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A Study of Seawater Intrusion Using Direct-Current Soundings in the Southeastern Part of the Oxnard Plain, California

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TABLE OF CONTENTS

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ABSTRACT

On the basis of ground-water quality data, previous investigations have estimated that more than 60 square kilometers of the Oxnard aquifer have been intruded by seawater to distances reaching several kilometers inland from the shoreline of the Pacific Ocean. A direct current resistivity survey was made to investigate whether the increased salinity in the inland wells is caused by lateral invasion of seawater or by downward leakage of saline water from near surface formations through some wells. The resistivity survey, which consisted of 94 Schlumberger soundings, helped solve the problem by mapping the three dimensional geometry of subsurface materials having different resistivities down to depths of about 500 m. The results of the resistivity survey showed that over most of the study area, near-surface layers (down to a depth of about 10 m) often have very-low to low resistivities (<1 to 4.5 ohm-m); but at depths greater than 30 meters, where the Oxnard aquifer is found, the very-low resistivity layers (seawater-saturated layers) do not extend inland as far as previously suspected. The resistivity survey showed that it is possible to detect fresh-water aquifers beneath saline-water aquifers, and that the fresh-water aquifers in the study area mostly are characterized by resistivities in the 30 to 70 ohm-m range.

INTRODUCTION

In July 1990, the U.S. Geological Survey made a direct-current resistivity survey in the southeastern part of the Oxnard Plain in Ventura County, California, which is located about 100 km northwest of Los Angeles. Previous investigations (California Department of Water Resources, 1965; County of Ventura Public Works Agency, 1990) have estimated that more than 60 square kilometers of the Oxnard aquifer have been intruded by seawater to distances reaching several kilometers inland from the shoreline of the Pacific Ocean. These estimates were based on ground-water quality data collected from wells, and *on using the criterion that chloride concentrations of more than 100 mg/l define the extent of the seawater-intrusion front.*

The purpose of the resistivity survey was to investigate the areal and vertical extent of seawater intrusion in the surveyed area and to help determine whether the increased salinity in the inland wells is caused by lateral invasion of seawater or by downward leakage of saline water from surface formations through some wells.

The resistivity survey consisted of 94 Schlumberger soundings (Kunetz, 1966, Zohdy and others, 1974) and covered an area of about 50 square kilometers along the coastal plain between Port Hueneme in the northwest and Point Mugu in the southeast. Two soundings were made at the U.S. Naval Construction Battalion Center at Port Hueneme and several soundings were made at the Point Mugu Naval Air Station and Pacific Missile Test Center (PMMTC). Subsequent to the resistivity survey, the U.S. Geological Survey installed four additional multiple-well monitoring sites (at SW, SCE, SWIFT, and DP) to help determine the source of the elevated chloride concentrations. Figure 1 shows the location of all the sounding stations made in this survey and the location of several of the monitoring-well sites.

The resistivity survey was funded by the southern California basins Regional Aquifer-System Analysis (RASA) program. The objectives of the southern California RASA program are: (1) to determine the geohydrologic framework of the coastal and desert basins in southern California, and (2) to identify and analyze major issues and problems affecting the use of ground water in these basins (Martin, 1986). Seawater intrusion is one of the major issues that has been selected for detailed investigation during this RASA study.

In this report, we present: a) a brief description of the geohydrology of the area, b) general principles of the resistivity method, c) the field data of the 94 Schlumberger soundings and their interpretations, d) a map of chloride concentrations and a map of old marsh land, e) twelve maps (at twelve selected depths) and three cross sections of interpreted resistivity, and f) a 3-D shaded relief of the interpreted-resistivity surface at a depth of 30 m. All maps and cross sections (except station location maps) are presented in color. On the interpreted-resistivity cross sections, we also include a color-coded presentation of the apparent resistivity recorded on 64-inch normal electric logs, and the chloride (Cl^-) and total dissolved solids (TDS) concentrations from some of the monitor wells in the area.

GENERAL FEATURES OF THE STUDY AREA

The Oxnard Plain has a typical coastal climate of warm-dry summers and cool-wet winters. Practically all the precipitation occurs from November through April. Mean annual precipitation on the Oxnard Plain is about 36 cm (California Department of Water Resources, 1965).

Land in the study area is used for agriculture, except where dune and marsh areas exist. At the time of this resistivity study (1990), most of the agricultural area included irrigated turf grasses and truck crops. Because of poor soil drainage, many of the fields are tile drained.

The main urban areas near the study area are the city of Port Hueneme in the northwest and the city of Oxnard in the north.

GEOHYDROLOGY

On the basis of characteristic geologic and hydrologic features, the water-bearing sediments beneath the Oxnard Plain are divided into two aquifer systems, an upper-aquifer system and a lower-aquifer system (Figure 2). The upper-aquifer system consists of relatively flat-lying alluvial deposits that have a total thickness of about 120 m. Within the upper-aquifer system, three aquifers are identified: the shallow, the Oxnard, and the Mugu (California Department of Water Resources, 1965). The lower-aquifer system consists of continental and marine deposits that are folded and faulted. These deposits have a thickness in excess of 300 m in parts of the study area. Within the lower-aquifer system, three aquifers are identified: the Hueneme, the Fox Canyon, and the Grimes Canyon (California Department of Water Resources, 1965).

The shallow aquifer (also sometimes referred to as the perched aquifer) extends from land surface to a depth of about 30 m in the study area. It consists of fine to medium sand and gravel. The water quality of the shallow aquifer is poor throughout most of the study area (California Department of Water Resources, 1965) and consequently few wells are perforated opposite it. A clay layer of low permeability separates the shallow aquifer from the underlying Oxnard aquifer. Pumping from the Oxnard aquifer occasionally results in the shallow aquifer becoming perched.

The Oxnard aquifer occurs from a depth of about 40 m to a depth of about 70 m beneath land surface in the study area. It consists of fine to coarse sand and gravel with occasional silt and clay beds. Historically, the Oxnard aquifer was the main aquifer tapped by wells in the Oxnard Plain.

The Mugu aquifer occurs beneath the Oxnard aquifer and extends from a depth of about 70 m to a depth of about 120 m in the study area. It consists of sand and gravel with interbedded silt and clay. Previous investigators reported that the Mugu aquifer is separated from the overlying Oxnard aquifer by a 3 to 30 m thick clay layer (California Department of Water Resources, 1965).

