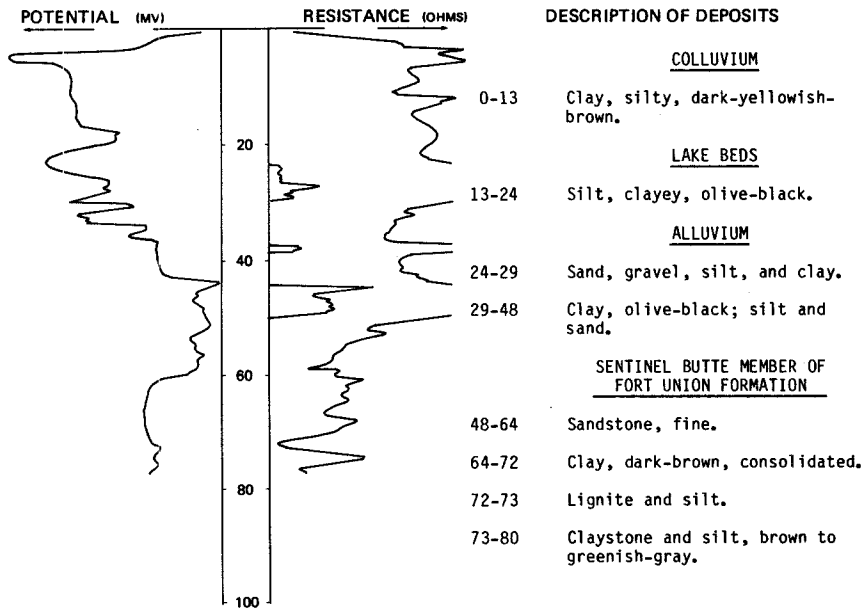
NDSWC 11347

LOCATION: 151-098-34DDC

DATE DRILLED: 9/08/80

ALTITUDE: 2020
(FT, NGVD)

DEPTH: 80
(FT)



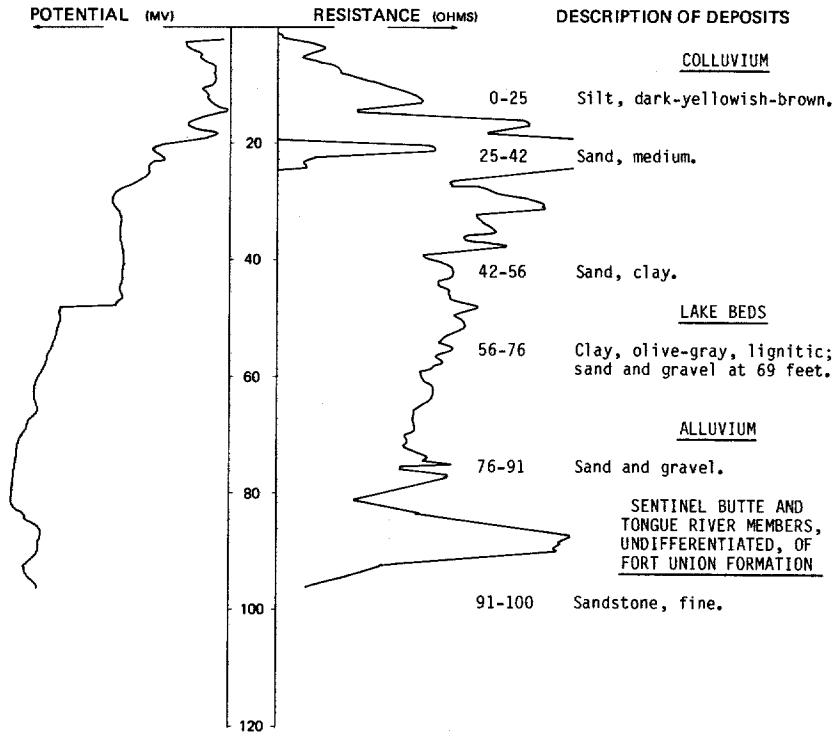
LOCATION: 151-098-36CDC

NDSWC 11737

DATE DRILLED: 9/23/81

ALTITUDE: 2052
(FT, NGVD)

DEPTH: 100
(FT)



151-099-17CBB
(Log modified from Thompson Drilling Co.)

Altitude: 2280 feet

Date drilled: 5/29/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	3	3
	Sand, coarse-----	15	18
	Sand, brown-----	22	40
	Sand, gray-----	28	68
	Sand, brown-----	3	71
	Sand, gray-----	49	120
	Sand, brown; water-----	10	130

151-099-22CCC
(Log modified from Thompson Drilling Co.)

Altitude: 2210 feet Date drilled: 7/30/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	17	17
	Sand-----	21	38
	Clay-----	58	96
	Sand-----	34	130

151-099-25DDC
(Log modified from B & K Water Well Drilling Co.)

Altitude: 2070 feet Date drilled: 4/18/76

	Topsoil-----	2	2
	Sand, brown-----	9	11
	Clay, sandy, brown-----	7	18
	Clay, brown-----	13	31
	Coal-----	5	36
	Sand, brown-----	26	62
	Sand, gray-----	14	76
	Clay, gray-----	4	80

151-099-33ADB
(Log modified from Thompson Drilling Co.)

Altitude: 2140 feet Date drilled: 5/05/76

	Topsoil-----	2	2
	Clay-----	22	24
	Sand, gray-----	14	38
	No record-----	2	40
	Clay-----	15	55
	Sand, gray-----	13	68
	Sand, blue-----	12	80

151-099-34DBC
NDSWC 11572

Altitude: 2097 feet Date drilled: 5/12/81

	Silt, dark-yellowish-brown, argillaceous-----	11	11
	Claystone, olive-gray-----	9	20

151-099-35ADD
NDSWC 11571

Altitude: 2014 feet Date drilled: 5/12/81

	Sand and gravel-----	6	6
	Silt, dark-yellowish-brown-----	12	18
	Claystone, olive-gray-----	4	22
	Lignite-----	3	25
	Claystone, olive-gray-----	15	40

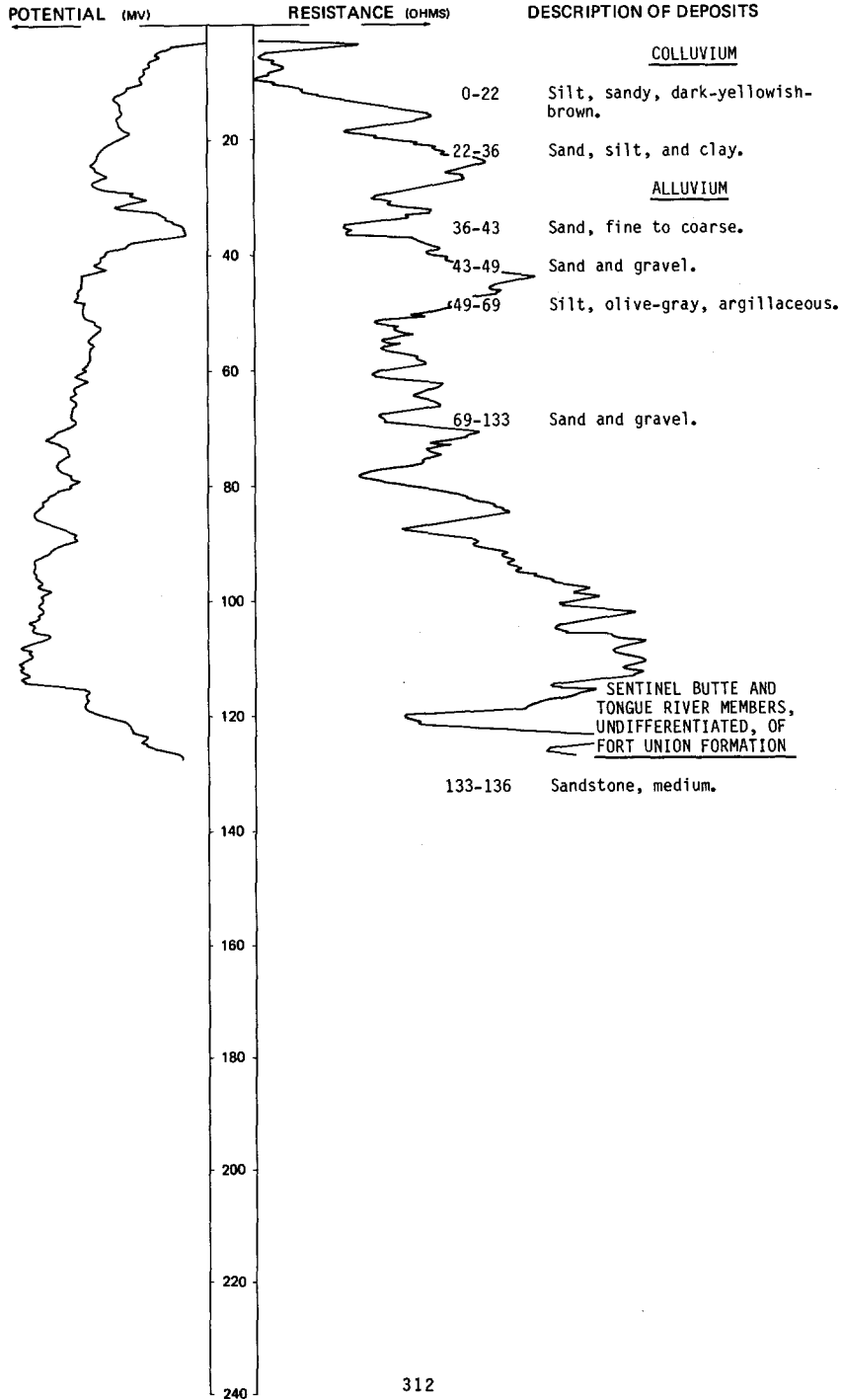
NDSWC 11568

LOCATION: 151-099-35CDC

DATE DRILLED: 5/12/81

ALTITUDE: 2087
(FT, NGVD)

DEPTH: 136
(FT)



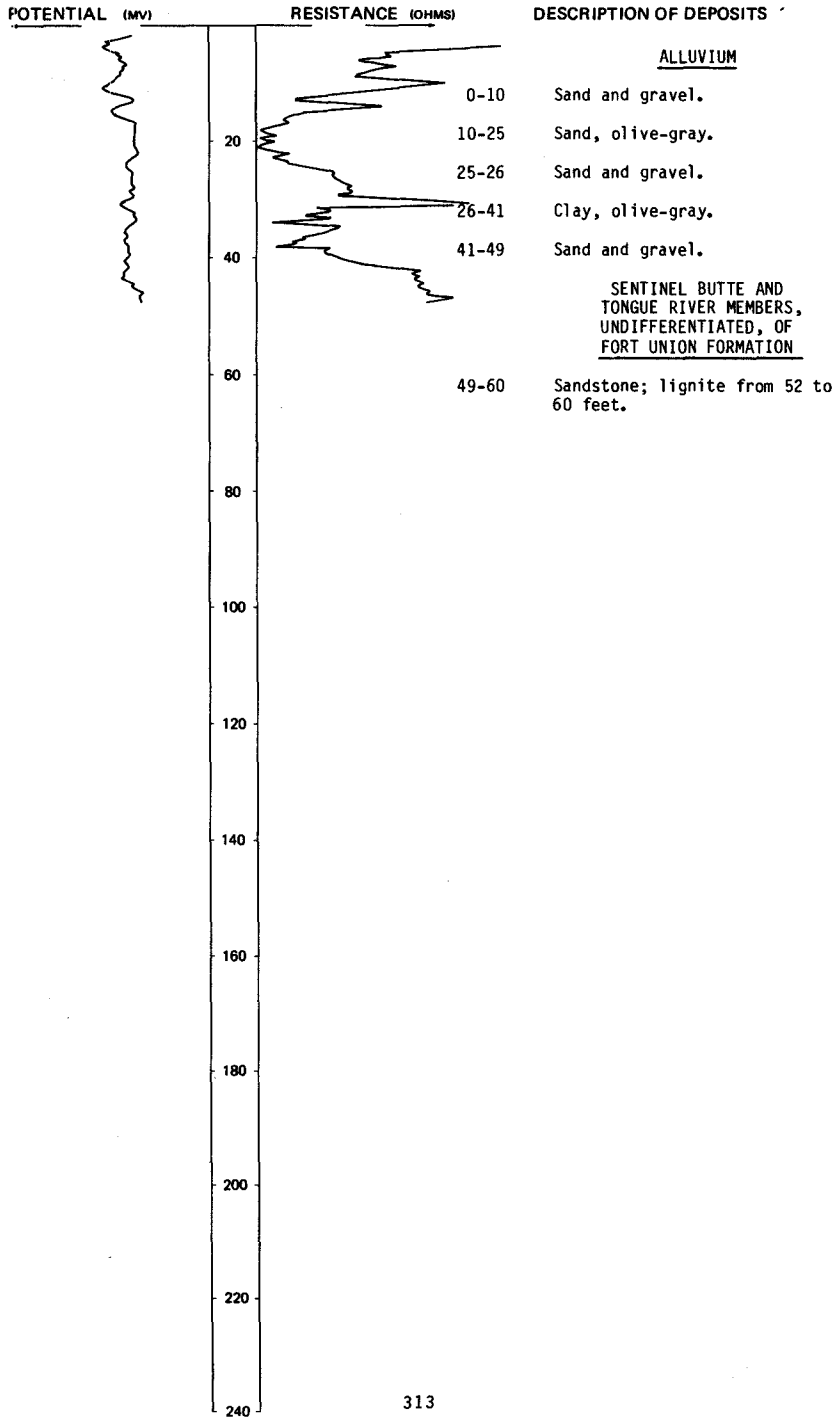
LOCATION: 151-099-35DAA

NDSWC 11570

DATE DRILLED: 5/12/81

ALTITUDE: 2078
(FT. NGVD)

DEPTH: 60
(FT)



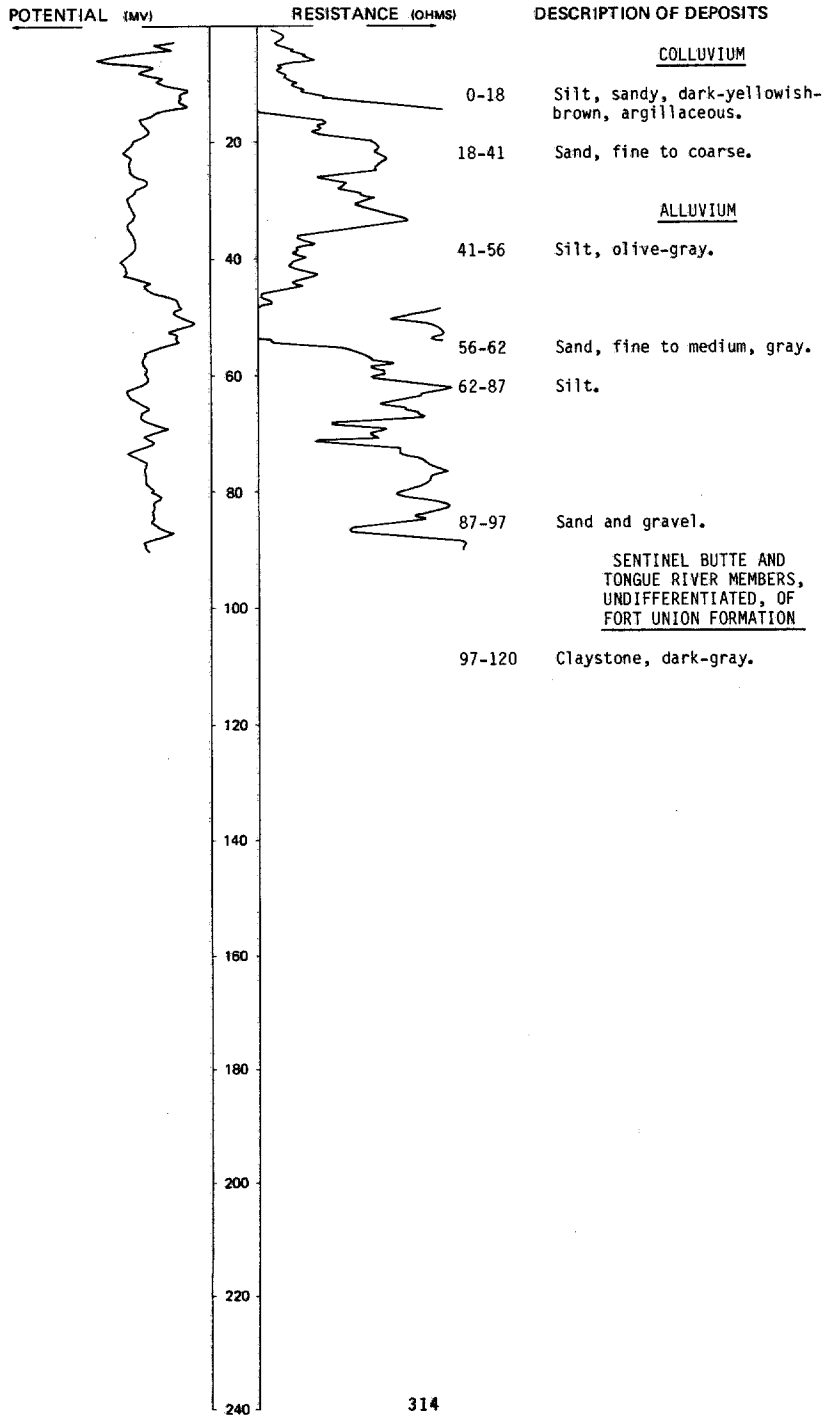
LOCATION: 151-099-350CC

NDSWC 11569

DATE DRILLED: 5/12/81

ALTITUDE: 2085
(FT, NGVD)

DEPTH: 120
(FT)



151-099-35DCD
NDSWC 11751

Altitude: 2093 feet Date drilled: 9/24/81

<u>GEOLOGIC</u> <u>SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS</u> <u>(FEET)</u>	<u>DEPTH</u> <u>(FEET)</u>
	Clay, olive-gray-----	5	5
	Sand, medium-----	10	15
	Claystone, olive-gray-----	25	40

151-099-35DDC
NDSWC 11750

Altitude: 2085 feet Date drilled: 9/24/81

	Topsoil-----	1	1
	Clay, medium-gray-----	5	6
	Sand, very coarse-----	18	24
	Claystone, dark-greenish-gray-----	16	40

151-099-36CDD
NDSWC 11749

Altitude: 2140 feet Date drilled: 9/24/81

	Topsoil-----	2	2
	Sand and gravel-----	7	9
	Sand, medium, argillaceous-----	11	20

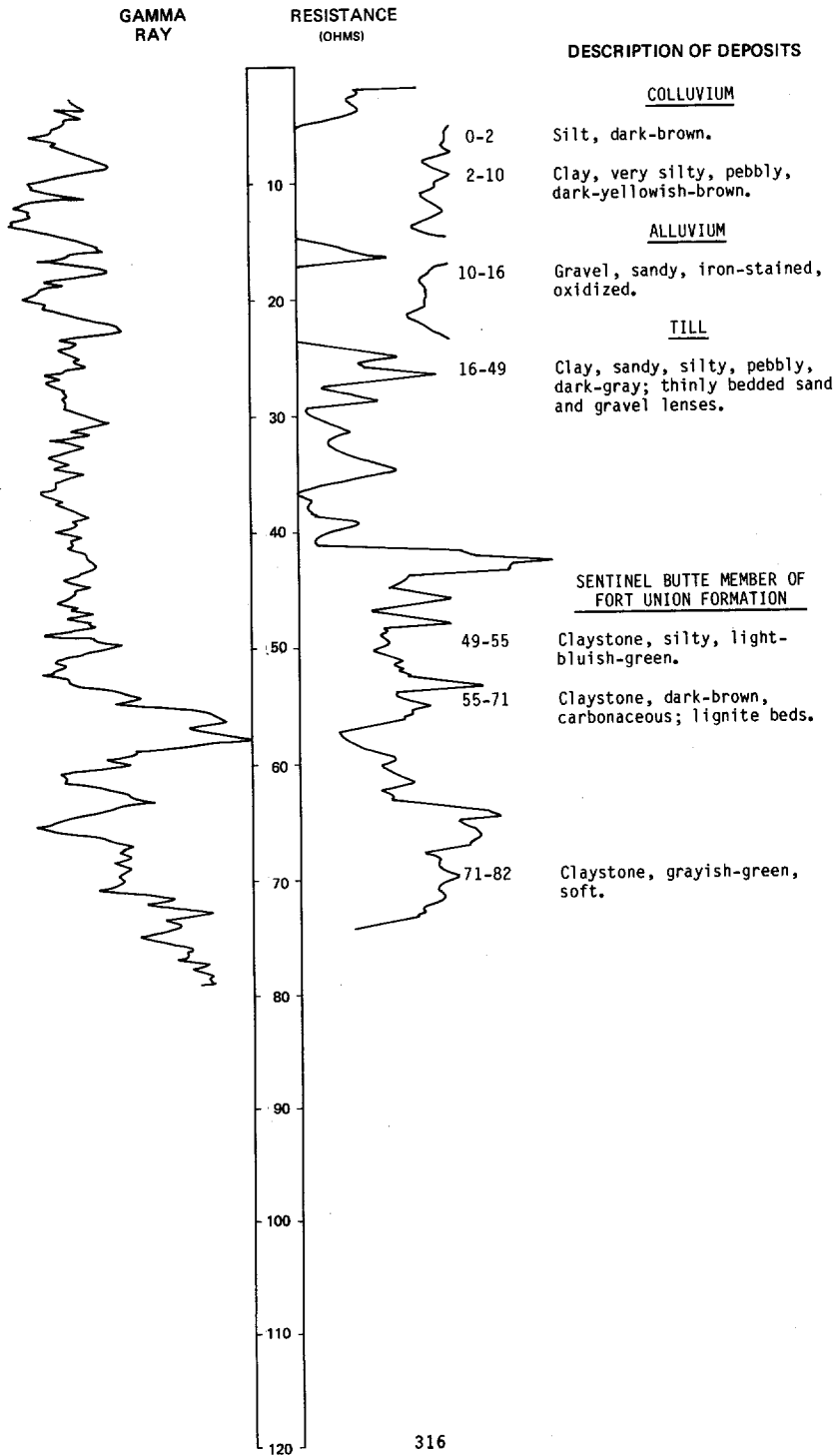
LOCATION: 151-101-04BAA

NDSWC 5619

DATE DRILLED: 10/10/79

ALTITUDE: 1945
(FT, NGVD)

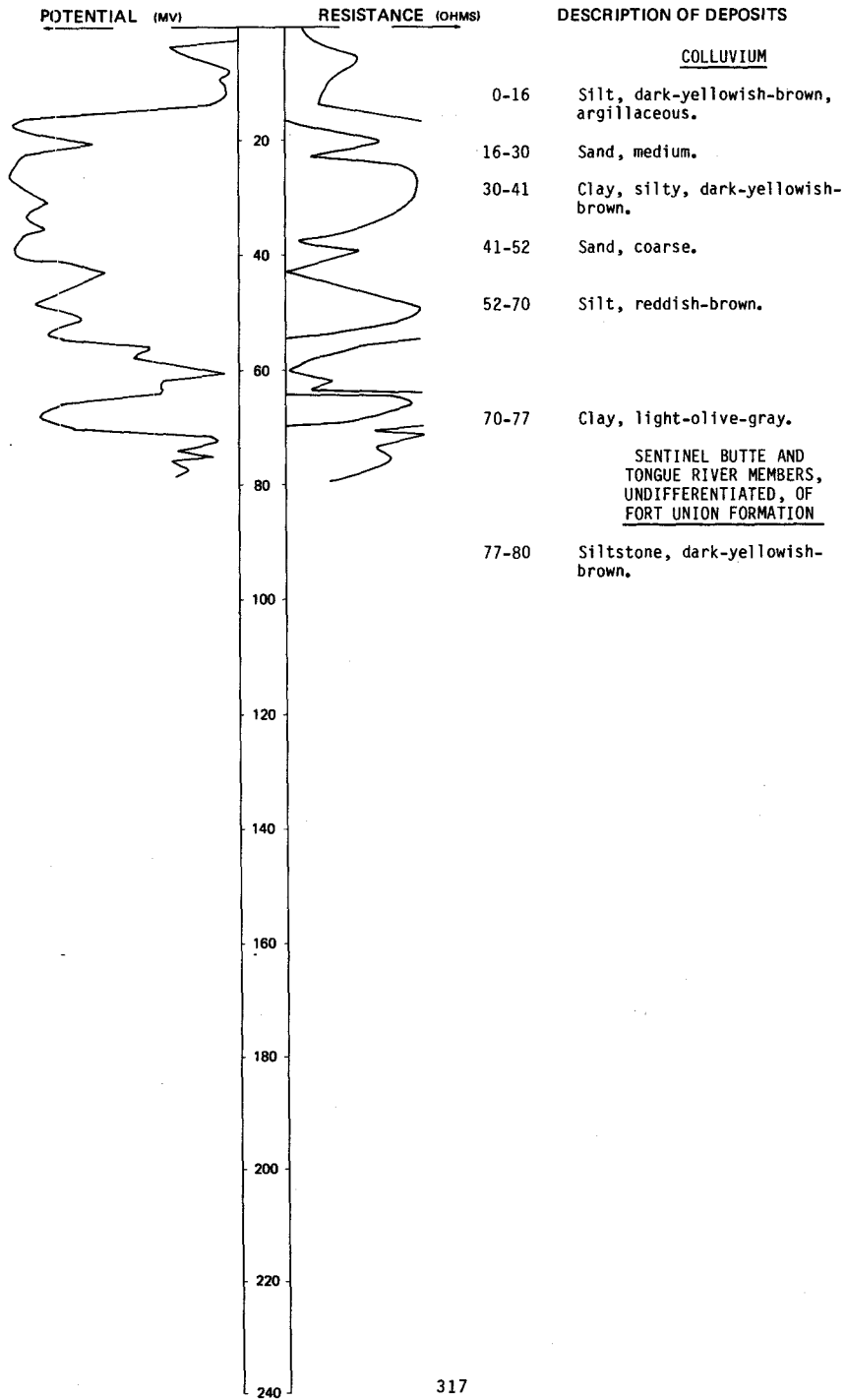
DEPTH: 82
(FT)



LOCATION: 151-101-06CCC
ALTITUDE: 2032
(FT, NGVD)

NDSWC 11573

DATE DRILLED: 5/12/81
DEPTH: 80
(FT)



151-101-06DAB
NDSWC 11859

Altitude: 1990 feet

Date drilled: 6/02/82

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Silt, sandy, yellowish-brown-----	10	10
	Sand and gravel-----	5	15
	Claystone, silty, gray-----	5	20

151-101-06DAC
NDSWC 11858

Altitude: 1990 feet

Date drilled: 6/02/82

	Asphalt-----	1	1
	Silt, clayey-----	9	10
	Clay-----	1	11
	Gravel-----	1	12
	Clay, silty, brown-----	3	15
	Clay, dark-greenish-gray; lignitic from 16 to 17 feet-----	5	20

151-101-06DAD
NDSWC 11857

Altitude: 1990 feet

Date drilled: 6/02/82

	Silt and clay-----	8	8
	Sand and gravel-----	1	9
	Clay, brown-----	3	12
	Claystone, greenish-gray; lignitic from 15 to 16 feet-----	8	20

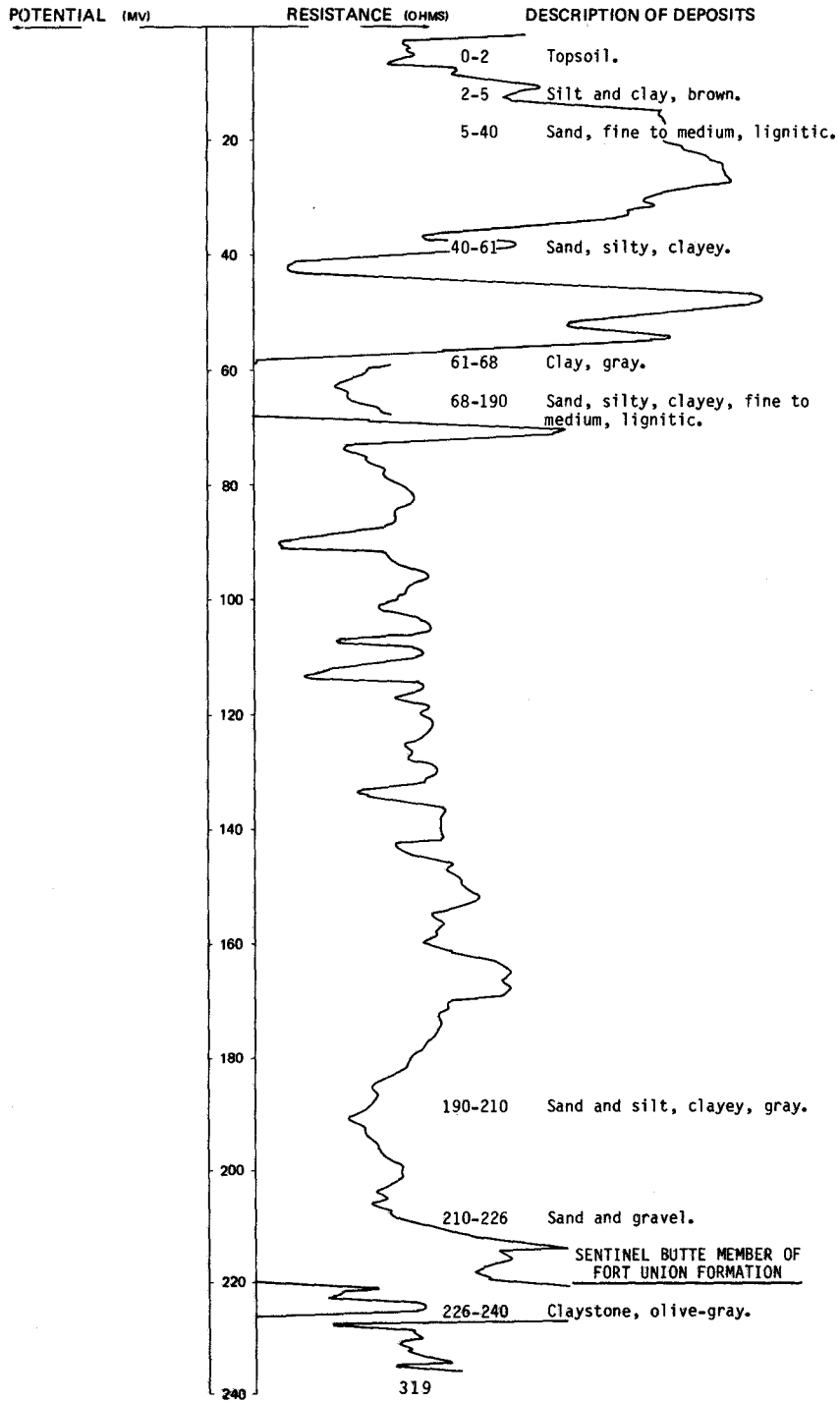
NDSWC 11856

LOCATION: 151-101-07BBC

DATE DRILLED: 6/01/82

ALTITUDE: 2025
(FT, NGVD)

DEPTH: 240
(FT)

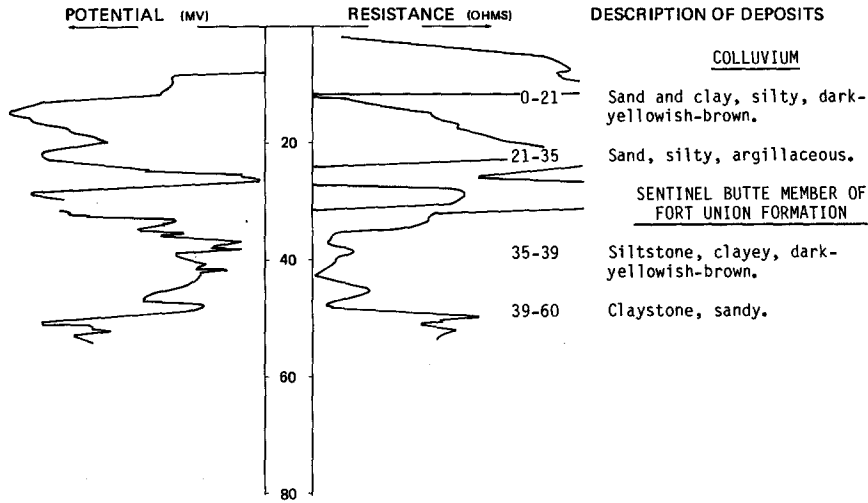


LOCATION: 151-101-07BCC
 ALTITUDE: 2020
 (FT, NGVD)

NDSWC 11574

DATE DRILLED: 5/12/81

DEPTH: 60
 (FT)



151-101-07CBC
 NDSWC 11855

Altitude: 2040 feet

Date drilled: 6/01/82

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	2	2
	Silt, sandy, yellowish-brown-----	5	7
	Claystone, yellowish-brown-----	13	20

LOCATION: 151-101-080AA

NDSWC 5617

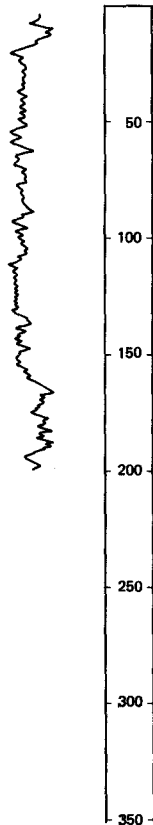
DATE DRILLED: 10/09/79

ALTITUDE: 1988
(FT, NGVD)

DEPTH: 202
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

0-16 Clay, silty, very sandy, dark-yellowish-brown; sand and gravel layers.

ALLUVIUM

16-21 Sand and gravel, poorly sorted; a few silty layers.

TILL

21-42 Clay, very sandy, pebbly, dark-brown to dark-yellowish-brown.

GLACIAL OUTWASH

42-122 Sand; lost circulation.

122-161 Sand and gravel, medium-gray, lignitic.

161-165 Clay, white, very soft, sticky.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

165-176 Sandstone, silty, medium-gray (peppered), cemented.

176-190 Claystone, grayish-green to light-grayish-blue.

190-202 Sandstone, silty, medium, greenish-gray.

151-101-080CC
NDSWC 11798

Altitude: 2035 feet

Date drilled: 10/22/81

GEOLOGIC
SOURCE

MATERIAL

THICKNESS
(FEET)

DEPTH
(FEET)

Clay, silty, dark-yellowish-brown-----

20

20

Sand, fine-----

20

40

LOCATION: 151-101-09BAA

NDSWC 5618

DATE DRILLED: 10/09/79

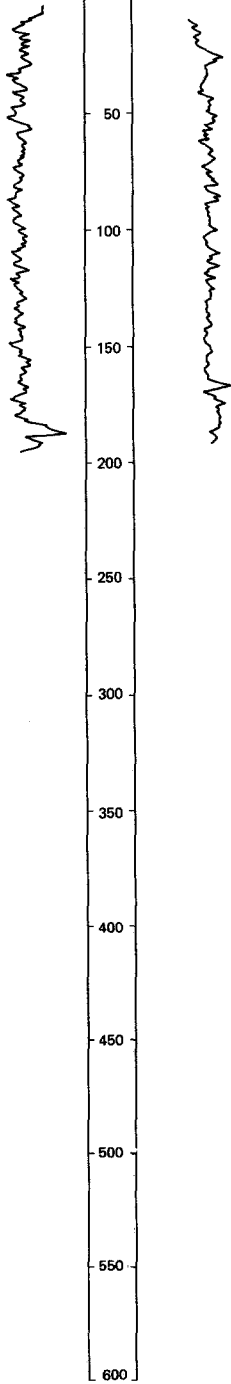
ALTITUDE: 1963
(FT, NGVD)

DEPTH: 202
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)

DESCRIPTION OF DEPOSITS



COLLUVIUM

- 0-2 Silt, dark-brown.
- 2-10 Clay, very sandy, silty, dark-yellowish-brown.

ALLUVIUM

- 10-22 Sand and gravel, fine to coarse.
- 22-54 Sand, fine to medium, yellowish-brown.

LAKE BEDS

- 54-59 Clay, very silty, very sandy, light-gray to medium-gray, lignitic, soft, plastic.

GLACIAL OUTWASH

- 59-148 Sand, medium; interbedded with gravel and clayey silt layers.
- 148-181 Gravel, fine to very coarse, well-sorted, very well rounded; thin beds of sand and silt.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

- 181-202 Siltstone, sandy, light-blue to greenish-blue; greenish-gray and medium-gray shale.

151-101-10CCC
(Log modified from Ralph Wold Well Drilling)

Altitude: 1983 feet Date drilled: 1/09/75

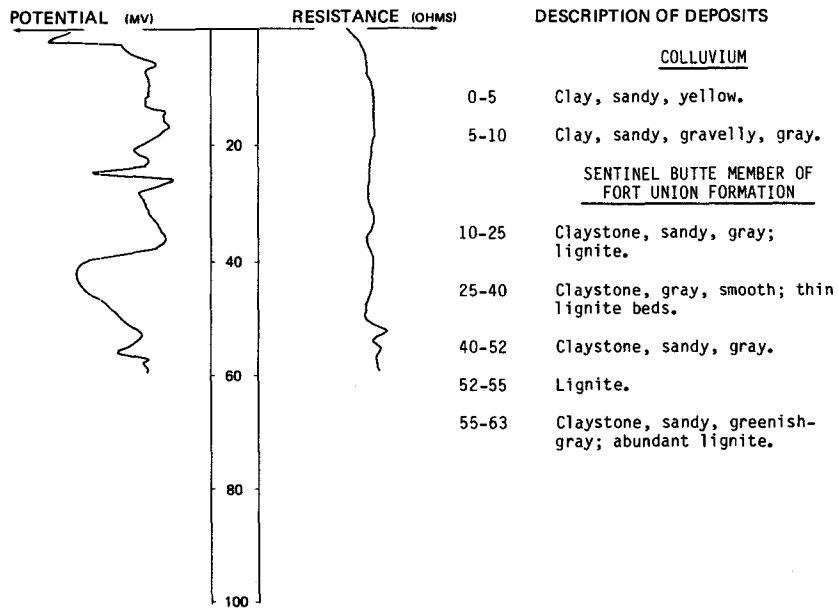
GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	10	10
	Gravel and till-----	3	13
	Coal-----	5	18
	Clay-----	24	42
	Coal-----	3	45
	Clay-----	9	54
	Coal-----	1	55
	Clay-----	15	70
	Coal-----	5	75
	Clay-----	9	84
	Sand-----	4	88
	Clay-----	4	92

151-101-16ABB
(Log modified from Thompson Drilling Co.)