The Hueneme, Fox Canyon, and Grimes Canyon aquifers of the lower aquifer system, unconformably underlie the Mugu aquifer. They consist of fine to medium sand with occasional gravel layers interbedded with silt and clay layers. In recent years, ground-water pumping from these deeper aquifers has replaced pumping from the Oxnard aquifer.

Ground-water pumping has caused water levels to decline below sea level in parts of the upper- and lower-aquifer systems, which in turn resulted in seawater intrusion through outcrop areas in submarine canyons near the study area. Seawater intrusion was first suspected in the early 1930's and became a serious problem in the 1950's (California Department of Water Resources, 1971). The most serious seawater intrusion occurred in the Oxnard aquifer. On the basis of chloride data collected from monitor wells, the County of Ventura Public Works Agency (1990) estimated that more than 60 square kilometers of the Oxnard aquifer were intruded by seawater. Figure 3 shows a contour map of the chloride concentration in mg/l on the basis of water samples from a network of monitor wells. **The 100 mg/l contour was given in the County of Ventura Public Works Agency report as the delimiter of seawater intrusion in the Oxnard aquifer.** Note that the 100 mg/l contour was the only contour shown on the County of Ventura Public Works Agency map, the additional contours were generated by Steven K. Predmore (U.S. Geological Survey, written communication, 1993).

PRINCIPLES OF THE DIRECT-CURRENT RESISTIVITY METHOD

<u>Electrical Resistivity</u>:

Electrical resistivity is an intrinsic physical property that defines the resistance of a unit cube of a particular material to the flow of electric current. Whereas electrical resistance depends on the length, cross sectional area, and composition of a material, resistivity depends only on the composition and physical state of the material. Accordingly, resistivity is sometimes refered to as specific resistance. Resistance has the unit of ohm whereas resistivity has the unit of ohm-meter.

The reciprocal of resistivity is conductivity or specific conductance and it has the units of siemens/meter. In ground-water investigations, the conductivity (specific conductance) of water is commonly expressed in microsiemens/cm or in micromhos/cm (a siemen is the same as a mho and a mho is 1/ohm). The following conversion formula is useful:

Resistivity (in ohm-m) = 10,000/Conductivity (in microsiemens/cm).

The electrical resistivity of most rocks depends primarily on the amount of water in the rock and on the salinity of that water. Saturated rocks have lower resistivity than unsaturated rocks. The higher the porosity of a saturated rock, the lower its resistivity; and the higher the salinity of the saturating fluids, the lower the resistivity.

Fluid-saturated clays conduct electricity both electrolytically and electronically. An unsaturated clay has low resistivity because of the ability of clay minerals to conduct electricity electronically. Other materials such as graphite and metallic minerals also conduct electricity electronically.

On the basis of resistivity measurements alone it is difficult to distinguish one cause of low resistivity from another. However, by knowing the rock types in a studied area, the salinity of the saturating fluids, measuring other electrical properties (such as induced polarization), mapping the geometry of the subsurface geoelectric units with electrical soundings, and by knowing typical resistivity values for various materials, one can make a good guess at the geologic and hydrologic nature of the buried materials.

<u>Electrical Sounding</u>:

Electrical sounding is the process by which one probes the ground to evaluate the variation of electrical resistivity mostly with depth and to a certain extent laterally. In the presence of lateral inhomogeneities, the sounding data is affected to various degrees depending on: the resistivity contrast, the geometry of the anomalous body, the type of electrode configuration, and the orientation of the electrode configuration with respect to the lateral inhomogeneity. Several electrode configurations (or electrode arrays) can be used to make an electrical sounding (Zohdy and others, 1974).

In this study, we used the Schlumberger electrode array. This is the most widely used electrode array in direct-current exploration on a world-wide basis. Four electrodes A, M, N, and B are placed at the surface of the ground along a straight line (Figure 4) so that AB (the distance between the current electrodes) is greater than or equal to five times MN (the distance between the potential electrodes). For the Schlumberger array, the current-electrode spacing is defined as half the distance between the current electrodes and is refered to as (AB/2).

A Schlumberger electrical sounding is made by increasing the distance between the current electrodes and successively computing the resistivity at each current-electrode spacing (AB/2). The distance between the potential electrodes M and N is periodically expanded after a set of increasing current-electrode spacings is made. The purpose of expanding the distance between the potential electrodes is to increase the signal to noise ratio of the measured potential difference between the electrodes M and N. When the distance between the potential electrodes is expanded, a repeat reading is made at the same current-electrode spacing. This repeated reading may be extended over two current-electrode spacings to form an overlap on the sounding curve. Each set of apparent resistivity measurements, made at increasing current-electrode spacings while holding the distance between the potential electrodes fixed, is called a segment. Thus a field-Schlumberger sounding curve, as opposed to a theoretical-Schlumberger sounding curve, is generally discontinuous and segmented.

The magnitude of a discontinuity, caused by expanding the distance between the potential electrodes, is normally very small (ranging from less than 1 to about 5 percent) provided the ground is laterally homogeneous and isotropic. If the ground is laterally inhomogeneous, then the magnitude of the discontinuity may be large; especially if one of the potential electrodes crosses over a material having a resistivity higher than the resistivity beneath the center of the array.

A resistivity is computed at each electrode setup from a formula (Zohdy and others, 1974) that contains the distances between the four electrodes (A, M, N, and B), the amount of current (I) injected into the ground at the current electrodes A and B, and the potential difference (delta V) measured between the potential electrodes M and N. The computed resistivity is called an apparent resistivity and is plotted on a log-log scale as a function of the current-electrode spacing (AB/2). The plot of apparent resistivity versus the current-electrode spacing (AB/2) is called an electrical-sounding curve.

FIELD CONDITIONS

The field conditions in the survey area were generally acceptable for making direct-current resistivity soundings, but were generally unsuitable for electromagnetic soundings, because of the presence of power lines and numerous aluminum irrigation pipes laid out in the fields. We made most of the Schlumberger soundings on private roads along the agricultural fields. Near some of the fields, we were concerned about the adverse effect of the aluminum irrigation pipes on the resistivity measurements. We concluded, however, that these pipes had very little effect on the Schlumberger soundings because:

1) The pipes were lying on the earth's surface, or in furrows, as opposed to being buried underground, and hence made lesser electrical contact with the ground.

2) At most (but not all) sounding locations, the pipes were laid perpendicular to the direction of the sounding expansion which has less effect than if the pipes were laid parallel to the direction of expansion.

3) We made a special effort to make most soundings near fields where the pipes were not in use and hence the ground was drier and the electrical contact of the pipes with the ground was minimal. However, we had to make a few of the soundings near irrigated fields.

4) Induced polarization effects were not observed during the voltage readings, which is a good indication that the effect of the pipes is minimal or absent.

We made some soundings on Point Mugu Naval Air Station and Pacific Missile Test Center (PMMTC) where much of the land was reclaimed from the ocean by land fill. Figure 5 shows a map of the distribution of marsh land as it appeared in 1901 (California Division of Mines and Geology, 1976). At several sounding locations on PMMTC we encountered a near-surface high-resistivity layer (dry sand and gravel) underlain by a very-low resistivity layer (saltwater-saturated sediments). The near-surface high-resistivity material caused high-contact resistance and limited the amount of current that we could inject into the ground. At large current-electrode spacings, the very-low resistivity material, underneath the dry sand and gravel layer, caused the voltage between the potential electrodes to be much smaller than normal. This condition coupled with the presence of buried metallic objects at some locations caused some difficulties and altered some of our plans. For example: a) sounding 60 (see Figure 1 for location) was terminated at the current-electrode spacing of 183 m (600 ft) because of severe reduction in the measured potential difference, b) the initial location of sounding 61 was changed to another location because of the presence of buried metallic objects (as indicated by measuring large induced-polarization effects), and c) an attempt to make a sounding west-northwest of sounding 61 was abandoned because of buried metallic objects and very high contact resistance.

We made two soundings, 93 and 94 (Figure 1) at the U.S. Naval Construction Battalion Center at Port Hueneme. Buried pipes and other cultural features limited the maximum current-electrode expansion and the reliability of these two soundings.

We made four soundings, 83, 84, 85, and 86 (Figure 1), on the beach within a few tens of meters from the shoreline. Contrary to what we expected, the contact resistance was low because of the presence of salty moisture in the beach sand.

EQUIPMENT AND SOUNDING MEASUREMENT PROCEDURES

Equipment:

A 5 KVA generator was used for current power supply and the current was controlled using equipment designed and built by the U.S. Geological Survey. A potentiometric chart recorder was used for measuring the potential difference between the potential electrodes. Three trucks were used for making the soundings: an instrument truck (a carryall) that remained stationary at the center of the sounding, and two pickup trucks that were used to lay out and pick up the current cable. Communication between operator and crew at large current-electrode spacings was maintained using 90 watt FM radios installed in each truck.

Electrode-Spacing Measurements:

All current- and potential-electrode spacings were measured in feet and later converted to meters during interpretation. In this section, we will describe the electrode spacings as they were measured in the field, that is in feet. Current-electrode spacings (AB/2) ranging from 10 to 100 ft were measured using a cloth tape. The current-electrode spacings at 140 ft and at 200 ft were measured using markings on the potential-electrode cable. Current-electrode spacings greater than 200 ft were measured using truck-mounted precision foot-odometers.

For most soundings, we expanded the current-electrode spacings (AB/2) to a maximum that ranged from about 1000 to 8000 ft. Most field curves were composed of only two or three segments. The first segment was obtained by expanding the current-electrode spacing (AB/2) from 10 to 100 ft with the potential-electrode spacing (MN/2) held fixed at 2 ft. At AB/2 = 100 ft, the potential-electrode spacing (MN/2) was expanded from 2 to 20 ft and the second segment was obtained by expanding the current-electrode spacing from 100 to 1000 ft. Similarly, at AB/2 = 1000 ft, the potential-electrode spacing (MN/2) was expanded from 20 to 200 ft and the third segment was obtained by expanding the current-electrode spacing from 1000 ft to the maximum required or logistically-possible spacing.

We expanded several soundings to current-electrode spacings that were longer than the available straight-line distance by following the turn in the road. We corrected the few measurements that were made at large current-electrode spacings, for non-linear geometry, using a method described by Zohdy and Bisdorf (1990). In general, the magnitudes of the corrections were small.

Data Acquisition Procedure:

The sounding curves were plotted in the field as the measurements were made. We use this procedure in order to identify and correct mistakes made by the operator or the crew, and to recognize spurious readings caused by man-made structures (fences, buried cables, etc), by current leakage, or by equipment malfunction. At the end of each sounding, we made a test for current leakage (Zohdy, 1968). We did not observe current-leakage indications in any of the tests.

DATA PROCESSING AND INTERPRETATION

The field-sounding curves and their interpretations are given in the appendix. The soundings are numbered consecutively from Oxnard 1 to Oxnard 94. Sounding curves, which were corrected for non-linear electrode geometry (at few large current-electrode spacings) are designated by the suffix C, see for example soundings 24C, 25C, 26C, and 27C. Only few soundings were distorted by man-made inhomogeneities such as a buried metallic-pipe line or a fence with metal posts. Examples of distorted sounding curves include those of soundings 5, 12, 22, and 34 (see appendix). The distortions were generally minor and had little impact on the interpreted resistivity.

All sounding curves were processed and interpreted using an automatic interpretation computer program (Zohdy, 1989; Zohdy and Bisdorf, 1989). The automatic-data processing consists of:

a) Converting the current-electrode spacings (AB/2) from feet to meters.

b) Shifting the observed-curve segments, obtained with fixed potential-electrode spacings (MN/2), upward or downward to obtain a continuous, unsegmented, curve. Generally, the segment measured with the largest potential-electrode spacing is kept fixed in position and the other segments are shifted up or down.

c) Sampling the continuous, unsegmented, curve at the rate of 6 points per logarithmic cycle to obtain a digitized-sounding curve. The sampling process is automatically made by the program, from right to left, starting at the largest current-electrode spacing.

The digitized sounding curve resulting from the above processing is fed into the automatic-interpretation portion of the program to obtain depths and resistivities of a horizontally stratified earth model. The obtained model is assumed to exist directly beneath the sounding station.