Altitude: 2025 feet Date drilled: 6/29/77

	Topsoil-----	1	1
	Sand-----	18	19
	Coal; water-----	4	23
	Clay-----	7	30

LOCATION: 151-101-27CAD NDSWC 1846 DATE DRILLED: 10/19/60
 ALTITUDE: 2100 DEPTH: 63
 (FT, NGVD) (FT)



151-101-29888
NDSWC 1847

Altitude: 2247 feet

Date drilled: 10/19/60

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, black-----	2	2
	Clay, sandy, yellow-----	9	11
	Clay, gray, smooth-----	16	27
	Coal-----	2	29
	Clay, grayish-yellow, smooth; mixed coal layers-----	13	42

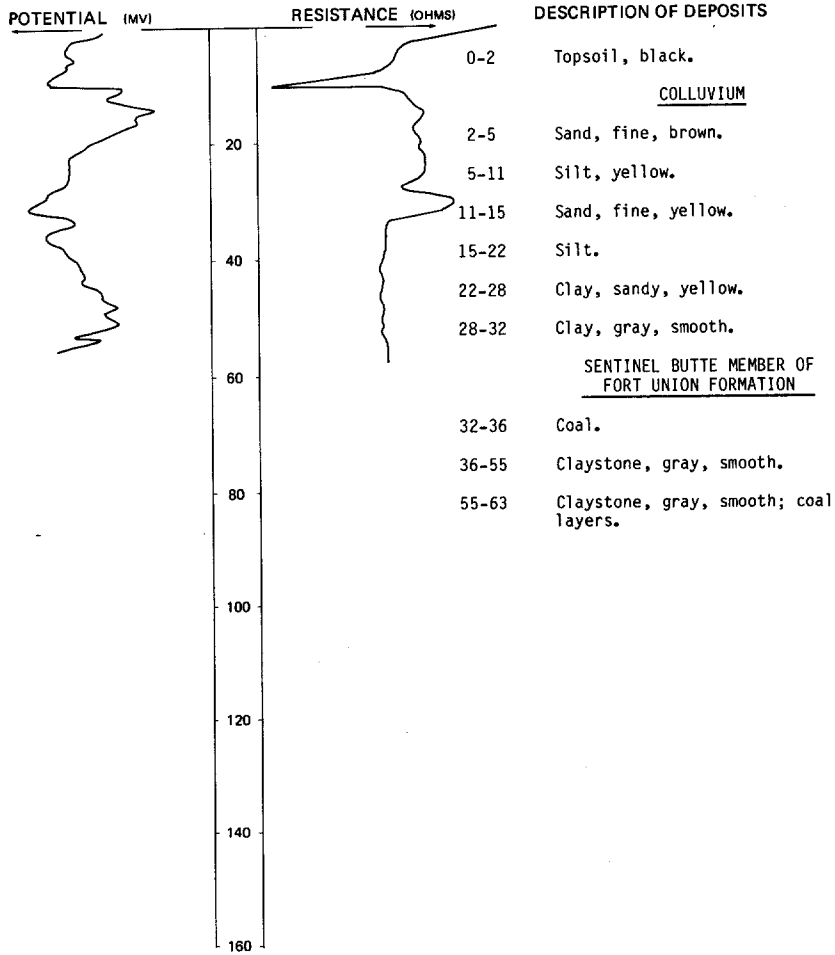
NDSWC 1836

LOCATION: 151-101-31000

DATE DRILLED: 10/13/60

ALTITUDE: 2220
(FT, NGVD)

DEPTH: 63
(FT)



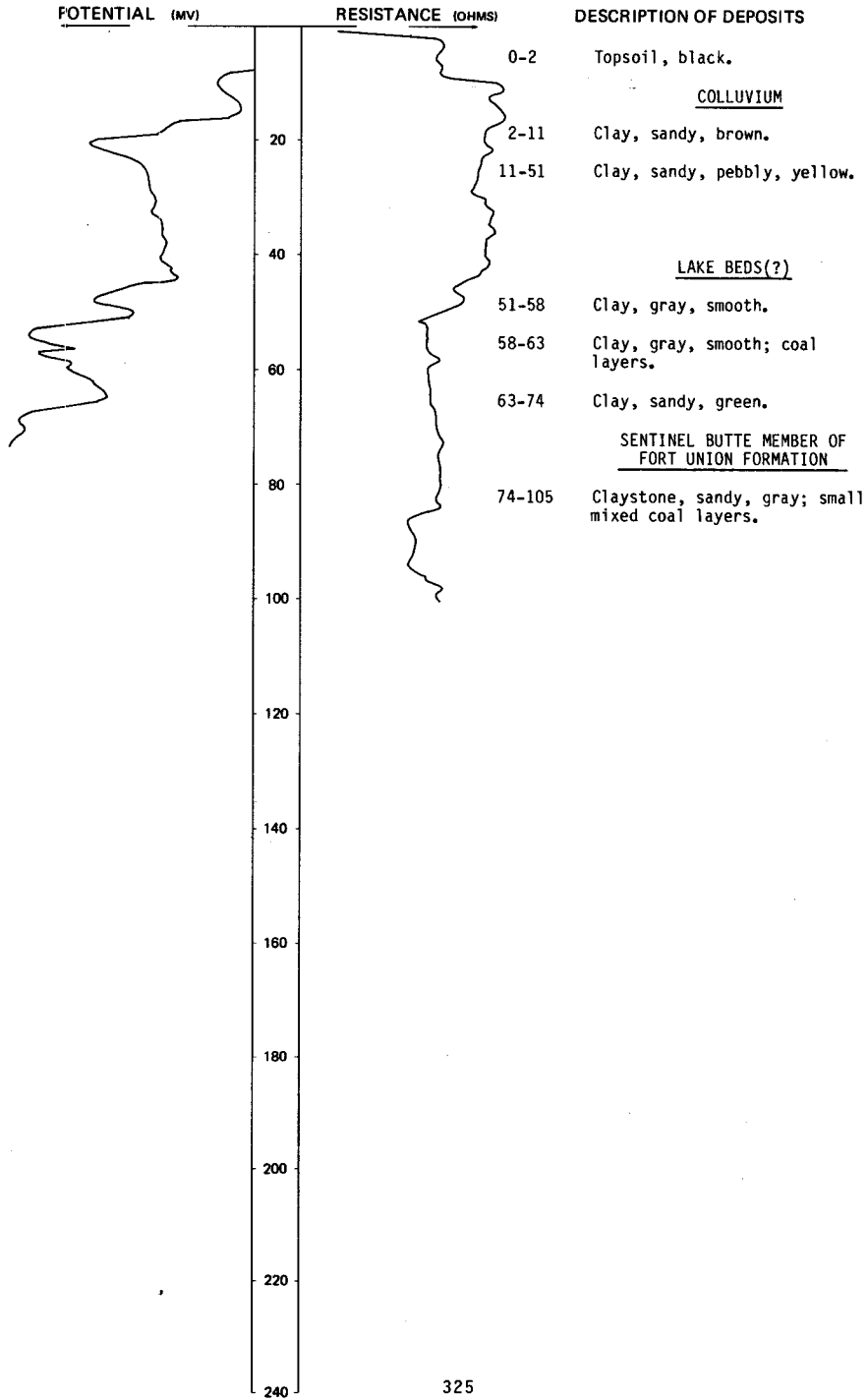
NDSWC 1845

LOCATION: 151-101-33CBB

DATE DRILLED: 10/19/60

ALTITUDE: 2200
(FT, NGVD)

DEPTH: 105
(FT)



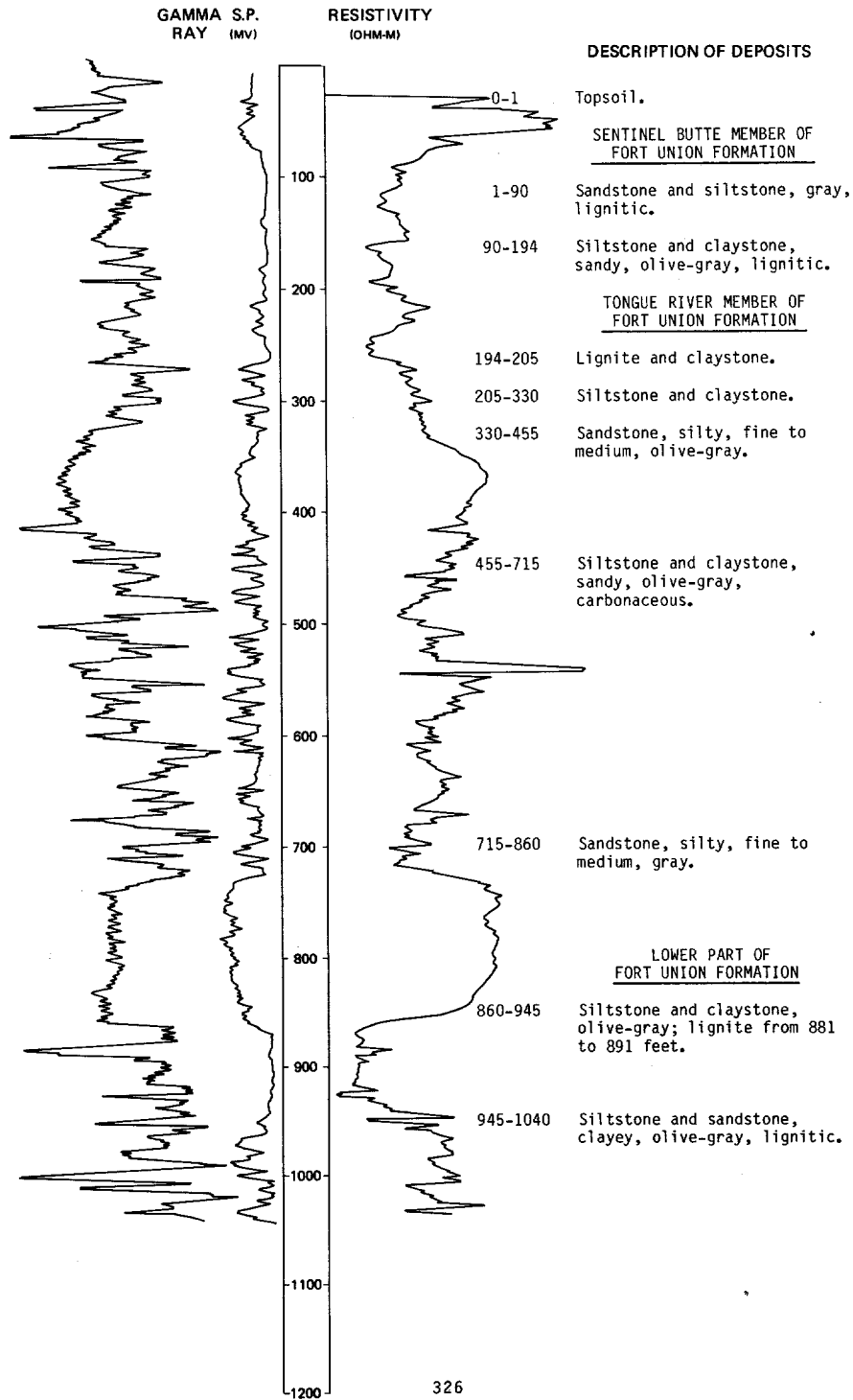
LOCATION: 151-101-36CCC

NDSWC 6055

DATE DRILLED: 6/03/82

ALTITUDE: 2225
(FT, NGVD)

DEPTH: 1040
(FT)

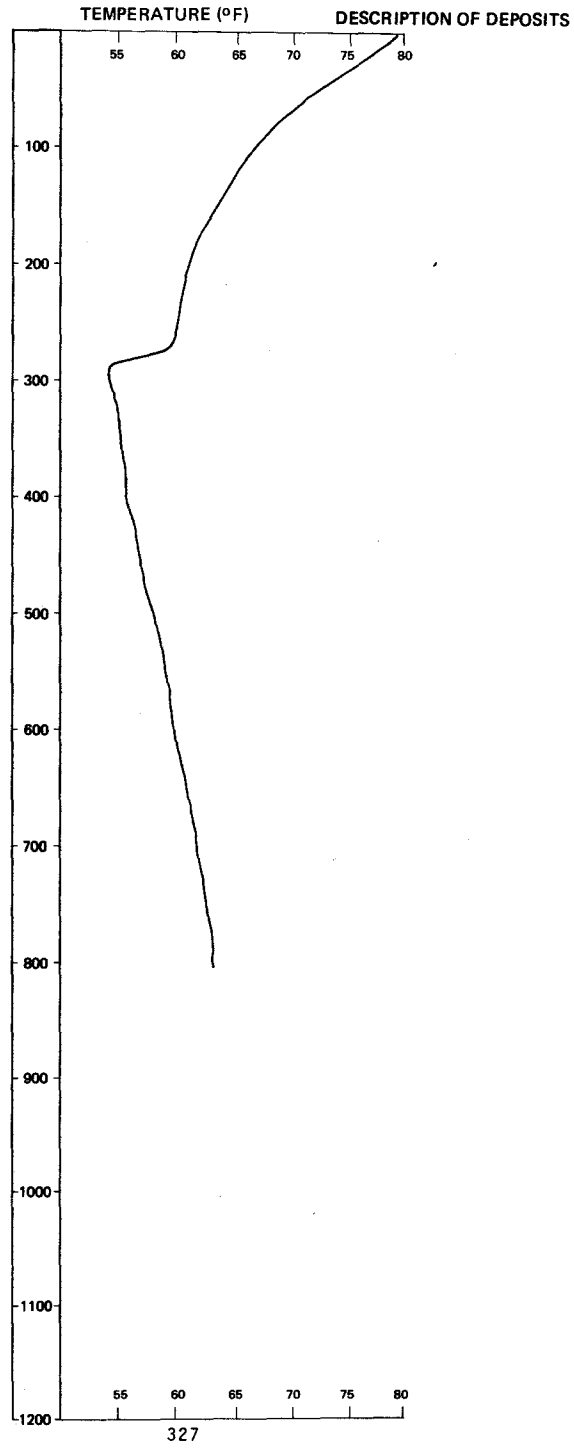


LOCATION: 151-101-36CCC

DATE DRILLED: 6/03/82

ALTITUDE: 2225
(FT, NGVD)

DEPTH: 1040
(FT)



151-102-100DB
(Log modified from Thompson Drilling Co.)

Altitude: 2090 feet Date drilled: 12/01/65

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	35	35
	Quicksand-----	30	65
	Clay-----	44	109
	Coal; some water-----	2	111
	Clay-----	9	120
	Sand; some water-----	5	125

151-102-12CCB
NDSWC 11797

Altitude: 2045 feet Date drilled: 10/22/81

	Sand and gravel-----	8	8
	Clay, silty, yellowish-brown-----	13	21
	Sand, medium, well-sorted-----	7	28
	No recovery-----	23	51
	Sand, lignitic-----	9	60
	Clay, sandy, yellowish-brown, lignitic-----	59	119
	Sand, medium, yellowish-brown, well-sorted-----	22	141
	Sand, medium, gray-----	48	189
	Sand, lignitic-----	34	223
	Sand and gravel-----	22	245
	Clay, light-gray-----	2	247
	Clay, dark-greenish-gray; bedrock-----	13	260

151-102-12CCC
NDSWC 11795

Altitude: 2045 feet Date drilled: 10/22/81

	Clay, silty, sandy, dark-yellowish-brown-----	21	21
	Sand and gravel-----	5	26
	No recovery-----	5	31
	Sand and gravel(?)-----	7	38
	No recovery-----	12	50
	Lost circulation-----	10	60

151-102-13AAA
NDSWC 11752

Altitude: 2065 feet Date drilled: 9/24/81

	Sand and gravel, yellowish-brown-----	5	5
	Claystone, dark-reddish-brown-----	20	25
	Sandstone, fine-----	5	30
	Claystone-----	30	60

151-102-13CBB
NDSWC 11796

Altitude: 2070 feet Date drilled: 10/22/81

	Silt and clay, yellowish-brown-----	7	7
	Clay, olive-gray; bedrock-----	33	40

151-102-13DAA
NDSWC 11753

Altitude: 2110 feet

Date drilled: 9/24/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Sand and gravel-----	1	3
	Sand, fine to medium-----	14	17
	Claystone, olive-gray-----	23	40

NDSWC 5620

LOCATION: 151-102-14CBC

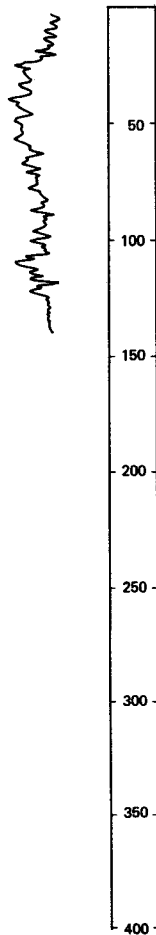
DATE DRILLED: 10/10/79

ALTITUDE: 2058
(FT, NGVD)

DEPTH: 142
(FT)

GAMMA RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

0-2	Topsoil, dark-brown.
	<u>COLLUVIUM</u>
2-23	Clay, very silty, sandy, pebbly, dark-brown.
	<u>TILL(?)</u>
23-61	Silt and clay, very sandy, dark-brown; thin gravel beds.
61-70	Silt and sand, dark-yellowish-brown, laminated.
	<u>LAKE BEDS</u>
70-80	Clay, very silty, sandy, dark-gray; oxidized sand laminae.
80-105	Clay, greenish-gray, soft.
	<u>SENTINEL BUTTE MEMBER OF FORT UNION FORMATION</u>
105-124	Siltstone, medium-gray, slightly crumbly.
124-142	Claystone, bluish-gray, lignitic.

LOCATION: 151-102-14CCC

NDSWC 5637

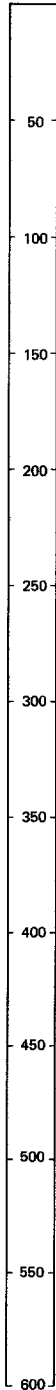
DATE DRILLED: 10/16/79

ALTITUDE: 2074
(FT, NGVD)

DEPTH: 302
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

- 0-1 Topsoil, sandy, gravelly, dark-brown.
- 1-9 Sand, clayey, gravelly, dark-yellowish-brown.
- 9-32 Clay, silty to sandy, yellowish-brown.

LAKE BEDS(?)

- 32-220 Clay, medium-bluish-gray to greenish-gray, waxy; thin sand and gravel lenses.

GLACIAL OUTWASH

- 220-274 Sand and gravel, fine to coarse; a few cobbles.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

- 274-278 Claystone, dark-gray, tight, waxy.
- 278-286 Claystone, silty, medium-bluish-gray.
- 286-302 Sandstone, silty, medium-grayish-blue, slightly micaceous.

LOCATION: 151-102-15AAA

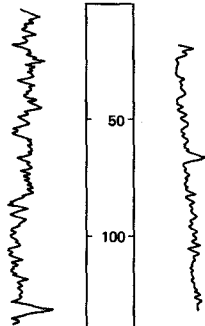
DATE DRILLED: 10/16/79

ALTITUDE: 2085
(FT, NGVD)

DEPTH: 142
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

0-1 Topsoil, sandy, gravelly,
dark-brown.

COLLUVIUM

1-20 Clay, silty, sandy, pebbly,
dark-yellowish-brown; thin
gravel lenses.

20-84 Clay, dark-brown to
dark-yellowish-brown; sandy
silty carbonaceous lignite
layers.

LAKE BEDS

84-117 Siltstone and claystone,
bluish-gray, waxy.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

117-129 Siltstone, medium-bluish-gray;
cemented sandstone layers.

129-134 Claystone, dark-gray, tight.

134-142 Siltstone, medium-bluish-gray;
cemented sandstone layers.

151-102-15ADC
(Log modified from Water Supply Inc.)

Altitude: 2065 feet Date drilled: 10/21/76

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil, sandy, black-----	1	1
	Clay, silty, yellowish-brown-----	3	4
	Sand, fine to medium-----	2	6
	Clay, silty, and yellowish-brown till-----	32	38
	Clay, silty, yellowish-brown-----	23	61
	Clay, silty, dark-gray-----	36	97
	Clay, silty, bluish-gray to greenish-gray-----	3	100

151-102-21BCC1
NDSWC 11379

Altitude: 2050 feet Date drilled: 9/22/80

	Topsoil-----	1	1
	Silt, clayey, dark-yellowish-brown-----	6	7
	Sand, fine, subrounded-----	37	44
	Lignite; interbedded with sand and olive-gray clay-----	22	66
	Sand and clay, brown-----	54	120

151-102-21BCC2
NDSWC 11380

Altitude: 2052 feet Date drilled: 9/22/80

	Topsoil-----	2	2
	Sand and gravel, coarse to pebbly, subangular-----	6	8
	Sand, medium, subrounded-----	42	50

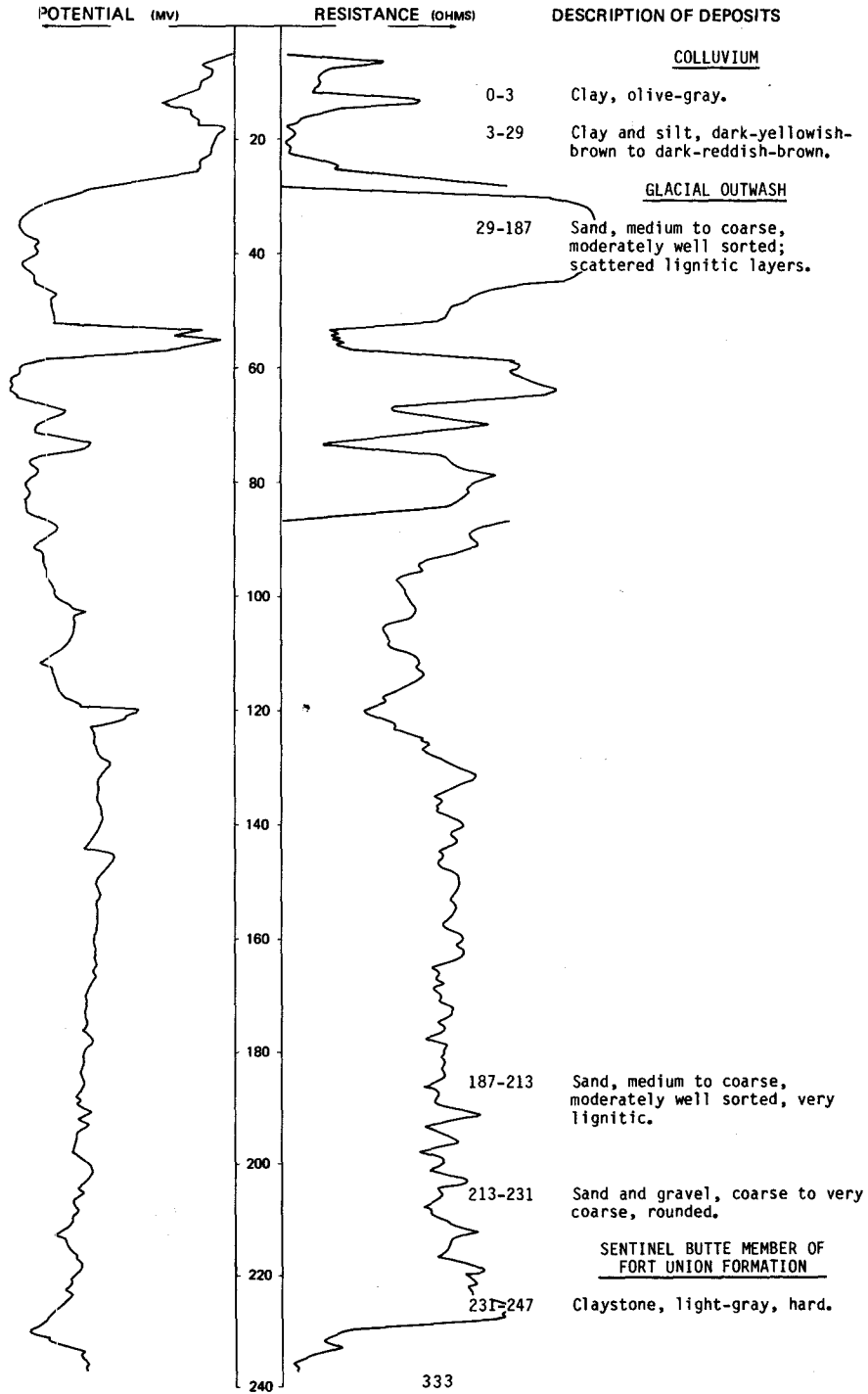
NDSWC 11378

LOCATION: 151-102-21CBC

DATE DRILLED: 9/19/80

ALTITUDE: 2040
(FT, NGVD)

DEPTH: 247
(FT)

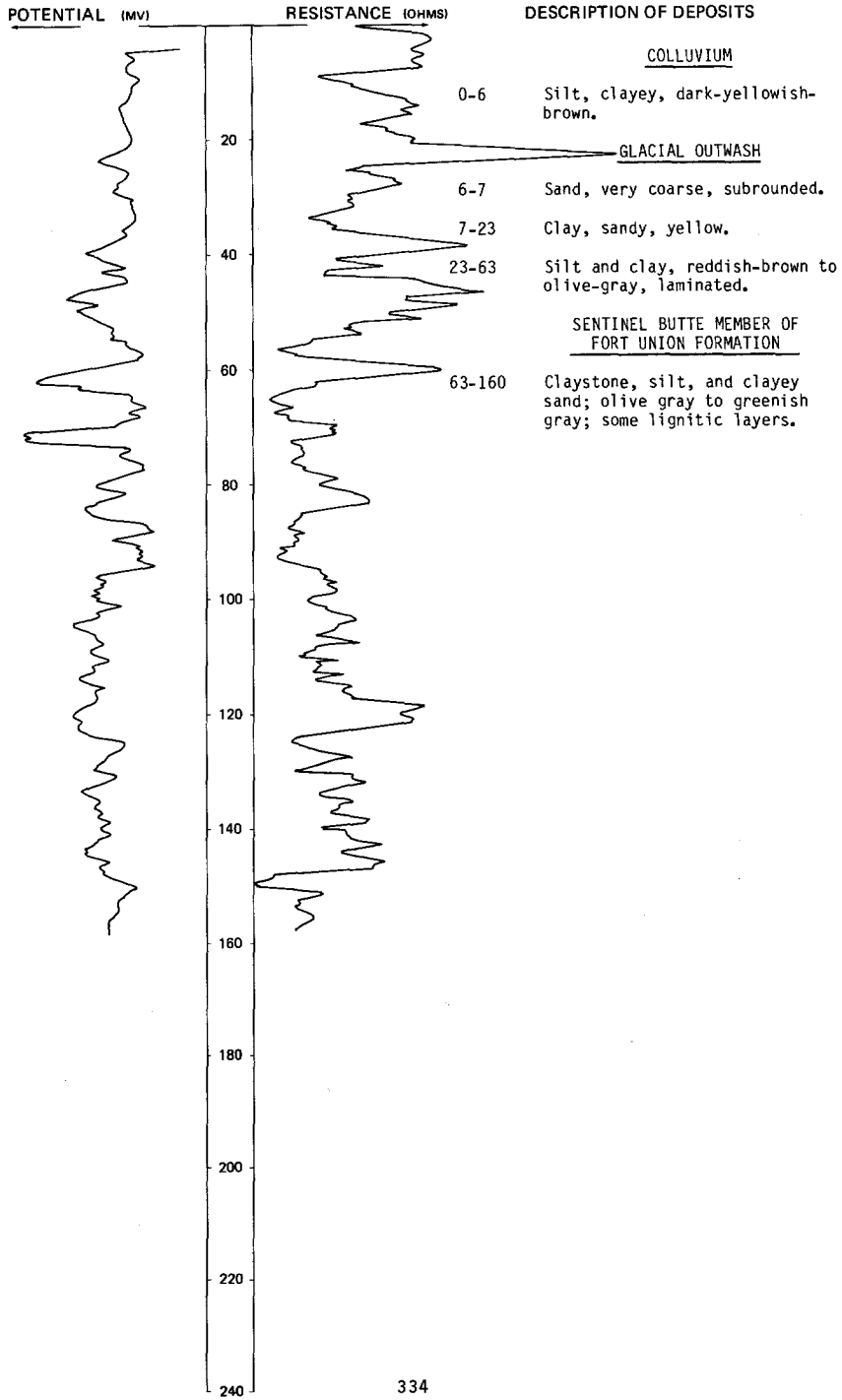


LOCATION: 151-102-21CCC

DATE DRILLED: 9/18/80

ALTITUDE: 2065
(FT, NGVD)

DEPTH: 160
(FT)

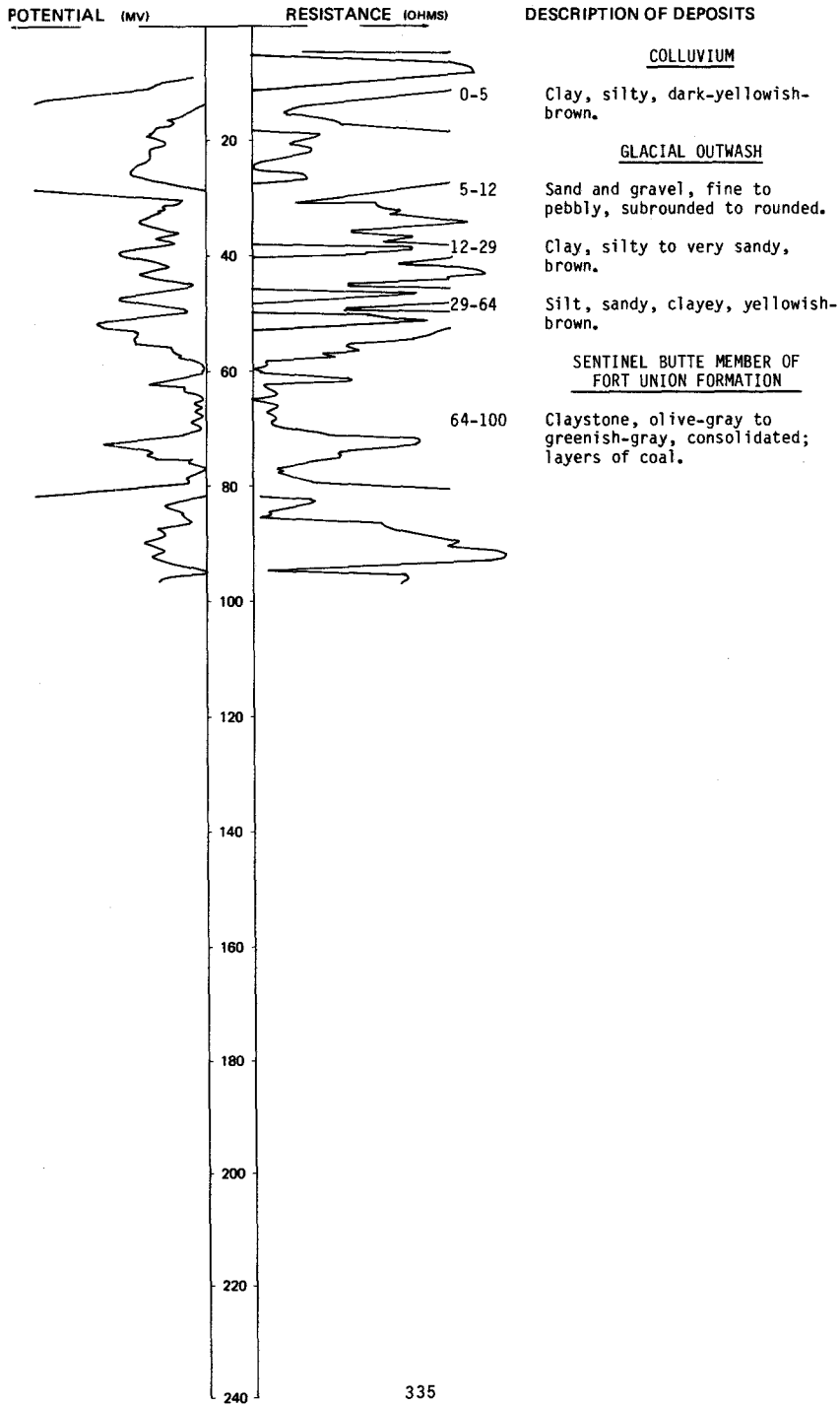


LOCATION: 151-102-22AAA
ALTITUDE: 2095
(FT, NGVD)

NDSWC 11376

DATE DRILLED: 9/18/80

DEPTH: 100
(FT)



151-102-22DDD
(Log modified from Ralph Wold Well Drilling)

Altitude: 2125 feet Date drilled: 2/28/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Sand-----	10	12
	Sand, coarse-----	23	35
	Gravel and sand-----	10	45
	Clay-----	19	64
	Coal and water-----	6	70
	Clay-----	2	72

151-102-24DDD
(Log modified from Thompson Drilling Co.)

Altitude: 2230 feet Date drilled: 3/15/75

	Topsoil-----	3	3
	Clay-----	21	24
	Coal, hard; 2-1/2 gallons per minute-----	5	29
	Clay-----	27	56
	Clay, blue-----	14	70
	Sand, brown-----	10	80
	Coal-----	1	81
	Clay-----	33	114
	Sand-----	4	118
	Clay-----	37	155
	Rocks-----	1	156
	Clay-----	9	165
	Sand; 25 gallons per minute-----	5	170

151-102-26ADD1
(Log modified from Thompson Drilling Co.)

Altitude: 2160 feet Date drilled: 4/16/74

	Soil-----	3	3
	Clay-----	7	10
	Sand, hard-----	16	26
	Sand, soft-----	6	32
	Clay-----	16	48
	Hard shell-----	4	52
	Clay, brown-----	8	60
	Hard shell-----	3	63
	Sand-----	34	97
	Coal; water-----	2	99
	Sand-----	16	115
	Clay-----	50	165
	Sand-----	10	175
	Clay-----	17	192
	Hard shell-----	3	195

151-102-26ADD2
(Log modified from Thompson Drilling Co.)

Altitude: 2160 feet Date drilled: 7/30/74

	Topsoil-----	2	2
	Clay-----	18	20
	Coal-----	2	22
	Clay-----	38	60

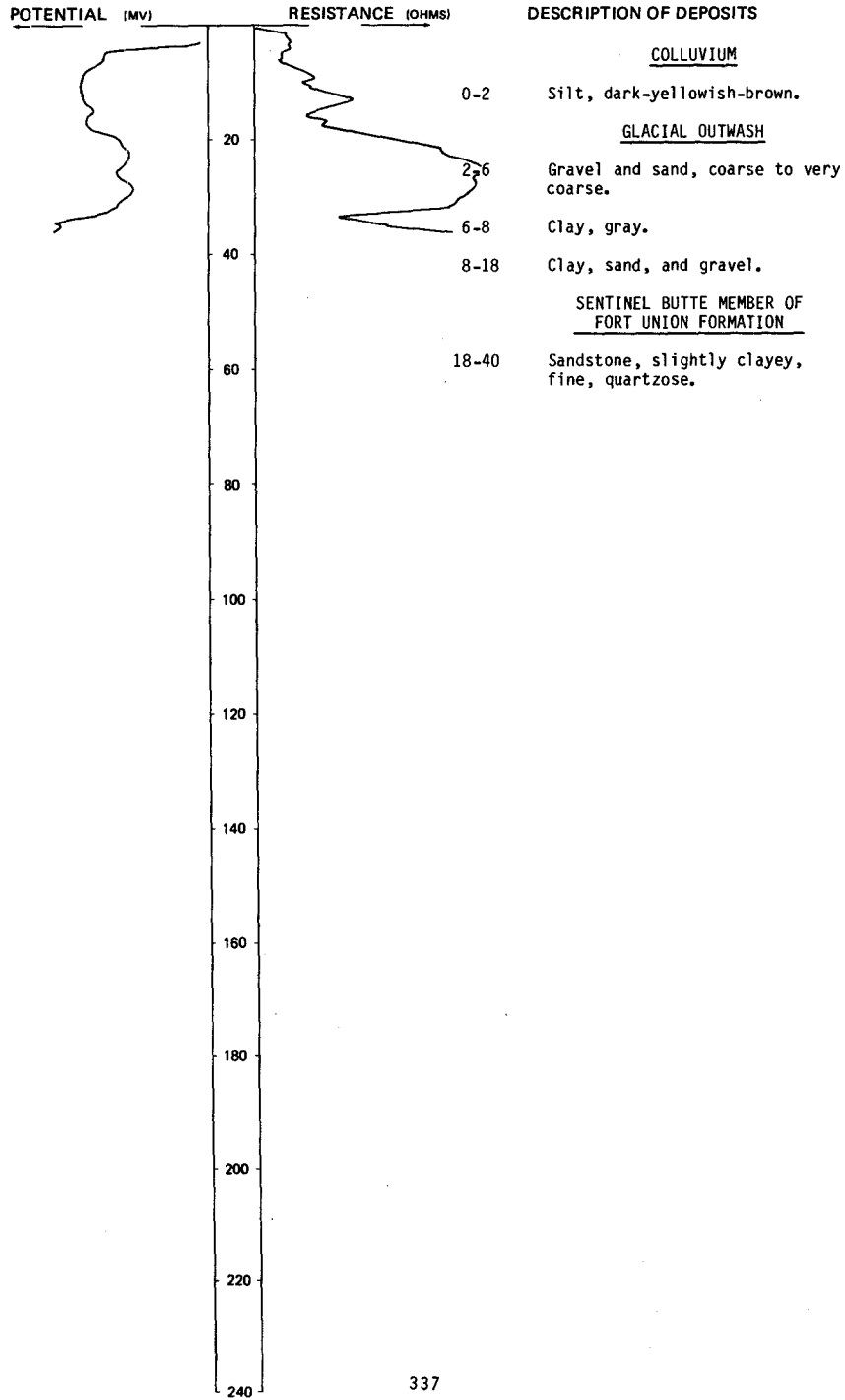
LOCATION: 151-102-32BCB

NDSWC 11381

DATE DRILLED: 9/23/80

ALTITUDE: 2024
(FT, NGVD)

DEPTH: 40
(FT)



151-102-35DAD
(Log modified from Thompson Drilling Co.)

Altitude: 2180 feet Date drilled: 7/12/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
Topsoil	-----	2	2
Clay	-----	15	17
Gravel	-----	1	18
Clay, blue	-----	27	45
Clay, light	-----	26	71
Coal; 1 gallon per minute	-----	1	72
Clay	-----	25	97
Coal	-----	3	100
Clay	-----	35	135
Clay, gritty	-----	5	140
Sand	-----	6	146
Hard shell(?)	-----	1	147
Clay	-----	5	152

151-103-08DCA
(Log modified from Thompson Drilling Co.)

Altitude: 2175 feet Date drilled: 10/30/74

Soil, sandy	-----	5	5
Sand	-----	10	15
Gravel, sandy	-----	13	28
Clay	-----	24	52
Coal, soft	-----	4	56
Clay, white	-----	69	125
Sand	-----	3	128
Coal; water	-----	2	130

151-103-23CBD
(Log modified from Francis Boyce Water Well)

Altitude: 1990 feet Date drilled: 8/03/67

Topsoil	-----	3	3
Clay, yellow	-----	20	23
Gravel	-----	2	25
Clay	-----	3	28
Sand and gravel	-----	7	35
Clay	-----	5	40
Sand, fine	-----	3	43
Clay, gray	-----	42	85
Sand, coarse, and clay	-----	13	98
Clay	-----	7	105
Sand, fine; coal slack; and clay	-----	43	148
Gravel, fine, and coarse sand; water	-----	17	165

151-103-26ACB
NDSWC 1284

Altitude: 1980 feet Date drilled: 4/15/58

Clay, yellow, smooth	-----	5	5
Gravel, fine to coarse	-----	7	12
Clay, sandy, blue; bedrock	-----	9	21

151-103-27AAA1
NDSWC 1285

Altitude: 1983 feet Date drilled: 4/15/58

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy, yellow-----	11	11
	Clay, yellow, smooth-----	12	23
	Gravel, medium to coarse; a little clay-----	9	32
	Gravel, fine to medium-----	4	36
	Clay, gray, smooth-----	6	42

151-103-27ACA1
(Log modified from Water Supply Inc.)

Altitude: 1955 feet Date drilled: 9/17/76

	Topsoil, silty, black-----	1	1
	Clay, silty, yellowish-brown-----	23	24
	Sand, medium-fine to coarse-----	17	41
	Clay, silty, and yellowish-brown till-----	12	53
	Sand, fine to medium, and coal-----	10	63
	Clay, silty, bluish-gray-----	11	74
	Sand, medium-fine to coarse, and coal-----	14	88
	Clay, silty, olive-gray-----	6	94
	Sand, medium-fine to coarse, and coal-----	21	115
	Clay, sandy, olive-gray; lots of coal-----	1	116
	Gravel, fine to coarse; some sand and rocks-----	33	149
	Clay, silty, light-medium-gray; bedrock-----	1	150

151-103-27ACA2
(Log modified from Water Supply Inc.)

Altitude: 1955 feet Date drilled: 10/25/76

	Topsoil, silty, black-----	1	1
	Clay, silty, yellowish-brown-----	19	20
	Sand, fine to coarse-----	12	32
	Clay, silty, and yellowish-brown till-----	2	34
	Gravel, sandy, fine to coarse-----	7	41
	Clay, silty, and yellowish-brown till-----	3	44
	Sand, fine to medium; a little coal-----	51	95
	Sand, clayey, fine to coarse; lots of coal-----	18	113
	Gravel, sandy, fine to coarse; a few cobbles-----	35	148
	Clay, silty, light-medium-gray; bedrock-----	2	150

151-103-28DDD
NDSWC 5621

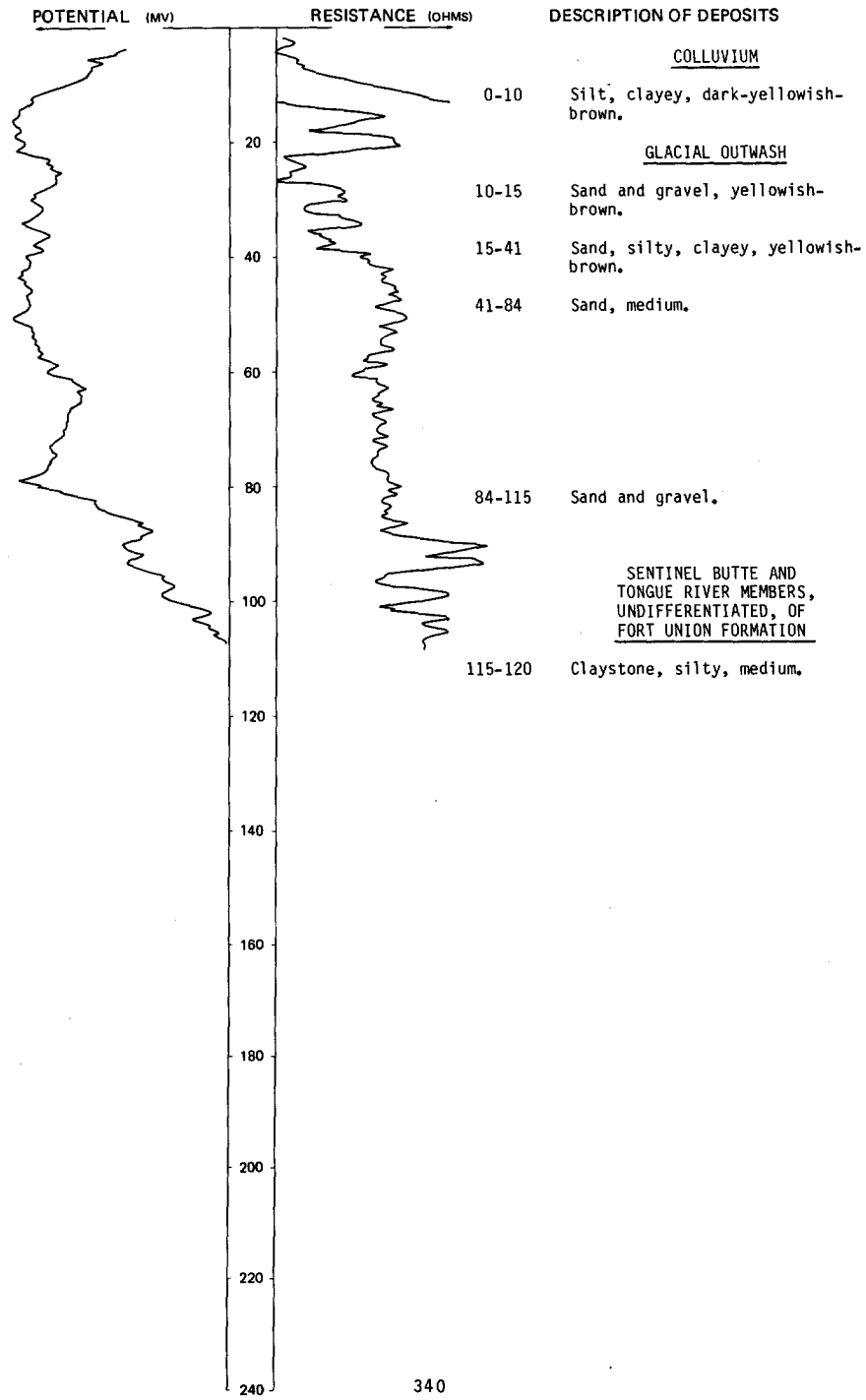
Altitude: 1965 feet Date drilled: 10/10/79

	Topsoil, dark-brown-----	1	1
	Clay, sandy, silty, dark-yellowish-brown, calcareous-----	29	30
	Gravel and sand; numerous clay layers-----	19	49
	Silt, sandy, brownish-gray, and slightly silty slightly sandy olive-gray clay-----	66	115
	Gravel, coarse to very coarse; mixed composition-----	27	142

LOCATION: 151-103-338BA
ALTITUDE: 1930
(FT, NGVD)

NDSWC 11575

DATE DRILLED: 5/13/81
DEPTH: 120
(FT)



151-104-02ABA1
(Log modified from Mann Drilling Co.)

Altitude: 1876 feet Date drilled: 10/25/66

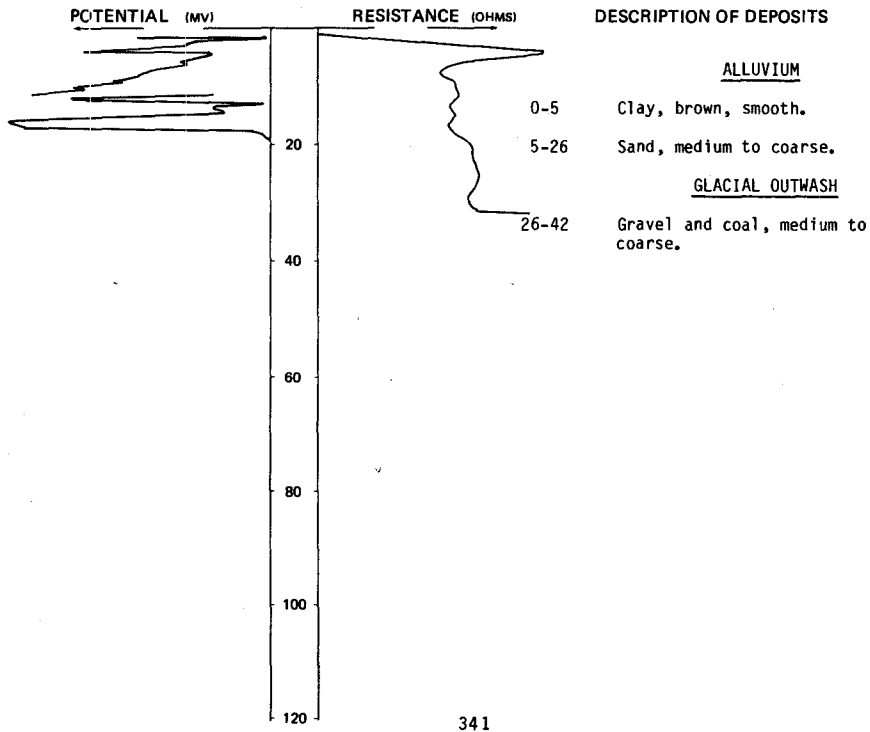
GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, silty, and sand-----	86	86
	Gravel-----	7	93
	Sand-----	4	97
	Gravel-----	32	129
	Sandstone-----	1	130

151-104-02ABA2
(Log modified from Mann Drilling Co.)

Altitude: 1875 feet Date drilled: 10/26/66

Clay, sandy-----	18	18
Sand-----	24	42
Gravel-----	3	45
Sand-----	24	69
Gravel-----	4	73
Sand-----	28	101
Gravel-----	17	118
Bedrock; Fort Union Formation-----	2	120

LOCATION: 151-104-02ABB NDSWC 1275 DATE DRILLED: 1/08/58
 ALTITUDE: 1876 DEPTH: 42
 (FT, NGVD) (FT)



151-104-02BDC
NDSWC 1274

Altitude: 1882 feet

Date drilled: 1/03/58

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, brown, smooth-----	7	7
	Sand, fine to medium, and a little coal-----	7	14
	Sand, medium to coarse-----	14	28
	Gravel, coarse-----	18	46
	Clay, light-gray; Fort Union Formation-----	7	53

151-104-02CAA
NDSWC 1276

Altitude: 1876 feet

Date drilled: 1/09/58

	Clay, brown, smooth-----	11	11
	Sand, fine, dirty-----	6	17
	Sand, coarse, and coal-----	7	24
	Clay, light-gray, smooth-----	7	31
	Gravel, coarse-----	22	53

151-104-02CCA1
NDSWC 1976

Altitude: 1885 feet

Date drilled: 1/09/58

	Clay, brown, smooth-----	11	11
	Sand, fine, dirty-----	6	17
	Sand, coarse, and coal-----	7	24
	Clay, light-gray, smooth-----	7	31
	Gravel, coarse-----	22	53

151-104-02CCA2
NDSWC 1277

Altitude: 1875 feet

Date drilled: 1/14/58

	Clay, brown, smooth-----	6	6
	Sand, fine to medium-----	13	19
	Clay, gray, smooth-----	5	24
	Gravel, fine to medium, and coal-----	6	30
	Gravel, coarse, and cobblestones-----	23	53

151-104-04AAA
(Log modified from Boyce Drilling, Inc.)