INTERPRETED RESISTIVITIES

In this section, we describe the ranges of interpreted resistivity that we encountered in this survey and what we infer these ranges to mean in terms of probable lithology and water quality. We also stress some facts regarding the method of interpretation and the depth resolution of direct-current soundings.

In general, the interpreted resistivities ranged from very low (0.5 to 2 ohm-m) for seawater-saturated sediments near the coast, to moderate (30 to 70 ohm-m) for freshwater-saturated sediments. Specifically, on the basis of typical resistivities of materials in similar geologic environments, the interpreted resistivity ranges may be described in terms of possible lithology and TDS concentrations, as follows:

1) Layers with resistivities of 0.5 to 2 ohm-m almost certainly represent porous sediments saturated with highly-saline water (either seawater or very saline drainage water) with TDS concentrations of about 20,000 mg/l or greater.

2) Layers with resistivities of 2 to 4.5 ohm-m probably represent sediments saturated with saline water with TDS concentrations of about 10,000 mg/l.

3) Layers with resistivities of 4.5 to 10 ohm-m may represent sandy sediments saturated with brackish water (about 10,000 to 1500 mg/l TDS, respectively) or may represent clays.

4) Layers with resistivities of 10 to 15 ohm-m probably represent sandy sediments rich in clay or possibly sand and gravel deposits saturated with brackish water (about 5000 mg/l to 1500 mg/l TDS, respectively).

5) Layers with resistivities of 15 to 30 ohm-m probably represent sand and gravel layers with some clay layers and most likely are saturated with poor to better quality water (1500 to 700 mg/l TDS, respectively).

6) Layers with resistivities of 30 to 70 ohm-m (which is the highest range of interpreted resistivity found in this study area) probably represent sand and gravel sediments with minor clay layers and saturated with freshwater (only few hundred mg/l TDS).

It is important to recognize the following facts: a) the above classification is meant to be used only as a general guide to the meaning of interpreted-resistivity values mentioned in this report, b) the interpreted resistivities given in this report (see appendix) are based on a theoretical modeling method (Zohdy, 1989) that results in a gradually changing step-function curve from which a continuous and smooth curve for the variation of resistivity with depth is derived, c) in an actual geoelectric section, such as one measured in a drill hole, the resistivity-depth function may vary smoothly in parts of the section and abruptly in others, and d) not all layers seen on an electric log are detected on a sounding curve; for a given layer, the smaller its thickness (with respect to its depth of burial) the less detectable it is; thin layers combine with overlying and underlying layers to to give the effect of a single equivalent layer.

IMPORTANT FEATURES OF SOME SOUNDING CURVES

In this section we describe the character and several important features of some of the field-sounding curves and what we interpret them to indicate in terms of probable subsurface conditions.

We did not observe on any of the sounding curves a clear indication of the detection of highly-resistive basement rocks with resistivities of several hundred ohm-meters. As we explain below, this does not mean that we did not measure sounding curves with a terminal branch that rises at nearly 45 degrees.

On a Schlumberger sounding curve, a highly resistive basement of significant thickness is manifested by the formation of a straight line that rises at an angle of 45 degrees (also known as the S-line, because one can determine the total longitudinal conductance, S, from it (Zohdy and others, 1974)). The measurement of such a straight line, however, does not necessarily indicate the detection of a very highly resistive basement rock, it merely indicates the detection of a thick, underlying, layer with a resistivity which is 20 times (or more) the resistivity of the overlying layer. Thus, if the overlying layer has a very-low resistivity of the order of one ohm-m (or less), then the thick and resistive underlying layer only has to have a resistivity of about 20 to 30 ohm-m for the terminal branch of the sounding curve to rise at an angle of nearly 45 degrees.

In this survey, at locations generally near the coastline, the terminal branch of several sounding curves rises at an angle of about 45 degrees (see for example soundings 15, 16, 17, 18, 19, 20, 22, 61, 66, 77, and 78) but, as explained above, because the resistivity of the overlying material at these sounding locations is very low (about one ohm-m or less), the rising branch does not necessarily indicate the detection of basement rocks having a resistivity in the hundreds of ohm-meters.

Some soundings (see for example soundings 1, 2, 3, 4, 26, 27, 28, 76, and 87) were expanded to large current-electrode spacings (AB/2) reaching as much as 2438 m (8000 ft) and did not show the detection of a highly resistive basement; instead they showed the detection of a thick bottom layer with a resistivity of less than 20 ohm-m beneath a moderately resistive (30 to 70 ohm-m) layer.

Several soundings at locations as much as 5 kilometers inland from the shoreline showed layers of low and very-low resistivities (<3 ohm-m) at shallow depths of less than 10 m (see for example soundings 1, 7, 8, 46, 51, 87, and 88). These conductive layers probably represent clayey soils saturated with salty water resulting from poor-irrigation drainage. Generally, they are underlain by layers with higher, but still low, resistivities in the range of 10 to 15 ohm-m (probably representing clayey sediments) or by medium resistivities in the range of 20 to 30 ohm-m (possibly representing sandy sediments saturated with somewhat better quality water, near a 1000 mg/l TDS). At few locations (such as beneath soundings 1, 2, 7, and 87) the interpreted resistivity at a depth of about 100 m is in the range of 45 to 70 ohm-m which is the highest range of interpreted-resistivity we found in the study area. These layers probably represent mostly sand and gravel layers saturated with freshwater of only a few hundred mg/l TDS.

The largest resistivity contrast, of more than 1000 to 1, was seen on the curve of sounding 22 (see appendix) obtained on PMMTC. The apparent resistivity on the field curve decreased from more than 1000 ohm-m (cemented sand and gravel layer) at short current-electrode spacings to less than 1 ohm-m (seawater-saturated sediments) at medium current-electrode spacings. At larger electrode spacings, the resistivity increased again along a line inclined to the abscissa at an angle of about 45 degrees. Here again, the rising branch on this sounding curve does not necessarily indicate the detection of a high resistivity basement, but more likely it represents the detection of freshwater-saturated layers below the saltwater-saturated ones. For freshwater-saturated layers to exist beneath saltwater saturated layers, an impermeable clay layer must exist between the two.

Soundings 83, 84, 85, and 86, which were made on the beach (see Figure 1 for location and see appendix for sounding curves) showed another interesting phenomenon which is indicative of the sensitivity of the resistivity method to a possible change in water salinity. The field curves of soundings 83, 84 and 86 show very low apparent resistivities of about 1 ohm-m, but the curve of sounding 85 which is located approximately opposite the discharge area of a canal shows an apparent resistivity of about 1.5 to 2 ohm-m. This increase in resistivity can be explained either by a change in lithology and porosity beneath sounding 85 or by a change in water salinity resulting from the mixing of discharge water from the canal with seawater.

The terminal branch of the above set of sounding curves (especially soundings 83, 85, and 86) does not rise at an angle of 45 degrees, but instead seems to be approaching an asymptote of about 15 ohm-m. This can be explained by: 1) the value of 15 ohm-m is the true resistivity of a very thick underlying layer, or 2) the true resistivity of the underlying layer is more than 15 ohm-m (perhaps 30 to 50 ohm-m) but the terminal branch of the sounding curve is being gently and continuously pulled down to lower apparent resistivities by the lateral effect of the adjacent wedge of low-resistivity ocean water (about 0.25 ohm-m) which lies parallel to the direction of the sounding expansion. However, since the ocean floor dips away from the shoreline, the lateral effect of the very-low resistivity ocean water would be less significant than a vertical contact or a contact that dips toward the sounding center (see theoretical sounding curves made parallel to the strike of a dipping contact, sheets No. 30 to No. 34, for dip angles ranging from 175 to 135 degrees, respectively, in Alpin and others, 1966, and for vertical contact in Zohdy, 1970). No attempt was made to subtract the effect of the wedge-shaped saltwater body from the observed sounding curves as described by Zohdy (1969).

INTERPRETED-RESISTIVITY MAPS

Twelve maps of interpreted resistivity at different depths were prepared and are shown in Figures 6, 7, and 8. The depths were selected at a logarithmically nearly-equal interval at values of 5, 10, 15, 20, 30, 45, 70, 100, 150, 200, 300, and 450 meters. Similarly, the resistivity contours were selected at a logarithmically nearly-equal interval at values of 1, 1.5, 2, 3, 4.5, 7, 10, 15, 20, 30, 45, and 70 ohm-m. The reason for using a logarithmic scale, rather than a linear scale, is that the resolution of electrical methods in terms of detectability of a given layer at depth follows a logarithmic scale.

The number of sounding stations shown on the maps diminishes from 94 for maps at depths of 5 to 150 m (Figures 6a through 8a), to 61 stations at 200 m (Figure 8b) , to 48 stations at 300 m (Figure 8c), and to 28 stations at 450 m (Figure 8d). The reason for the fewer sounding stations on maps representing greater depths is that probing to greater depths requires larger current-electrode spacings and the study area did not have many continuous roads where large current-electrode spacings could be deployed.

Small-Depth Maps, 5 to 30 m (the Shallow Aquifer):

The interpreted resistivity distribution at a depth of 5 m (Figure 6a) shows predominantly very-low and low resistivities (<1 to 4.5 ohm-m). A region of moderately-low resistivity (4.5 to 15 ohm-m) exists beneath the area near Arnold Road (extending from near the coast to the northern end of the study area) and also in a region that nearly parallels the coastline, at a distance of about 1.5 kilometers inland, between PMMTC and Arnold Road. Southwest of Arnold Road, the region with moderately-low resistivity (4.5 to 15 ohm-m) is shown *reaching* the coastline on Figures 6a and 6b. There are no sounding stations close to the coastline in that area and these moderately-low interpreted resistivity values, *adjacent* to the coastline, are probably only an artifact of the contouring algorithm in the computer program which is based on the available set of data points. Normally, one would expect the resistivity to be low and very low along a strip of about 0.5 km in width paralleling the coastline.

The pattern of interpreted resistivity on the 5 m depth map (Figure 6-a) appears to be related to soil type. A generalized soils map compiled by the U.S. Department of Agriculture, Soil Conservation Service (1970), groups soils in the study area into saline and less-moderately-saline soils. In general, we found that saline soils are identified in regions where the interpreted resistivity is very-low to low (<1 to 4.5 ohm-m) and that moderately-saline soils coincide with regions of moderately-low interpreted resistivity (4.5 to 15 ohm-m). The saline soils on the soil map occupy topographically-low regions whereas the moderately-saline soils occupy topographically-high regions. It should be noted, however, that the topographic relief in the study area is hardly noticeable.

At the shallow depth of 5 m (Figure 6-a), near the ocean and in areas that were originally marsh land (Figure 5), the low resistivities of less than 3 ohm-m probably represent seawater-saturated sediments. In inland areas, these low resistivity materials, which are mapped to as far north as the area near the SCE monitoring-well site north of Hueneme Road and south of Highway 1 (Figure 1), probably represent clayey layers and layers saturated with saline irrigation-return waters. Saline waters at this shallow depth in the inland areas may be the source of localized contamination of deep aquifers by imperfect well construction or by old well casings that corroded and failed.

The sediments from land surface to a depth of about 30 m are part of the shallow aquifer. Water samples collected during the RASA studies from wells completed in the shallow aquifer ranged from fresh to more saline than seawater with chloride concentrations in excess of 23,000 mg/l in comparison to 19,000 mg/l for seawater (Stamos and others, 1992).

At the successively greater depths of 10, 15, 20, and 30 m, the interpreted-resistivity maps (Figures 6b, 6c, 6d, and 7a) show the gradual change in the distribution of very-low and low-resistivity materials versus the moderately-low resistivity materials. The interpreted resistivity increases with depth in the inland region, but along the coast, the interpreted resistivities remain low and very low. In particular, at 20 and 30 m depths (Figures 6d and 7a) a boundary in the form of a sharp resistivity gradient separating very-low resistivity materials (<1 to 4.5 ohm-m) from moderately-low resistivity materials (4.5 to 15 ohm-m) becomes well defined. This sharp resistivity gradient mostly represents the boundary between seawater-saturated sediments and fresher-water-saturated sediments in the shallow aquifer. Note that the location of the sharp resistivity gradient is close to the boundary of the old marsh land (compare Figures 6d and 7a to Figure 5). The relation between these two features is explained as follows.