Altitude: 1879 feet

Date drilled: 12/26/73

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	13	13
	Sand, brown; scoria chips-----	82	95
	Clay, gray-----	69	164
	Coal-----	11	175
	Clay; interbedded coal-----	305	480
	Rock-----	11	491
	Clay, crumbly-----	229	720
	Clay, sandy, gray-----	150	870
	Rock-----	3	873
	Clay, sandy, gray-----	145	1018
	Rock-----	1	1019
	Clay, sandy; interbedded with coal-----	71	1090
	Clay-----	135	1225
	Clay, soft-----	67	1292
	Clay-----	22	1314
	Rock, soft-----	1	1315
	Sand-----	63	1378
	Rock-----	4	1382
	Sand-----	5	1387
	Rock-----	2	1389
	Sand-----	15	1404
	Clay, gray-----	1	1405

151-104-12BBC
NDSWC 1631

Altitude: 1888 feet

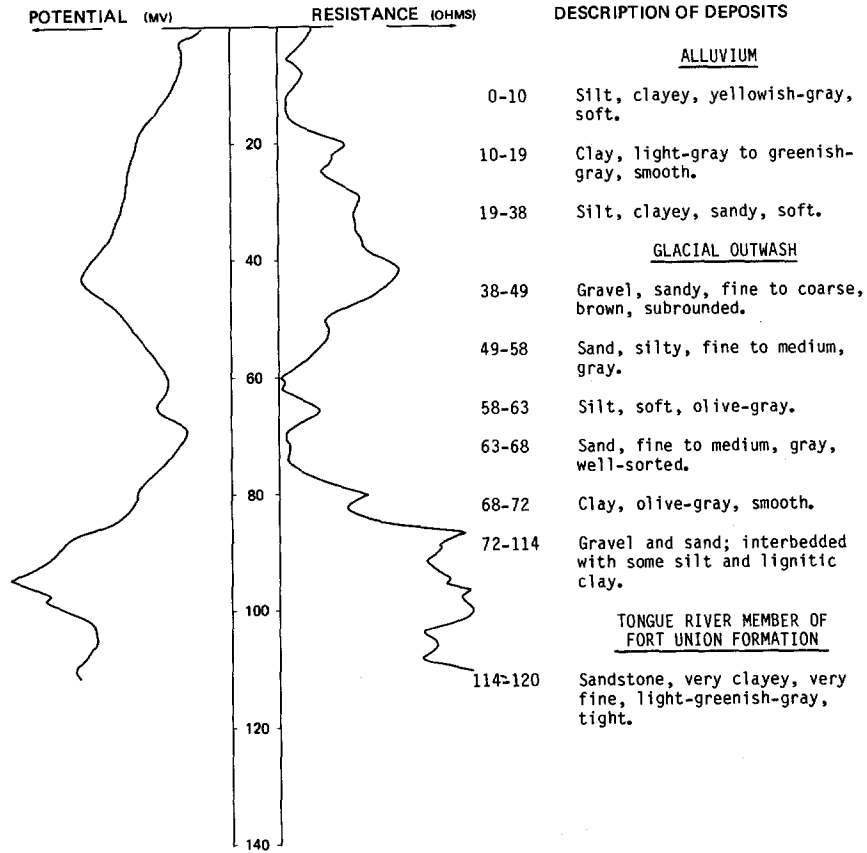
Date drilled: 10/23/59

	Clay, silty, brown-----	11	11
	Sand, fine-----	10	21
	Sand, fine to medium; a little coal-----	26	47
	Gravel, coarse-----	5	52
	Sand, fine to coarse-----	23	75
	Gravel, fine to coarse-----	20	95

LOCATION: 151-104-12CBD
 ALTITUDE: 1875
 (FT. NGVD)

NDSWC 2

DATE DRILLED: 10/23/66
 DEPTH: 120
 (FT)



151-104-12CCC1
 NDSWC 1628

Altitude: 1877 feet

Date drilled: 10/20/59

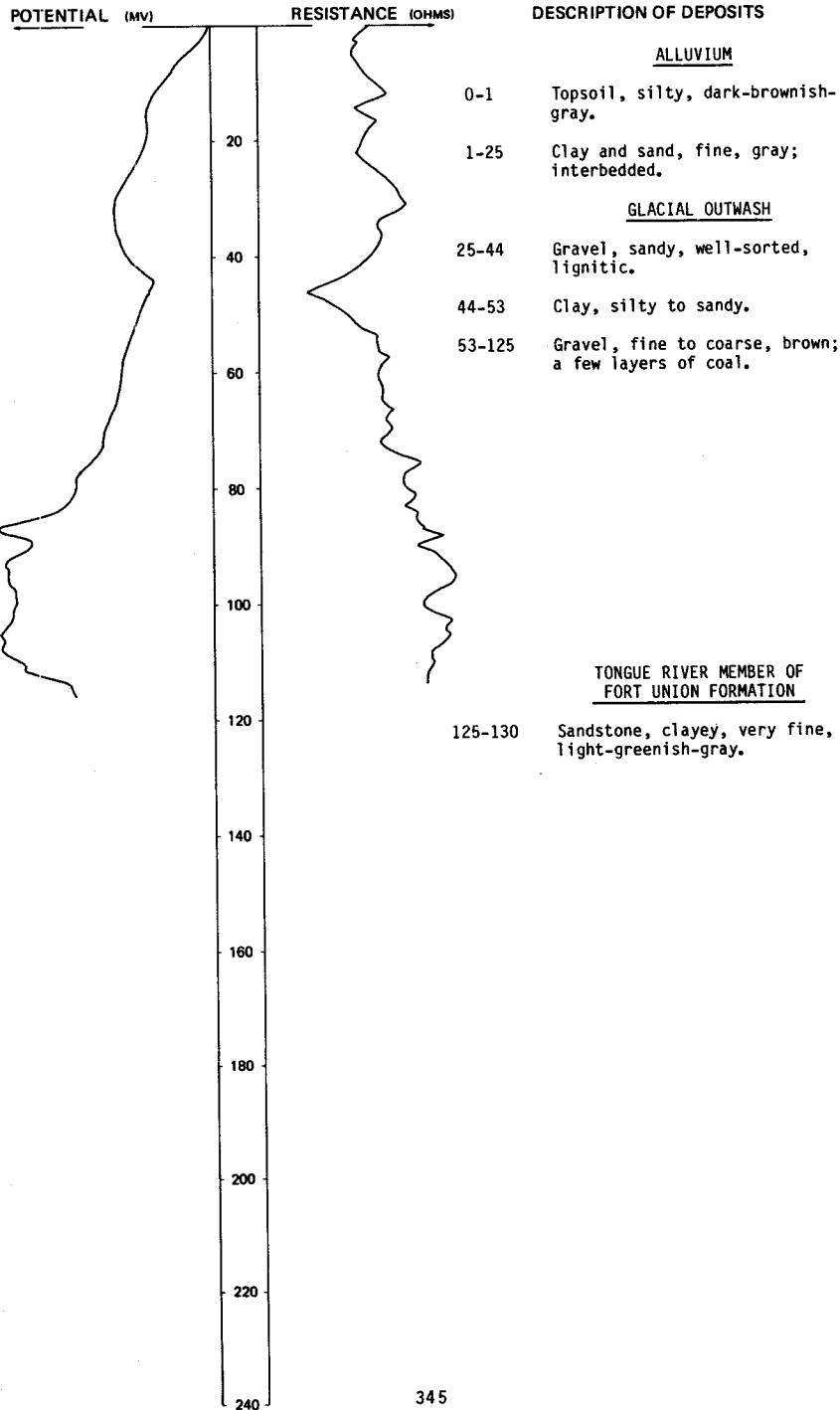
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, silty, brown-----	12	12
	Sand, fine-----	9	21
	Sand, fine to coarse-----	34	55
	Clay, gray, smooth-----	4	59
	Coal-----	4	63
	Gravel, coarse-----	11	74
	Gravel, fine to medium-----	19	93
	Gravel, coarse, and cobblestones-----	12	105

LOCATION: 151-104-12CCC2
ALTITUDE: 1876
(FT, NGVD)

NDSWC 1

DATE DRILLED: 10/22/66

DEPTH: 130
(FT)



151-104-12CDC
NDSWC 1633

Altitude: 1880 feet

Date drilled: 10/28/59

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, silty, brown-----	16	16
	Sand, fine-----	23	39
	Sand, fine; a little gray clay-----	11	50
	Sand, fine to medium-----	45	95
	Fort Union Formation-----	10	105

151-104-12DCC
NDSWC 1629

Altitude: 1888 feet

Date drilled: 10/22/59

	Clay, silty, brown-----	11	11
	Sand, fine to medium-----	30	41
	Clay, light-gray, smooth-----	9	50
	Clay, green, smooth-----	14	64
	Fort Union Formation-----	9	73

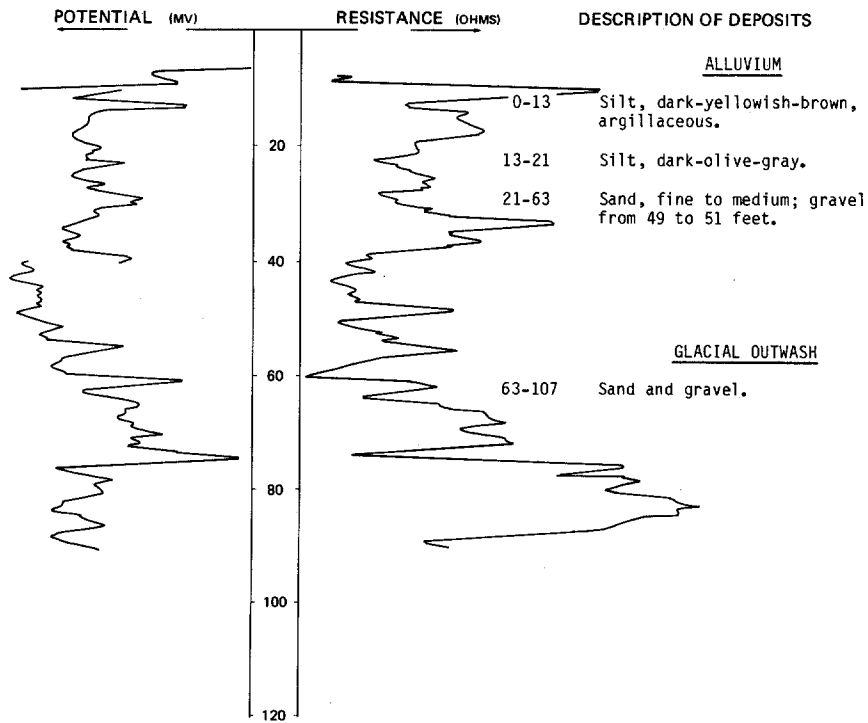
NDSWC 11582

LOCATION: 151-104-138BB

DATE DRILLED: 5/14/81

ALTITUDE: 1876
(FT, NGVD)

DEPTH: 107
(FT)



151-104-13BCB
NDSWC 1632

Altitude: 1879 feet

Date drilled: 10/27/59

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay, silty, brown-----	21	21
	Sand, fine to coarse; a little coal-----	54	75
	Gravel, fine to coarse-----	5	80
	Gravel, coarse, and cobblestones-----	25	105

151-104-14ADC
NDSWC 1848

Altitude: 1880 feet

Date drilled: 10/21/60

	Clay, brown, smooth-----	16	16
	Clay, blue, smooth-----	6	22
	Sand, fine; a little coal-----	20	42
	Clay, silty, yellow; a little coal-----	11	53
	Clay, silty, yellow; layers of Fort Union Formation-----	11	64
	Sand, fine; clay layers-----	6	70
	Gravel, coarse; sand layers-----	12	82
	Sand, fine to medium; clay layers-----	11	93
	Gravel, medium to coarse-----	11	104
	Sand, fine to medium; a little gravel; coal layers-----	9	113
	Fort Union Formation-----	3	116

151-104-14DAA
NDSWC 1630

Altitude: 1880 feet

Date drilled: 10/23/59

	Clay, silty, brown-----	21	21
	Sand, fine-----	9	30
	Sand, fine to medium; a little coal-----	16	46
	Fort Union Formation-----	7	53

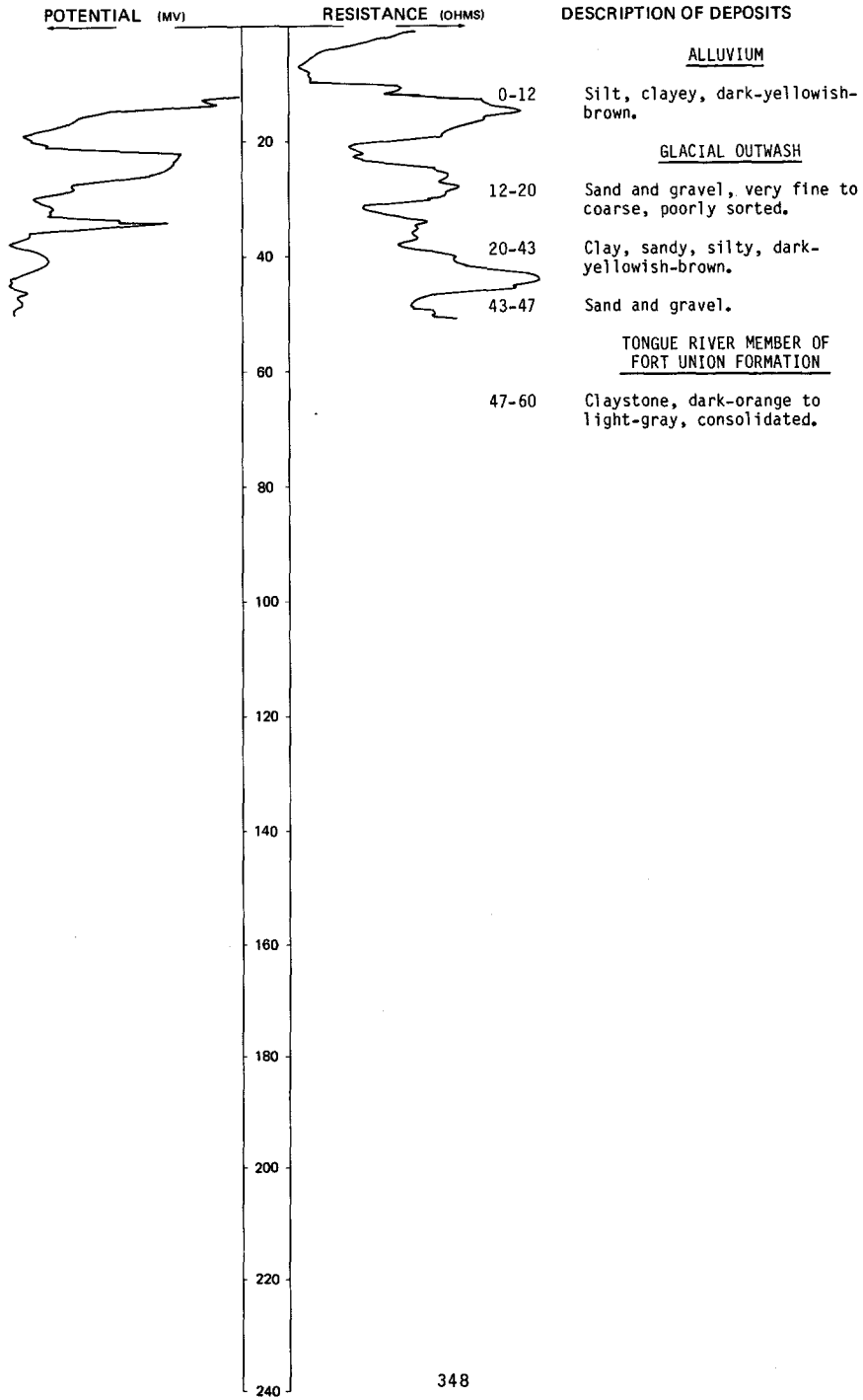
LOCATION: 151-104-17CCC

NDSWC 11390

DATE DRILLED: 9/25/80

ALTITUDE: 1915
(FT, NGVD)

DEPTH: 60
(FT)



151-104-20DCD
(Log modified from E. C. Gendren & Sons)

Altitude: 1897 feet Date drilled: 6/05/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay and sand-----	18	18
	Sand-----	6	24
	Gravel and sand-----	4	28
	Sand-----	22	50

151-104-25DBD
(Log modified from Francis Boyce Water Well)

Altitude: 1950 feet Date drilled: 7/26/71

	Topsoil and brown sand-----	30	30
	Clay, gray-----	8	38
	Coal-----	3	41
	Sand, gray-----	49	90
	Coal-----	2	92
	Sand, gray-----	10	102
	Clay, gray-----	28	130
	Sand, gray; water-----	10	140
	Shale, gray-----	61	201
	Sandstone-----	2	203
	Shale, gray-----	147	350
	Sand, gray-----	30	380
	Shale, gray-----	66	446
	Sandstone-----	2	448
	Shale, gray-----	103	551
	Sandstone-----	1	552
	Shale, gray-----	85	637
	Coal-----	21	658
	Clay, gray-----	67	725
	Sandstone, hard-----	11	736
	Shale, gray-----	21	757
	Coal-----	24	781
	Shale, gray-----	15	796
	Coal-----	4	800
	Shale, gray-----	262	1062
	Sandstone-----	1	1063
	Shale, gray-----	130	1193
	Sandstone-----	2	1195
	Shale, gray-----	215	1410
	Sandstone, hard-----	1	1411
	Water strata, artesian-----	39	1450

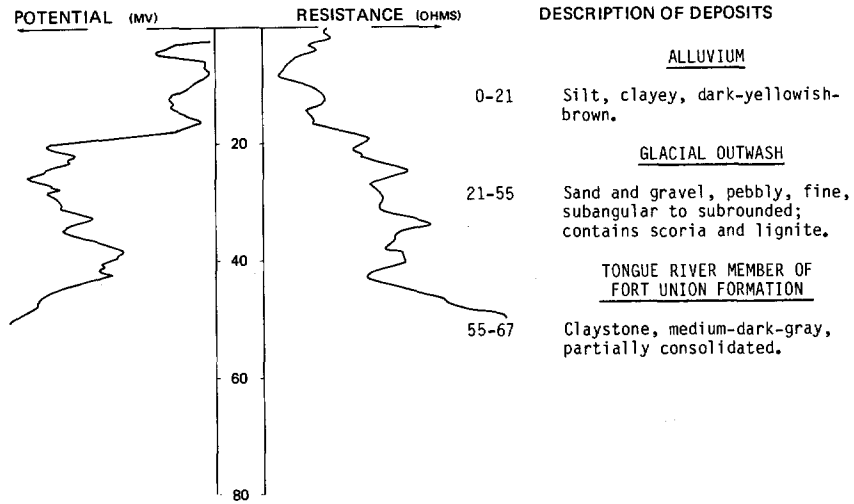
NDSWC 11389

LOCATION: 151-104-29ABB

DATE DRILLED: 9/25/80

ALTITUDE: 1900
(FT, NGVD)

DEPTH: 67
(FT)



151-104-31ABA
(Log modified from Boyce Drilling, Inc.)

Altitude: 1905 feet

Date drilled: 1/18/80

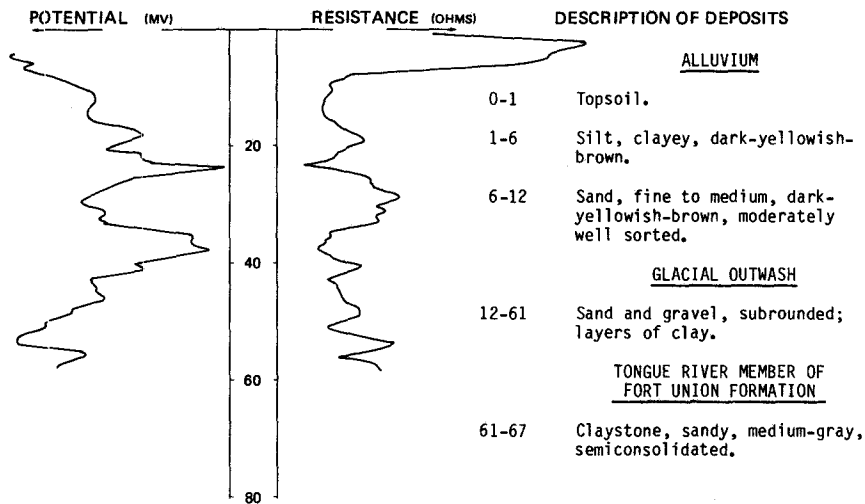
GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, brown, and brown gravel-----	150	150
	Clay, gray, and coal-----	315	465
	Rock-----	3	468
	Sand, fine, gray-----	19	487
	Rock-----	2	489
	Clay, gray, and coal; rock ledges-----	543	1032
	Rock-----	3	1035
	Sand, fine-----	49	1084
	Rock-----	3	1087
	Sand-----	28	1115
	Rock-----	2	1117
	Sand-----	83	1200
	Rock-----	2	1202
	Sand and rocks-----	98	1300
	Clay, streaky-----	20	1320
	Sand-----	39	1359
	Rock-----	1	1360
	Sand-----	23	1383
	Clay, gray-----	2	1385

LOCATION: 151-104-34AAA
 ALTITUDE: 1885
 (FT, NGVD)

NDSWC 11391

DATE DRILLED: 9/25/80

DEPTH: 67
 (FT)

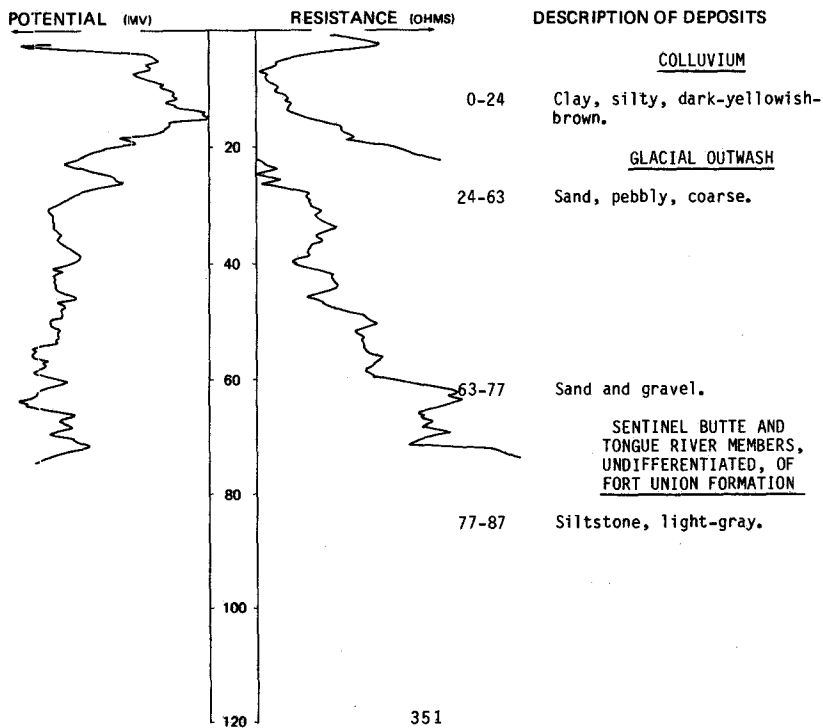


LOCATION: 151-104-36AAA
 ALTITUDE: 1910
 (FT, NGVD)

NDSWC 11578

DATE DRILLED: 5/13/81

DEPTH: 87
 (FT)



151-104-36AAD1
(Log modified from Thompson Drilling Co.)

Altitude: 1900 feet

Date drilled: 3/23/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Bentonite-----	16	18
	Sand, dirty-----	7	25
	Sand, blue; water-----	7	32
	Sand, gray, soft-----	10	42
	Sand, pebbly, brown-----	6	48

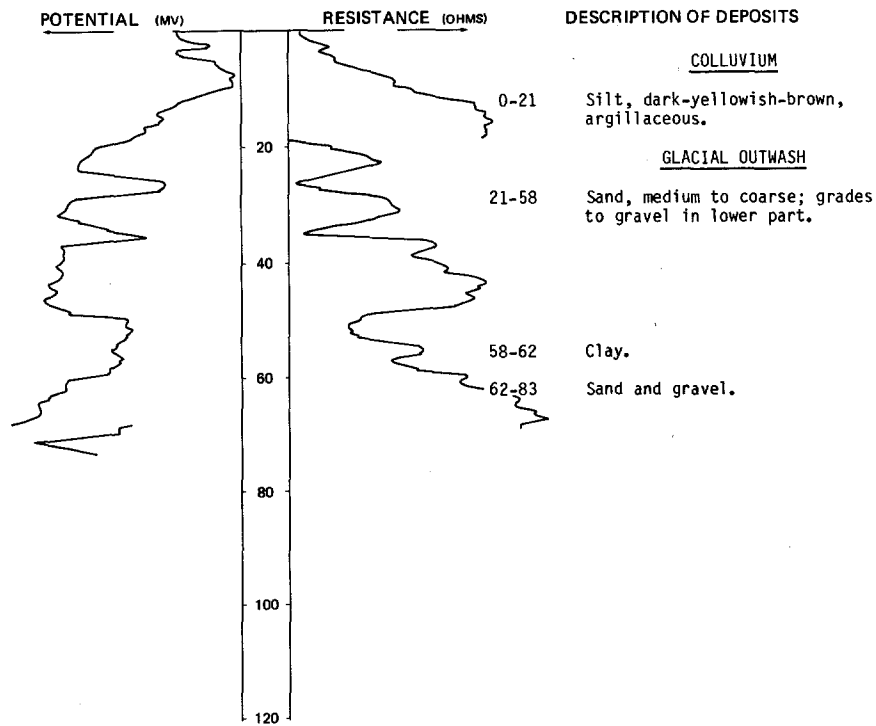
151-104-36AAD2
(Log modified from Thompson Drilling Co.)

Altitude: 1900 feet

Date drilled: 3/27/77

	Topsoil-----	2	2
	Bentonite-----	16	18
	Sand, dirty-----	20	38
	Clay-----	1	39
	Sand, blue; water-----	2	41

LOCATION: 151-104-36ADA NDSWC 11576 DATE DRILLED: 5/13/81
 ALTITUDE: 1903 DEPTH: 83
 (FT. NGVD) (FT)

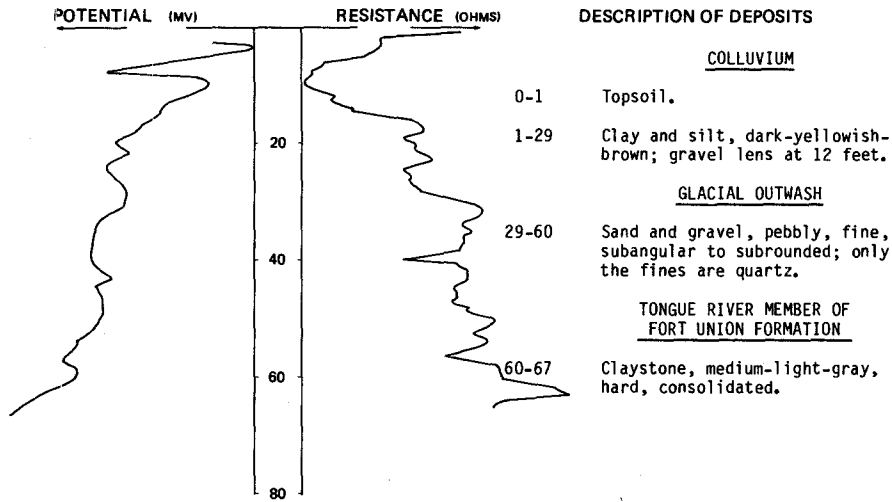


LOCATION: 151-104-36BCD
 ALTITUDE: 1890
 (FT. NGVD)

NDSWC 11384

DATE DRILLED: 9/23/80

DEPTH: 67
 (FT)

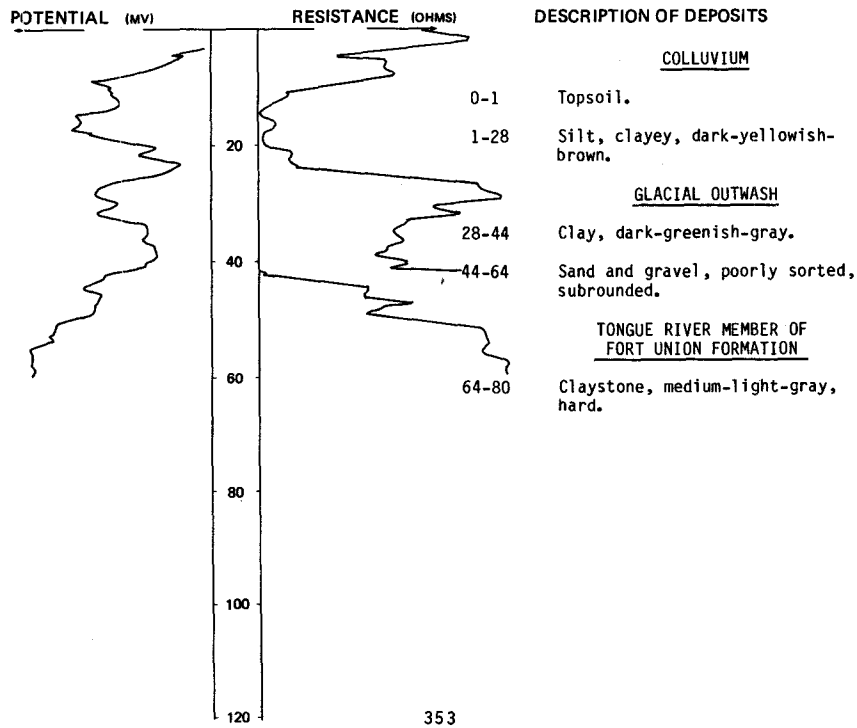


LOCATION: 151-104-36CCA
 ALTITUDE: 1895
 (FT. NGVD)

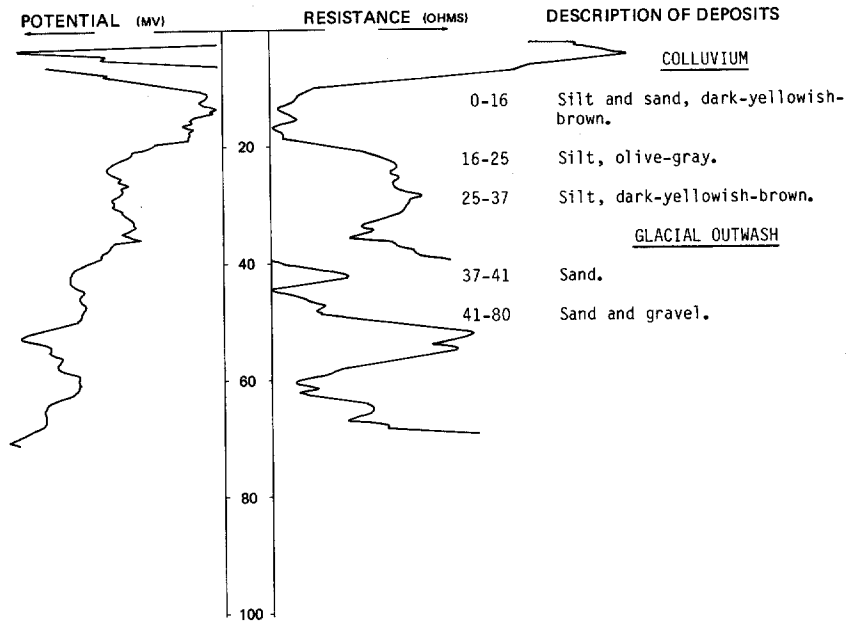
NDSWC 11385

DATE DRILLED: 9/23/80

DEPTH: 80
 (FT)



LOCATION: 151-104-36DAA NDSWC 11577 DATE DRILLED: 5/13/81
 ALTITUDE: 1895 DEPTH: 80
 (FT, NGVD) (FT)



151-104-36DAD
 NDSWC 29

Altitude: 2060 feet Date drilled: 6/15/57

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil, black-----	1	1
	Clay, sandy, brown-----	5	6
	Clay, yellow, smooth-----	16	22
	Sand, fine to medium-----	18	40
	Sand, medium to coarse; a little gray clay-----	6	46
	Sand, medium to coarse; a little coal-----	6	52
	Gravel, medium to coarse-----	18	70

152-094-10ABC
(Log modified from Thompson Drilling Co.)

Altitude:	1980 feet	Date drilled:	12/02/72
<u>GEOLOGIC</u>		<u>THICKNESS</u>	<u>DEPTH</u>
<u>SOURCE</u>	<u>MATERIAL</u>	<u>(FEET)</u>	<u>(FEET)</u>
	Topsoil-----	2	2
	Sand-----	13	15
	Sand and gravel-----	10	25

152-094-10ABD
(Log modified from Kieson Drilling)

Altitude:	1980 feet	Date drilled:	7/13/76
	Topsoil-----	1	1
	Gravel-----	9	10
	Clay, sandy-----	7	17
	Sand and gravel-----	5	22
	Clay-----	13	35
	Sand-----	12	47
	Clay-----	23	70
	Coal-----	4	74
	Clay-----	13	87
	Sand-----	4	91
	Clay-----	3	94
	Coal-----	4	98
	Clay-----	2	100
	Coal-----	3	103
	Clay-----	8	111
	Coal-----	4	115
	Clay-----	3	118
	Coal-----	2	120

152-094-19ACC
USGS 16

Altitude:	2210 feet	Date drilled:	12/10/51
	Clay, brown-----	36	36
	Clay, blue; 3 feet of lignite at 80 feet; 2 feet of rock at 86 feet-----	164	200

152-094-19DBC
USGS 68

Altitude:	2250 feet	Date drilled:	12/11/51
	Shale-----	20	20
	Lignite-----	5	25
	Shale-----	175	200

152-094-20ACC
USGS 50

Altitude:	2220 feet	Date drilled:	11/08/51
	Clay, brown-----	21	21
	Clay, gray-----	15	36
	Lignite-----	6	42
	Clay, gray-----	56	98
	Lignite-----	6	104
	Clay, gray-----	96	200

152-094-20DDA
USGS 33

Altitude: 2151 feet Date drilled: 11/06/51

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	40	40
	Clay, blue; 6 feet of lignite at 54 feet; 4 feet of lignite at 120 feet; 4 feet of lignite at 134 feet; 2 feet of rock at 142 feet; 4 feet of rock at 162 feet-----	165	205

152-094-21BCC
USGS 31

Altitude: 2190 feet Date drilled: 11/05/51

	Clay, brown-----	95	95
	Clay, blue; 3 feet of rock at 130 feet; 4 feet of lignite at 144 feet-----	110	205

152-094-21CAD
USGS 72

Altitude: 2155 feet Date drilled: 12/12/52

	Clay, brown-----	32	32
	Clay, blue; 3 feet of rock at 82 feet-----	168	200

152-094-21DAA
USGS 49

Altitude: 2060 feet Date drilled: 11/12/51

	Clay, sandy-----	45	45
	Rock-----	3	48
	Clay, sandy-----	72	120

152-094-21DBC
USGS 73

Altitude: 2140 feet Date drilled: 12/13/51

	Shale-----	80	80
	Lignite-----	10	90
	Shale-----	110	200

152-094-21DDB
USGS 74

Altitude: 2090 feet Date drilled: 12/12/51

	Sand and gravel; 6 feet of rock at 16 feet; 2 feet of lignite at 22 feet-----	55	55
	Clay, blue-----	145	200

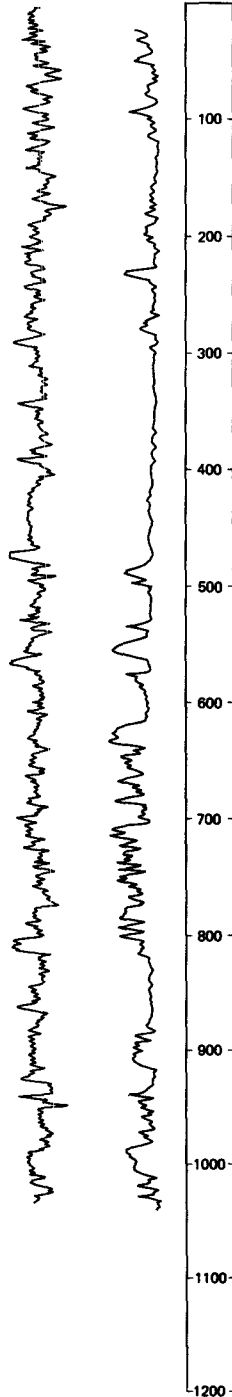
LOCATION: 152-094-24888

ALTITUDE: 2060
(FT, NGVD)

NEUTRON (API) S.P. (MV)

DATE DRILLED: 12/02/81

DEPTH: 1040
(FT)



DESCRIPTION OF DEPOSITS

- 0-23 Till.
SENTINEL BUTTE MEMBER OF FORT UNION FORMATION
- 23-108 Siltstone and sandstone, clayey; lignitic in upper part.
TONGUE RIVER MEMBER OF FORT UNION FORMATION
- 108-428 Siltstone and claystone, sandy, gray.

- 428-470 Sandstone, silty, gray.
- 470-480 Lignite.
- 480-500 Sandstone, silty.
- 500-510 Claystone.
- 510-810 Siltstone and sandstone, clayey, gray.

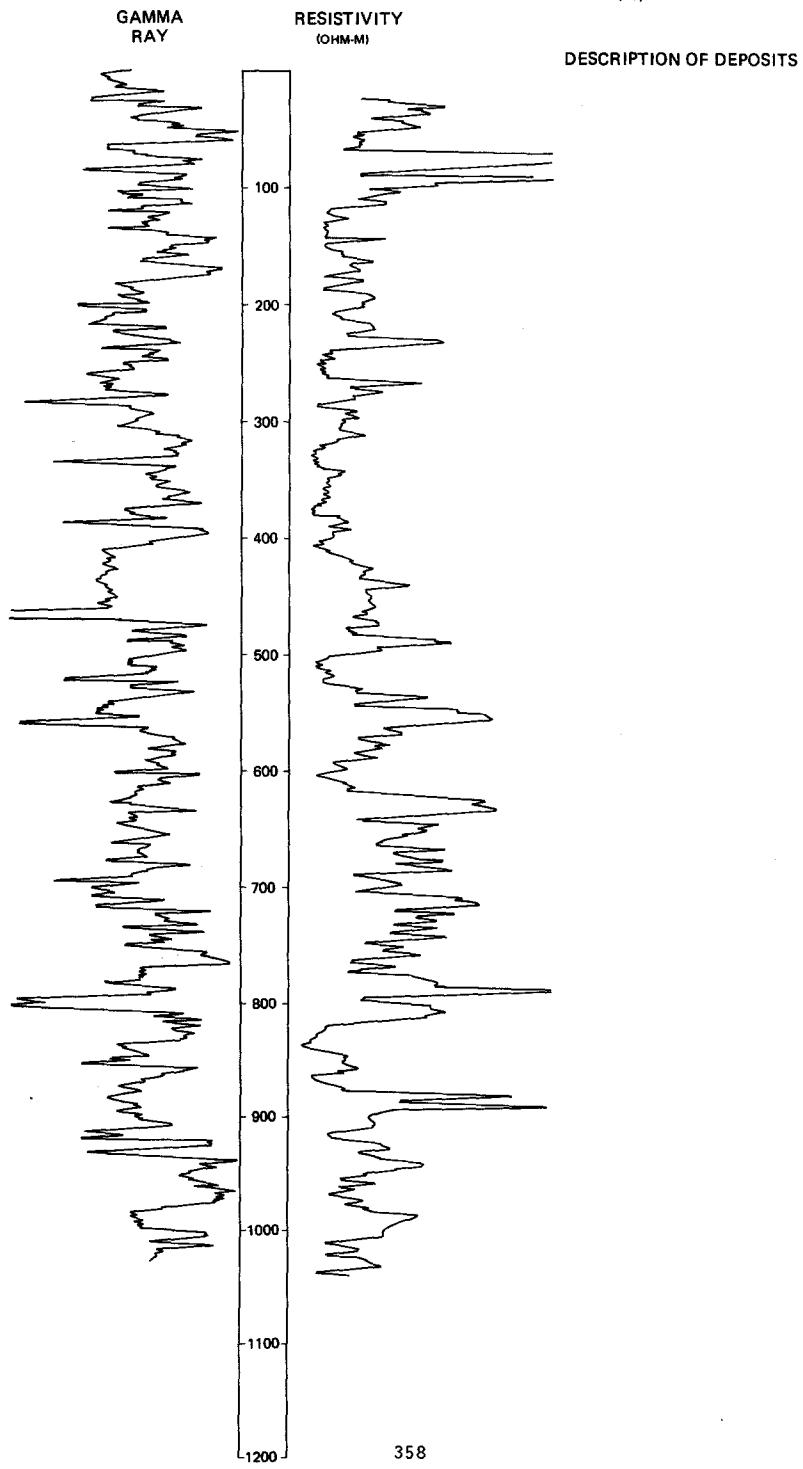
LOWER PART OF FORT UNION FORMATION
- 810-875 Siltstone and claystone, gray.
- 875-910 Sandstone, fine to medium, gray.
- 910-1040 Siltstone and sandstone, gray.

LOCATION: 152-094-24BBB

DATE DRILLED: 12/02/81

ALTITUDE: 2060
(FT, NGVD)

DEPTH: 1040
(FT)

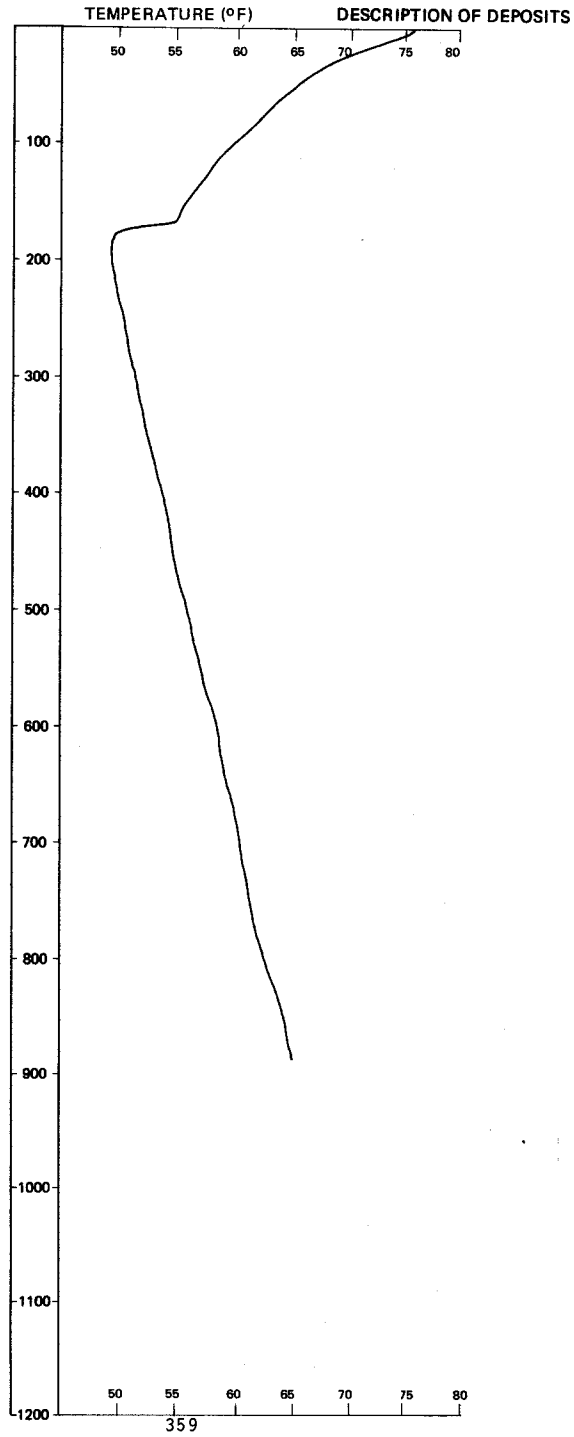


LOCATION: 152-094-24BBB

DATE DRILLED: 12/02/81

ALTITUDE: 2060
(FT, NGVD)

DEPTH: 1040
(FT)



152-094-27AAB
USGS 2

Altitude: 2160 feet Date drilled: 10/30/51

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	45	45
	Clay, blue; 4 feet of lignite at 90 feet; 7 feet of lignite at 180 feet; 6 feet of lignite at 220 feet-----	210	255

152-094-27BBB
USGS 3

Altitude: 2180 feet Date drilled: 10/30/51

	Clay, brown-----	30	30
	Clay, blue; 6 feet of lignite at 180 feet; 4 feet of rock at 220 feet; 4 feet of lignite at 235 feet-----	225	255

152-094-27DDD
USGS 35

Altitude: 2163 feet Date drilled: 11/07/51

	Clay, brown-----	55	55
	Clay, blue; 3 feet of rock at 85 feet; 2 feet of rock at 130 feet; 6 feet of lignite at 142 feet-----	150	205

152-094-28ABA
USGS 76

Altitude: 2115 feet Date drilled: 1/07/52

	Clay-----	20	20
	Shale-----	165	185

152-094-28BAB
USGS 5

Altitude: 2220 feet Date drilled: 10/31/51

	Clay, brown-----	55	55
	Clay, blue-----	25	80
	Lignite-----	12	92
	Clay, blue-----	88	180
	Rock-----	6	186
	Clay, blue-----	124	310
	Rock-----	12	322
	Clay, blue-----	33	355

152-094-28BBC
USGS 71

Altitude: 2190 feet Date drilled: 12/11/51

	Clay-----	30	30
	Shale-----	50	80
	Lignite-----	10	90
	Shale-----	110	200

152-094-29AAB
USGS 70

Altitude: 2195 feet Date drilled: 12/11/51

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	30	30
	Clay, blue-----	170	200

152-094-29ACC
USGS 63

Altitude: 2180 feet Date drilled: 11/12/51

	Clay, brown-----	45	45
	Clay, blue; 4 feet of lignite at 84 feet; 2 feet of rock at 95 feet; 5 feet of lignite at 120 feet-----	160	205

152-094-29CCC
USGS 53

Altitude: 2200 feet Date drilled: 11/08/51

	Shale-----	75	75
	Lignite-----	5	80
	Shale-----	90	170
	Lignite-----	10	180
	Shale-----	20	200

152-094-29DCA
USGS 52

Altitude: 2165 feet Date drilled: 11/08/51

	Gravel-----	25	25
	Clay, brown-----	17	42
	Clay, blue; 3 feet of rock at 94 feet; 2 feet of rock at 138 feet; 6 feet of lignite at 155 feet-----	163	205

152-094-30ACD
USGS 60

Altitude: 2240 feet Date drilled: 11/12/51

	Clay-----	10	10
	Lignite-----	5	15
	Shale-----	125	140
	Lignite-----	5	145
	Shale-----	45	190

152-094-30ADD
USGS 61

Altitude: 2215 feet Date drilled: 11/12/51

	Clay, brown-----	55	55
	Clay, blue; 6 feet of lignite at 84 feet; 4 feet of lignite at 102 feet; 4 feet of rock at 142 feet-----	150	205

152-094-30CCD
USGS 54

Altitude: 2200 feet

Date drilled: 11/08/51

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sandstone-----	75	75
	Lignite-----	5	80
	Shale-----	60	140
	Lignite-----	5	145
	Shale-----	55	200

152-094-31ACA
USGS 43

Altitude: 2185 feet

Date drilled: 11/08/51

	Clay-----	35	35
	Sandstone-----	35	70
	Lignite-----	5	75
	Shale-----	125	200

152-094-31BCD
USGS 55

Altitude: 2080 feet

Date drilled: 1/07/52

	Clay, brown-----	22	22
	Clay, blue; 3 feet of sandrock at 35 feet; 11 feet of lignite at 80 feet; 2 feet of rock at 122 feet-----	158	180

152-094-31DBD
USGS 44

Altitude: 2135 feet

Date drilled: 11/08/51

	Clay, brown; 8 feet of lignite at 22 feet; 4 feet of lignite at 30 feet-----	40	40
	Clay, blue; 4 feet of rock at 84 feet; 1 foot of rock at 135 feet-----	165	205

152-094-32CCB
USGS 46

Altitude: 2180 feet

Date drilled: 11/07/51

	Clay, brown-----	65	65
	Lignite-----	9	74
	Clay, blue; 4 feet of lignite at 87 feet; 3 feet of rock at 95 feet; 4 feet of rock at 129 feet-----	131	205

152-094-32DBC
USGS 47

Altitude: 2180 feet

Date drilled: 11/07/51

	Clay, sandy-----	35	35
	Rock-----	3	38
	Clay, gray-----	67	105
	Lignite-----	3	108
	Clay, gray-----	17	125

152-094-33CAB
USGS 40

Altitude: 2175 feet Date drilled: 11/06/51

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, brown-----	65	65
	Clay, blue; 16 feet of lignite at 130 feet; 2 feet of rock at 190 feet-----	140	205

152-094-33DBA
USGS 39

Altitude: 2175 feet Date drilled: 11/06/51

	Clay-----	10	10
	Lignite-----	5	15
	Shale-----	185	200

152-094-34ADC
USGS 36

Altitude: 2120 feet Date drilled: 11/07/51

	Clay-----	30	30
	Lignite-----	10	40
	Shale-----	60	100
	Shale, sandy-----	100	200

152-094-34CAA
USGS 37

Altitude: 2110 feet Date drilled: 11/06/51

	Clay-----	30	30
	Shale-----	90	120
	Lignite-----	10	130
	Shale-----	70	200

152-095-06BAC
(Log modified from Kieson Drilling)

Altitude: 2260 feet Date drilled: 1/30/76

	Topsoil-----	2	2
	Clay, yellow-----	23	25
	Clay, sandy, yellow-----	5	30
	Sand and gravel-----	16	46
	Sand and silt-----	8	54
	Clay, gray-----	2	56
	Coal-----	3	59
	Clay-----	1	60
	Coal-----	1	61
	Clay-----	4	65

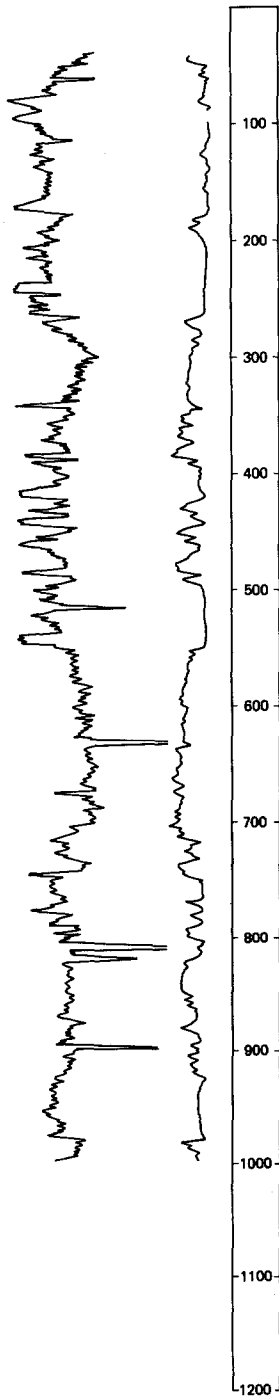
LOCATION: 152-095-16ADD

DATE DRILLED: 11/21/81

ALTITUDE: 2295
(FT, NGVD)

DEPTH: 1000
(FT)

NEUTRON (API) S.P. (MV)



DESCRIPTION OF DEPOSITS

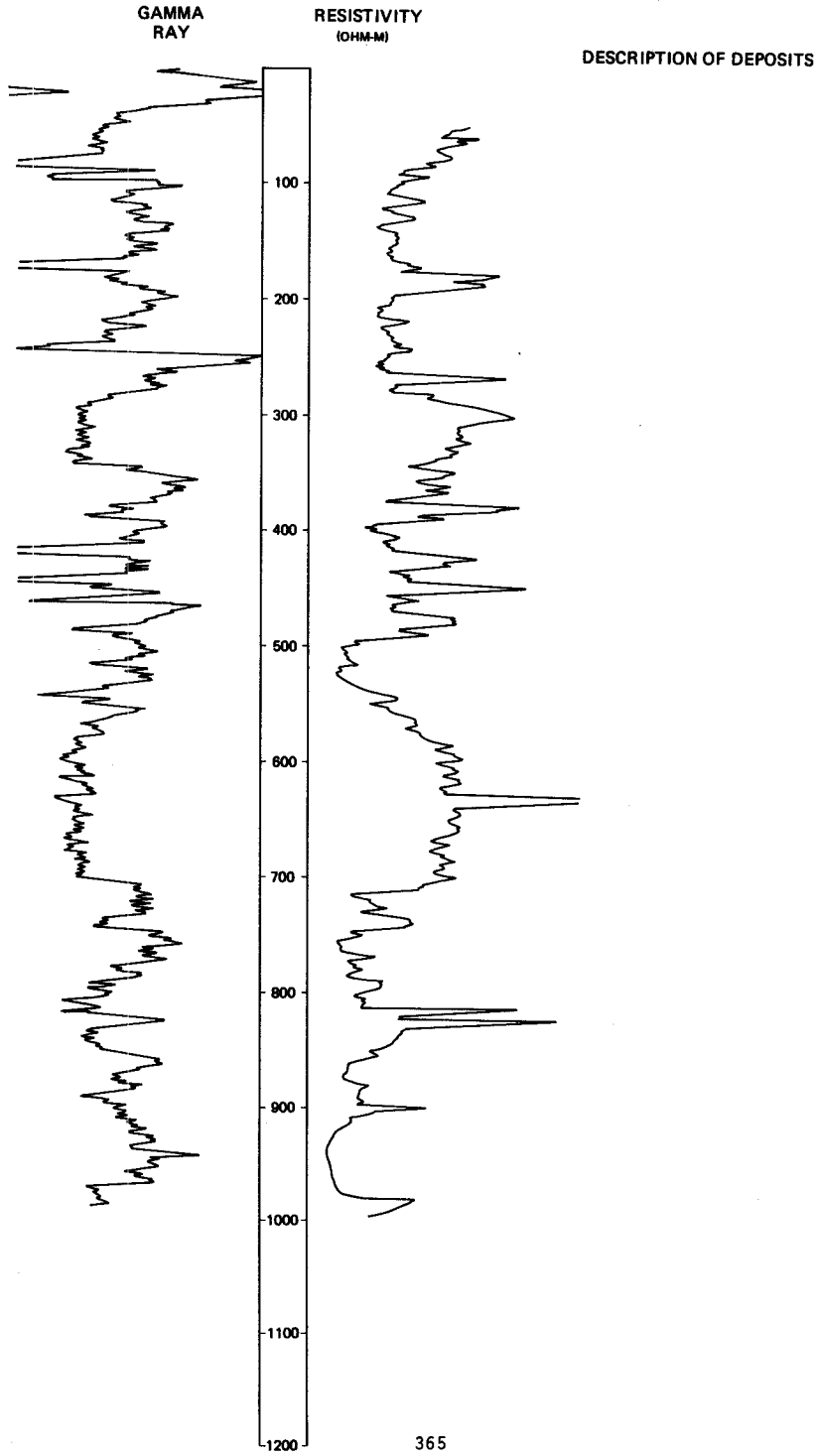
0-15	Colluvium.
	<u>SENTINEL BUTTE MEMBER OF FORT UNION FORMATION</u>
15-80	Siltstone and sandstone, gray.
	<u>TONGUE RIVER MEMBER OF FORT UNION FORMATION</u>
80-100	Claystone and lignite.
100-170	Siltstone and claystone, carbonaceous.
170-175	Lignite.
175-200	Siltstone, sandy, brownish- gray.
200-280	Siltstone and claystone, gray, lignitic.
280-500	Siltstone and sandstone, fine to medium; lignitic below 375 feet.
500-550	Siltstone and claystone, lignitic.
550-750	Sandstone and siltstone, fine to medium, gray.
750-855	Claystone and siltstone, sandy, brownish-gray.
	<u>LOWER PART OF FORT UNION FORMATION</u>
855-900	Siltstone, sandy.
900-1000	Claystone, silty, brownish- gray.

LOCATION: 152-095-16ADD NDSWC 6048, Continued

DATE DRILLED: 11/21/81

ALTITUDE: 2295
(FT, NGVD)

DEPTH: 1000
(FT)

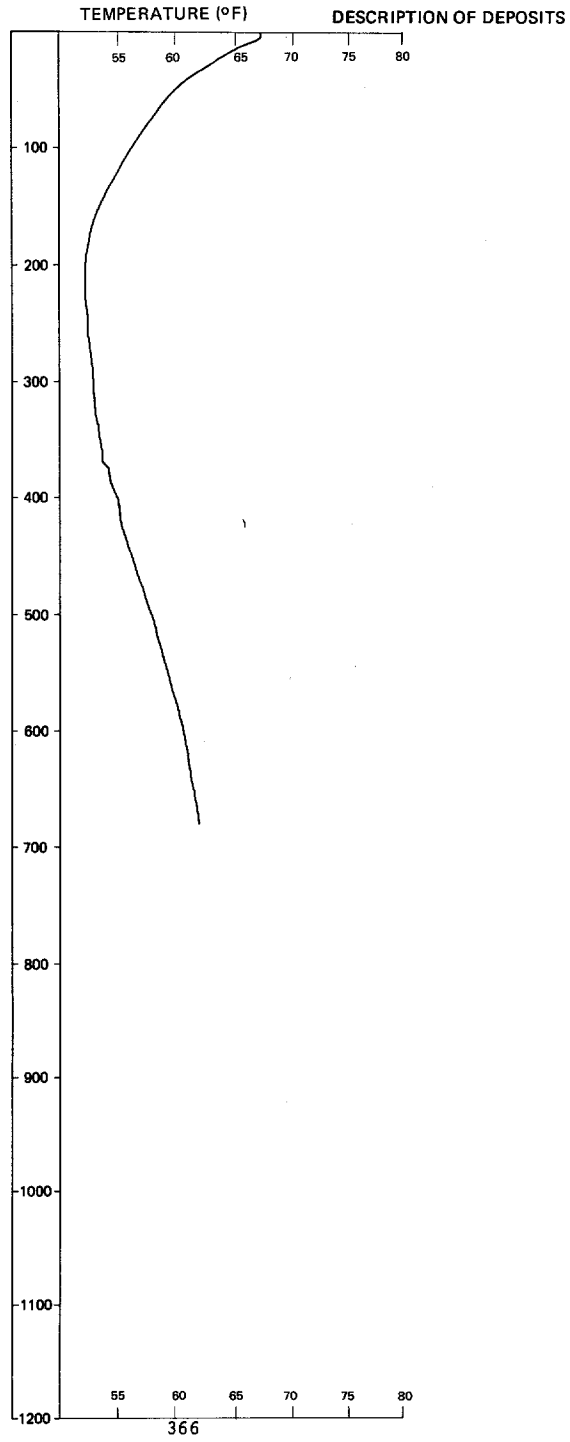


LOCATION: 152-095-16ADD

DATE DRILLED: 11/21/81

ALTITUDE: 2295
(FT, NGVD)

DEPTH: 1000
(FT)



152-095-19DD1
(Log modified from Kieson Drilling)

Altitude: 2435 feet Date drilled: 8/21/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	1	1
	Clay, brown-----	19	20
	Coal-----	3	23
	Clay-----	9	32
	Coal-----	1	33
	Clay-----	3	36
	Coal-----	8	44
	Clay-----	4	48
	Sand-----	10	58
	Clay-----	2	60

152-095-19DD2
(Log modified from Kieson Drilling)

Altitude: 2435 feet Date drilled: 8/27/75

	Topsoil-----	2	2
	Gravel-----	16	18
	Coal-----	5	23
	Clay-----	9	32
	Coal-----	9	41
	Clay-----	4	45

152-095-32CBC
NDSWC 11549

Altitude: 2380 feet Date drilled: 5/05/81

Colluvium:	Clay, olive-gray, plastic-----	8	8
Till:	Gravel; some mafics-----	2	10
	Silt, pebbly, dark-yellowish-brown-----	30	40
	Clay, silty, sandy, pebbly, yellowish-brown-----	30	70
Sentinel Butte and Tongue River Members, undifferentiated, of Fort Union Formation:	Sandstone, light-olive-gray-----	1	71
	No recovery-----	19	90

LOCATION: 152-096-03BBB

NDSWC 5948

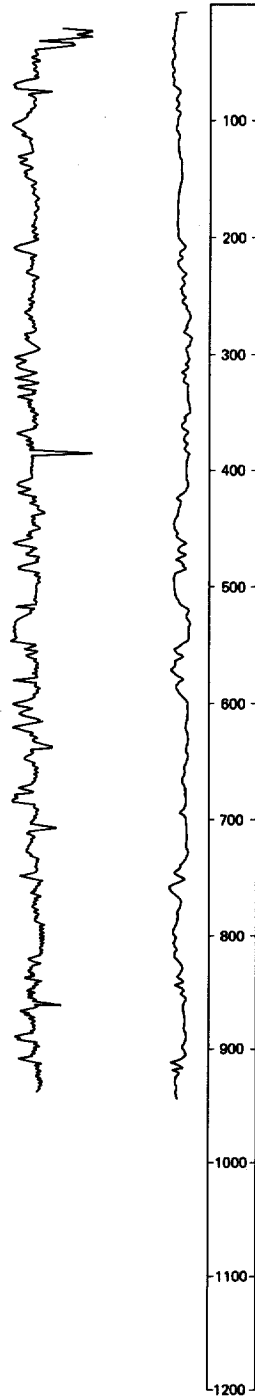
DATE DRILLED: 7/30/81

ALTITUDE: 2330
(FT, NGVD)

DEPTH: 940
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

0-21	Till.
	<u>SENTINEL BUTTE MEMBER OF FORT UNION FORMATION</u>
21-150	Sandstone and siltstone, clayey, lignitic.
	<u>TONGUE RIVER MEMBER OF FORT UNION FORMATION</u>
150-260	Sandstone and siltstone, clayey, gray, lignitic.
260-300	Siltstone and claystone, gray.
300-315	Claystone and lignite.
315-412	Siltstone and claystone, gray, lignitic.
412-418	Lignite.
418-485	Siltstone and claystone, sandy, lignitic.
485-515	Sandstone, silty, fine.
515-550	Lignite.
550-595	Siltstone and sandstone, gray.
595-695	Siltstone and sandstone, gray, lignitic.
695-725	Siltstone and claystone, gray.
725-825	Sandstone and siltstone, fine to medium, gray.
	<u>LOWER PART OF FORT UNION FORMATION</u>
825-905	Siltstone and claystone, gray, carbonaceous.
905-940	Siltstone and sandstone.

LOCATION: 152-096-03888

DATE DRILLED: 7/30/81

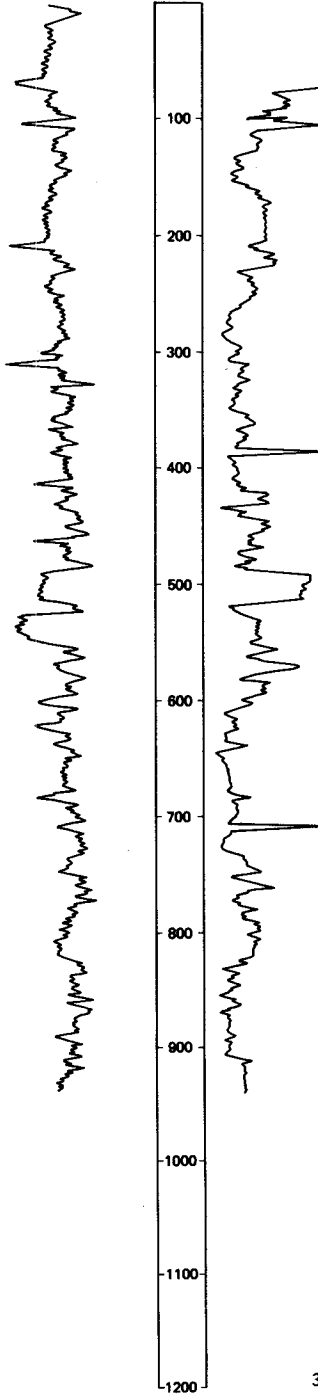
ALTITUDE: 2330
(FT, NGVD)

DEPTH: 940
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

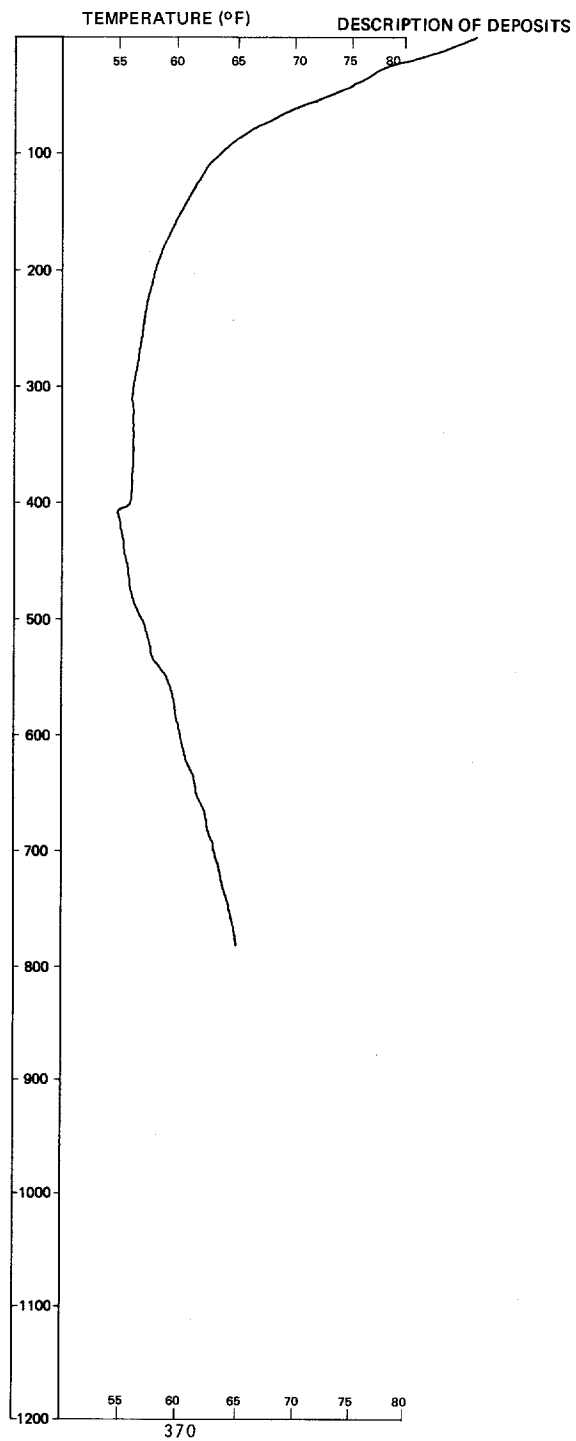


LOCATION: 152-096-03888

DATE DRILLED: 7/30/81

ALTITUDE: 2330
(FT, NGVD)

DEPTH: 940
(FT)



152-096-23C8D
(Log modified from Thompson Drilling Co.)

Altitude: 2360 feet Date drilled: 9/05/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	3	3
	Clay-----	9	12
	Sand, dirty-----	8	20
	Sand, clean-----	4	24
	Clay-----	14	38
	Coal-----	8	46
	Clay-----	22	68
	Coal-----	3	71
	Clay-----	1	72
	Coal-----	3	75
	Clay-----	25	100

152-096-25BCC
(Log modified from Kieson Drilling)

Altitude: 2386 feet Date drilled: 9/17/77

	Topsoil-----	2	2
	Clay, sandy-----	18	20
	Clay-----	19	39
	Silt-----	19	58
	Clay-----	13	71
	Clay, sandy-----	23	94
	Coal-----	15	109
	Clay-----	3	112

152-096-26BCB
NDSWC 11548

Altitude: 2325 feet Date drilled: 5/05/81

	Sand and scoriaceous gravel-----	11	11
	Silt, dark-yellowish-brown, argillaceous-----	6	17
	Silt, olive-gray-----	1	18
	Lignite-----	6	24
	Claystone, medium-gray-----	10	34
	Sandstone, fine, argillaceous-----	4	38

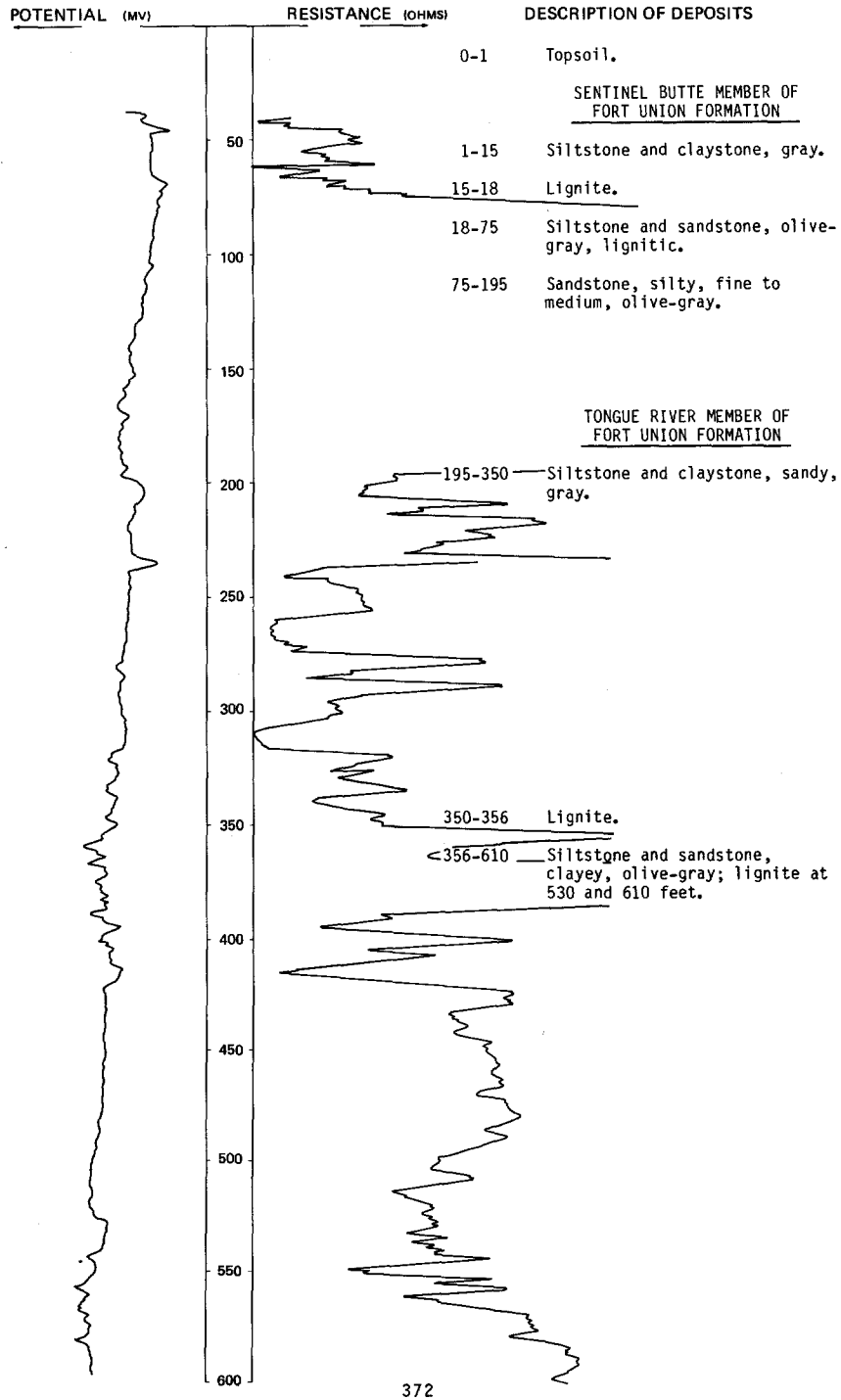
NDSWC 6046

LOCATION: 152-096-34000

DATE DRILLED: 11/11/81

ALTITUDE: 2390
(FT, NGVD)

DEPTH: 1240
(FT)

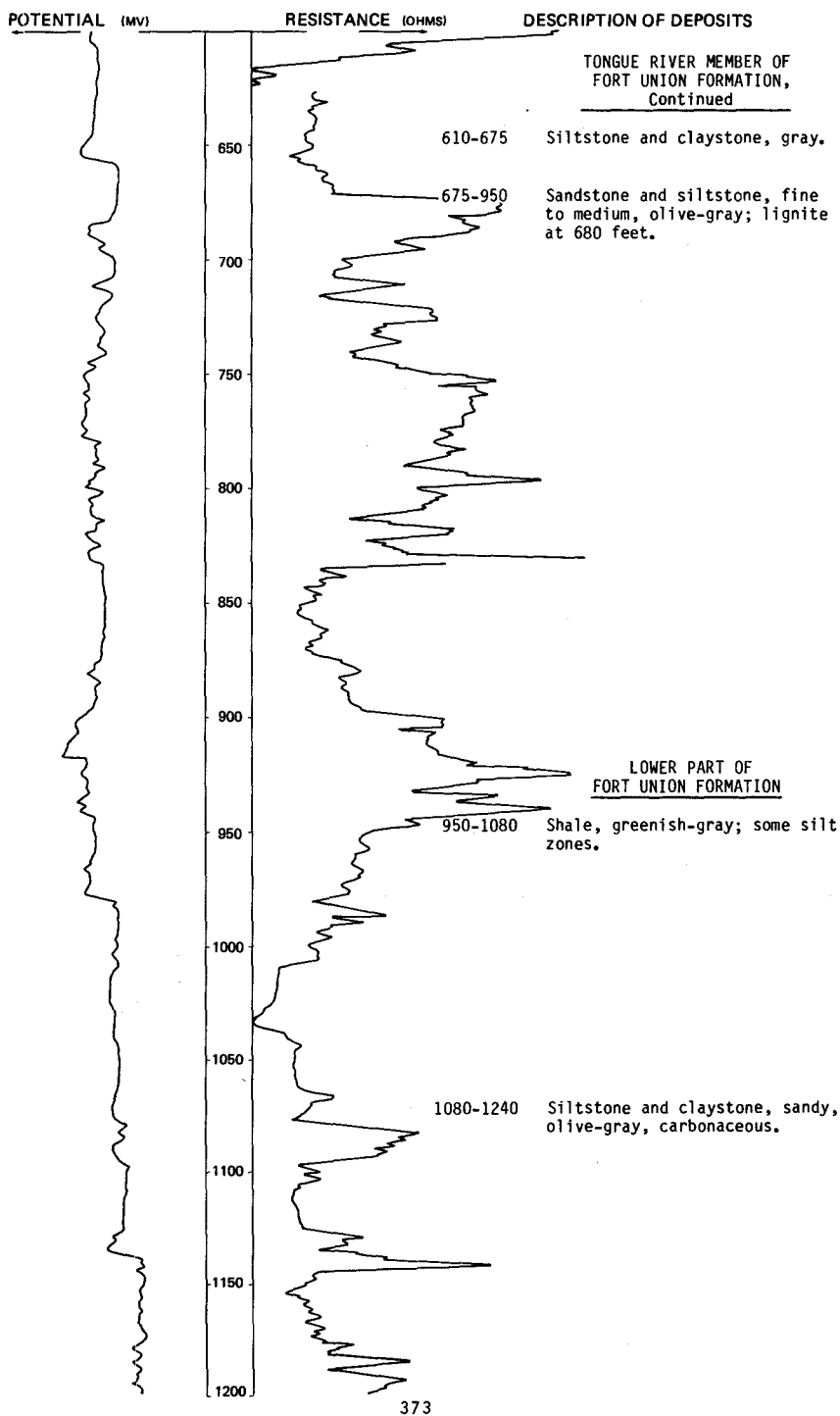


LOCATION: 152-096-340DD

DATE DRILLED: 11/11/81

ALTITUDE: 2390
(FT, NGVD)

DEPTH: 1240
(FT)



LOCATION: 152-096-34000

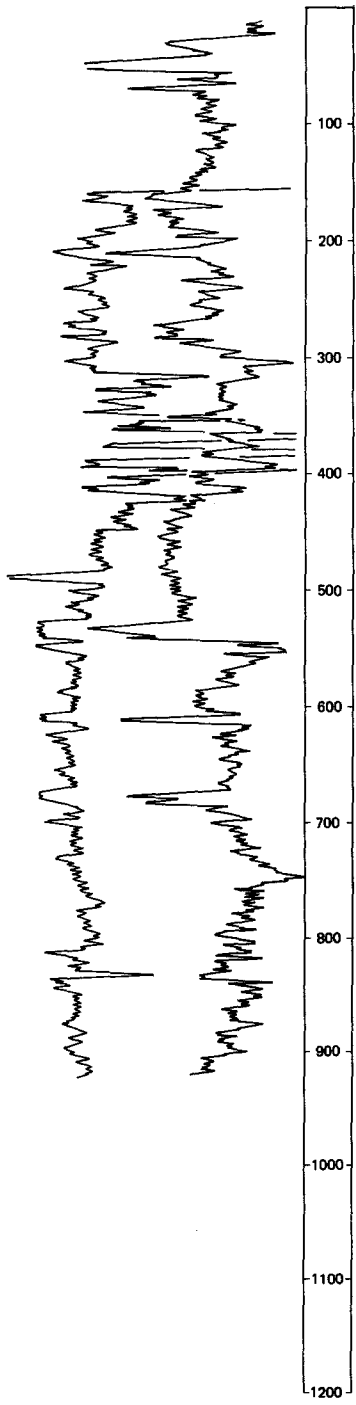
DATE DRILLED: 11/11/81

ALTITUDE: 2390
(FT, NGVD)

DEPTH: 1240
(FT)

NEUTRON GAMMA
(API) RAY

DESCRIPTION OF DEPOSITS

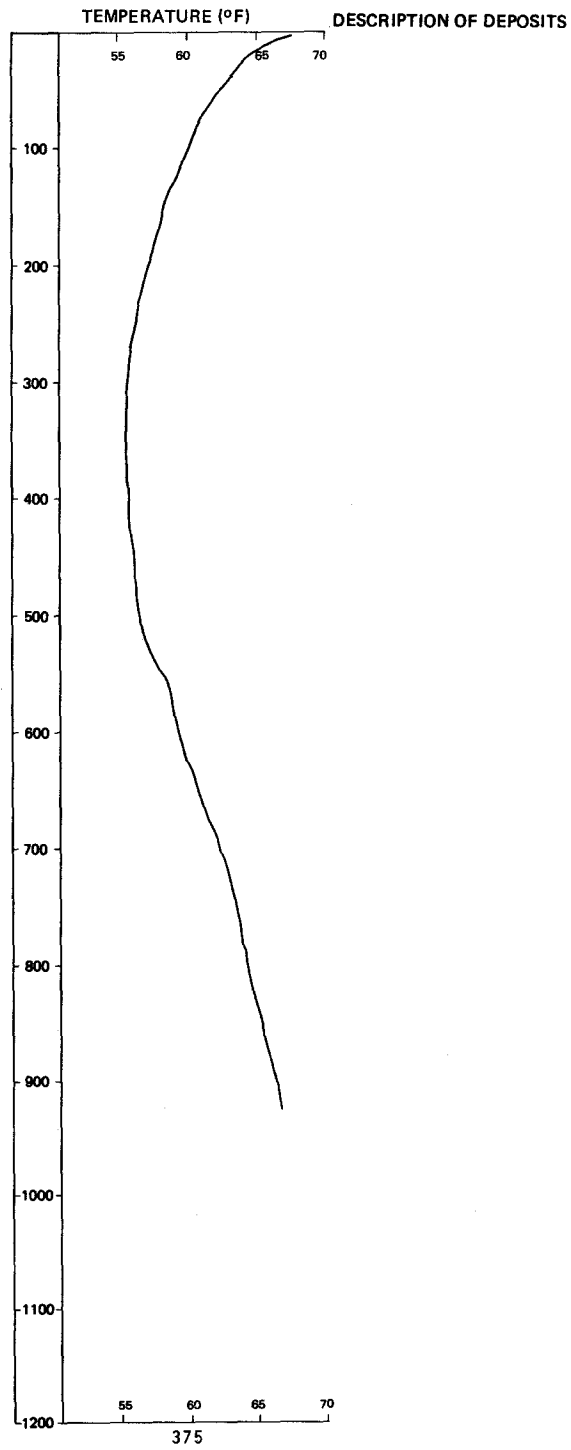


LOCATION: 152-096-34DDD

DATE DRILLED: 11/11/81

ALTITUDE: 2390
(FT, NGVD)

DEPTH: 1240
(FT)



152-096-35CBB
(Log modified from Thompson Drilling Co.)

Altitude: 2380 feet

Date drilled: 6/27/77

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Soil-----	3	3
	Clay-----	7	10
	Sand-----	11	21
	Sand, coarse-----	4	25
	Clay-----	2	27

152-097-06AAA
NOSWC 1484

Altitude: 1915 feet

Date drilled: 4/09/59

	Topsoil, sandy, brown-----	2	2
	Gravel, fine to coarse; lignite-----	4	6
	Sand, coarse, to medium gravel; lignite-----	18	24
	Clay, sandy, blue-----	14	38
	Sand, medium, to medium gravel; lignite fragments-----	8	46
	Clay, sandy, shaly, light-gray; Fort Union Formation-----	7	53

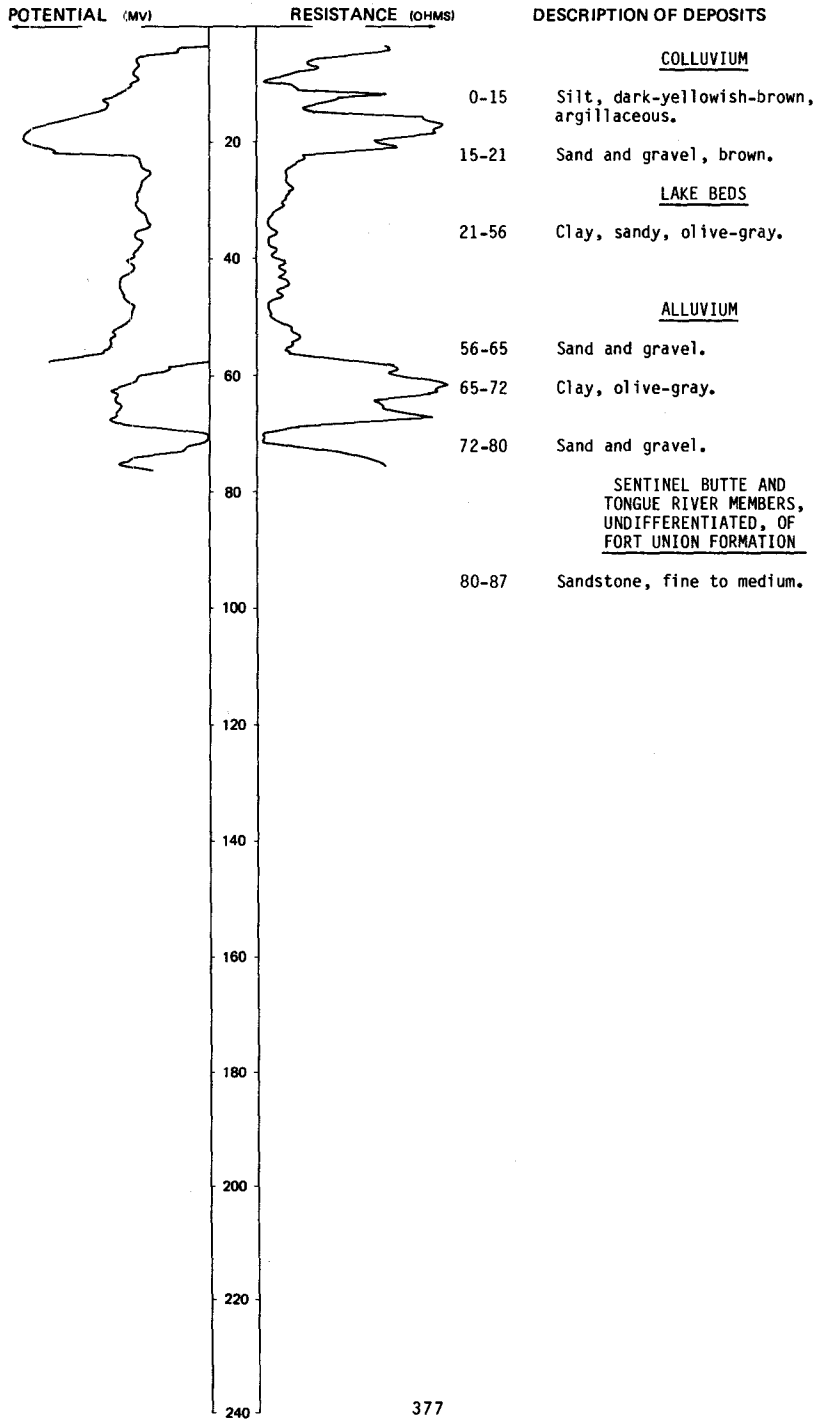
LOCATION: 152-097-07CAA

NDSWC 11555

DATE DRILLED: 5/06/81

ALTITUDE: 1946
(FT. NGVD)

DEPTH: 87
(FT)



152-097-088AA
(Log modified from Francis Boyce Water Well)

Altitude: 2020 feet Date drilled: 11/27/72

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand, brown-----	90	90
	Clay, gray-----	80	170
	Sandstone-----	1	171
	Clay, gray-----	2	173
	Coal-----	5	178
	Clay, gray-----	22	200
	Sandstone-----	2	202
	Sand, fine-----	23	225
	Shale, gray-----	92	317
	Coal-----	3	320
	Shale, gray; interbedded with sandstone-----	135	455
	Coal-----	15	470
	Shale, gray; interbedded with coal-----	355	825
	Sand, gray-----	20	845
	Sandstone-----	1	846
	Shale, gray; interbedded with sandstone-----	639	1485
	Sand, gray; water-----	45	1530
	Sandstone-----	--	1530

152-097-088BC
(Log modified from Ralph Wold Well Drilling)

Altitude: 1950 feet Date drilled: 6/01/74

	Clay-----	13	13
	Gravel-----	2	15
	Till and gravelly sand-----	13	28
	Gravel-----	3	31
	Till and clay-----	9	40

152-097-148DB
(Log modified from Ralph Wold Well Drilling)

Altitude: 1960 feet Date drilled: 5/26/74

	Clay and till-----	11	11
	Gravel-----	5	16
	Clay-----	4	20

152-097-16DDC
NDSWC 11554

Altitude: 2030 feet Date drilled: 5/06/81

	Topsoil-----	2	2
	Sand and gravel-----	5	7
	Clay, olive-gray-----	15	22
	Sand and gravel-----	1	23
	Claystone, gray-----	17	40

152-097-27BDB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2120 feet

Date drilled: 7/01/73

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Loam, sandy-----	10	10
	Clay-----	18	28
	Gravel-----	3	31
	Sand, blue-----	17	48
	Clay-----	12	60

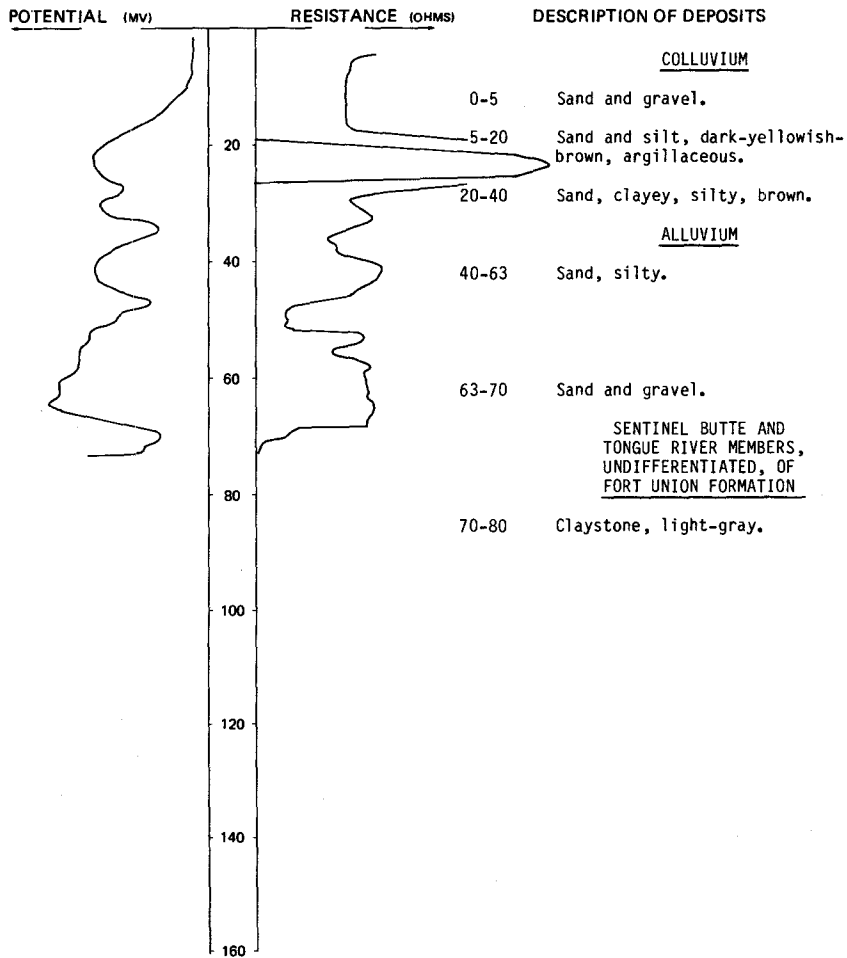
LOCATION: 152-098-01DDA

NDSWC 11748

DATE DRILLED: 9/24/81

ALTITUDE: 1950
(FT, NGVD)

DEPTH: 80
(FT)