In the early 1900's, prior to the development of the Oxnard Plain, marsh land and lagoonal areas extended inland to more than one kilometer (Figure 5). The marsh land and lagoonal areas have been inundated by seawater from wave action and high tides. Sea water trapped in the marsh land and lagoonal areas became concentrated by evaporation.

Although the very-low resistivity materials, near the ocean and in the old marsh land area, most likely represent sediments saturated with seawater, this does not necessarily represent *seawater intrusion everywhere* because: a) most of this region was reclaimed from the ocean, b) there has been no pumping from the shallow aquifer, c) in most monitoring wells the hydraulic head is above sea level, and d) available data indicate that the water table of the shallow aquifer has historically been above sea level. Therefore, lateral seawater intrusion has not occurred everywhere in the shallow aquifer, and the low-interpreted resistivities down to a depth of 30 m are caused by seawater-saturated sediments which resulted from *downward* migration of seawater in the old marsh land area. However, a close comparison of the location of the sharp-resistivity gradient on the 20 and 30 m depth maps (Figures 6d and 7a) to the location of the boundary of the old marsh land (Figure 5), indicates that seawater-saturated sediments may extend inland few hundred meters farther than the boundary of the old marsh land. Therefore, assuming that the 1901 marsh land boundary was drawn correctly; either some inland movement of seawater into the shallow aquifer may have occurred in certain areas, or an older marsh-land boundary existed at a distance of a few hundred meters farther inland than the one mapped in 1901. In either case, we believe that the seawater-saturated sediments in the depth range of 20 to 30 m in the shallow aquifer do not extend inland beyond the location of the sharp-resistivity gradient.

<u>Medium-Depth Maps, 45 to 100 m (the Oxnard and Mugu Aquifers)</u>:

The interpreted resistivity maps at depths of 45 m and at 70 m (Figures 7b and 7c) represent part of the Oxnard aquifer and the bottom of the Oxnard aquifer, respectively. These two maps show that very-low (<1 to 4.5 ohm-m) and moderately-low (4.5 to 15 ohm-m) resistivity materials extend only about 3 km inland from the coast near Point Mugu. This is in disagreement with the report (County of Ventura Public Works, 1990) that the seawater-intrusion front in the Oxnard aquifer (which was defined by the > 100 mg/l chloride concentration contour) extends as far inland as northwest of the intersection of Highway 1 and Hueneme Road (see Figure 3). Much of the area believed to be intruded by seawater at depths of 45 and 70 m (Figures 7b and 7c) is shown to have moderately-high interpreted resistivities in the range of 15 to 45 ohm-m. The significant difference between the moderately-high interpreted resistivity distribution and the extent of the reported seawater intrusion front suggests that a source other than seawater intrusion may be the cause for elevated chloride concentrations in the inland area.

As mentioned earlier, as a result of the resistivity survey, the U.S. Geological Survey installed multiple-well monitoring sites (at SW, SCE, SWIFT, and DP; see Figure 1 for location) to help determine the source of the elevated chloride concentrations. Izbicki (1991) used water-quality data, including stable isotope analyses and showed that the area affected by seawater intrusion is less than originally believed, and that the source of elevated chloride concentration in some wells is attributed to downward leakage of seawater whereas in other wells it is attributed to downward leakage of irrigation return waters, through failed casings.

At a depth of 100 m (Figure 7d), the resistivity distribution is similar to the 70 m depth (Figure 7c) but the area of low resistivity near the coastline is further reduced and the low-resistivity materials, shown to the northwest of PMMTC on the previous maps, are mostly replaced by higher resistivity materials at this greater depth. The Mugu aquifer, which is normally saturated with freshwater, should be present at this 100 m depth. Most wells perforated solely opposite this depth yield low-salinity ground water.

The clay layer, with a thickness of 3 to 30 m, that separates the Oxnard aquifer from the Mugu aquifer (Figure 2), cannot be detected by electrical soundings at this depth, especially if there is saltwater saturated sediments above it and freshwater saturated sediments below it.

<u>Large-Depth Maps, 150 to 450 m (Lower-Aquifer System)</u>:

The interpreted-resistivity maps at depths of 150, 200, 300, and 450 m (Figure 8 a,b,c,and d) represent the lower aquifer system. All four maps show the predominance of freshwater saturated sediments of medium-low to moderately-high resistivity (15 to 70 ohm-m) at these depths.

At the depths of 150 and 200 m the maps in Figures 8a and 8b show the remanence of very-low and moderately-low resistivities (1 to 10 ohm-m) in the southern part of the PMMTC area. These two maps also suggest that perhaps the best water supply in the studied area may be found at these depths in the central part of the studied area (south of Hueneme Road and east of Arnold Road) where interpreted resistivities of 30 to 70 ohm-m cover an area of about 4 to 5 square kilometers.

An interpreted high resistivity (45 to >70 ohm-m) region is present in the eastern end of the study area at 150, 200, 300, and 450 m depths (Figures 8a to 8d). The size of this high resistivity region increases somewhat with depth and the high resistivity material probably represents volcanic rocks of Miocene age as indicated by geologic logs of several wells in the area. The depth to these volcanic rocks in the wells is found to be as shallow as 150 m.

In the central part of Figure 8d, at a depth of 450 m, a low resistivity anomaly exists. The location and depth of this anomaly correlates with the depth to the top of an anticline of low-resistivity rocks of Miocene (?) age (Greene and others, 1978). A comparison of the interpreted resistivity maps for the 300 and 450 m depths (Figures 8c and 8d) shows some abrupt changes in resistivity in the southern part of the survey area. These changes are caused by the reduction in the number of sounding stations from 48 to 24.

INTERPRETED-RESISTIVITY CROSS SECTIONS

Three interpreted-resistivity cross sections were prepared from the interpretation of the sounding data. The location of these cross sections is shown in Figure 9. Two cross sections are oriented east-west and a third one is oriented north-south. The three interpreted-resistivity cross sections are shown in Figures 10, 11, and 12. Each of these figures is composed of two parts: an upper part which shows the top 150 or 170 m of the cross section vertically exaggerated 10 times, and a lower part which shows the entire cross section extended to greater depths with no vertical exaggeration.