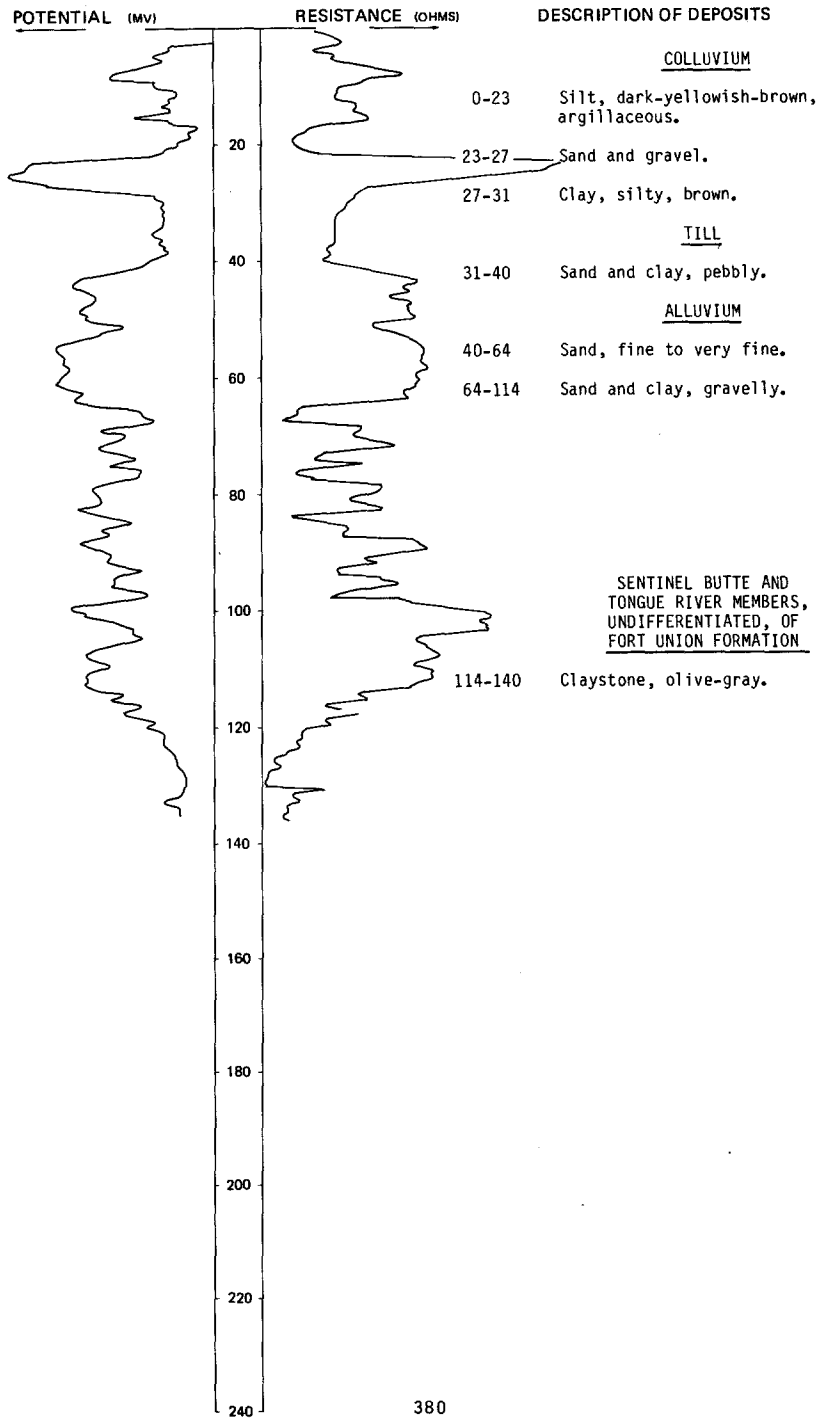
NDSWC 11740

LOCATION: 152-098-02CCC

DATE DRILLED: 9/23/81

ALTITUDE: 1985
(FT, NGVD)

DEPTH: 140
(FT)



152-098-03DAB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2020 feet

Date drilled: 7/18/73

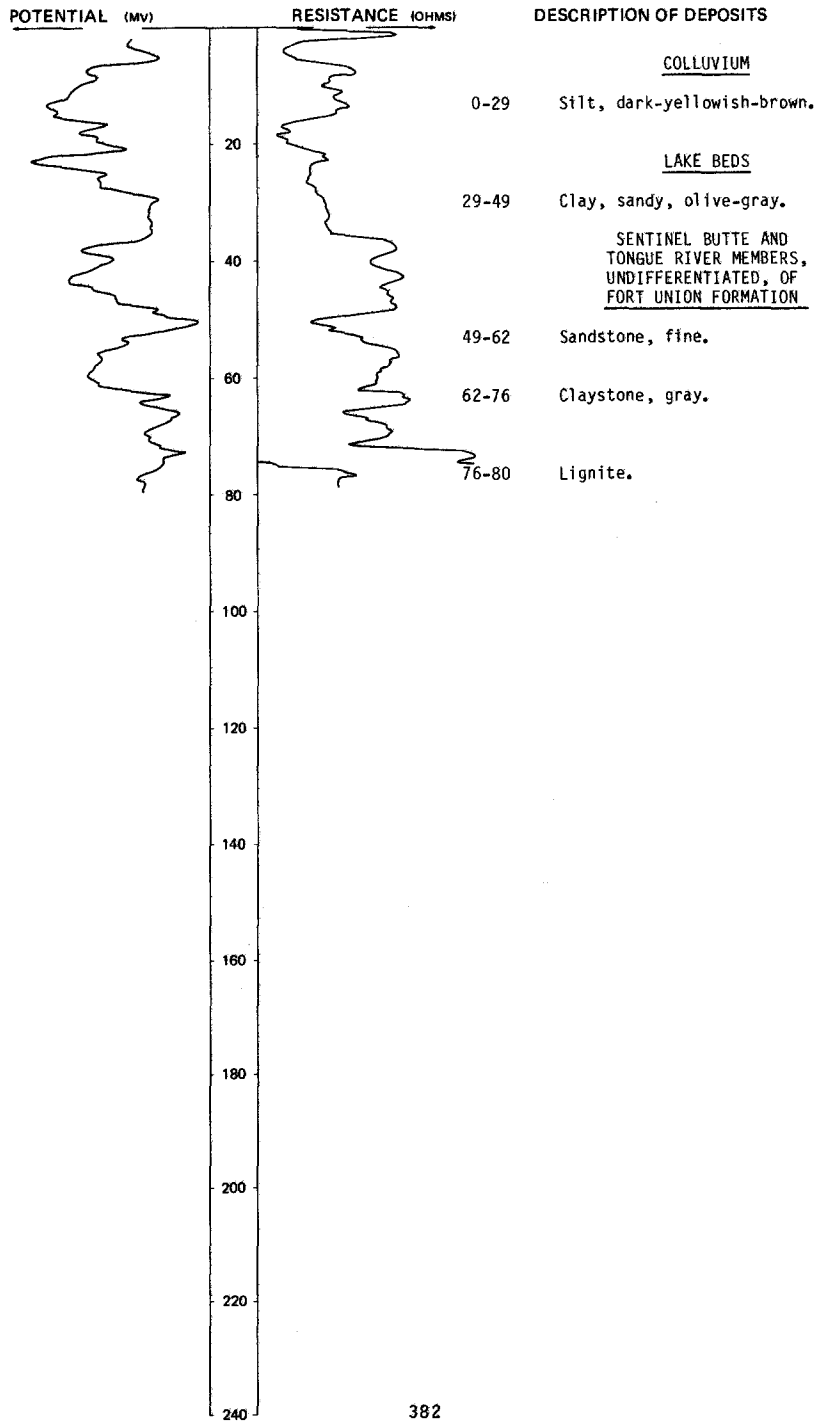
<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	15	15
	Coal-----	9	24
	Clay-----	33	57
	Rock-----	2	59
	Clay-----	11	70
	Coal-----	14	84
	Clay and rock-----	101	185
	Coal-----	7	192
	Rock-----	3	195
	Clay-----	105	300
	Sand-----	35	335
	Clay; interbedded with sand-----	75	410
	Sand-----	15	425
	Clay-----	163	588
	Coal-----	27	615
	Clay-----	195	810
	Coal-----	14	824
	Clay-----	86	910
	Clay, sandy-----	48	958
	Rock-----	5	963
	Clay-----	240	1203
	Rock-----	2	1205
	Shale-----	265	1470
	Rock-----	2	1472
	Sand-----	28	1500
	Clay-----	72	1572
	Rock-----	2	1574
	Clay-----	16	1590
	Sand-----	15	1605
	Clay-----	45	1650
	Sand-----	80	1730

LOCATION: 152-098-11CCD
ALTITUDE: 1970
(FT, NGVD)

NDSWC 11553

DATE DRILLED: 5/06/81

DEPTH: 80
(FT)

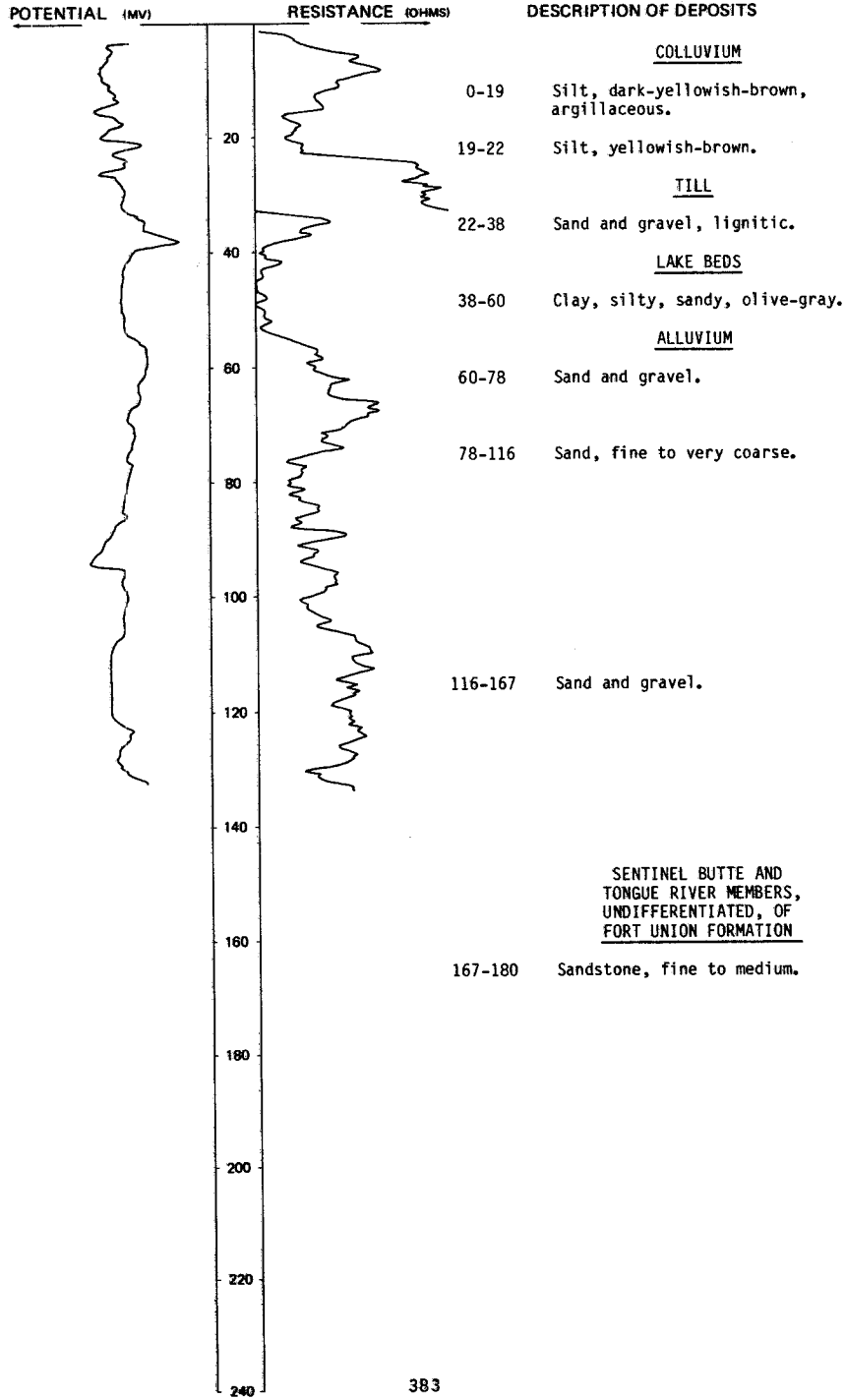


LOCATION: 152-098-11DCC
ALTITUDE: 1956
(FT, NGVD)

NDSWC 11552

DATE DRILLED: 5/06/81

DEPTH: 180
(FT)

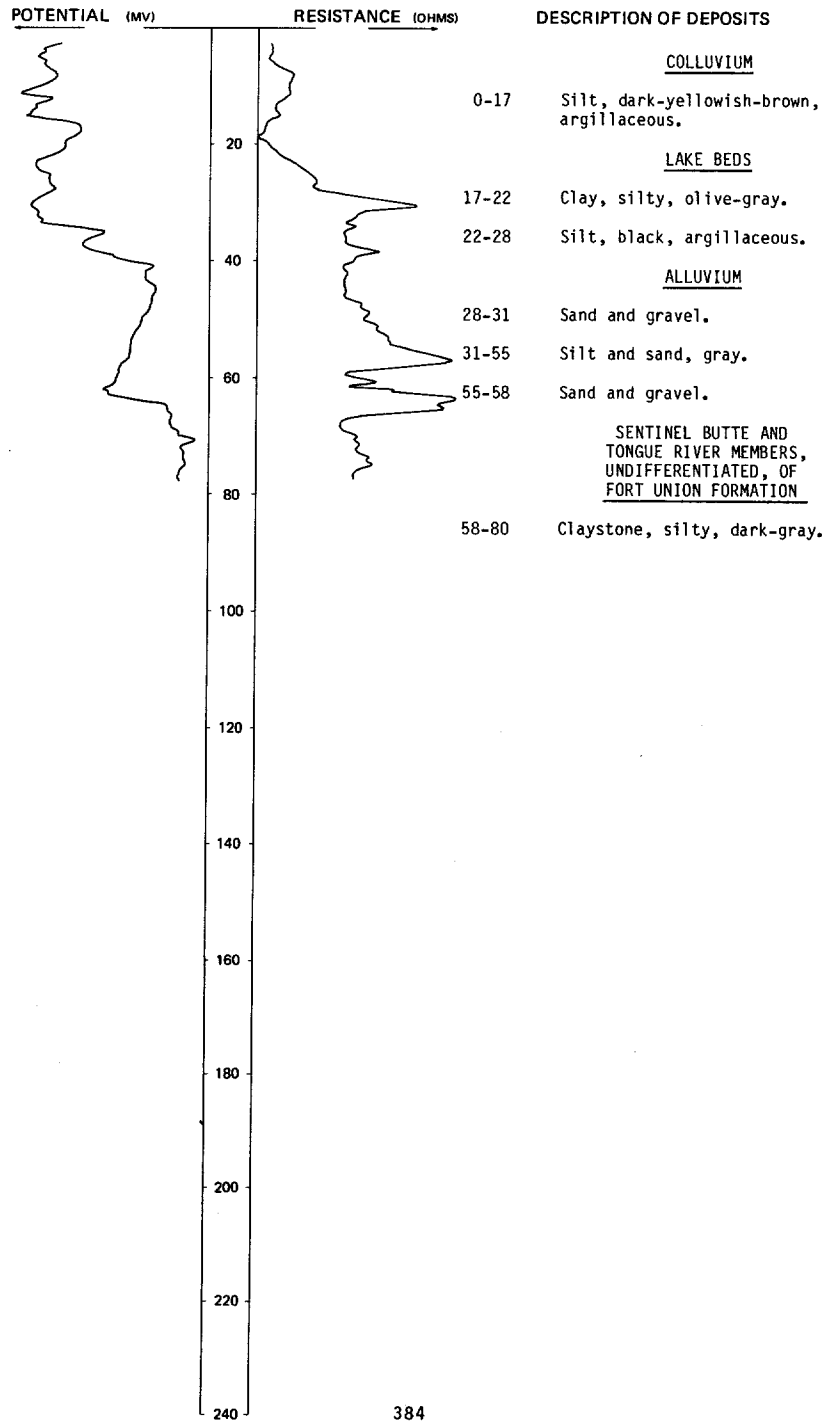


LOCATION: 152-098-11000
ALTITUDE: 1951
(FT, NGVD)

NDSWC 11550

DATE DRILLED: 5/06/81

DEPTH: 80
(FT)



152-098-13BAA
NDSWC 11551

Altitude: 1950 feet

Date drilled: 5/06/81

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Silt, dark-yellowish-brown-----	9	9
	Sand and gravel-----	1	10
	Clay, silty, olive-gray-----	22	32
	Claystone, medium-gray, lignitic-----	8	40

152-098-14CCC
NDSWC 1488

Altitude: 1969 feet

Date drilled: 4/10/59

	Topsoil, sandy, brown-----	1	1
	Clay, dark-gray, smooth-----	8	9
	Till, yellow to buff, oxidized, and fine to coarse gravel; scoria and shale pebbles-----	23	32
	Till, light-gray, and fine to coarse gravel; little scoria, shale, or lignite-----	21	53
	Sand, fine to medium, dirty; lignite-----	9	62
	Clay, silty to sandy, light-gray; lignite-----	11	73
	Sand, fine to coarse; scoria and lignite-----	5	78
	Clay, silty to sandy, light-gray; lignite-----	28	106
	Sand, coarse, and fine to coarse gravel; scoria and lignite fragments-----	63	169
	Clay, sandy, light-gray; Fort Union Formation-----	10	179

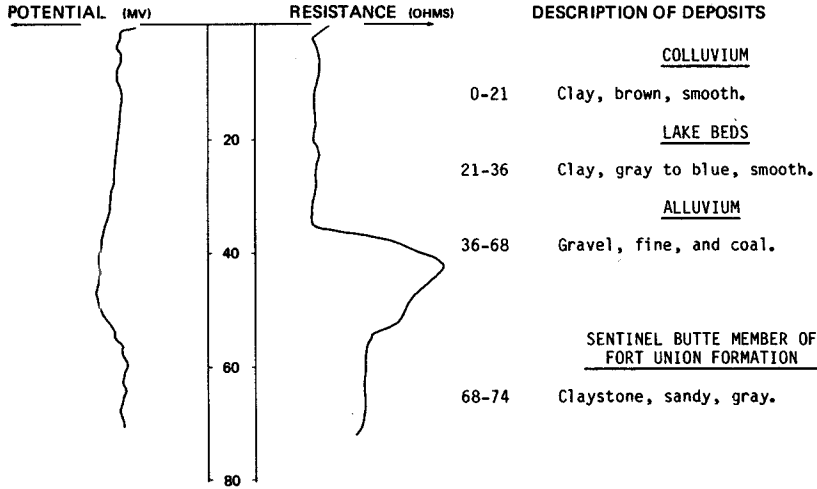
NDSWC 1486

LOCATION: 152-098-23ABB

DATE DRILLED: 4/09/59

ALTITUDE: 1960
(FT, NGVD)

DEPTH: 74
(FT)



152-098-23ADD
(Log modified from Ralph Wold Well Drilling)

Altitude: 1990 feet Date drilled: 5/23/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Scoria and till-----	11	11
	Rock-----	1	12
	Clay-----	17	29
	Sand-----	12	41
	Rock-----	1	42
	Sand-----	16	58
	Coal-----	13	71
	Clay-----	1	72

152-098-23BAA1
NDSWC 1487

Altitude: 1955 feet Date drilled: 4/10/59

	Topsoil, sandy, brown-----	4	4
	Clay, silty to sandy, gray; scoria pebbles-----	34	38
	Gravel, fine to coarse, and coarse sand; scoria pebbles and lignite-----	9	47
	Till, gray, and fine to coarse gravel; shale pebbles and lignite-----	17	64
	Clay, sandy, light-gray; Fort Union Formation-----	9	73

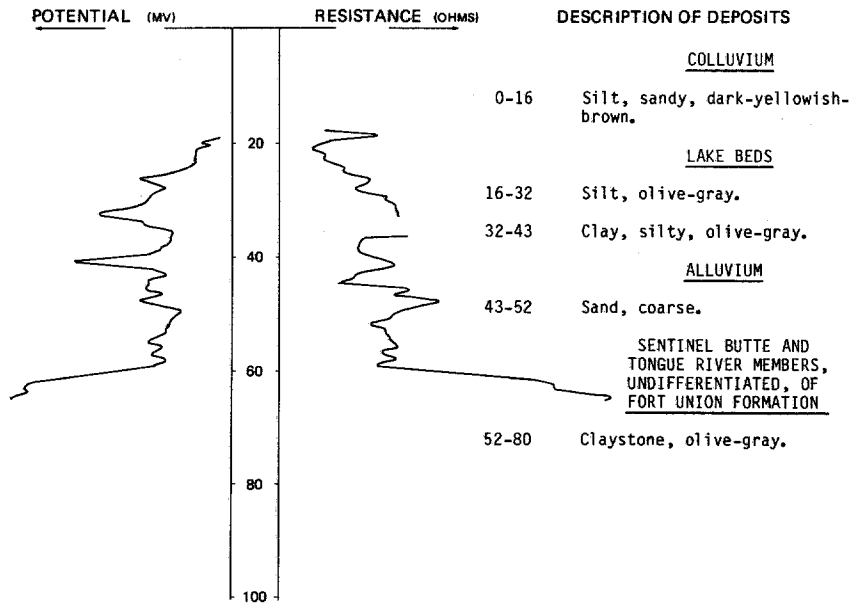
NDSWC 11739

LOCATION: 152-098-23BAA2

DATE DRILLED: 9/23/81

ALTITUDE: 1965
(FT, NGVD)

DEPTH: 80
(FT)



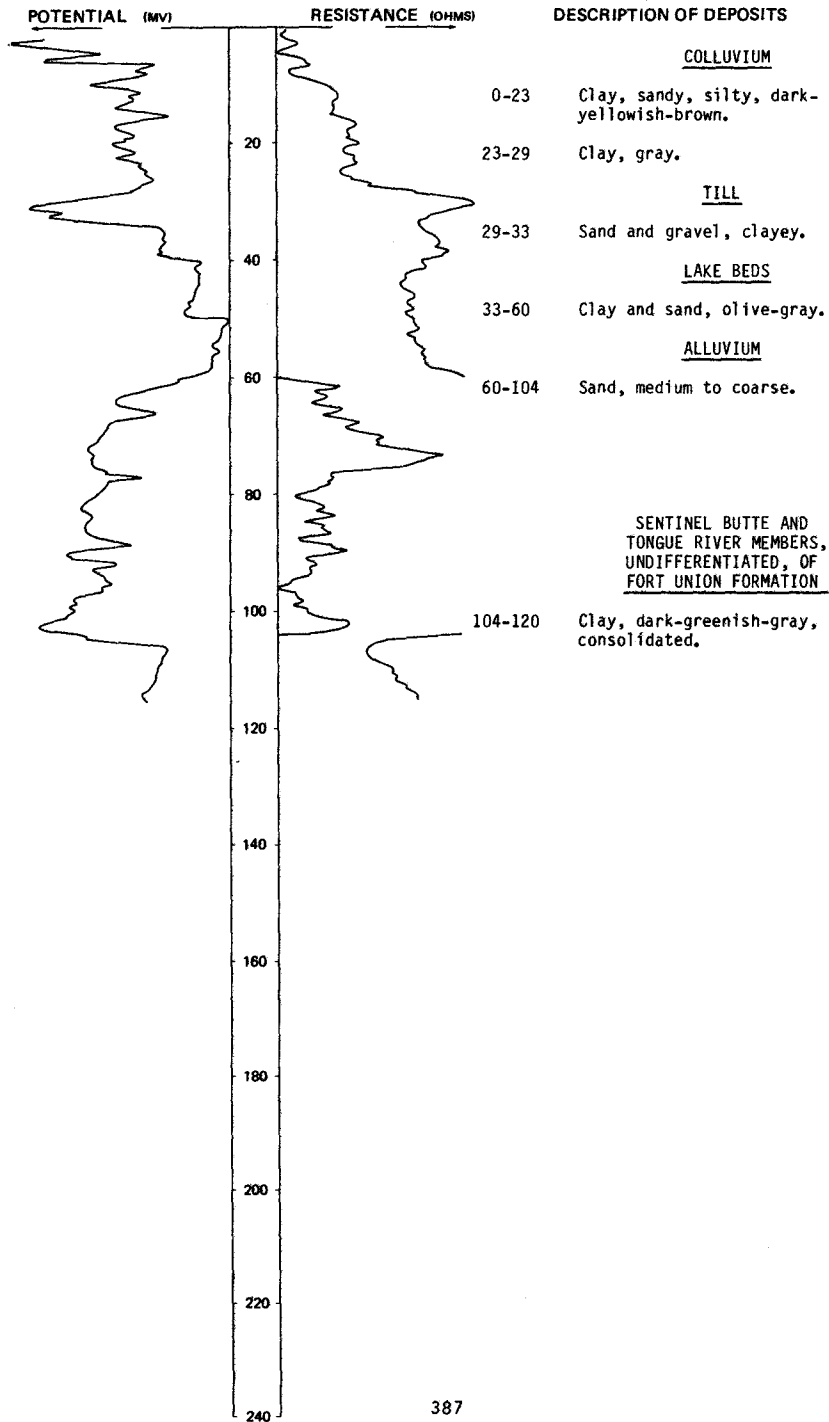
LOCATION: 152-098-23BCC

NDSWC 11747

DATE DRILLED: 9/24/81

ALTITUDE: 1967
(FT, NGVD)

DEPTH: 120
(FT)



NDSWC 5949

LOCATION: 152-098-27CDD1

DATE DRILLED: 9/23/81

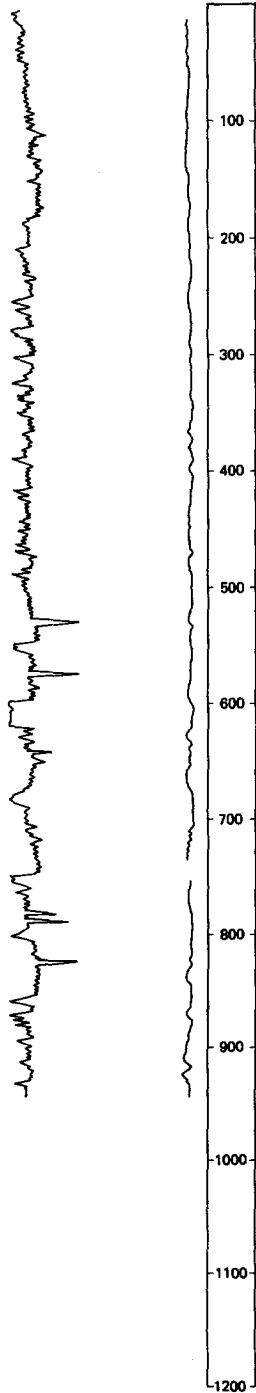
ALTITUDE: 1990
(FT, NGVD)

DEPTH: 940
(FT)

NEUTRON
(API)

S.P.
(MV)

DESCRIPTION OF DEPOSITS



0-183 Sand and gravel.

TONGUE RIVER MEMBER OF
FORT UNION FORMATION

183-420 Siltstone and claystone,
sandy, gray, carbonaceous.

420-495 Siltstone and sandstone, fine
to medium, gray.

495-595 Sandstone and siltstone, gray.

595-620 Lignite.

620-670 Sandstone and siltstone.

670-690 Lignite.

690-720 Claystone, gray.

720-760 Siltstone, sandy.

760-800 Siltstone and claystone, gray.

800-940 Sandstone and siltstone, fine
to medium, gray.

LOCATION: 152-098-27CDD1

DATE DRILLED: 9/23/81

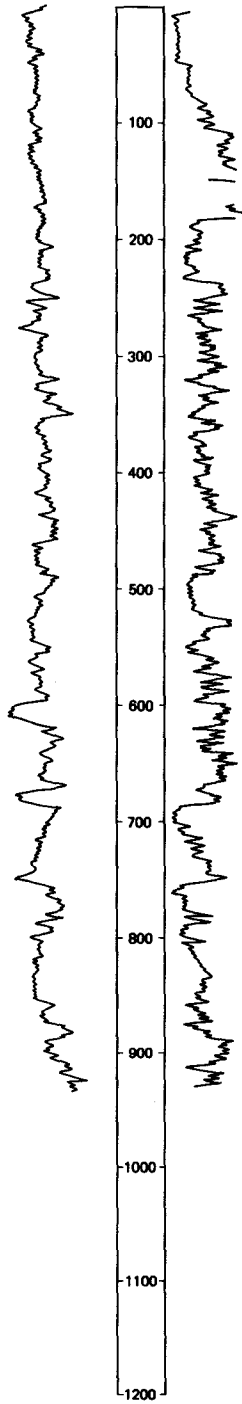
ALTITUDE: 1990
(FT. NGVD)

DEPTH: 940
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

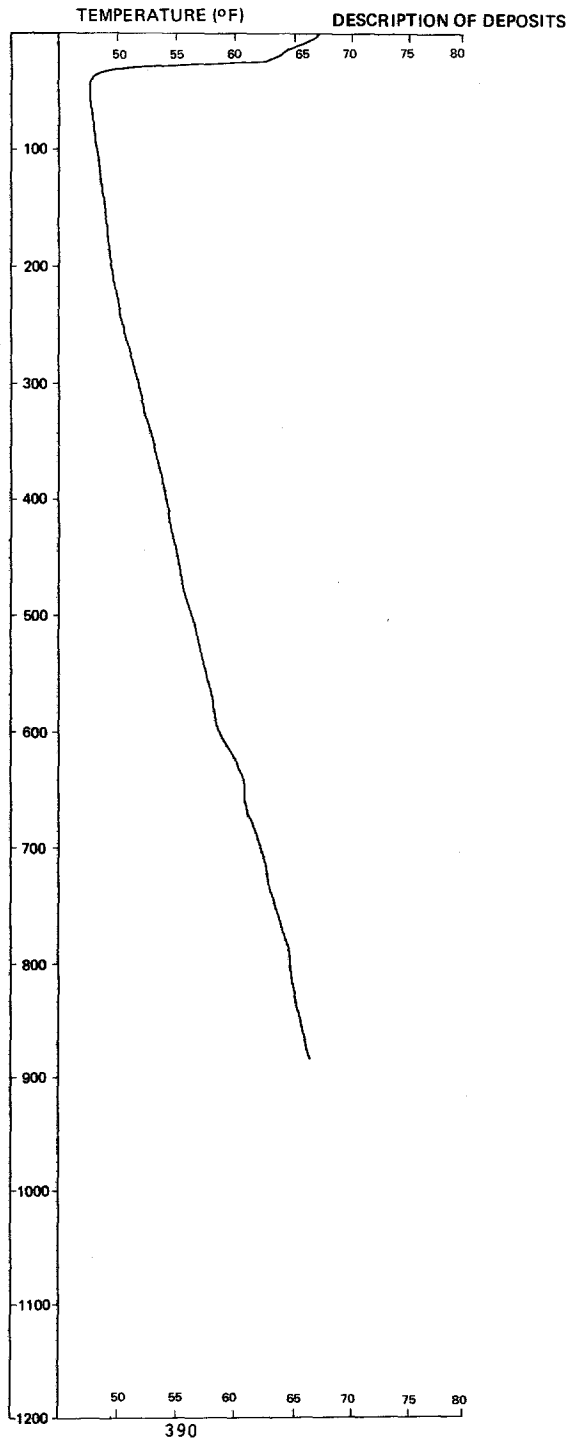


LOCATION: 152-098-27CDD1

DATE DRILLED: 9/23/81

ALTITUDE: 1990
(FT, NGVD)

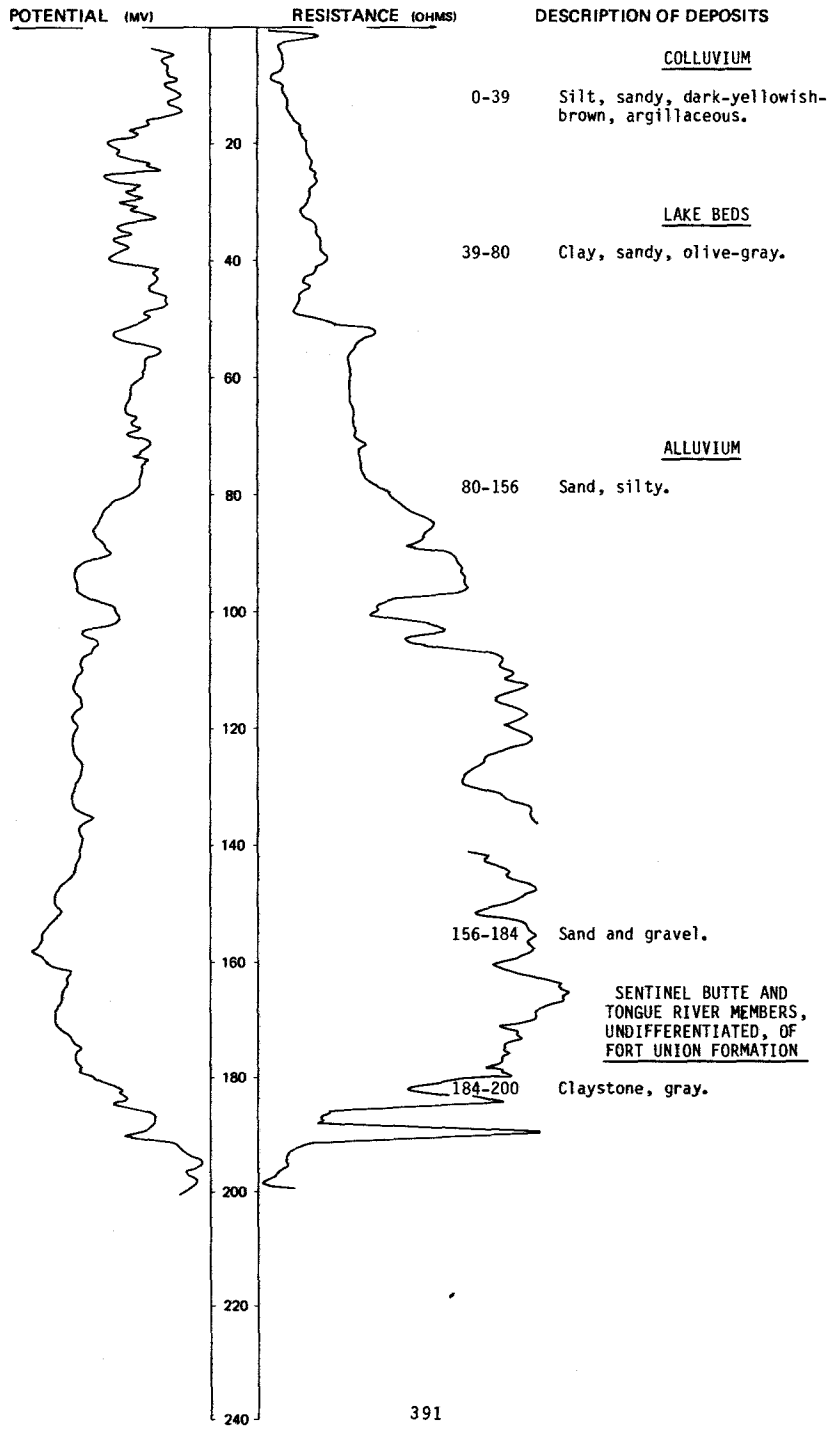
DEPTH: 940
(FT)



LOCATION: 152-098-27CDD2
ALTITUDE: 1989
(FT, NGVD)

NDSWC 11738

DATE DRILLED: 9/23/81
DEPTH: 200
(FT)



152-098-34CAB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2000 feet Date drilled: 5/22/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	4	4
	Clay and till-----	44	48
	Clay-----	15	63
	Sand and till-----	26	89
	Coal-----	6	95
	Clay-----	14	109
	Coal-----	6	115
	Clay-----	9	124
	Sand-----	8	132
	Clay-----	18	150

152-099-03ACB
(Log modified from Ralph Wold Well Drilling)

Altitude: 1920 feet Date drilled: 8/19/74

	Sand-----	20	20
	Clay-----	89	109
	Rock-----	1	110
	Clay-----	90	200
	Coal-----	4	204
	Sand-----	31	235
	Clay-----	38	273
	Sand-----	7	280
	Clay-----	22	302
	Sand-----	14	316
	Clay-----	5	321
	Rock-----	5	326
	Clay-----	24	350
	Sand-----	82	432
	Clay-----	11	443
	Rock-----	1	444
	Clay-----	76	520
	Coal-----	10	530
	Clay-----	60	590
	Coal-----	12	602
	Clay-----	13	615
	Coal-----	8	623
	Clay-----	64	687
	Sand-----	28	715
	Clay-----	105	820
	Coal-----	10	830
	Clay-----	22	852
	Rock-----	5	857
	Clay-----	58	915
	Sand-----	7	922
	Shale-----	70	992
	Sand-----	5	997
	Shale-----	131	1128
	Sand-----	5	1133
	Clay and shale-----	12	1145
	Rock-----	3	1148
	Shale and clay-----	367	1515
	Sand streaks-----	15	1530
	Rock-----	2	1532
	Clay, sandy-----	13	1545
	Shale-----	15	1560
	Sand-----	50	1610

152-099-248BB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2040 feet Date drilled: 6/29/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy-----	26	26
	Coal-----	2	28
	Clay-----	31	59
	Rock-----	4	63
	Clay-----	9	72
	Coal-----	13	85
	Clay-----	155	240
	Rock-----	2	242
	Clay-----	38	280
	Coal-----	18	298
	Clay; interbedded with rock-----	267	565
	Coal-----	10	575
	Clay-----	43	618
	Coal-----	12	630
	Clay, sandy-----	43	673
	Coal-----	19	692
	Clay-----	20	712
	Rock-----	3	715
	Clay-----	20	735
	Coal-----	15	750
	Clay-----	298	1048
	Sand-----	22	1070
	Clay-----	195	1265
	Sand-----	25	1290
	Clay-----	133	1423
	Rock-----	2	1425
	Sand-----	10	1435
	Shale-----	94	1529
	Sand-----	46	1575
	Coal-----	7	1582
	Sand-----	10	1592
	Shale-----	88	1680
	Shale-----	55	1735
	Sand-----	60	1795

152-099-24CDA
(Log modified from Ralph Wold Well Drilling)

Altitude: 1875 feet Date drilled: 7/22/73

	Till and clay-----	15	15
	Clay-----	12	27
	Sand-----	1	28
	Clay-----	40	68
	Coal-----	9	77
	Rock-----	1	78
	Clay; sand streaks-----	10	88
	Rock-----	4	92
	Clay-----	10	102
	Coal-----	11	113
	Clay-----	7	120

152-099-25AAB
(Log modified from Ralph Wold Well Drilling)

Altitude: 2100 feet

Date drilled: 7/16/76

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Clay-----	7	7
	Coal-----	4	11
	Clay-----	74	85
	Coal-----	2	87
	Clay-----	4	91
	Coal-----	6	97
	Clay, sandy-----	18	115
	Coal-----	17	132
	Clay-----	88	220
	Rock-----	3	223
	Clay-----	107	330
	Coal-----	15	345
	Clay-----	15	360
	Coal-----	7	367
	Clay-----	53	420
	Sand-----	9	429
	Clay-----	33	462
	Rock-----	4	466
	Clay-----	21	487
	Sand-----	10	497
	Clay-----	113	610
	Coal-----	15	625
	Clay-----	53	678
	Coal-----	12	690
	Clay, sandy-----	40	730
	Coal-----	17	747
	Clay-----	40	787
	Coal-----	13	800
	Clay-----	65	865
	Coal-----	10	875
	Clay-----	53	928
	Sand-----	27	955
	Shale-----	11	966
	Coal-----	5	971
	Clay-----	68	1039
	Sand-----	54	1093
	Shale-----	13	1106
	Sand-----	9	1115
	Clay-----	99	1214
	Sand-----	16	1230
	Shale-----	62	1292
	Rock-----	4	1296
	Shale-----	64	1360
	Sand-----	40	1400
	Shale-----	137	1537
	Sand-----	14	1551
	Shale-----	179	1730
	Sand-----	70	1800

152-099-28BBA
(Log modified from Thompson Drilling Co.)

Altitude: 2140 feet Date drilled: 6/27/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, blue-----	60	60
	Coal-----	1	61
	Clay-----	12	73
	Coal-----	3	76
	Clay-----	7	83
	Shale, hard-----	1	84
	Clay-----	19	103
	Coal-----	7	110
	Clay-----	27	137
	Sand, coarse-----	58	195

152-099-33ADB
(Log modified from Thompson Drilling Co.)

Altitude: 2300 feet Date drilled: 12/08/74

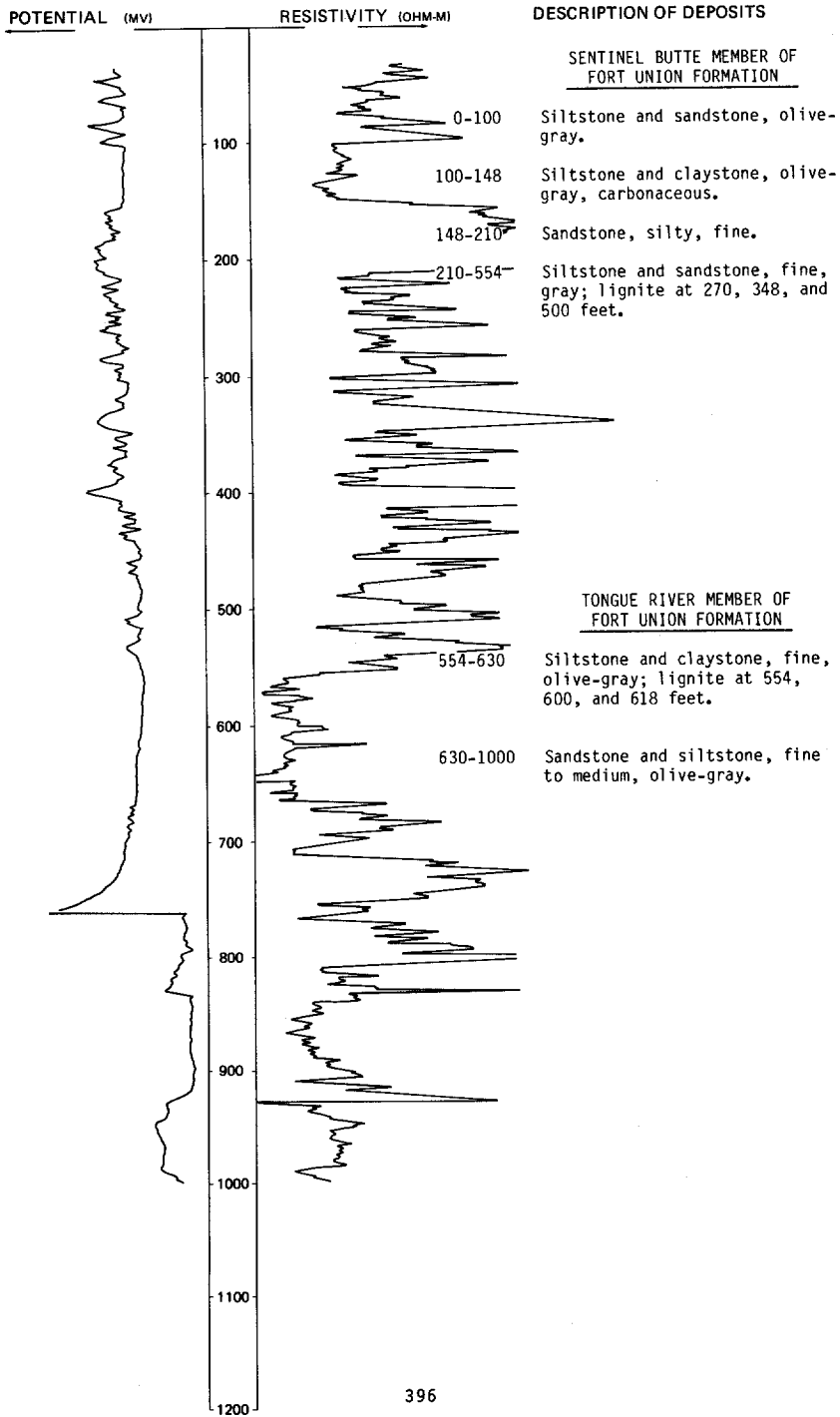
	Topsoil-----	3	3
	Sand-----	16	19
	Sand, dirty-----	46	65
	Clay-----	5	70
	Coal-----	5	75
	Sand-----	25	100
	Clay-----	10	110
	Sand, dirty-----	6	116
	Sand, clean-----	6	122
	Coal-----	3	125

LOCATION: 152-101-14ACA

DATE DRILLED: 11/06/81

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 1000
(FT)



LOCATION: 152-101-14ACA

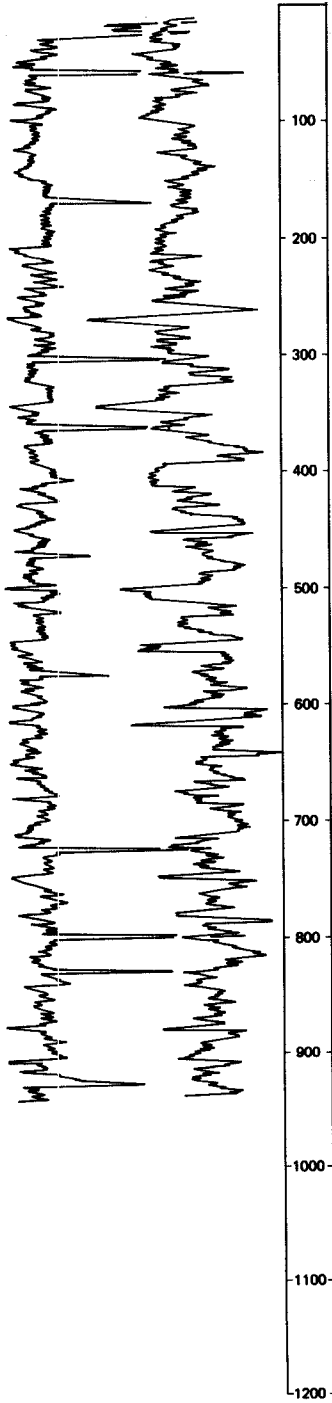
DATE DRILLED: 11/06/81

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 1000
(FT)

NEUTRON GAMMA
(API) RAY

DESCRIPTION OF DEPOSITS

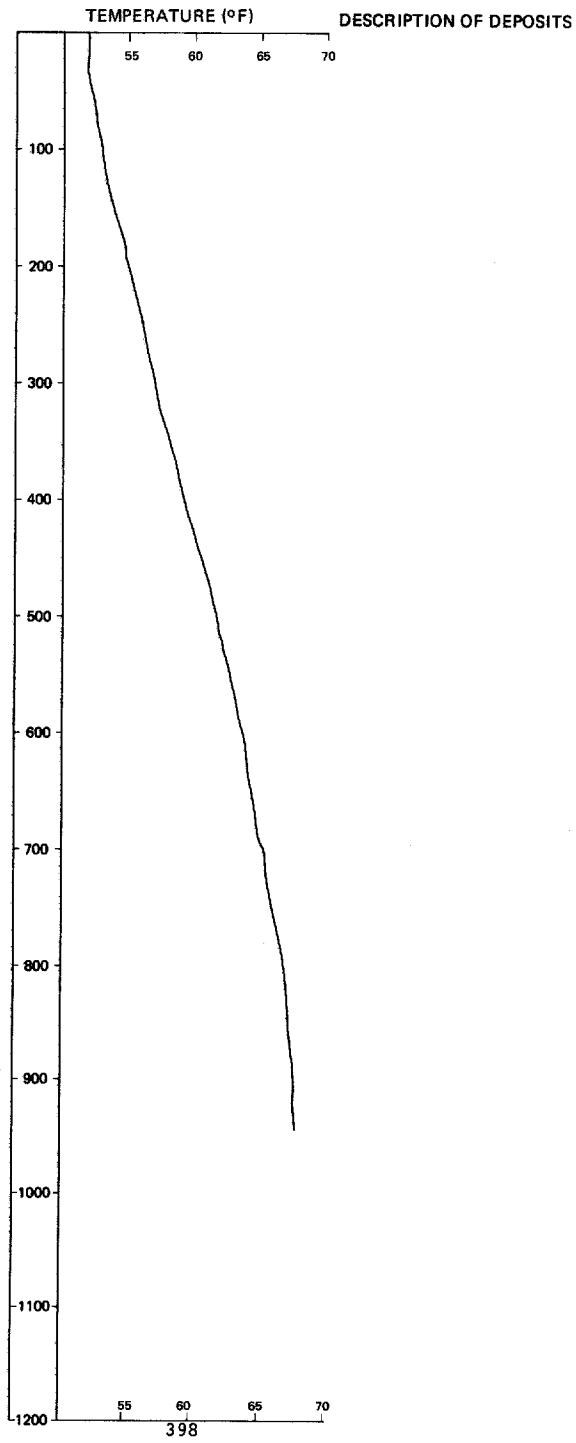


LOCATION: 152-101-14ACA NDSWC 6044, Continued

DATE DRILLED: 11/06/81

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 1000
(FT)



(Log modified from Himebaugh Drilling)
LOCATION: 152-101-15ADD

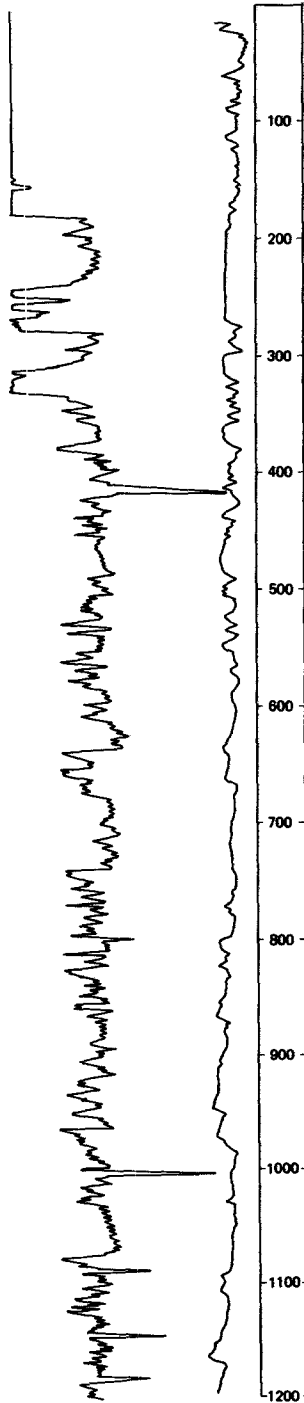
DATE DRILLED: 6/24/82

ALTITUDE: 1995
(FT, NGVD)

DEPTH: 1640
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

- 0-160 Siltstone and claystone, olive-gray, lignitic.
- 160-165 Limestone.
- 165-190 Siltstone, sandy, clayey.
- 190-275 Sandstone, fine to medium, gray.
- 275-315 Siltstone, gray.

TONGUE RIVER MEMBER OF
FORT UNION FORMATION

- 315-330 Lignite and claystone.
- 330-355 Claystone, silty, gray.
- 355-360 Lignite.
- 360-415 Claystone, silty, gray.
- 415-420 Limestone.
- 420-645 Claystone, silty, sandy, carbonaceous.
- 645-745 Sandstone, fine to coarse.
- 745-795 Claystone, gray.
- 795-925 Siltstone, sandy, gray.

LOWER PART OF
FORT UNION FORMATION

- 925-1000 Claystone, gray.
- 1000-1005 Limestone.
- 1005-1205 Claystone, silty, carbonaceous.

LOCATION: (Log modified from Himebaugh Drilling), Continued
152-101-15ADD

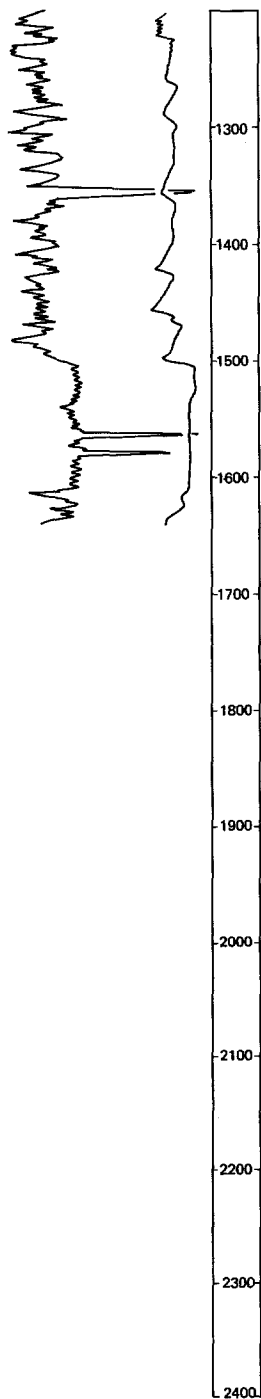
DATE DRILLED: 6/24/82

ALTITUDE: 1995
(FT, NGVD)

DEPTH: 1640
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued

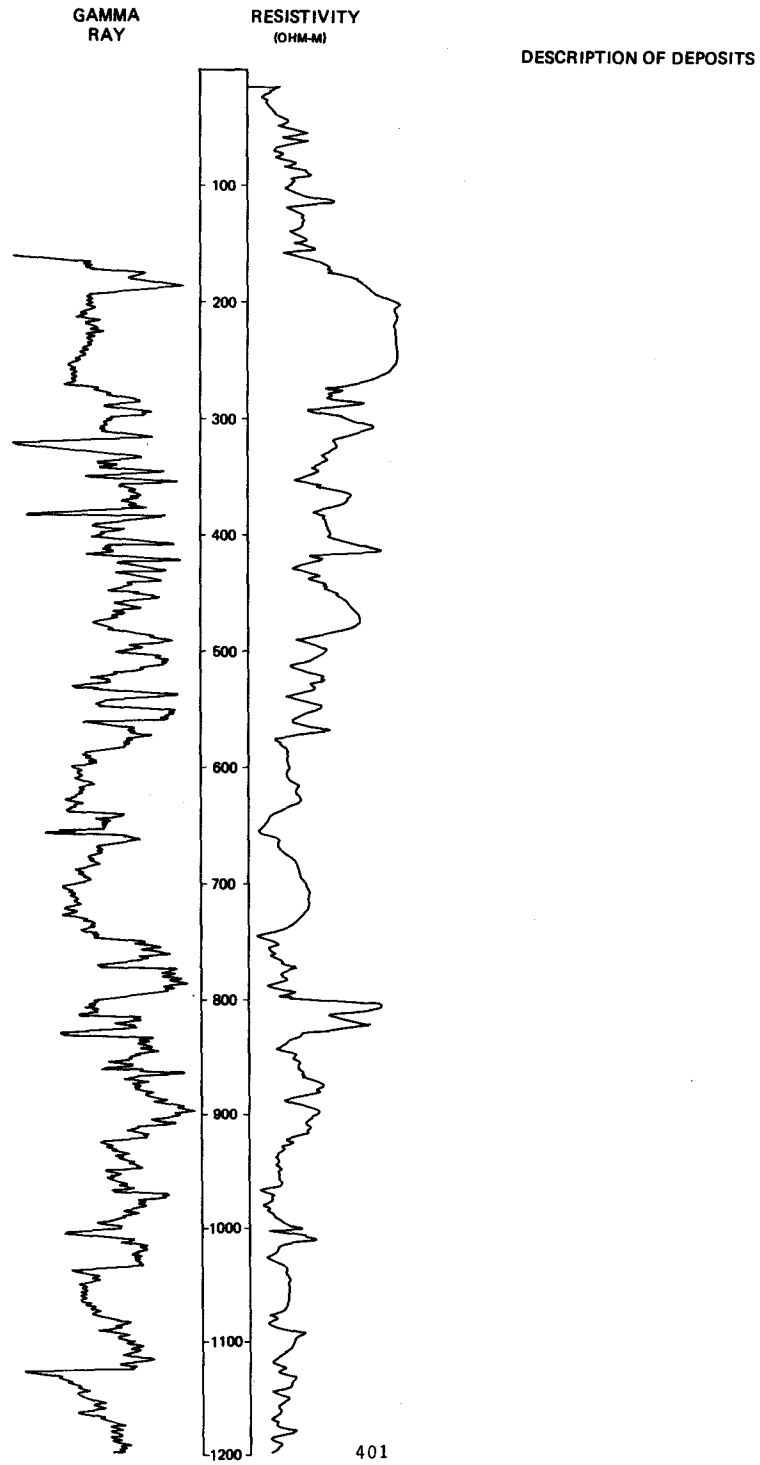
- | | |
|-----------|-------------------------------------|
| 1205-1250 | Siltstone and lignite, sandy. |
| 1250-1280 | Claystone, silty, gray. |
| 1280-1415 | Siltstone, sandy, clayey. |
| 1415-1495 | Claystone, silty,
carbonaceous. |
| 1495-1610 | Sandstone, fine to coarse,
gray. |
| 1610-1640 | Siltstone, sandy, clayey. |

LOCATION: (Log modified from Himebaugh Drilling), Continued
152-101-15ADD

DATE DRILLED: 6/24/82

ALTITUDE: 1995
(FT, NGVD)

DEPTH: 1640
(FT)

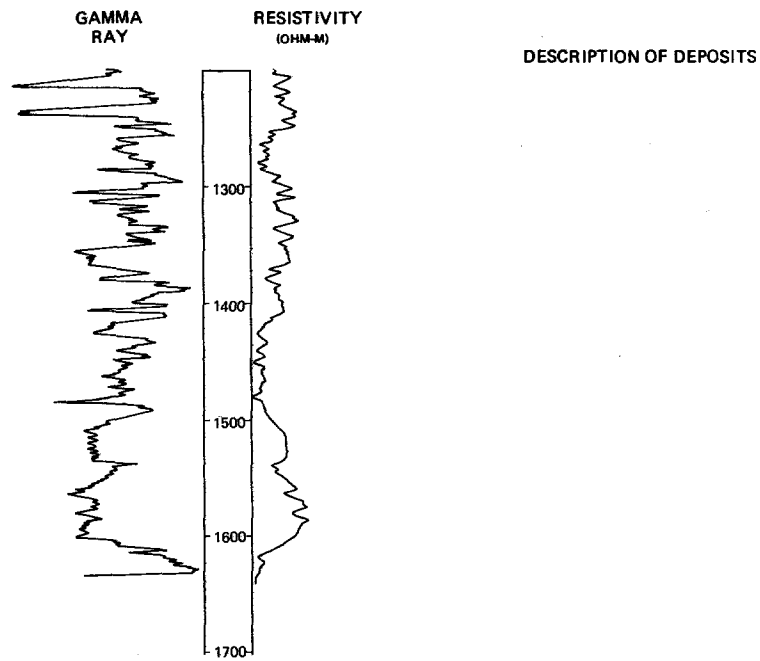


(Log modified from Himebaugh Drilling), Continued
 LOCATION: 152-101-15ADD

DATE DRILLED: 6/24/82

ALTITUDE: 1995
 (FT, NGVD)

DEPTH: 1640
 (FT)



152-101-19CAD
 (Log modified from Thompson Drilling Co.)

Altitude: 2265 feet

Date drilled: 8/16/72

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	4	4
	Sand, red, dirty-----	24	28
	Sand, gray-----	27	55
	Clay-----	3	58
	Sand, gray-----	17	75
	Clay-----	5	80

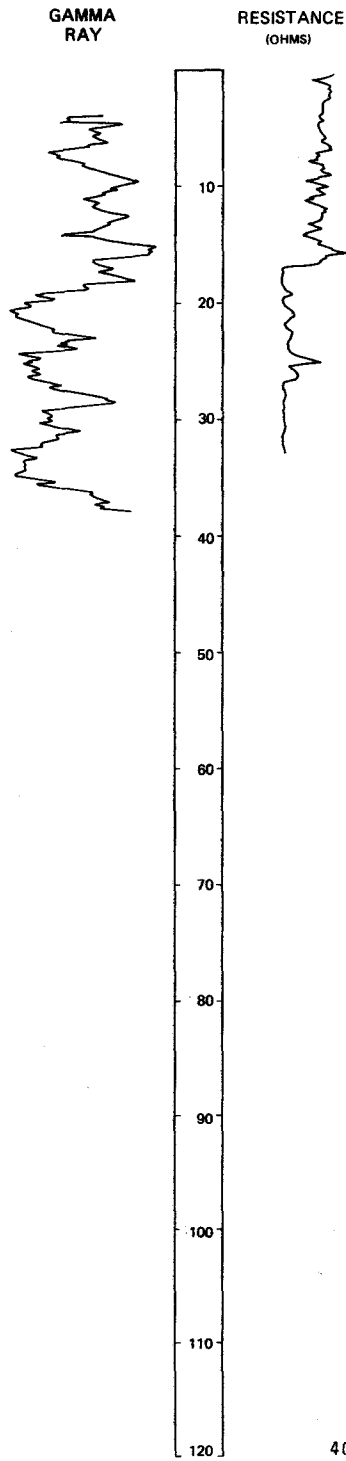
NDSWC 5616

LOCATION: 152-101-24CBB1

DATE DRILLED: 10/08/79

ALTITUDE: 1878
(FT, NGVD)

DEPTH: 62
(FT)



DESCRIPTION OF DEPOSITS

COLLUVIUM

- 0-2 Topsoil.
- 2-18 Clay, very silty, very sandy, pebbly, dark-yellowish-brown.

GLACIAL OUTWASH

- 18-39 Sand and gravel, very fine to coarse.

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION

- 39-62 Siltstone and claystone, light-bluish-gray.

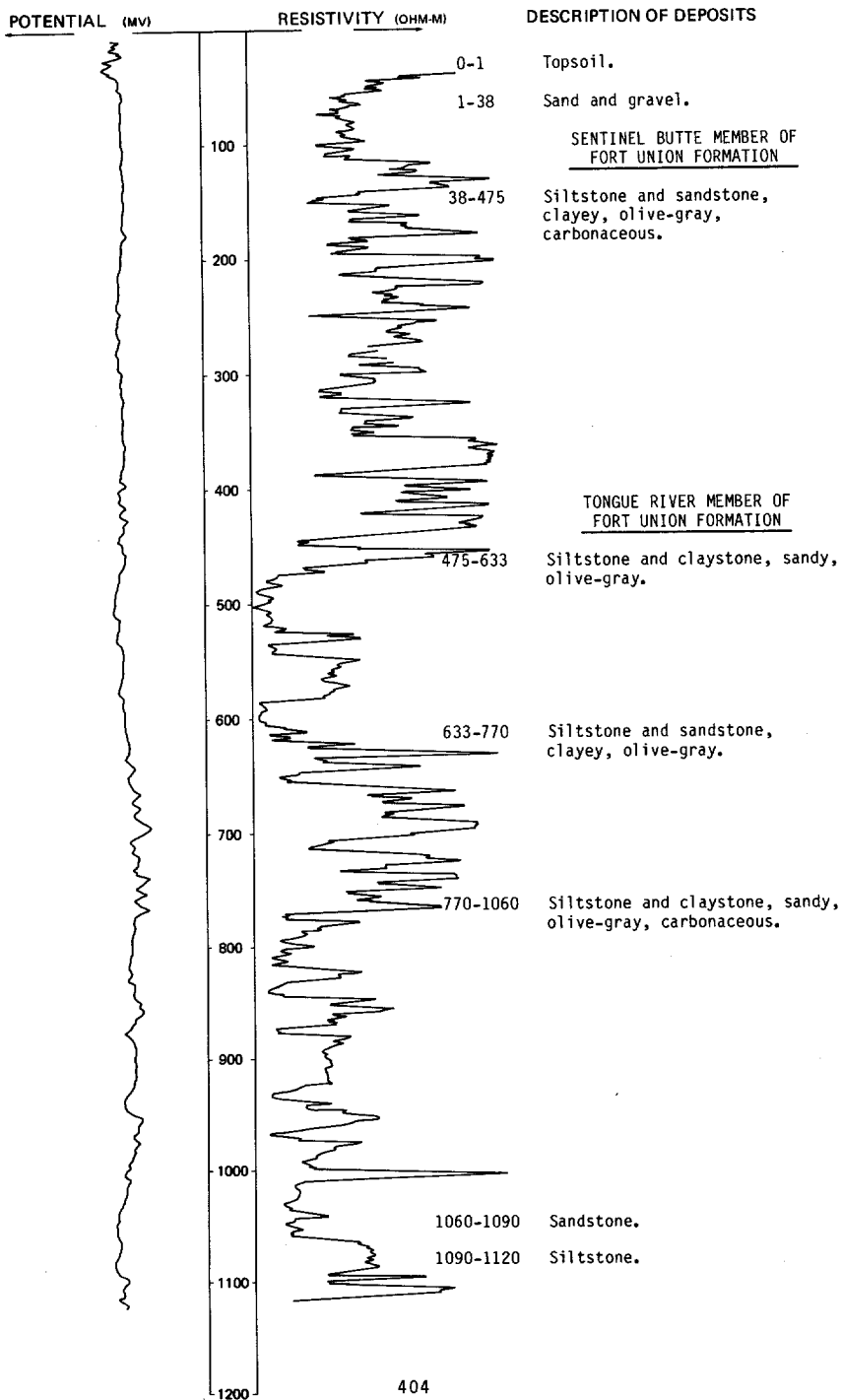
NDSWC 6043

LOCATION: 152-101-24CBB2

DATE DRILLED: 11/02/81

ALTITUDE: 1879
(FT, NGVD)

DEPTH: 1120
(FT)



152-102-08BAC
(Log modified from Henry M. Halverson)

Altitude: 2050 feet Date drilled: 6/20/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Rocks and clay-----	100	100
	Sand-----	1	101
	Sandstone-----	14	115
	Clay, gray-----	33	148
	Clay, blue-----	4	152

152-102-17DAC
(Log modified from Thompson Drilling Co.)

Altitude: 2070 feet Date drilled: 3/21/74

	Clay-----	12	12
	Rocks-----	5	17
	Clay-----	13	30
	Sand, brown-----	10	40
	Sand, soft-----	10	50
	Sand, blue; water-----	20	70

152-102-27CDD
(Log modified from Thompson Drilling Co.)

Altitude: 2278 feet Date drilled: 4/04/74

	Soil-----	2	2
	Sand, hard-----	20	22
	Sand, soft-----	13	35
	Clay-----	15	50
	Sand, firm-----	34	84
	Shale, hard-----	2	86
	Sand, soft-----	14	100
	Sand, soft; water-----	10	110

152-103-25CAB
(Log modified from Kieson Drilling)

Altitude: 1965 feet

Date drilled: 11/05/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	8	8
	Clay, sandy-----	57	65
	Coal-----	5	70
	Clay, sandy-----	55	125
	Coal-----	5	130
	Clay-----	6	136
	Coal-----	10	146
	Clay-----	144	290
	Coal-----	4	294
	Clay, sandy-----	26	320
	Coal-----	15	335
	Clay-----	15	350
	Coal-----	15	365
	Clay-----	75	440
	Sand-----	30	470
	Clay-----	15	485
	Coal-----	19	504
	Clay-----	86	590
	Coal-----	15	605
	Clay, sandy-----	75	680
	Sand-----	30	710
	Clay, sandy-----	270	980
	Clay-----	120	1100
	Coal-----	10	1110
	Clay-----	80	1190
	Clay, sandy-----	30	1220
	Clay-----	30	1250
	Clay, sandy-----	30	1280
	Sand-----	35	1315
	Clay-----	85	1400
	Clay, sandy-----	20	1420
	Coal-----	5	1425
	Clay, sandy-----	70	1495
	Sand-----	33	1528
	Clay-----	2	1530

152-104-20CCC
(Log modified from Boyce Drilling, Inc.)

Altitude: 1930 feet

Date drilled: 8/16/77

	Sand, brown, and clay-----	25	25
	Clay, gray-----	105	130
	Coal-----	8	138
	Clay, gray-----	162	300
	Sand-----	25	325
	Clay, gray-----	15	340
	Sandstone-----	3	343
	Clay, gray-----	14	357
	Sandstone-----	3	360
	Clay, gray-----	265	625
	Coal-----	6	631
	Clay, gray-----	89	720
	Sand and sandy clay-----	50	770
	Clay, sandy, gray; layers of coal-----	635	1405
	Sand-----	5	1410
	Sandstone-----	2	1412
	Sand-----	28	1440
	Sand, dark-gray; water-----	45	1485

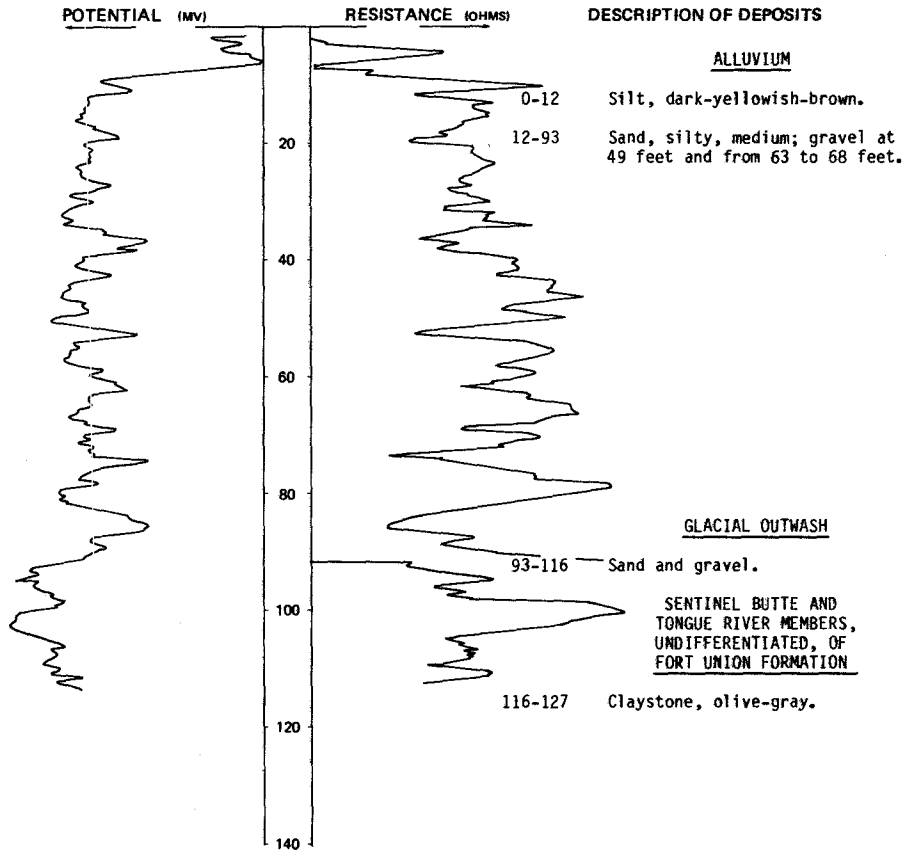
LOCATION: 152-104-26DAD

NDSWC 11583

DATE DRILLED: 5/15/81

ALTITUDE: 1876
(FT, NGVD)

DEPTH: 127
(FT)



152-104-30DAC
(Log modified from Gulbraa Drilling Co.)

Altitude: 1930 feet

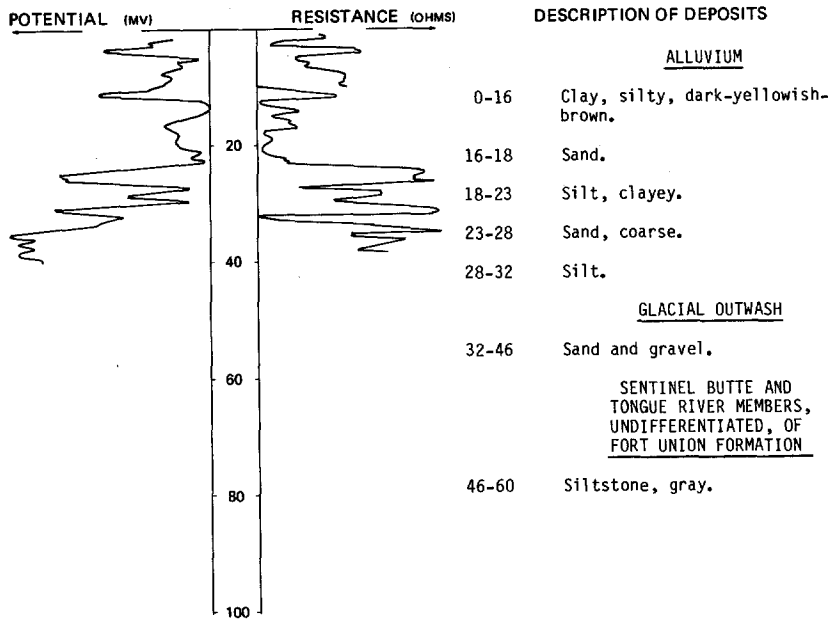
Date drilled: 10/02/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy, yellow-----	30	30
	Coal-----	3	33
	Clay, sandy, brown-----	5	38
	Clay, blue-----	22	60
	Rock-----	3	63
	Clay, gray-----	25	88
	Clay, blue-----	7	95
	Sandstone; water-----	19	114
	Clay, blue-----	2	116

LOCATION: 152-104-32CCB
 ALTITUDE: 1890
 (FT, NGVD)

NDSWC 11580

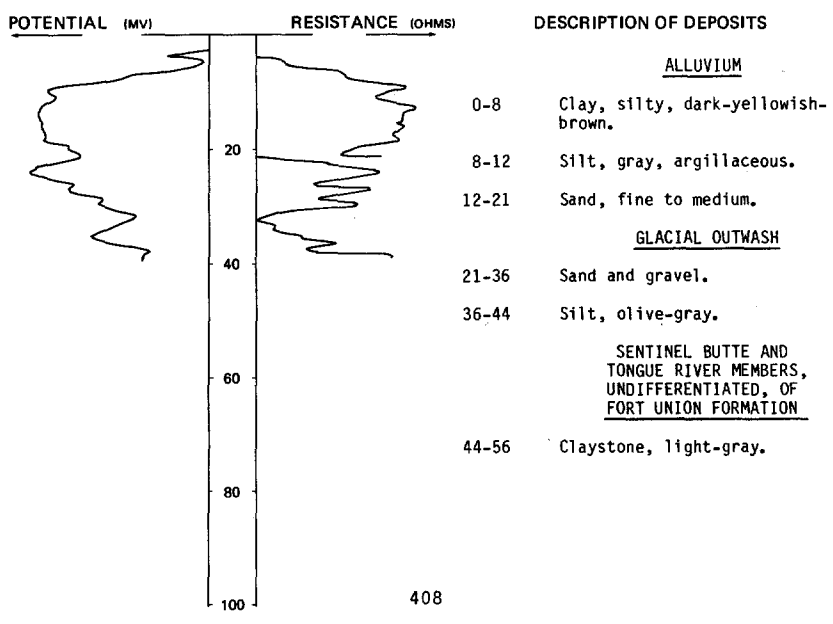
DATE DRILLED: 5/14/81
 DEPTH: 60
 (FT)



LOCATION: 152-104-33DAA
 ALTITUDE: 1875
 (FT, NGVD)

NDSWC 11579

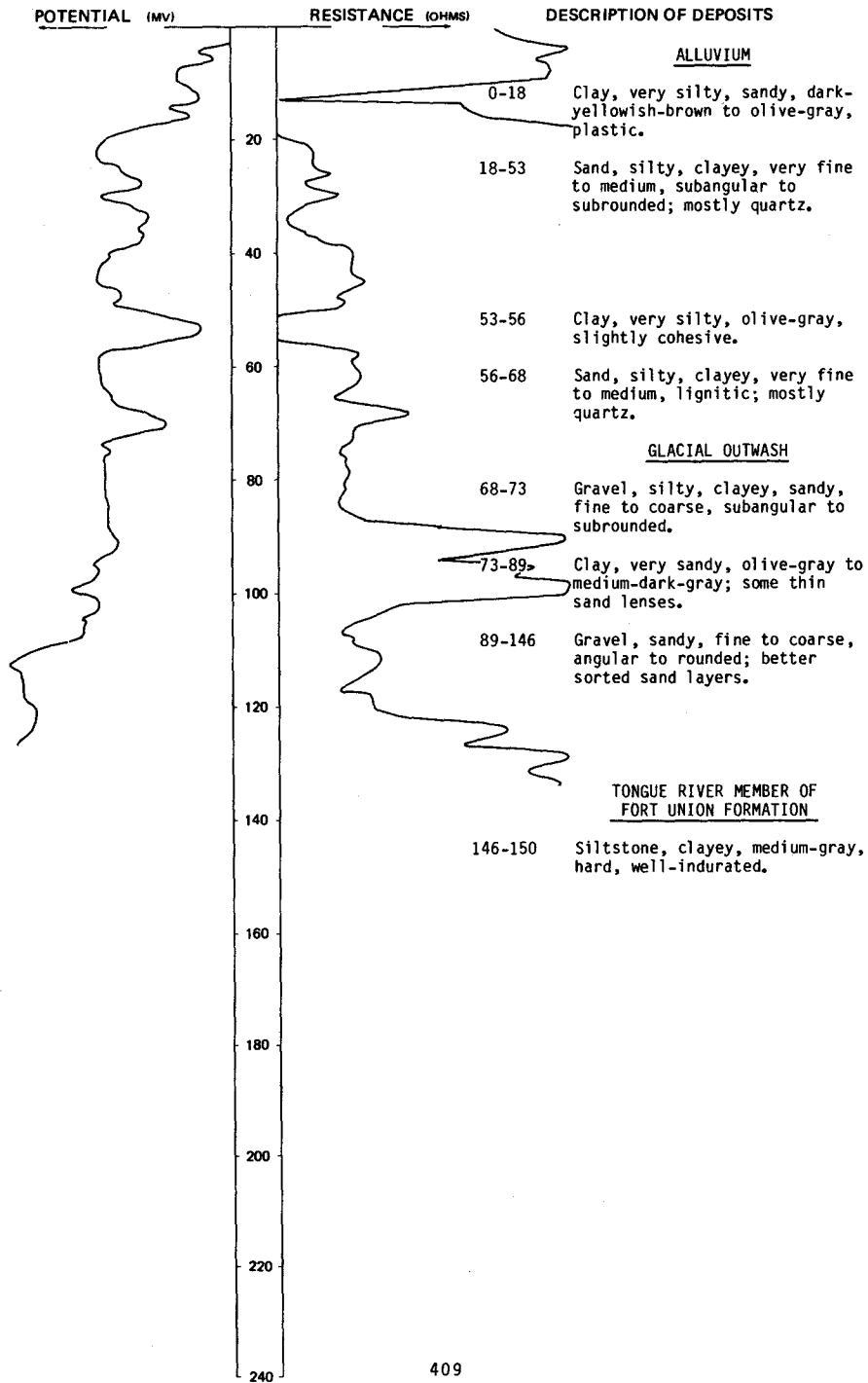
DATE DRILLED: 5/14/81
 DEPTH: 56
 (FT)



LOCATION: 152-104-34AAA
 ALTITUDE: 1878
 (FT, NGVD)

NDSWC 8027

DATE DRILLED: 7/14/71
 DEPTH: 150
 (FT)



152-104-34CDC
(Log modified from Boyce Drilling, Inc.)

Altitude: 1875 feet Date drilled: 5/21/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand and gravel-----	50	50
	Coal-----	10	60
	Clay, gray; interbedded with coal-----	155	215
	Coal-----	3	218
	Clay, gray-----	52	270
	Coal-----	5	275
	Clay, gray-----	47	322
	Sandstone-----	1	323
	Sand, gray-----	32	355
	Clay, gray-----	231	586
	Sandstone-----	2	588
	Clay, gray-----	102	690
	Sandstone-----	2	692
	Clay, gray; interbedded with sand-----	227	919
	Sandstone-----	1	920
	Clay, gray-----	365	1285
	Sand-----	25	1310
	Clay, gray-----	76	1386
	Water sand, gray-----	39	1425
	Clay-----	--	1425

152-104-36DBC
(Log modified from Boyce Drilling, Inc.)

Altitude: 2030 feet Date drilled: 2/18/75

	Clay, brown-----	5	5
	Gravel-----	10	15
	Clay, sandy, gray-----	50	65
	Clay, gray-----	6	71
	Coal-----	3	74
	Clay, gray-----	118	192
	Sandstone-----	1	193
	Clay, gray-----	22	215
	Coal; water-----	5	220
	Clay, gray-----	--	220

153-094-19CDD
(Log modified from Kieson Drilling)

Altitude: 2235 feet Date drilled: 1/21/76

	Topsoil-----	1	1
	Sand and gravel-----	19	20
	Clay-----	15	35
	Coal-----	1	36
	Clay-----	18	54
	Clay, sandy-----	6	60
	Clay-----	18	78
	Coal-----	3	81
	Clay-----	3	84
	Coal-----	3	87
	Clay-----	23	110
	Coal-----	3	113
	Clay, sandy-----	--	113

LOCATION: NDSWC 5781, 5781A, 5781B
153-094-23CCC1, 2, 3

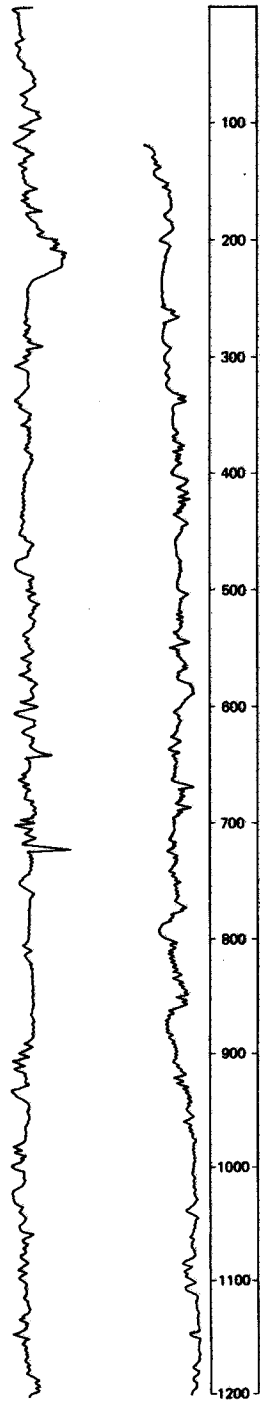
DATE DRILLED: 8/21/80

ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1856
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

- 0-15 Till.
- SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION
- 15-150 Siltstone and claystone,
sandy, brown, lignitic.
- 150-220 Siltstone and claystone, gray.
- 220-245 Sandstone and siltstone, fine
to medium.
- TONGUE RIVER MEMBER OF
FORT UNION FORMATION
- 245-365 Lignite and claystone, sandy.
- 365-435 Siltstone and claystone, gray.
- 435-495 Claystone and siltstone,
lignitic.
- 495-510 Lignite.
- 510-770 Siltstone and claystone, gray,
lignitic.

- 770-780 Lignite.
- 780-925 Siltstone and sandstone, fine
to medium.
- LOWER PART OF
FORT UNION FORMATION
- 925-1055 Claystone and lignite, sandy,
gray.

- 1055-1220 Siltstone and sandstone, gray.

NDSWC 5781, 5781A, 5781B, Continued
LOCATION: 153-094-23CCC1, 2, 3

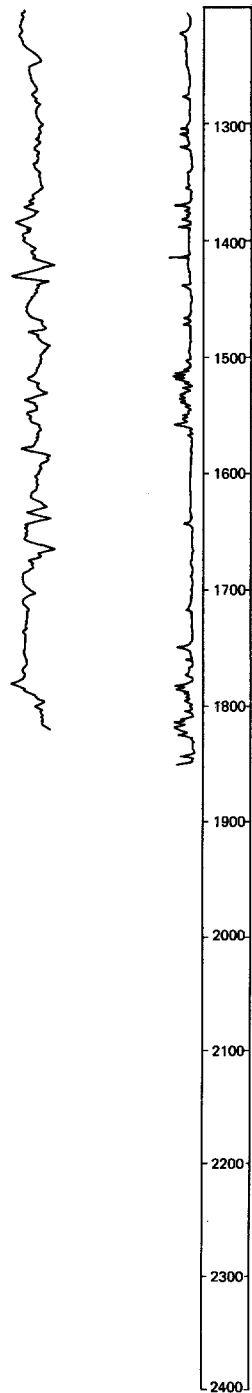
DATE DRILLED: 8/21/80

ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1856
(FT)

NEUTRON
(API)

S.P.
(MV)



DESCRIPTION OF DEPOSITS

LOWER PART OF
FORT UNION FORMATION,
Continued

- 1220-1260 Sandstone, silty, fine to medium, gray.
- 1260-1380 Siltstone and claystone.
- 1380-1445 Siltstone and sandstone, fine to medium, gray.
- 1445-1458 Lignite.

HELL CREEK AND FOX HILLS
FORMATIONS, UNDIFFERENTIATED

- 1458-1600 Siltstone and sandstone, fine to medium, gray.
- 1600-1810 Sandstone and siltstone, fine to medium, gray.

- 1810-1845 Siltstone, sandy, gray.

PIERRE SHALE

- 1845-1856 Shale.