Information from multiple-well monitoring sites constructed by the U.S. Geological Survey is included on each of the cross sections. The information includes apparent resistivity values taken from 64-inch normal electric logs and are color coded according to the resistivity scale used in the interpreted-resistivity cross sections. The original logs are available at the U.S. Geological Survey office in San Diego, California. No attempt was made to compute interpreted resistivities from the apparent resistivities of the electric logs. In addition to the electric logs, chloride (Cl^-) and total dissolved solids (TDS) concentrations of water samples at several depths are included for comparison with the interpreted-resistivity distribution depicted on the cross sections. Well construction information and selected chemical analyses are presented in table 1 (see pages 30 and 31) for the multiple-well monitoring sites shown on the cross sections. Note that some wells were drilled to greater depths than the depths indicated in table 1. These wells were logged then backfilled to the depths indicated in table 1. The information from the monitoring-well sites was added to the interpreted-resistivity cross sections after the interpretation was completed and no attempt was made to revise the interpreted depths or resistivities of the sounding data.

Cross Section 83-88:

The interpreted-resistivity cross-section 83-88 (Figure 10) extends from sounding 83 near the Pacific Ocean in the west to sounding 88 in the east (see Figure 9 for location). The length of this cross section is approximately 9 km.

In the west side of the cross section, beneath sounding 83, the interpreted resistivity in the upper 30 m ranges from very-low to low (< 1 to 4.5 ohm-m). These very-low and low resistivity layers extend inland to just west of sounding 68. In view of the proximity of the Pacific Ocean, these layers probably represent sedimentary layers saturated with seawater.

From a depth of about 30 to 150 m the resistivity is moderately low (about 4.5 to 15 ohm-m) and is interpreted to represent either clayey layers with freshwater or sandy layers with brackish water. This interpretation is substantiated by data from the CM-4 monitoring-well site which is located about one kilometer east of sounding 83. Drill cuttings collected from CM-4 at this depth interval are predominantly sand and gravel. Ground-water samples from the 61 m and 84 m wells at the CM-4 monitoring-well site contain chloride concentrations in the range of 3,100 to 6,200 mg/l and TDS concentrations in the range of 6,530 to 11,200 mg/l. These concentrations indicate the presence of brackish water to a depth of at least 84 m. Drill cuttings at depths of 100 to 200 m are predominantly silt and clay.

At a depth range between 150 and 200 m the interpreted resistivity increases to greater than 15 ohm-m which signals the possible detection of freshwater-saturated layers. This interpretation is supported by the increase in the apparent-resistivity log of CM-4 at depths greater than about 230 m and the significant improvement in water quality, in samples obtained from the deeper wells (>200 m) in the CM-4 monitoring-well site, with chloride concentrations in the 39 to 59 mg/l range and TDS concentrations in the 577 to 713 mg/l range .

Soundings 83 and 68 (on each side of the CM-4 monitoring well site) probe to depths at which only the upper part of the freshwater aquifers in the lower aquifer system are detected. The data from these two soundings show the detection of higher resistivity layers at depth but do not probe deep enough to determine the resistivity of these layers with greater confidence.

At depths greater than 200 m the well-log resistivities in CM-4 correlate very well with the interpreted resistivities beneath soundings 5, and 4 (east of sounding 68) as shown in the bottom part of Figure 10.

To the east of sounding 68, beneath soundings 5, 4, and 3, only the near surface materials reaching to depths of 15 to 20 m are characterized by very-low and low resistivities (less than 4.5 ohm-m). At larger depths, the interpreted resistivities increase gradually; and at depths greater than about 35 m, the interpreted resistivities reach values mostly between 20 and 45 ohm-m which is generally indicative of sediments saturated with better-quality water (about 1000 mg/l TDS or less). The electric log data from the Swift well, located about 700 m east of sounding 3, also support the above interpretation as shown by the color coded distribution of apparent resistivity at depths greater than 20 m in the well.

The nearest sounding to the Swift well is sounding 2. The interpreted resistivity beneath sounding 2 at depths of less than 20 m show higher resistivities (7 to 10 ohm-m) than beneath soundings 3, 4, 5, 68, and 83 in the west, and soundings 1, 87, 7, 8, and 9 in the east (<1 to 4.5 ohm-m).

Near the top of the Swift well, the chloride concentration is surprisingly low (62 mg/l) and the total dissolved solids are moderately high (1070 mg/l). Thus both the data from the water-quality samples and the interpretation of sounding 2 show that the Swift well may be located in an atypical location as far as the upper 30 m in the area is concerned. Furthermore, the generalized soil map compiled by the U.S. Department of Agriculture (1970), shows that the soils at the SWIFT site are less saline than surrounding soils.

At the depth interval from 56 to 60 m in the SWIFT well, the water-quality analysis is somewhat in disagreement with both the interpreted-sounding resistivity and the electric-log resistivities at that depth. The chloride concentration is 1000 mg/l and the TDS is 2450 mg/l. These concentrations are fairly high to correspond to interpreted resistivities of 30 to 45 ohm-m (from sounding data) and apparent resistivities of 15 to 30 ohm-m (on the electric log). Preliminary chemical analyses indicate that seawater is not the source of the observed high chloride and TDS concentrations. As mentioned earlier, Izbicki (1991) has shown that leakage from the shallow aquifer is the cause of elevated chloride concentrations in some areas of the Oxnard Plain. Although the shallow aquifer at the SWIFT site contains relatively good quality water, low resistivity zones of the shallow aquifer are found within 0.5 km of the site.

At a depth of about 100 m in the SWIFT well, the chloride and TDS concentrations decrease to 37 mg/l and 805 mg/l, respectively, and thus are back in good agreement with what might be expected from the interpretation of the sounding data and from the well-log resistivities (30 to less than 70 ohm-m).

East of sounding 9 and beneath sounding 88, there is a layer of moderately low resistivity (10 to 15 ohm-m) whose thickness increases from about 25 m beneath sounding 9 to about 70 m beneath sounding 88. This layer mostly corresponds to the eastern edge of the Oxnard aquifer and contains fine grained deposits. The quality of the water in these deposits is not well defined.

In the lower part of Figure 10, beneath soundings 1, 87, 7, and 8 at a depth of about 400 to 500 m a low resistivity anticlinal structure with layers of about 10 to 15 ohm-m is detected. As mentioned earlier, this feature may represent the top of an anticline of low-resistivity rocks of Miocene (?) age (Greene and others, 1978).