NDSWC 5781, 5781A, 5781B, Continued
LOCATION: 153-094-23CCC1, 2, 3

DATE DRILLED: 8/21/80

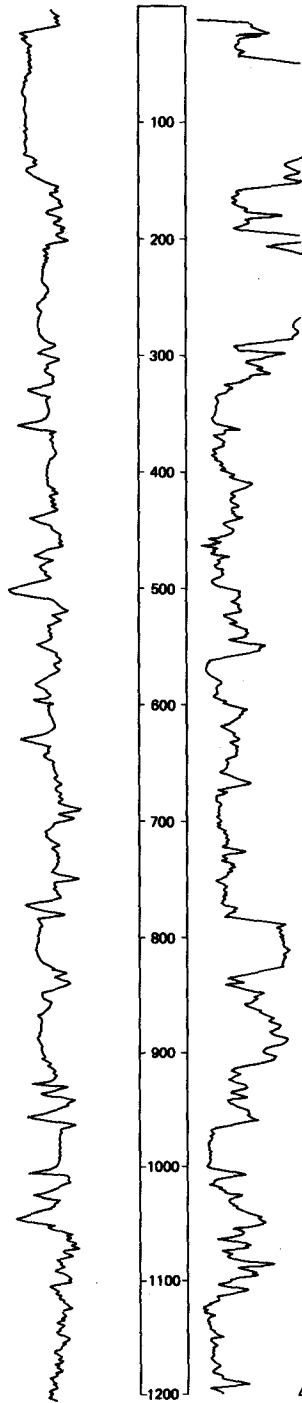
ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1856
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS



NDSWC 5781, 5781A, 5781B, Continued
LOCATION: 153-094-230CC1, 2, 3

DATE DRILLED: 8/21/80

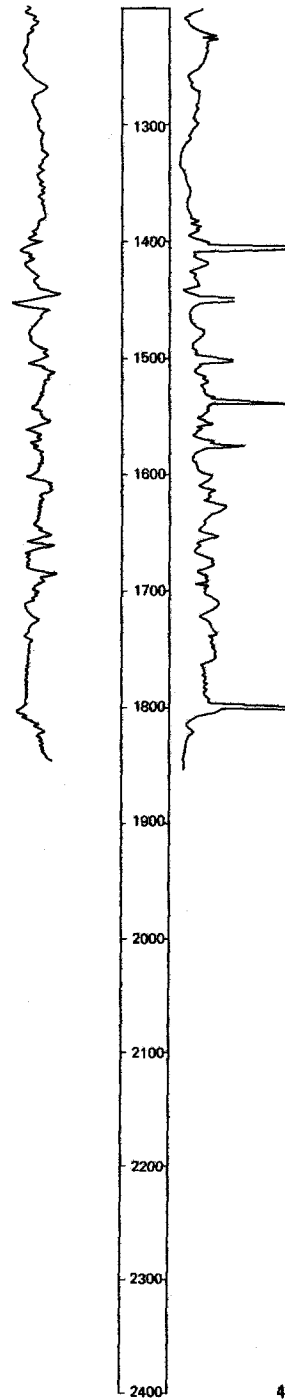
ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1856
(FT)

GAMMA
RAY

RESISTIVITY
(OHM-M)

DESCRIPTION OF DEPOSITS

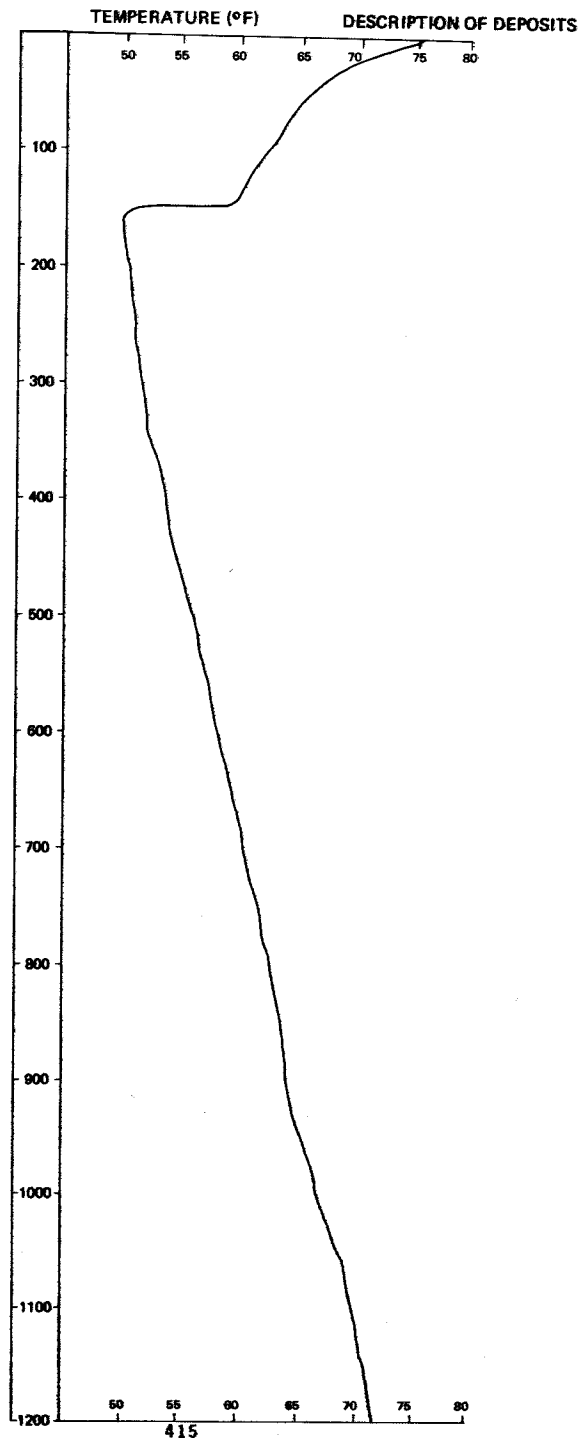


NDSWC 5781A, Continued
LOCATION: 153-094-23CCC2

DATE DRILLED: 8/21/80

ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1465
(FT)

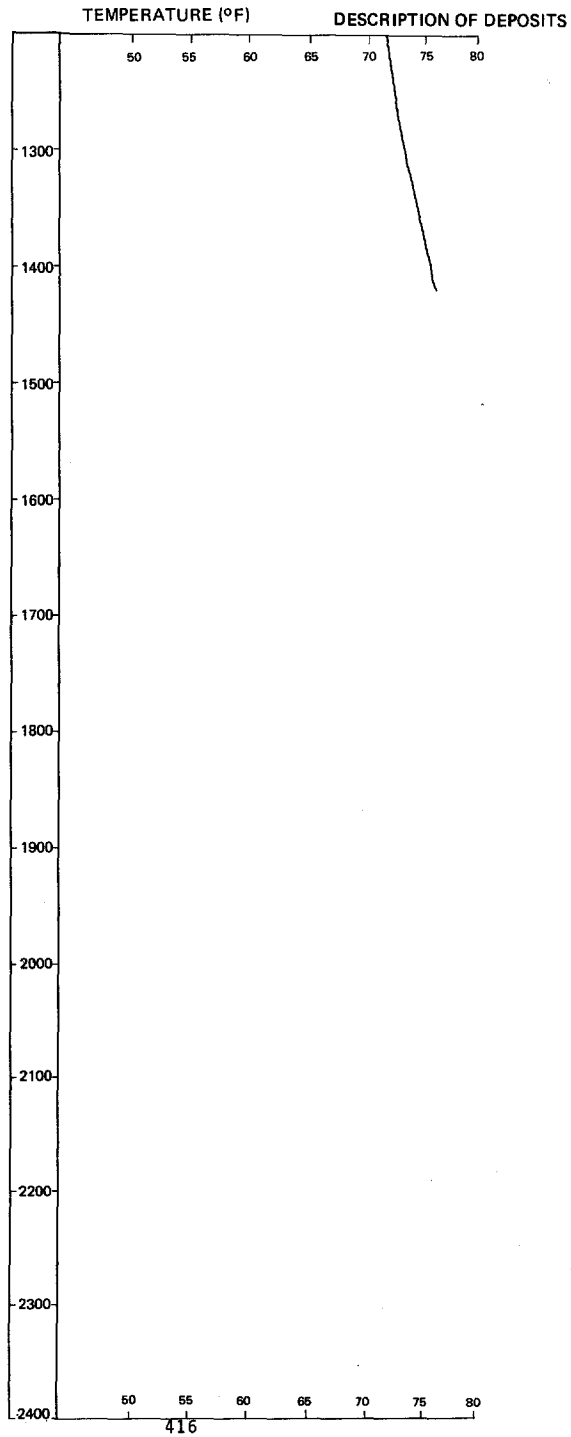


LOCATION: 153-094-23CCC2 NDSWC 5781A, Continued

DATE DRILLED: 8/21/80

ALTITUDE: 2186
(FT, NGVD)

DEPTH: 1465
(FT)

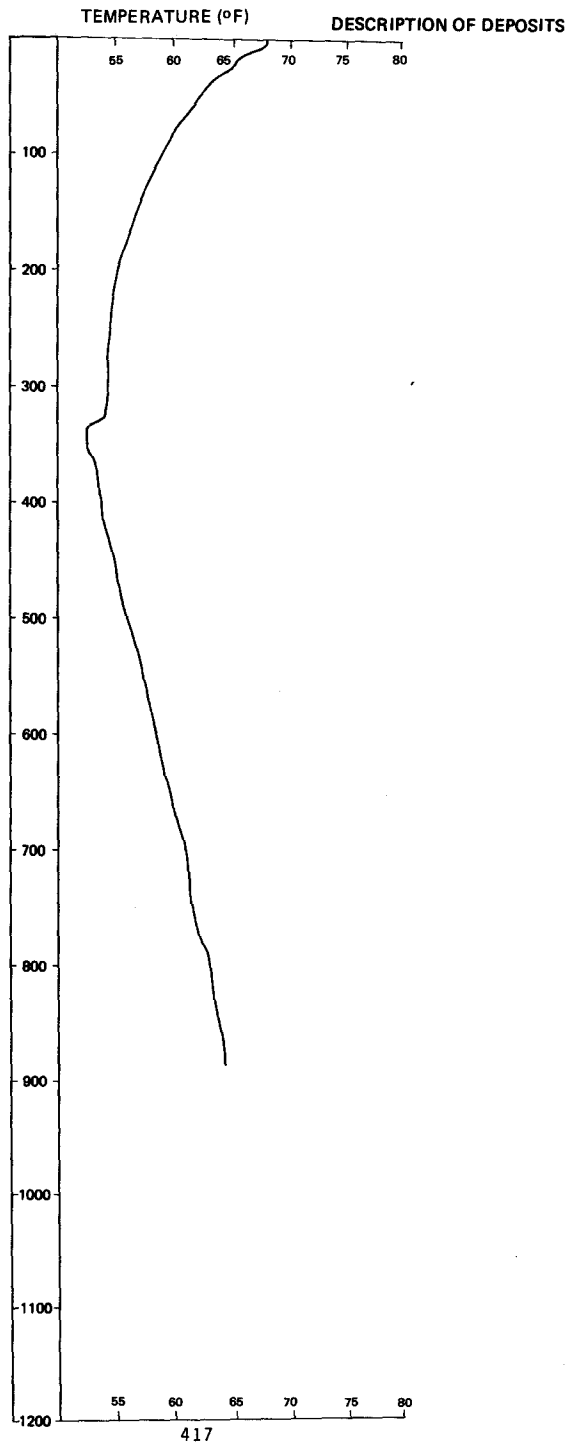


LOCATION: 153-094-23CCC3

DATE DRILLED: 8/21/80

ALTITUDE: 2186
(FT. NGVD)

DEPTH: 980
(FT)



153-094-26CCC
(Log modified from Dakota Drilling Co.)

Altitude: 2310 feet Date drilled: 6/26/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	5	5
	Clay, yellow-----	25	30
	Coal-----	11	41
	Coal and sand-----	17	58
	Coal-----	4	62
	Sand-----	14	76
	Coal, sandy-----	2	78
	Shale, gray-----	122	200

153-094-30DD
(Log modified from Kieson Drilling)

Altitude: 2200 feet Date drilled: 5/24/75

	Topsoil-----	1	1
	Clay, yellowish-gray-----	24	25
	Coal-----	6	31
	Clay, gray-----	11	42
	Coal and clay-----	4	46
	Clay-----	4	50

153-095-08ABA
(Log modified from Thompson Drilling Co.)

Altitude: 2100 feet Date drilled: 6/28/73

	Clay-----	12	12
	Gravel and clay-----	4	16
	Clay, blue-----	14	30
	Clay, sandy-----	12	42
	Clay, blue-----	13	55
	Coal, loose-----	7	62
	Clay, blue-----	13	75
	Clay, blue-----	4	79
	Coal, loose-----	31	110
	Clay, gray-----	4	114
	Coal, hard-----	32	146
	Clay, blue-----	3	149
	Shale, hard-----	11	160
	Clay, blue-----		

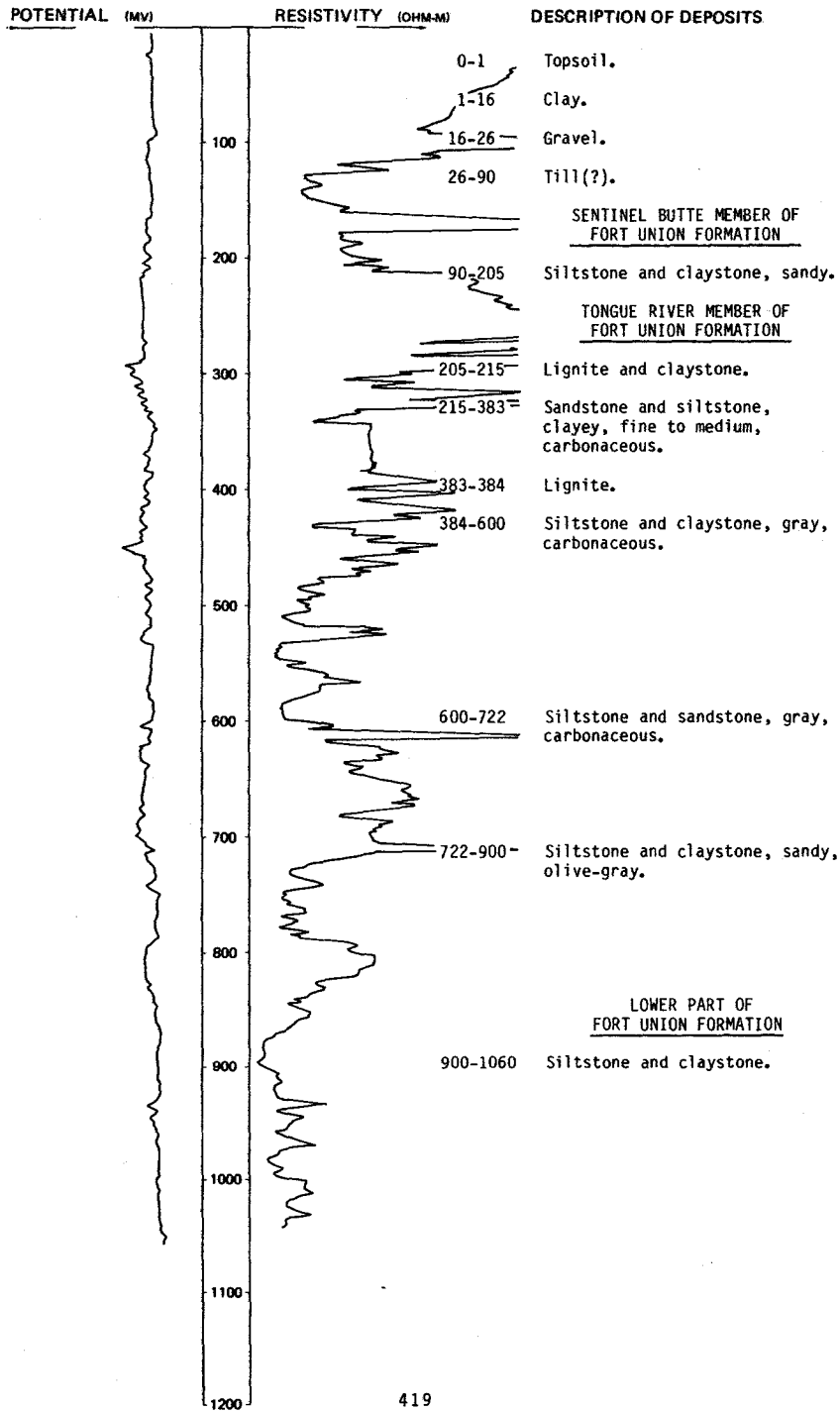
LOCATION: 153-095-16CCC

NDSWC 6047

DATE DRILLED: 11/13/81

ALTITUDE: 2330
(FT, NGVD)

DEPTH: 1060
(FT)

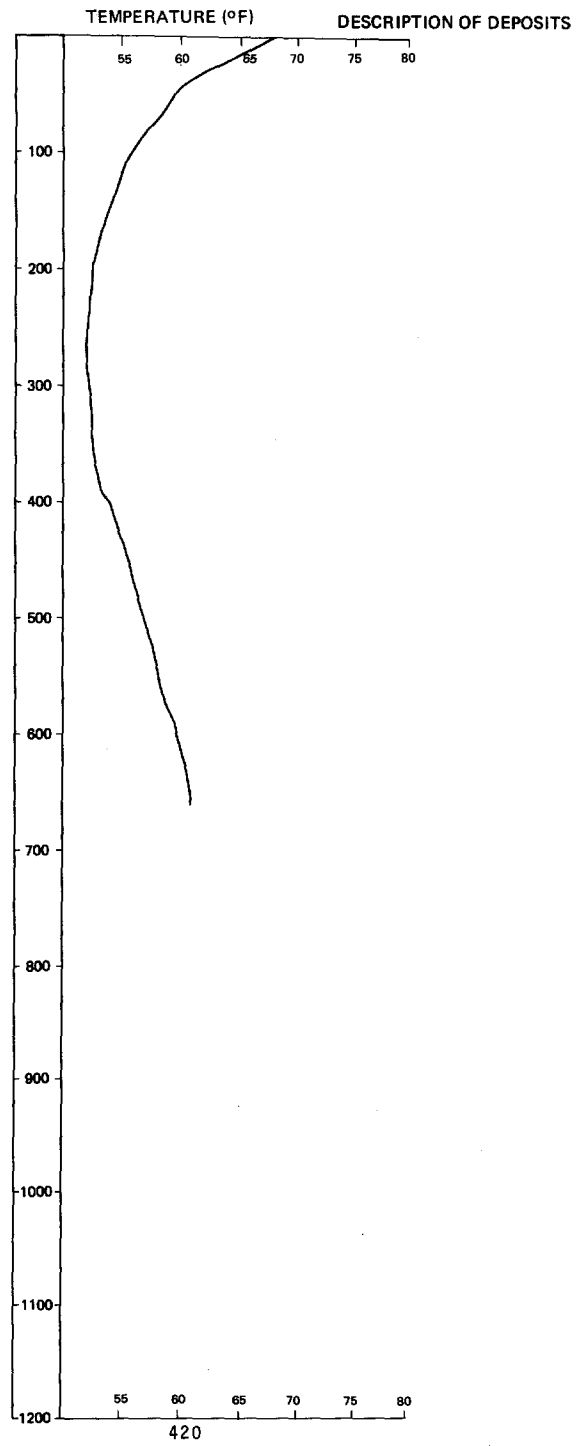


LOCATION: 153-095-16CCC NDSWC 6047, Continued

DATE DRILLED: 11/13/81

ALTITUDE: 2330
(FT, NGVD)

DEPTH: 1060
(FT)



153-095-26CCC
(Log modified from Thompson Drilling Co.)

Altitude: 2310 feet

Date drilled: 11/20/72

<u>GEOLOGIC</u> <u>SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS</u> <u>(FEET)</u>	<u>DEPTH</u> <u>(FEET)</u>
	Topsoil-----	3	3
	Clay-----	79	82
	Coal; some sand-----	5	87
	Clay-----	38	125

153-095-29CDD
(Log modified from Kieson Drilling)

Altitude: 2210 feet

Date drilled: 1/27/76

	Topsoil-----	2	2
	Clay, sandy-----	18	20
	Clay-----	21	41
	Coal-----	1	42
	Clay-----	19	61
	Silt-----	8	69
	Sand, coarse, and gravel-----	7	76
	Clay-----	10	86
	Sand-----	11	97
	Sand and gravel-----	9	106
	Clay-----	4	110

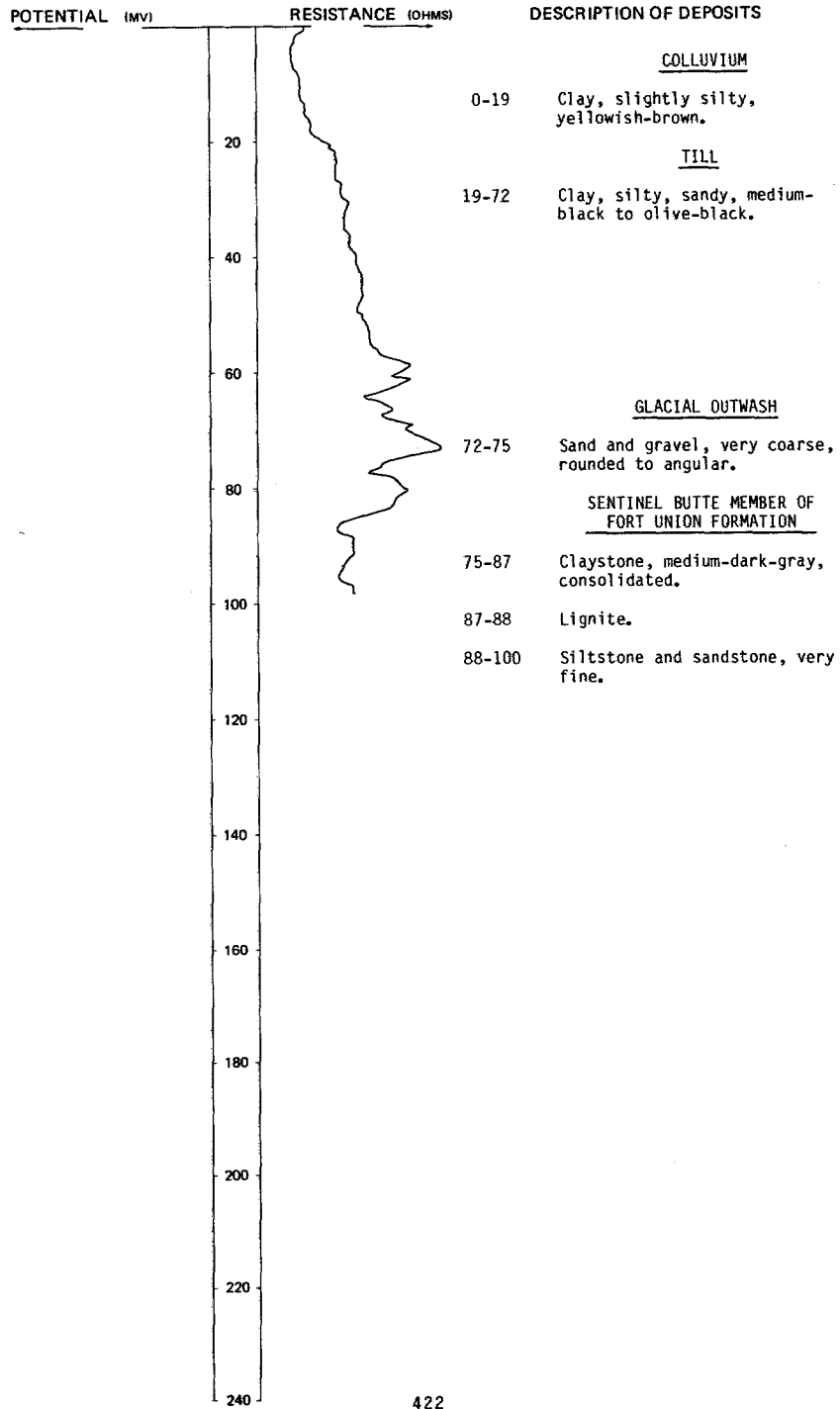
LOCATION: 153-095-33BBB

NDSWC 11362

DATE DRILLED: 9/11/80

ALTITUDE: 2215
(FT, NGVD)

DEPTH: 100
(FT)



153-096-03BCB
(Log modified from Kieson Drilling)

Altitude: 1937 feet Date drilled: 3/19/77

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay, gray-----	73	75
	Coal-----	35	110
	Clay, blue-----	40	150
	Coal-----	8	158
	Clay-----	52	210
	Coal-----	6	216
	Clay; several spots of coal-----	89	305
	Clay, sandy-----	45	350
	Sand-----	30	380
	Clay, sandy, gray-----	15	395
	Clay, sandy-----	120	515
	Clay; coal layers-----	75	590
	Clay, sandy-----	30	620
	Coal-----	15	635
	Clay-----	45	680
	Coal-----	10	690
	Clay, gray-----	50	740
	Clay, sandy-----	140	880
	Clay-----	50	930
	Coal-----	8	938
	Clay, sandy-----	52	990
	Clay-----	20	1010
	Clay, sandy-----	43	1053
	Sand-----	22	1075

153-096-05CAA
(Log modified from Kieson Drilling)

Altitude: 1912 feet Date drilled: 11/20/76

	Topsoil-----	2	2
	Clay, gray-----	18	20
	Coal-----	4	24
	Clay-----	141	165
	Coal; some clay layers-----	65	230
	Clay, gray-----	90	320
	Clay, sandy-----	30	350
	Sand-----	15	365
	Clay-----	45	410
	Clay; spots of coal-----	165	575
	Clay-----	15	590
	Sand-----	15	605
	Coal-----	15	620
	Clay-----	30	650
	Clay, sandy-----	45	695
	Clay; some coal-----	150	845
	Clay, sandy-----	45	890
	Clay-----	75	965
	Clay, sandy-----	155	1120
	Clay-----	85	1205
	Clay, sandy-----	75	1280
	Sand-----	5	1285
	Clay-----	5	1290

153-097-01CBD
(Log modified from Thompson Drilling Co.)

Altitude: 1855 feet Date drilled: 12/11/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Topsoil-----	2	2
	Clay-----	11	13
	Sand and rock-----	4	17
	Clay-----	7	24
	Sand-----	4	28
	Gravel-----	4	32

153-097-10DAC
NDSWC 1478

Altitude: 1890 feet Date drilled: 4/04/59

	Clay, sandy, brown-----	6	6
	Sand, coarse-----	6	12
	Till, fine gray gravel, and shale pebbles-----	9	21
	Clay, sandy, blue-----	11	32
	Clay, sandy, gray; layers of sand-----	18	50
	Sand, medium to coarse, and coal-----	9	59
	Shale and sandy gray clay-----	14	73

153-097-10DAD
NDSWC 1477

Altitude: 1865 feet Date drilled: 4/02/59

	Topsoil, sandy, brown-----	5	5
	Clay, sandy, yellow-----	6	11
	Gravel, fine to medium-----	3	14
	Clay, gray and green-----	7	21
	Till, gray clay, fine gravel, and shale pebbles-----	11	32
	Sand, fine to medium; a little coal-----	31	63
	Sand, fine to coarse, and coal-----	32	95
	Fort Union Formation-----	10	105

153-097-11CCA
NDSWC 1479

Altitude: 1880 feet Date drilled: 4/04/59

	Topsoil, sandy, brown-----	5	5
	Gravel, fine and medium-----	16	21
	Sand, coarse-----	5	26
	Fort Union Formation-----	6	32

LOCATION: 153-097-15CCC

NDSWC 5613

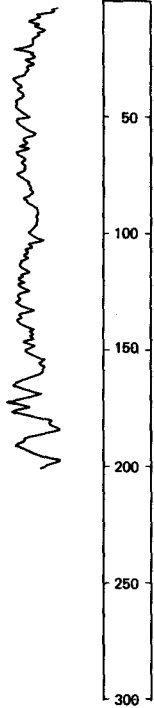
DATE DRILLED: 10/05/79

ALTITUDE: 1915
(FT, NGVD)

DEPTH: 202
(FT)

GAMMA
RAY

RESISTANCE
(OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

- 0-18 Clay, very silty, sandy, dark-brown.
- 18-32 Clay, very silty, sandy, dark-yellowish-brown.

TILL

- 32-97 Clay, silty, sandy, pebbly, dark-brown; sand and gravel lenses.

LAKE BEDS

- 97-106 Silt, clayey, greenish-gray.

ALLUVIUM

- 106-149 Sand, fine, medium-gray; interbedded with silty, clayey, and gravelly layers.

SENTINEL BUTTE MEMBER OF
FORT UNION FORMATION

- 149-202 Sandstone, silty, clayey, gray.

153-097-15CCD1
NDSWC 1482

Altitude: 1912 feet

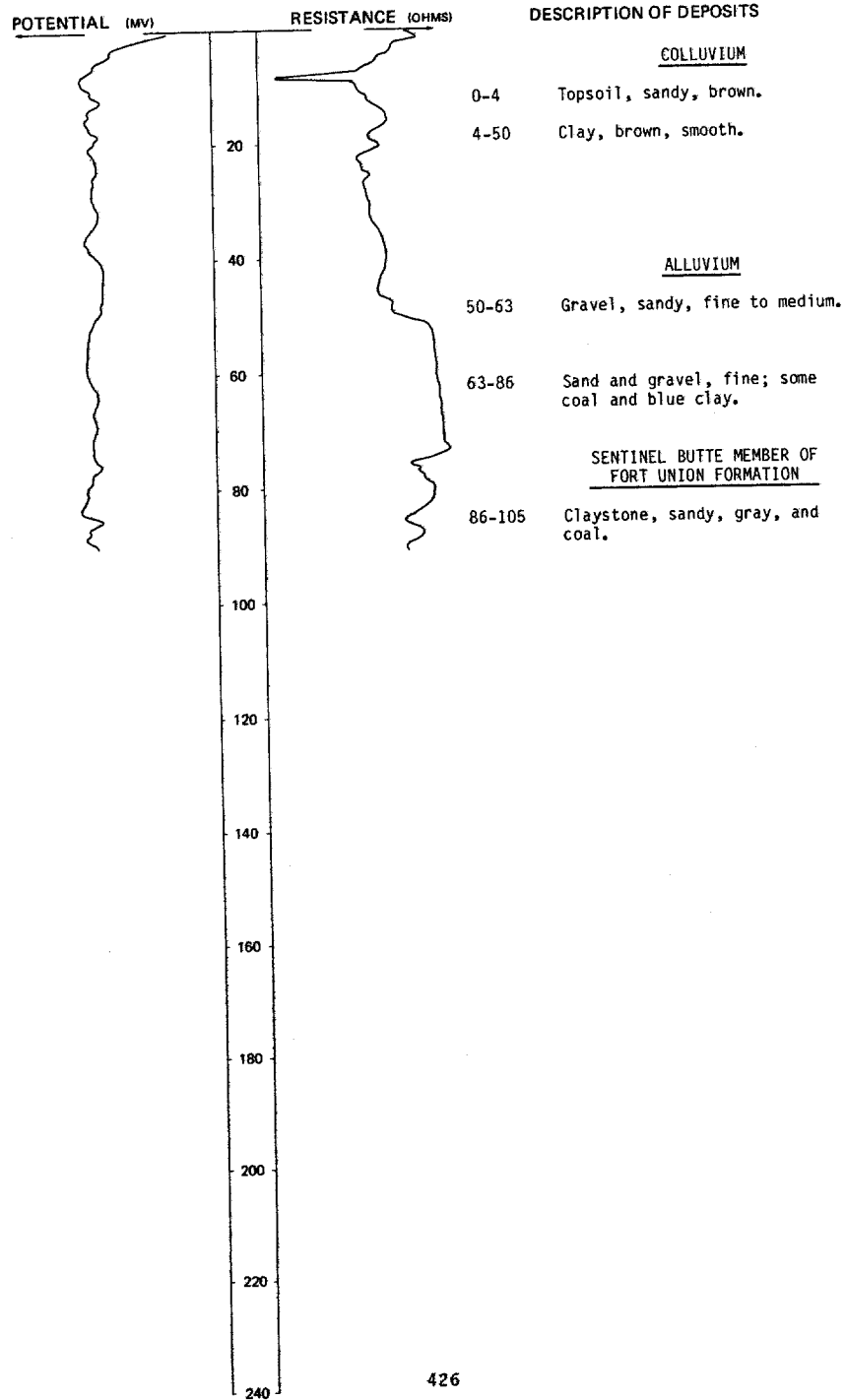
Date drilled: 4/08/59

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil, sandy, brown-----	4	4
	Clay, brown, smooth-----	46	50
	Gravel, fine to medium-----	13	63
	Sand, coarse; some fine gravel with blue clay and coal-----	23	86
	Clay, sandy, gray; a little coal-----	19	105

NDSWC 1483

LOCATION: 153-097-15CCD2
ALTITUDE: 1915
(FT, NGVD)

DATE DRILLED: 4/08/59
DEPTH: 105
(FT)



LOCATION: 153-097-16AAA

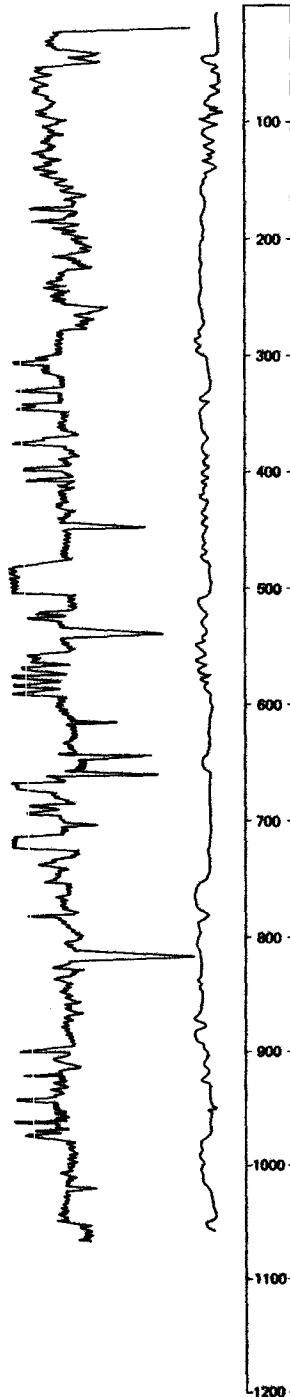
NDSWC 6054

DATE DRILLED: 5/28/82

ALTITUDE: 1920
(FT, NGVD)

DEPTH: 1060
(FT)

NEUTRON (API) S.P. (MV)



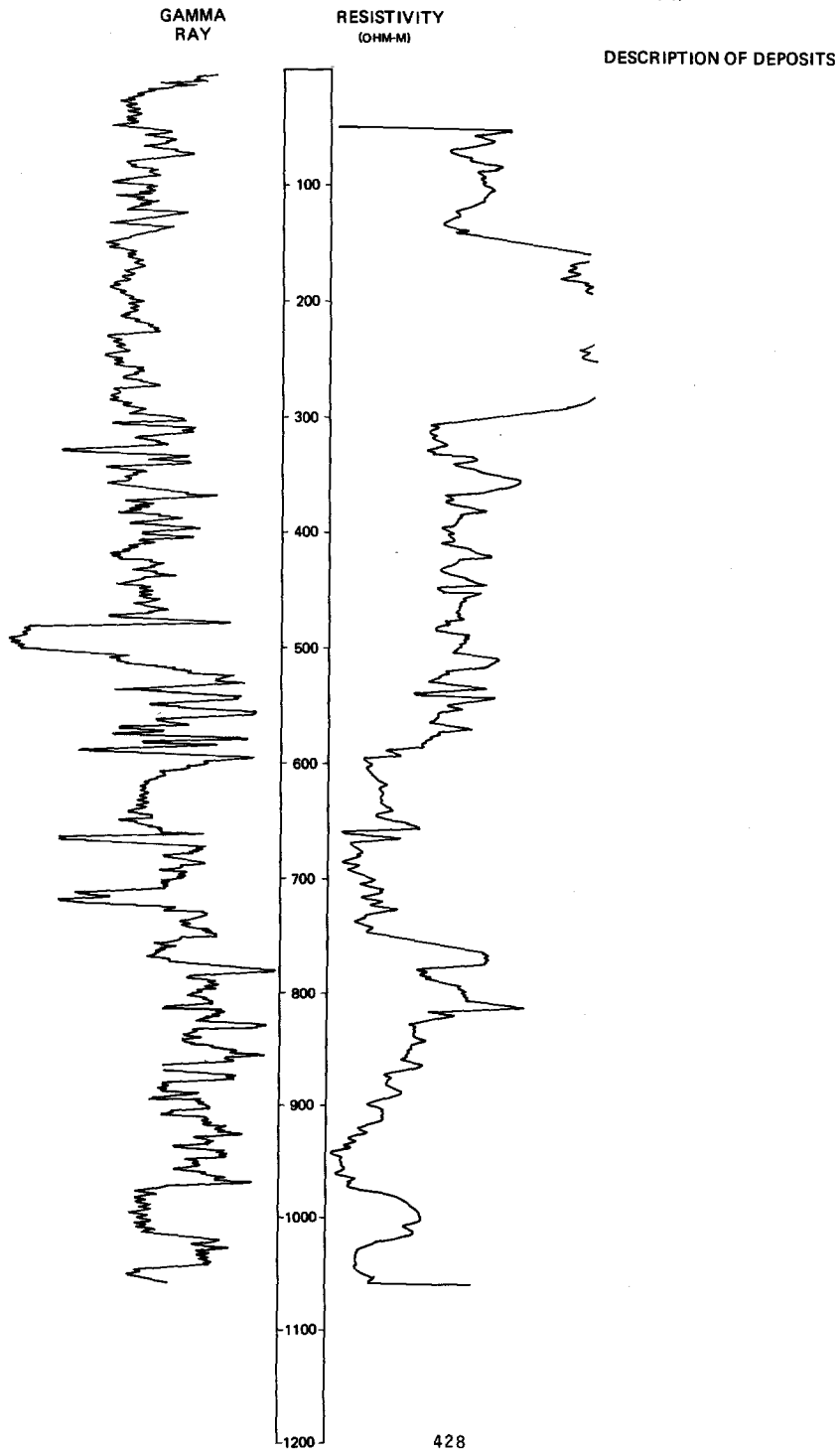
DESCRIPTION OF DEPOSITS

0-1	Topsoil.
1-8	Gravel.
8-120	Silt and clay.
120-230	Sand.
230-283	Sand and gravel.
<u>TONGUE RIVER MEMBER OF FORT UNION FORMATION</u>	
283-290	Sandstone.
290-302	Siltstone.
302-308	Lignite.
308-490	Siltstone and claystone, sandy.
490-502	Lignite.
502-600	Siltstone and claystone, sandy.
600-665	Siltstone and claystone.
665-675	Lignite.
675-720	Siltstone and claystone.
720-730	Lignite.
730-760	Siltstone.
760-815	Siltstone and sandstone.
815-930	Siltstone and claystone, gray.
<u>LOWER PART OF FORT UNION FORMATION</u>	
930-980	Siltstone and claystone.
980-1020	Sandstone, fine.
1020-1060	Siltstone and claystone.

LOCATION: 153-097-16AAA NDSWC 6054, Continued
ALTITUDE: 1920
(FT, NGVD)

DATE DRILLED: 5/28/82

DEPTH: 1060
(FT)



LOCATION: 153-097-16AAA NDSWC 6054, Continued

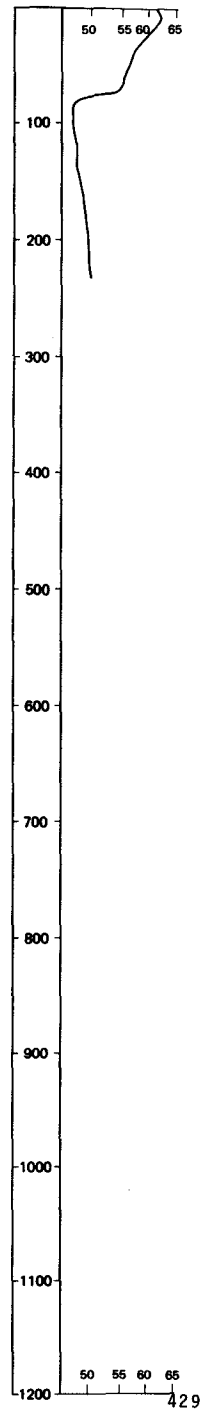
DATE DRILLED: 5/28/82

ALTITUDE: 1920
(FT, NGVD)

DEPTH: 1060
(FT)

TEMPERATURE (°F)

DESCRIPTION OF DEPOSITS



153-097-19CDC
(Log modified from Ralph Wold Well Drilling)

Altitude: 2175 feet

Date drilled: 2/02/73

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Sand-----	12	12
	Clay-----	6	18
	Coal-----	1	19
	Clay-----	14	33
	Coal-----	4	37
	Clay-----	148	185
	Coal-----	15	200
	Clay-----	240	440
	Sand-----	35	475
	Clay-----	17	492
	Coal-----	16	508
	Clay-----	132	640
	Sand-----	10	650
	Clay-----	85	735
	Coal-----	25	760
	Clay-----	5	765
	Sand-----	23	788
	Clay-----	48	836
	Rock-----	6	842
	Clay-----	40	882
	Sand-----	33	915
	Clay-----	13	928
	Sand-----	7	935
	Shale-----	10	945
	Sand-----	29	974
	Clay and shale-----	206	1180
	Sand-----	108	1288
	Clay-----	142	1430
	Sand-----	30	1460
	Clay-----	110	1570
	Coal-----	15	1585
	Shale-----	15	1600
	Sand-----	10	1610
	Shale-----	175	1785
	Sand-----	55	1840

153-097-20AAA
(Log modified from Ralph Wold Well Drilling)

Altitude: 2015 feet Date drilled: 1/04/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay-----	12	12
	Gravel-----	1	13
	Clay-----	79	92
	Rock-----	2	94
	Coal-----	5	99
	Clay-----	6	105
	Coal-----	9	114
	Clay-----	44	158
	Sand-----	62	220

153-097-21DCA
(Log modified from Ralph Wold Well Drilling)

Altitude: 1920 feet Date drilled: 9/12/73

	Loam, sandy-----	20	20
	Clay-----	10	30
	Rock-----	1	31
	Clay-----	12	43
	Sand-----	4	47
	Clay-----	23	70
	Sand-----	58	128
	Sand, coarse-----	27	155

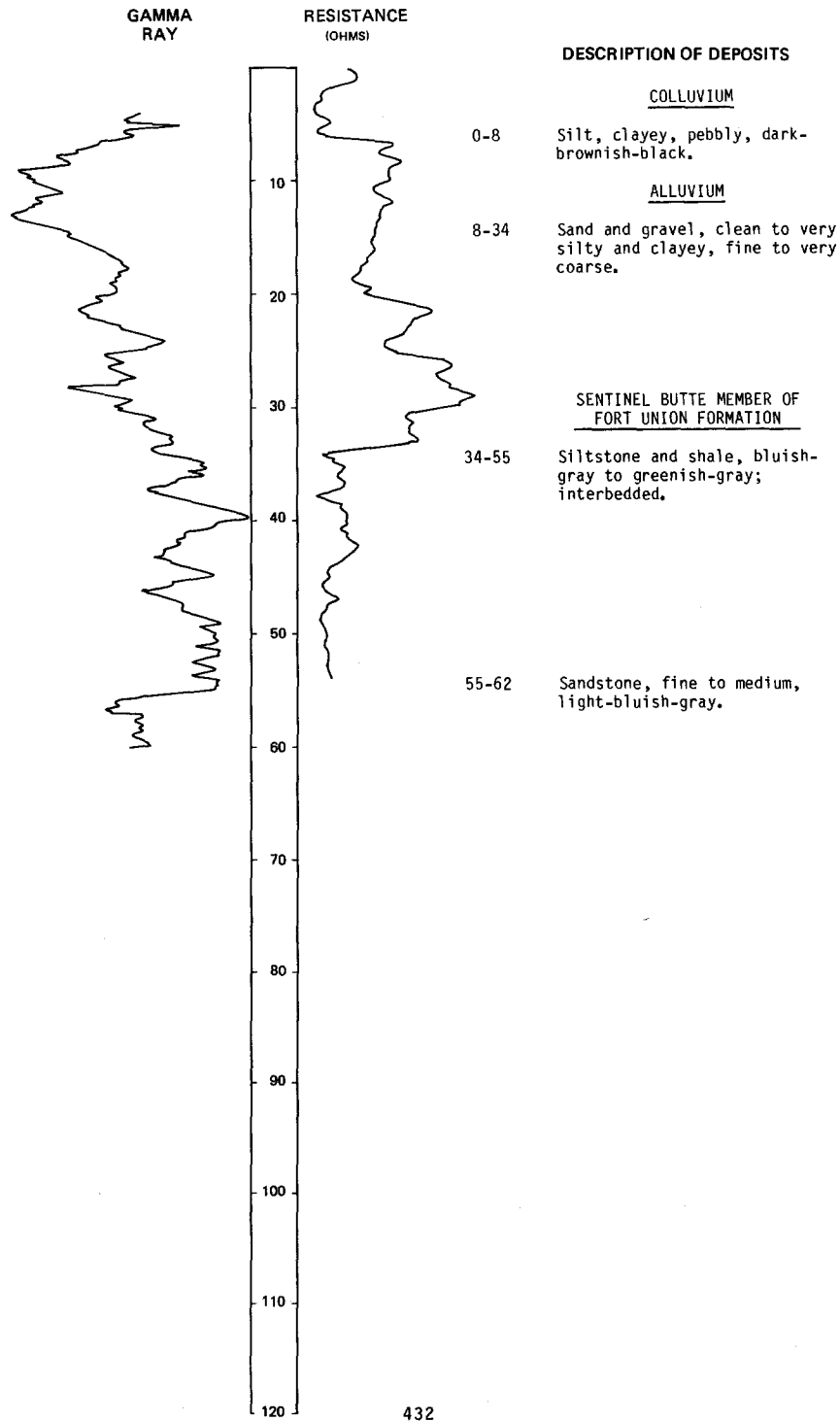
LOCATION: 153-097-22AAA

NDSWC 5611

DATE DRILLED: 10/04/79

ALTITUDE: 1870
(FT, NGVD)

DEPTH: 62
(FT)



LOCATION: 153-097-22A88
 ALTITUDE: 1890
 (FT, NGVD)

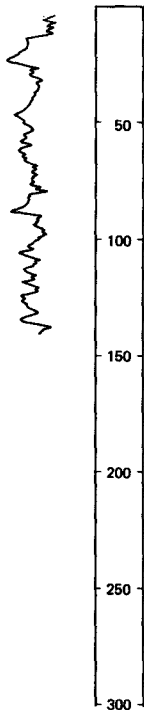
NDSWC 5612

DATE DRILLED: 10/04/79

DEPTH: 142
 (FT)

GAMMA
 RAY

RESISTANCE
 (OHMS)



DESCRIPTION OF DEPOSITS

COLLUVIUM

- 0-2 Topsoil, brownish-black.
- 2-12 Silt, clayey, very sandy, pebbly, dark-yellowish-brown.
- 12-26 Sand, fine to very coarse; silty at the top.

TILL

- 26-58 Clay, silty, sandy, pebbly, dark-brown; several sand and gravel layers at the bottom.

LAKE BEDS

- 58-65 Clay, silty, gray.

ALLUVIUM

- 65-108 Sand and gravel, fine to coarse; thin clay layers.

SENTINEL BUTTE MEMBER OF
 FORT UNION FORMATION

- 108-142 Siltstone, very sandy, light-gray.

153-097-23BAA1
 NDSWC 1480

Altitude: 1870 feet

Date drilled: 4/06/59

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil, sandy, brown-----	5	5
	Gravel, fine to medium-----	7	12
	Till, gray clay, fine to medium gravel, and shale pebbles-----	13	25
	Gravel, fine, and coarse sand-----	6	31
	Clay, sandy, gray-----	11	42

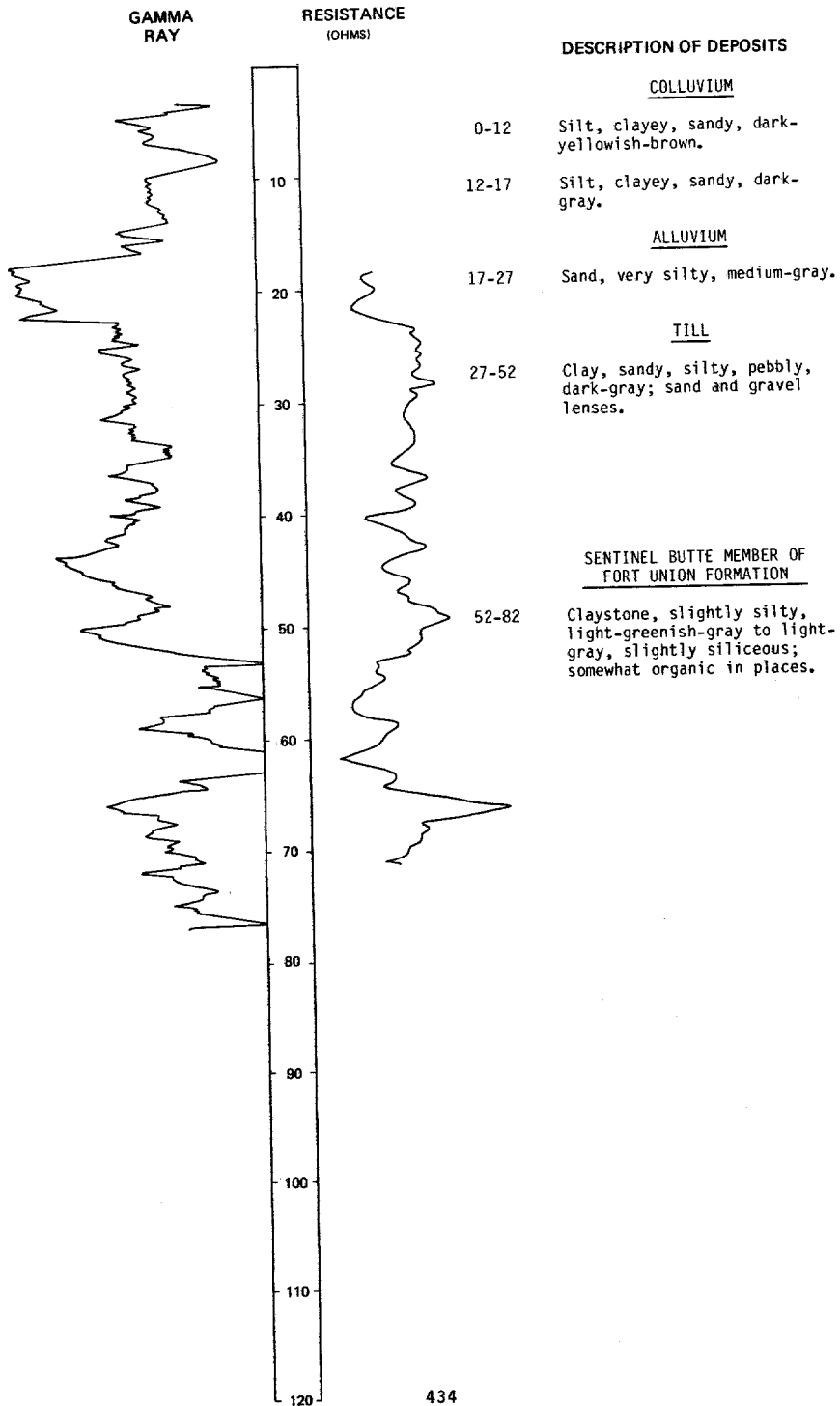
NDSWC 5609

LOCATION: 153-097-23BAA2

DATE DRILLED: 10/04/79

ALTITUDE: 1880
(FT, NGVD)

DEPTH: 82
(FT)



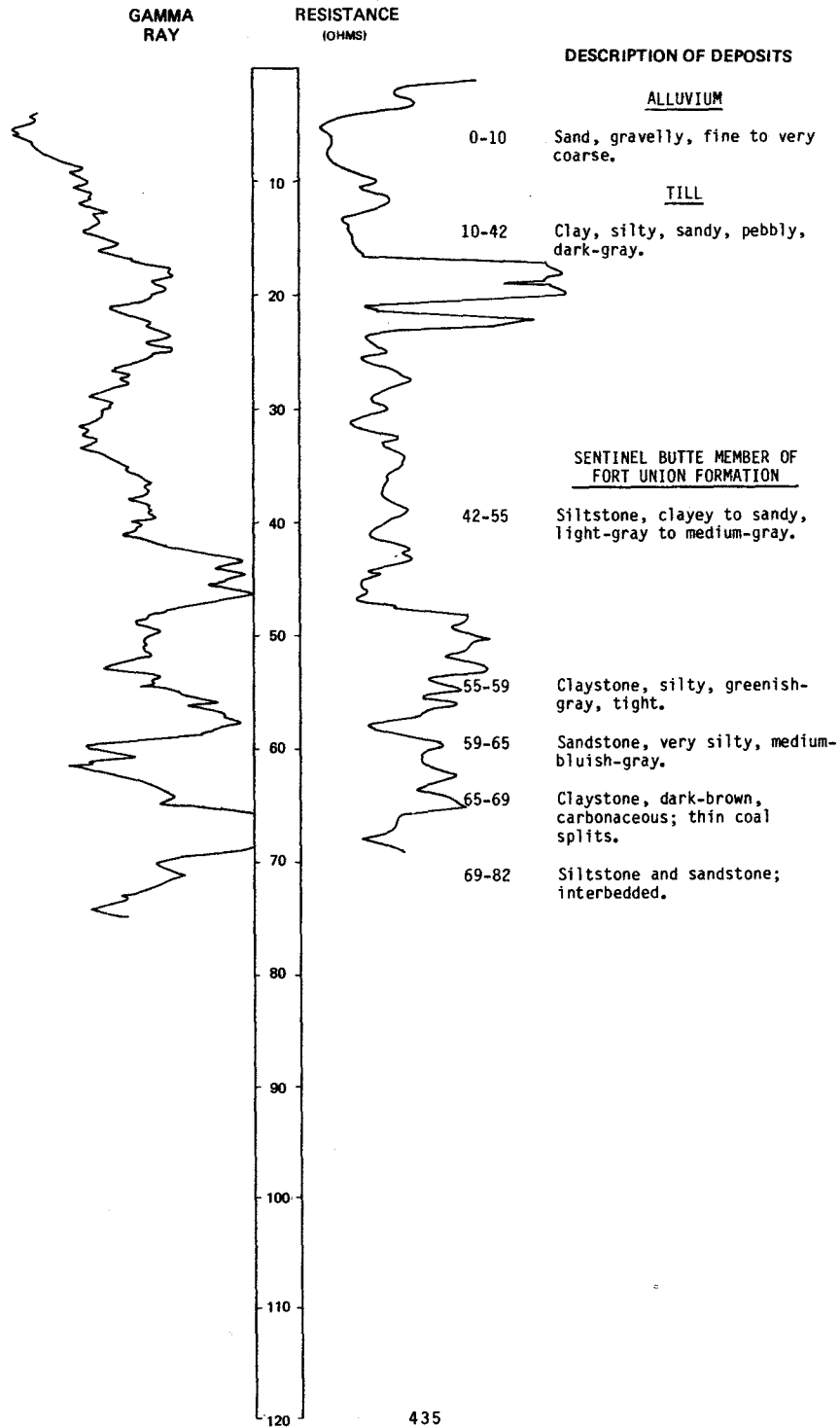
LOCATION: 153-097-23BBA

NDSWC 5610

DATE DRILLED: 10/04/79

ALTITUDE: 1865
(FT, NGVD)

DEPTH: 82
(FT)



153-097-23BBB
NDSWC 1481

Altitude: 1875 feet

Date drilled: 4/06/59

<u>GEOLOGIC</u> <u>SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS</u> <u>(FEET)</u>	<u>DEPTH</u> <u>(FEET)</u>
	Clay, sandy, brown to gray-----	5	5
	Gravel, coarse; pebbles; and cobblestones-----	10	15
	Till, gray, and fine to coarse gravel; some coal-----	17	32
	Gravel, fine to medium; a little coal-----	21	53
	Clay, sandy, light-gray; some coal; Fort Union Formation-----	10	63

153-097-32BAA
(Log modified from Thompson Drilling Co.)

Altitude: 2110 feet

Date drilled: 10/10/72

	Clay-----	32	32
	Sand-----	8	40
	Clay-----	5	45
	Coal-----	6	51
	Clay-----	92	143
	Coal-----	9	152
	Clay-----	11	163

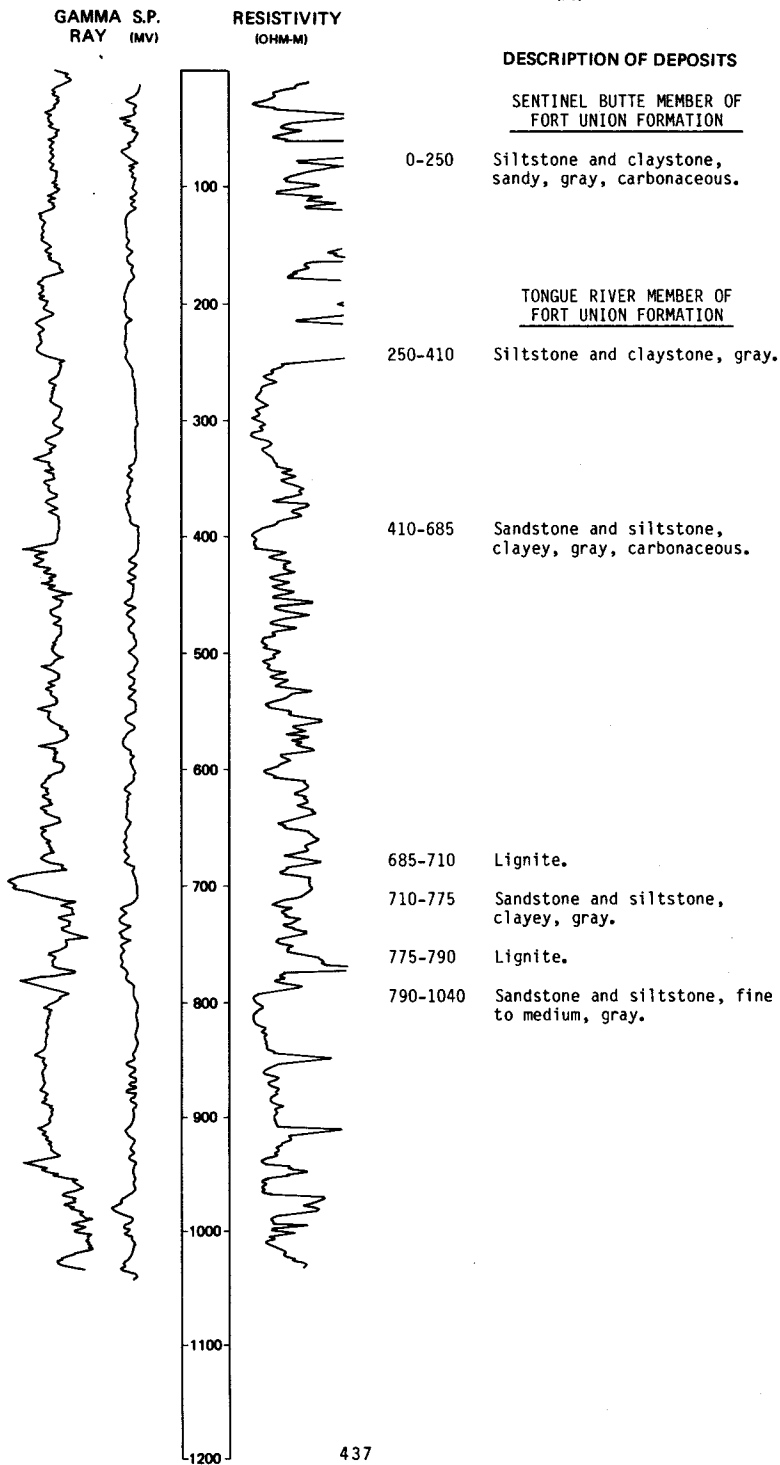
LOCATION: 153-097-32888

NDSWC 5940

DATE DRILLED: 7/01/81

ALTITUDE: 2090
(FT, NGVD)

DEPTH: 1040
(FT)



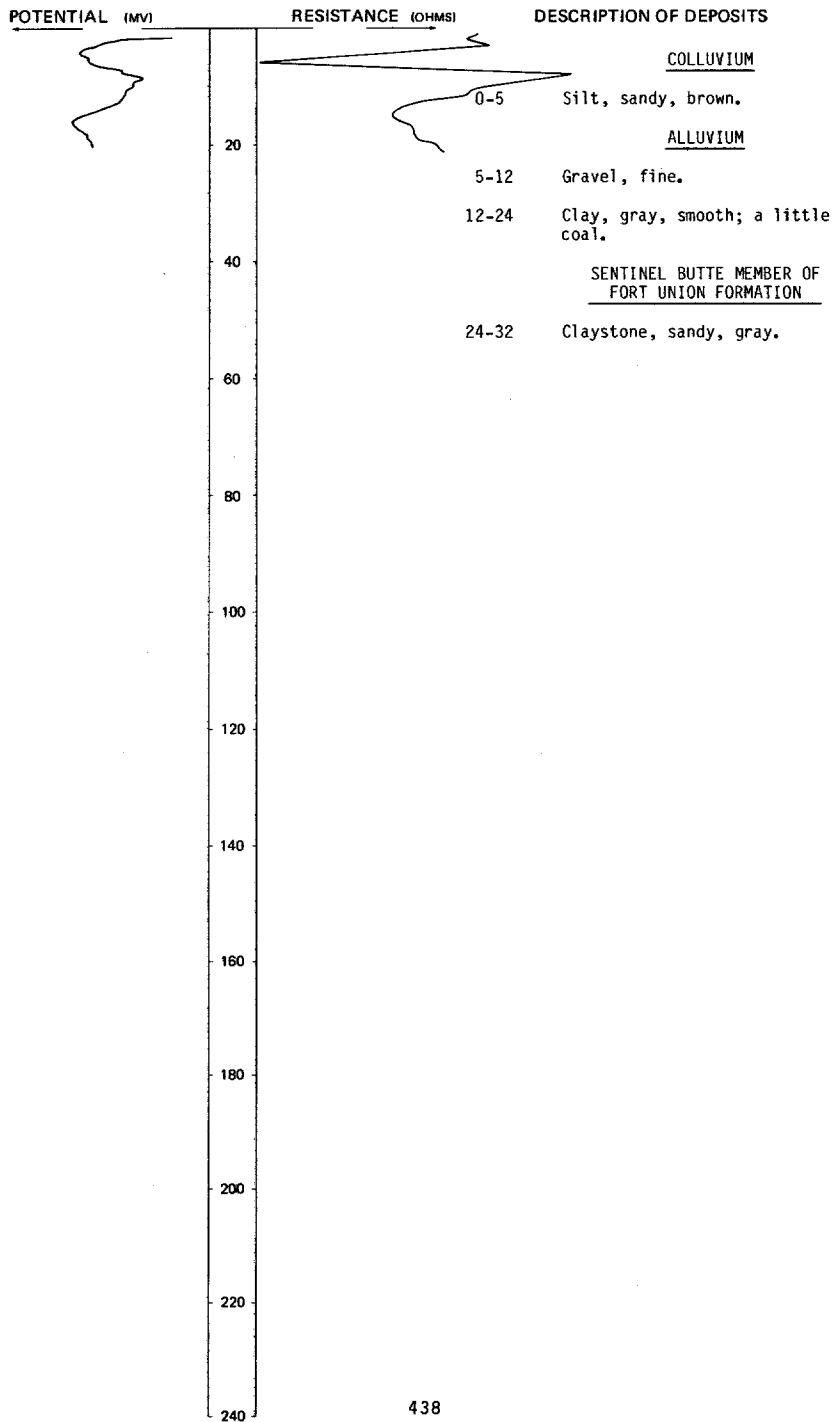
LOCATION: 153-097-34DAA

NDSWC 1485

DATE DRILLED: 4/09/59

ALTITUDE: 1900
(FT, NGVD)

DEPTH: 32
(FT)



153-097-34DAB
(Log modified from Ralph Wold Well Drilling)

Altitude: 1910 feet Date drilled: 6/02/74

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Sand-----	12	12
	Gravel-----	4	16
	Clay-----	12	28
	Coal-----	2	30

153-097-35DCC
(Log modified from Ralph Wold Well Drilling)

Altitude: 1940 feet Date drilled: 11/23/76

	Sand-----	44	44
	Gravel-----	20	64
	Clay-----	4	68
	Gravel-----	2	70
	Clay-----	14	84
	Coal-----	4	88
	Clay, sandy-----	53	141
	Rock-----	2	143
	Clay-----	27	170
	Coal-----	4	174
	Clay-----	161	335
	Coal-----	30	365
	Clay-----	105	470
	Sand-----	90	560
	Clay-----	78	638
	Sand-----	10	648
	Rock-----	3	651
	Clay-----	14	665
	Sand-----	15	680
	Clay-----	123	803
	Rock-----	23	826
	Clay-----	59	885
	Rock-----	2	887
	Clay-----	37	924
	Rock-----	1	925
	Clay-----	93	1018
	Rock-----	2	1020
	Clay-----	105	1125
	Coal-----	13	1138
	Clay-----	50	1188
	Sand-----	10	1198
	Coal-----	12	1210
	Shale-----	55	1265
	Sand-----	20	1285
	Clay, sandy-----	35	1320
	Sand-----	5	1325
	Shale-----	33	1358
	Sand-----	36	1394
	Shale-----	14	1408
	Sand-----	57	1465

153-098-35ACA
(Log modified from Ralph Wold Well Drilling)

Altitude: 1920 feet

Date drilled: 6/08/75

GEOLOGIC SOURCE	MATERIAL	THICKNESS (FEET)	DEPTH (FEET)
	Clay, sandy-----	35	35
	Coal-----	8	43
	Clay-----	77	120
	Rock-----	4	124
	Clay-----	40	164
	Gravel-----	6	170
	Clay-----	90	260
	Sand-----	10	270
	Clay-----	78	348
	Sand-----	46	394
	Clay-----	111	505
	Coal-----	35	540
	Clay-----	25	565
	Sand; interbedded with coal-----	40	605
	Clay-----	85	690
	Rock-----	5	695
	Sand-----	79	774
	Rock-----	13	787
	Shale-----	19	806
	Coal-----	10	816
	Sand-----	18	834
	Shale-----	66	900
	Sand-----	18	918
	Coal-----	7	925
	Clay-----	10	935
	Rock-----	12	947
	Shale-----	53	1000
	Sand-----	80	1080
	Clay-----	145	1225
	Coal-----	20	1245
	Clay-----	103	1348
	Rock-----	2	1350
	Clay-----	60	1410
	Sand-----	40	1450
	Shale-----	160	1610
	Sand-----	55	1665

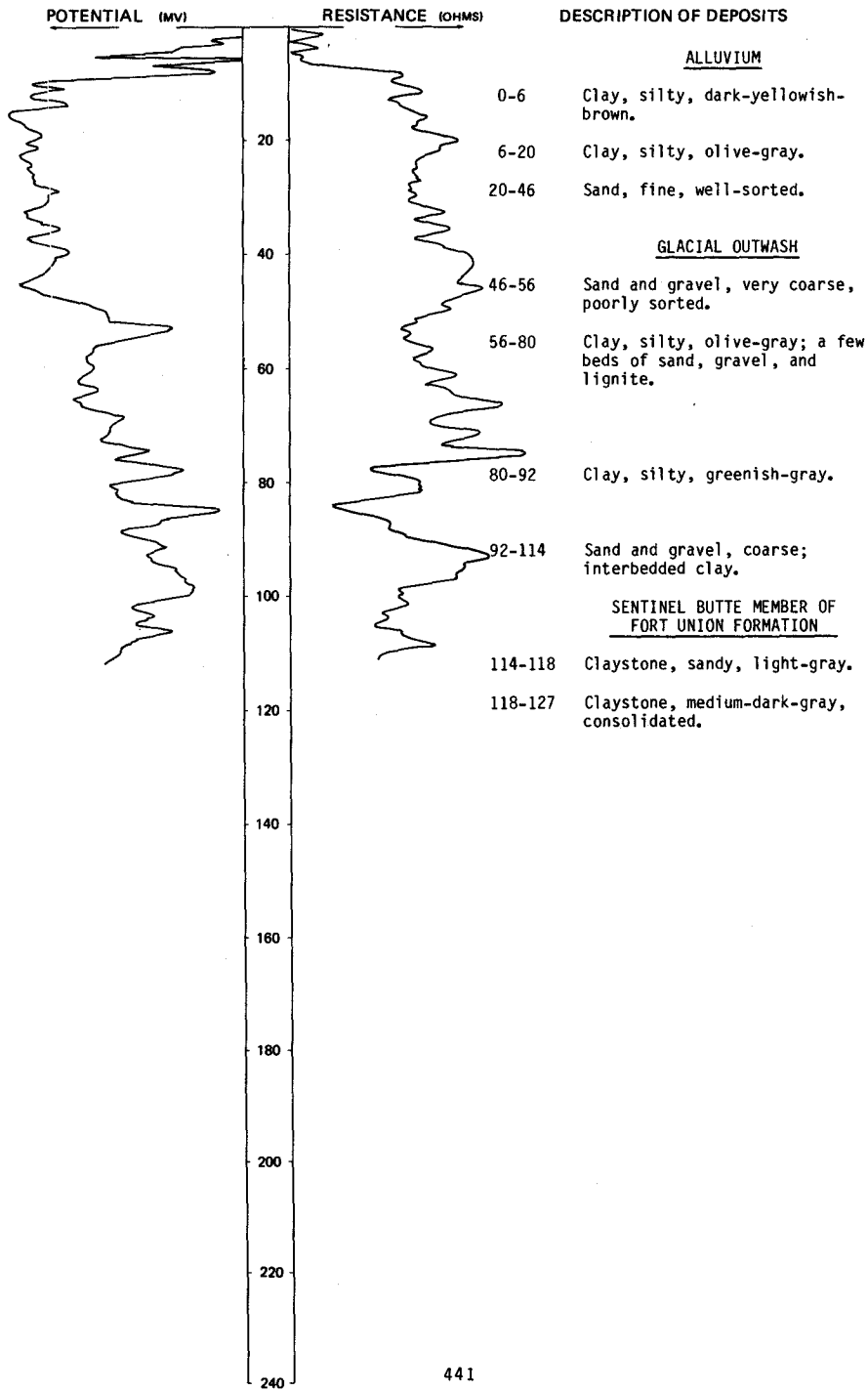
LOCATION: 153-101-06ADB

NDSWC 11373

DATE DRILLED: 9/17/80

ALTITUDE: 1850
(FT. NGVD)

DEPTH: 127
(FT)



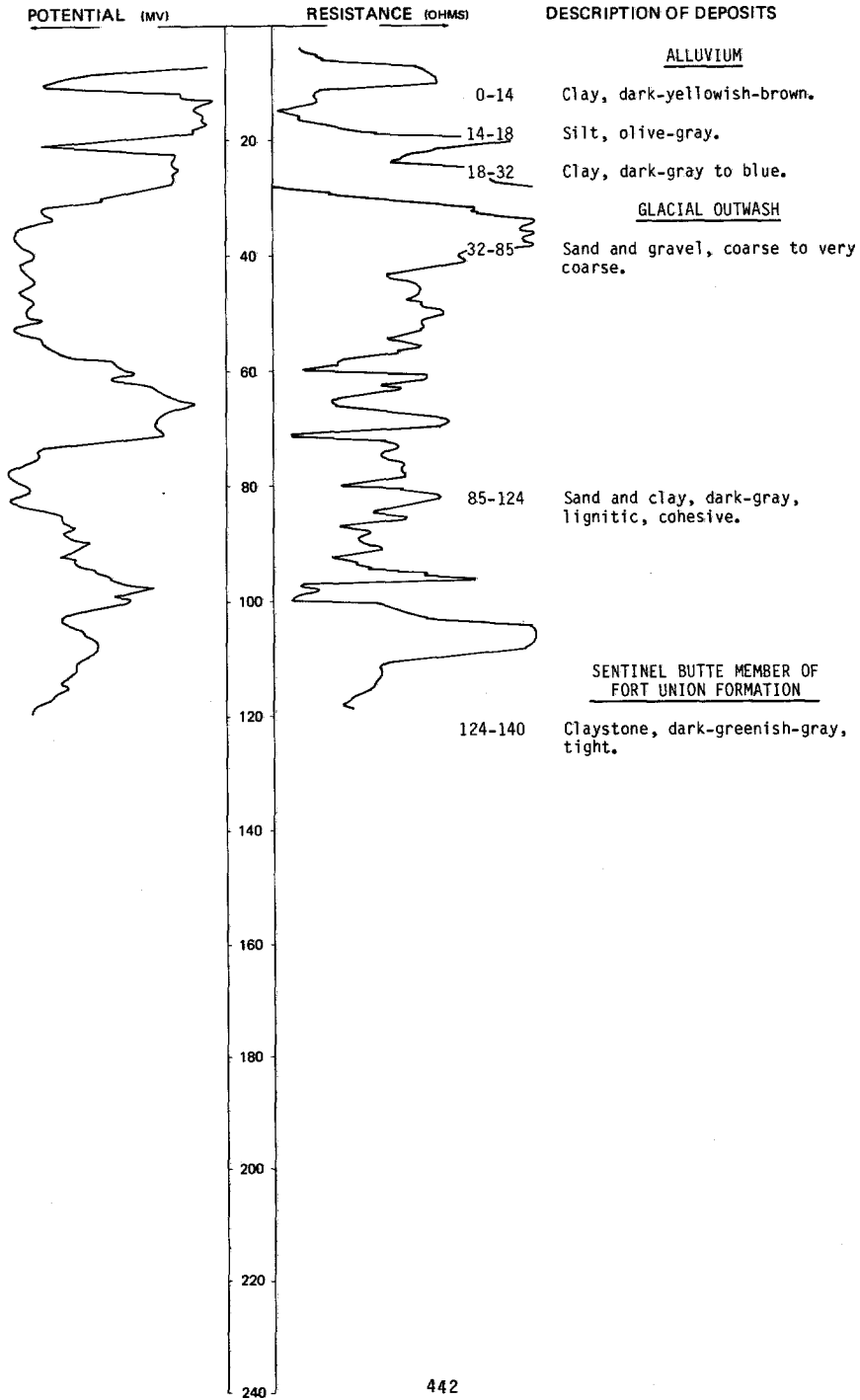
LOCATION: 153-101-08BAA

NDSWC 11372

DATE DRILLED: 9/17/80

ALTITUDE: 1855
(FT, NGVD)

DEPTH: 140
(FT)



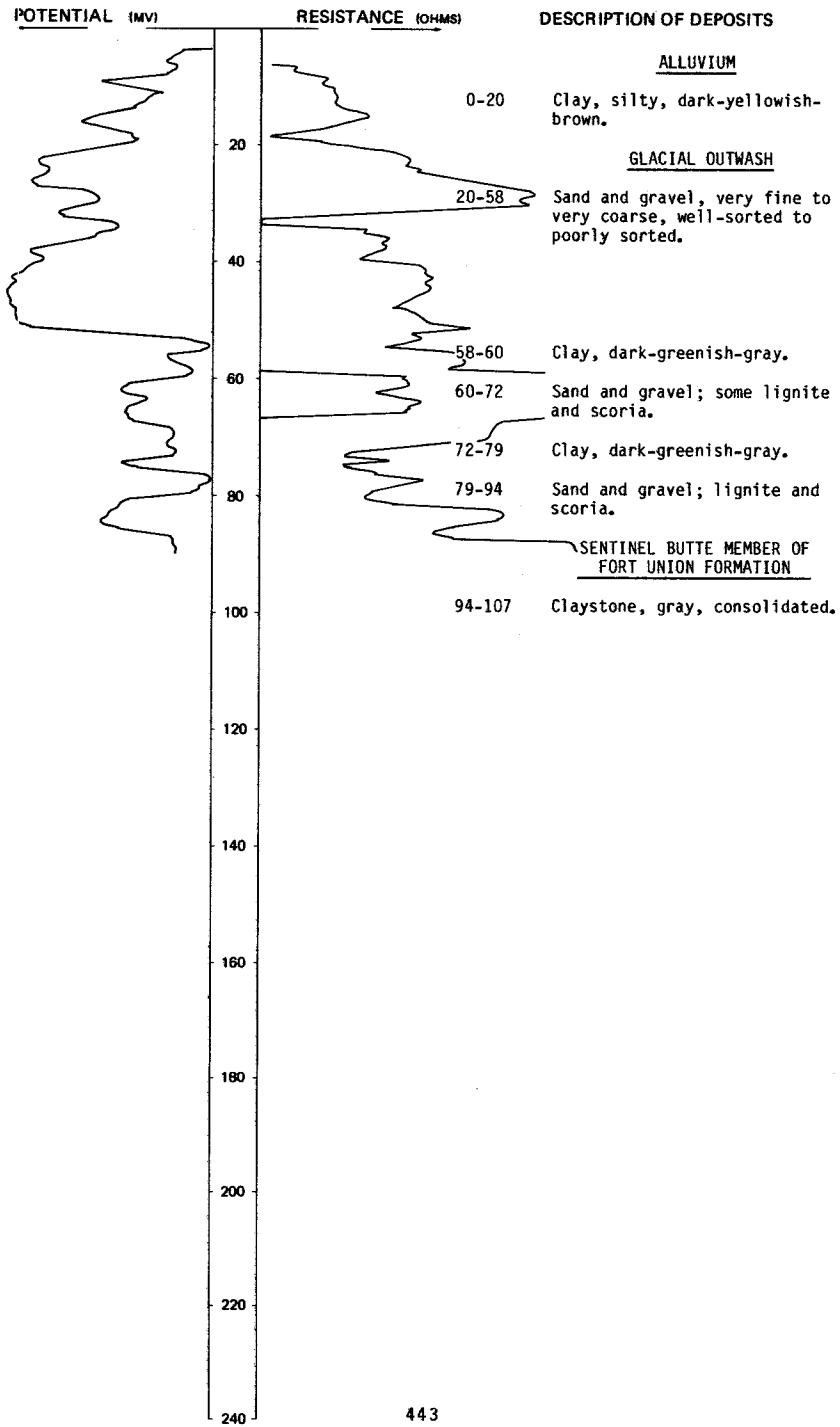
LOCATION: 153-101-08DAD

NDSWC 11374

DATE DRILLED: 9/18/80

ALTITUDE: 1860
(FT, NGVD)

DEPTH: 107
(FT)



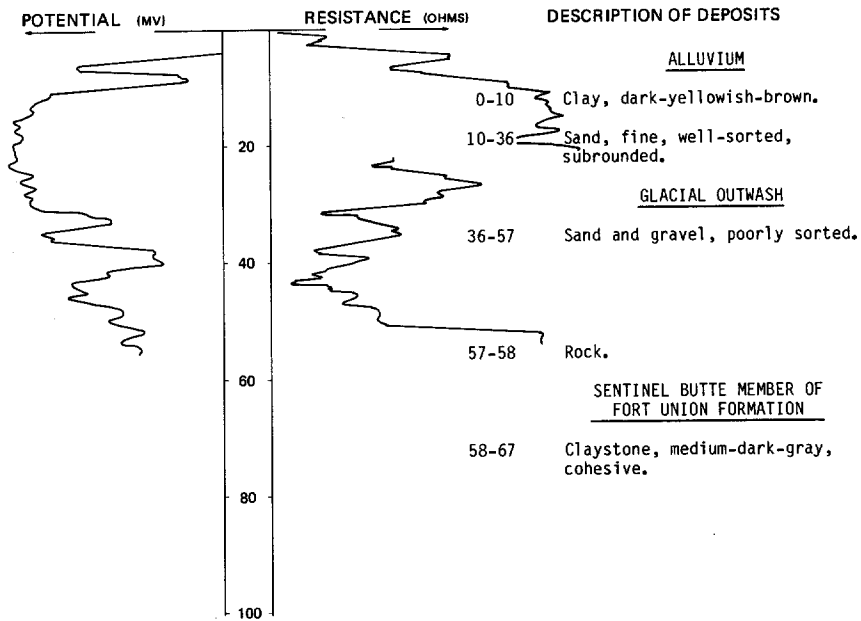
LOCATION: 153-101-16BAC

NDSWC 11371

DATE DRILLED: 9/17/80

ALTITUDE: 1855
(FT, NGVD)

DEPTH: 67
(FT)



153-101-16DBC
NDSWC 11375

Altitude: 1854 feet

Date drilled: 9/18/80

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil-----	1	1
	Silt, clayey, dark-yellowish-brown-----	6	7
	Clay, occasionally silty, dark-yellowish-brown to olive-gray-----	15	22
	Sand, fine, well-sorted, quartzose-----	10	32
	Clay, medium-gray, consolidated; Sentinel Butte Formation-----	8	40

LOCATION: 154-096-31CCA

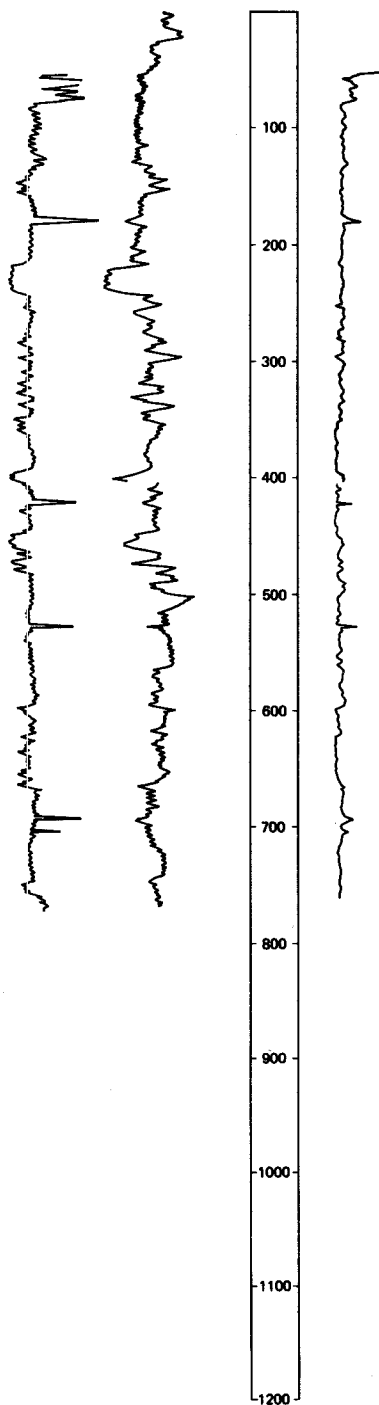
DATE DRILLED: 6/11/81

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 840
(FT)

NEUTRON (API) GAMMA RAY

RESISTIVITY (OHM-M)



DESCRIPTION OF DEPOSITS

GLACIAL OUTWASH

0-50 Sand and gravel.

SENTINEL BUTTE MEMBER OF FORT UNION FORMATION

50-150 Siltstone and claystone, gray.

TONGUE RIVER MEMBER OF FORT UNION FORMATION

150-155 Lignite and claystone.

155-220 Siltstone and sandstone.

220-245 Lignite.

245-360 Siltstone and claystone.

360-398 Claystone.

398-406 Lignite.

406-450 Claystone.

450-465 Lignite.

465-565 Siltstone and claystone, sandy, carbonaceous.

565-600 Sandstone, silty, fine to medium.

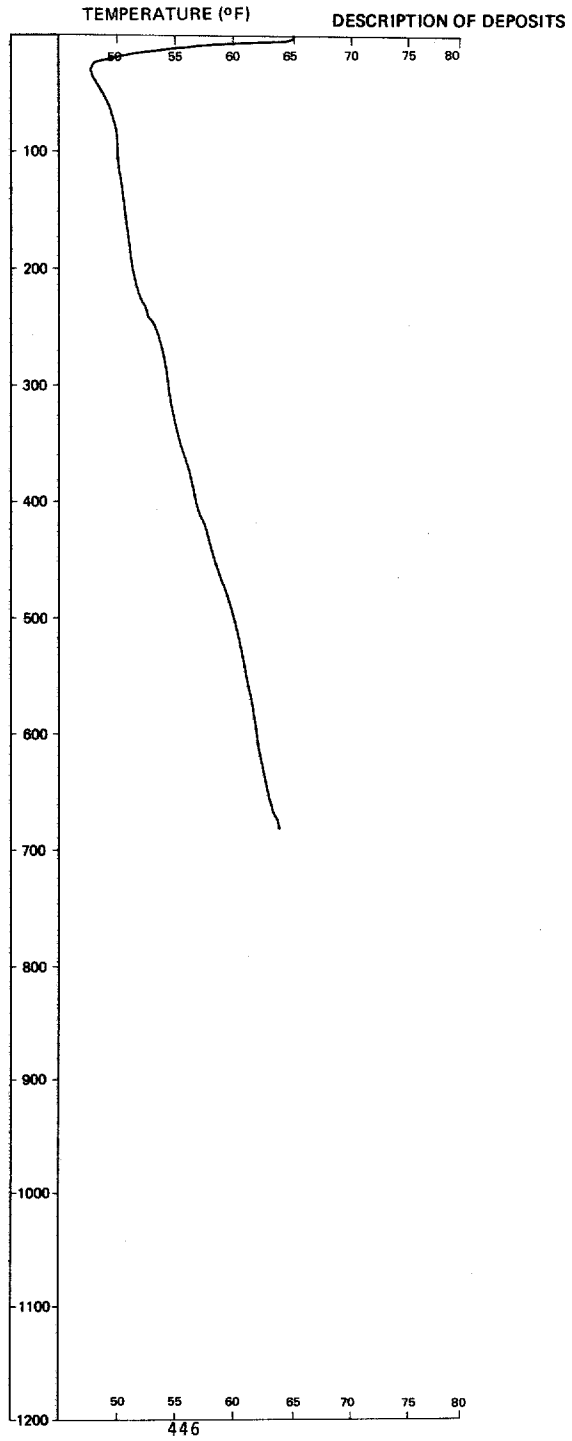
600-840 Siltstone and claystone.

LOCATION: 154-096-31CCA

DATE DRILLED: 6/11/81

ALTITUDE: 1940
(FT, NGVD)

DEPTH: 840
(FT)



154-096-31DDD
(Log modified from Francis Boyce Water Well)

Altitude: 2180 feet Date drilled: 12/27/71

<u>GEOLOGIC SOURCE</u>	<u>MATERIAL</u>	<u>THICKNESS (FEET)</u>	<u>DEPTH (FEET)</u>
	Topsoil, sand, and gravel-----	72	72
	Clay, gray-----	38	110
	Sandstone-----	1	111
	Clay, gray-----	34	145
	Coal-----	2	147
	Shale, gray-----	50	197
	Coal-----	8	205
	Shale, gray-----	112	317
	Coal-----	23	340
	Water strata-----	60	400

154-097-350CB
(Log modified from Thompson Drilling Co.)

Altitude: 1965 feet Date drilled: 12/10/74

	Topsoil-----	2	2
	Clay-----	8	10
	Sand, dirty-----	7	17
	Boulders-----	3	20
	Sand-----	12	32
	Clay-----	4	36
	Coal and sand-----	9	45

TABLE 4.--Chemical analyses of ground water

<u>Principal aquifer</u>	<u>Specific conductance</u>
110, Quaternary	Value shown is the field specific conductance measured at the well at the time of inventory unless otherwise indicated.
112, Pleistocene	
125, Paleocene	
211, Upper Cretaceous	
BNPR, Bennie Peer aquifer	
CRCK, Cherry Creek aquifer	
CRNB, Charbonneau aquifer	
HCFH, Hell Creek Formation-Fox Hills Sandstone	
LDLW, Ludlow member of Fort Union Formation	
LLMR, Little Missouri aquifer	
TBCG, Tobacco Garden aquifer	
TGRV, Tongue River member of Fort Union Formation	
YLMR, Yellowstone-Missouri aquifer	

Table with columns: LOCAL IDENTITY, PIER, LOGIC UNIT, DEPTH, DATE OF SAMPLE, CIPIC CONC, TEMPER, HARDNESS, CALC. DISS, SODIUM, POTAS, BICARB, CARBONATE, SULFATE, CHLOR, FLUOR, SILICA, SOLIDS AT 100, METRE, BORON, IRON, MANGA, etc. The table contains a large volume of analytical data for various samples.

150-098-10000
150-098-10001
150-098-10002
150-098-10003
150-098-10004
150-098-10005
150-098-10006
150-098-10007
150-098-10008
150-098-10009
150-098-10010
150-098-10011
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TABLE 5.--Chemical analyses of water from streams

	Little Missouri River at 144-102-08ABA		Little Missouri River near Watford City, North Dakota, at 148-099-35DDA					
	10/27/78	10/25/79	3/23/72	9/25/72	3/21/78	11/07/78	3/20/79	11/13/79
Date of sample	10/27/78	10/25/79	3/23/72	9/25/72	3/21/78	11/07/78	3/20/79	11/13/79
Streamflow, instantaneous (ft ³ /s)	61.7	23.5	3,640	69	7,740	66	1,960	18
Specific conductance (umho/cm @ 25°C)	2,250	2,510	635	2,040	440	2,100	630	2,550
pH (units)	8.3	8.2	7.3	7.9	--	8.6	8.1	8.1
Temperature (Deg C)	6.0	17.0	3.0	7.0	2.0	3.0	1.0	5
Silica, dissolved (mg/L as SiO ₂)	3.8	8.8	7.6	10	--	9.2	5.8	12
Calcium, dissolved (mg/L as Ca)	70	77	48	82	--	91	28	110
Magnesium, dissolved (mg/L as Mg)	45	48	15	45	--	46	3.7	61
Sodium, dissolved (mg/L as Na)	400	440	66	330	--	380	100	490
Potassium, dissolved (mg/L as K)	8.5	9.1	5.5	9.6	--	11	7.0	13
Bicarbonate (mg/L as HCO ₃)	401	400	156	411	--	--	--	--
Carbonate (mg/L as CO ₃)	0	0	0	0	--	--	--	--
Alkalinity (mg/L as CaCO ₃)	--	--	128	337	--	360	110	470
Sulfate, dissolved (mg/L as SO ₄)	860	1,000	200	770	--	860	180	1,000
Chloride, dissolved (mg/L as Cl)	13	16	1.3	1.5	--	10	7.7	12
Fluoride, dissolved (mg/L as F)	.3	.4	.1	.3	--	.3	.1	.3
Nitrate, dissolved (mg/L as NO ₃)	1	1	.23	.56	--	--	--	.1
Boron, dissolved (mg/L as B)	.41	.55	--	.34	--	--	--	.34
Solids, residue at 180°C dissolved (mg/L)	1,630	1,810	409	1,470	--	1,620	--	1,990
Hardness (mg/L as Ca, Mg)	360	390	180	390	--	420	85	530
Hardness, noncarbonate (mg/L as CaCO ₃)	31	62	54	53	--	57	0	56
Percent sodium	70	70	43	64	--	66	70	66
Sodium-adsorption ratio	9.2	9.7	2.1	7.3	--	8.1	4.7	9.3

TABLE 6.--Hydraulic conductivity and porosity values determined by laboratory tests^{1/}

Sampling depth (feet below land surface)	Hydraulic conductivity (feet per day)	Porosity (percent)	Sampling depth (feet below land surface)	Hydraulic conductivity (feet per day)	Porosity (percent)	Sampling depth (feet below land surface)	Hydraulic conductivity (feet per day)	Porosity (percent)
148-102-15DDA1			150-099-22BBA1			153-094-23CCC1		
200	5.7	33.5	55	57.7	31.5	244	2.3	29.1
260	3.5	33.3	176	22.8	37.1	246	1.6	27.5
578	7.2	33.8	444	2.4	31.9	610	1.7	26.6
615	.3	33.4	916	11.6	29.4	715	2.3	31.6
796	.03	29.4	1,224	4.9	36.8	1,240	6.9	31.8
938	.1	28.5	1,274	7.2	31.4	1,436	11.5	29.1
1,040	2.9	30.1	1,393	4.1	34.5	1,490	6	27.8
1,180	14	33.9	1,534	1.8	30.6	1,550	3.7	25.8
1,202	4.7	31.5	1,560	.7	25.9	1,590	4.4	24.2
1,290	4.7	33.7	1,660	3.8	27.7	1,630	4.3	24.2
1,648	5.3	30.6	1,700	6.2	33.9	1,650	5.7	26.1
1,670	9.3	32.8	1,780	32.5	33.6	1,670	9.8	21.5
1,692	14.1	33.1	1,790	16	33	1,680	6.5	30.6
1,718	17.1	32.1	1,798	18.4	35.3	1,694	2.2	14.9
1,800	6.8	32.3	1,806	11.7	35.8	1,710	14.4	30.7
1,820	19.8	33.6	1,880	10.3	34.2	1,719	12.6	31.1
			1,890	8.3	35.2	1,740	8.3	27.7
			1,912	2.6	29	1,750	6.5	27.8
			1,948	10.8	31.5	1,755	7.5	29.3
						1,760	29.4	32.6

^{1/}Analysis of sidewall cores by Core Laboratories, Inc.

TABLE 7.--Analyses of selected gases in ground water

[Analytical results are in milligrams per liter]

Local well number	Depth of well (feet)	Sampling date	Temperature (Degrees C)	Helium (He)	Hydrogen (H ₂)	Nitrogen (N ₂)	Oxygen (O ₂)	Argon (Ar)	Methane (CH ₄)	Carbon dioxide (CO ₂)	Ethane (C ₂ H ₆)
145-098-34DCA	2,013	6/04/79	17.0	0.014	--	28	0.03	0.80	2.3	5.9	--
145-102-24DDA	608	5/28/81	12.5	.004	--	38	3.2	1.2	.13	6.7	--
146-102-27BCA	1,310	6/05/79	14.5	.015	0.001	31	<.02	1.03	5.1	5.4	0.01
147-098-09AAC	710	7/09/80	11.0	.007	--	25	<.01	.88	.24	15	--
147-100-20DDB1	750	5/27/81	12.0	.012	.0001	26	<.1	.89	24	17	<.02
148-099-35DCA	107	5/15/81	11.0	Trace	--	23	<.04	.86	.016	36	--
148-099-36CAA	1,475	11/01/78	18.0	.010	--	32	2.9	.96	15	3.4	--
149-102-31DAC	1,910	11/02/78	12.5	.021	--	37	.04	1.09	22	4	--
150-098-06DAA1	104	5/04/81	9.0	--	--	27	<.04	.97	.013	28	--
151-104-04AAA	1,405	4/06/79	9.0	.021	--	27	<.02	.83	30	3.8	--
152-095-08CB	5,313	6/19/79	80.0	.010	.0005	4.4	<.01	.093	7.9	81	.17
153-097-02CDD	1,467	6/14/79	17.5	.009	--	13	<.03	.42	37	7.9	.07
153-098-33DCA	850	7/09/80	14.0	.011	.0005	24	.05	.69	25	25	--