<u>Cross Section 35-92</u>:

The interpreted-resistivity cross section 35-92 (Figure 11) extends from sounding 35 in the west to sounding 92 in the east (see Figure 9 for location). The length of this cross section is approximately 7 km.

The cross section includes data from the SW monitoring-well site. Here, the electric-log data is inconsistent with both the sounding-data interpretation and the water-quality data analyses. On average, the apparent resistivities on the electric log range from 20 to 45 ohm-m (and can even reach 70 ohm-m) whereas the interpreted resistivity from soundings 35 and 73 (on either side of the well SW) are in the range of about 7 to 15 ohm-m. Water-quality samples from the SW monitoring-well site at a depth of about 55 m indicate a chloride concentration of 2700 mg/l and a TDS of 5750 mg/l which is consistent with the moderately-low resistivities obtained from the sounding interpretations but inconsistent with the moderately-high apparent resistivities obtained from the electric log. At a depth of about 85 m, the water-quality data analysis from the SW well indicates a much improved chloride and TDS concentrations of 36 mg/l and 541 mg/l, respectively, which is in good general agreement with the interpretation of soundings 35 and 73 where the interpreted resistivity begins to increase with increasing depth from 15 ohm-m to greater than 20 ohm-m at a depth of about 100 m. One possible explanation for the observed disagreement between the electric log data on one hand and the sounding and water-quality analysis data on the other hand, is that the electric-log scale was mislabled by a factor of 2 or 3 in the field.

On this cross section, the area in the west is characterized by relatively low resistivities down to a depth of about 100 m, whereas east of sounding 58, the low resistivity materials are generally confined to the upper 20 to 30 meters. The near-surface material (top 15 m) beneath soundings 46, 51, and 50 contains layers with low and very-low resistivities (less than 3 ohm-m) which is characteristic of clays or saltwater-saturated sandy sediments. At depths greater than 30 m, the area between soundings 45 and 50 is characterized by layers with resistivities in the range of 20 to <45 ohm-m and therefore should represent mostly freshwater aquifers. At the east side of the profile, between soundings 50 and 92, the thickness of the potentially freshwater aquifer diminishes in the depth range between 70 and 250 m (note: the scale on the east side of the cross section is in feet not in meters) where the interpreted resistivity is in the range of 10 to 15 ohm-m. At depths greater than 200 m (see lower part of Figure 11) the interpreted resistivity increases again to greater than 30 ohm-m which is a good indication that the aquifers at those depths are probably saturated with fresh water, and that the low resistivity material in the 70 to 250 m depth zone is most likely caused by an increase in clay content.

Cross Section CM6-52:

Cross section CM6-52 (Figure 12) extends from well CM-6 in the south to sounding 52 in the north (see Figure 9 for location). The length of this cross section is about 5 km. The correlation between interpreted resistivity from the sounding data and the data from wells CM-6, DP and SCE is good.

Throughout most of this cross section there is a layer of low resistivity in the upper 20 m. In this shallow part of the cross section, it is difficult to ascertain where seawater-saturated sediments end and clayey layers saturated with salty irrigation water begin. Measurements of water samples from the SCE well in the upper 15 m indicate that the water resistivity is as low as 1.1 ohm-m (conductivity of 8824 micromhos/cm), the chloride concentration is 2,300 mg/l, and the the TDS is 7,220 mg/l. Complete chemical analyses from this site indicate that seawater is not the source of these elevated chloride and TDS values (Izbicki, written communication, 1993).

From CM-6 to just north of DP, the low resistivity zone extends to a depth of about 60 m (near the base of the Oxnard aquifer). The interpreted-resistivity data in conjunction with the water-quality data from DP, indicate that the seawater front in the Oxnard aquifer extends to near sounding 82. North of sounding 82 the interpreted resistivity increases significantly in the Oxnard aquifer (45 to 60 m depth).

In the depth range from 60 to 100 m, the interpreted resistivity, between CM-6 in the south and DP in the north, is moderately low (4.5 to 15 ohm-m) which indicates the presence of brackish water or very fine grained deposits. Drill cuttings collected at CM-6 and DP in this depth interval are predominantly silt and clay. In DP, the chloride and TDS concentrations sampled at the depth interval from 54 to 60 m are 900 and 2,060 mg/l, respectively. However, a sample collected at the depth interval from 95 to 101 m had the surprisingly low chloride concentration of 68 mg/l and a TDS of 881 mg/l. At the depth interval from 119 to 137 m the chloride and TDS concentrations increase again to 1200 and 2,250 mg/l, respectively. North of sounding 82 the interpreted resistivity is generally in the range from 15 to 45 ohm-m below the 60 m depth.

In the lower part of Figure 12, there is a low resistivity structure at a depth of about 400 to 500 m beneath sounding 76. This is the same low-resistivity structure refered to previously in the discussion of cross section 83-88 and in the interpreted resistivity map at a depth of 450 m.

3-D SHADED RELIEF OF RESISTIVITY SURFACE AT 30 M DEPTH

Figure 13 shows a 3-D shaded relief image of the interpreted-resistivity surface at a depth of 30 m. See Figure 7a for reference. This depth approximately corresponds to the bottom of the shallow aquifer and the top of the Oxnard aquifer. The viewer is located in the southeast near Point Mugu and looking to the northwest toward Port Hueneme. The direction of illumination is from the east and the angle of incidence is 45 degrees. The cliff-like feature in the figure represents the sharp resistivity gradient separating very-low resistivity materials in the foreground (seawater-saturated sediments) from higher resistivity materials in the background (freshwater-saturated sediments). The smoothness of the resistivity surface in the foreground as compared to its complicated nature in the distance, is mainly governed by the number of sounding stations. There are fewer sounding stations where the surface is smoothest. We present this figure as an example of 3-D shaded-relief data presentation, which often help further visualization of subsurface conditions.

SUMMARY AND CONCLUSIONS

The direct current resistivity survey made in the southern part of the Oxnard plain using Schlumberger soundings proved useful in investigating the boundary of the seawater intrusion front. In the depth range from 5 to 15 m, the interpreted-resistivity data showed the prevalence of low-resistivity layers over most of the studied area. Near the coast, the cause of these low resistivities is probably seawater-saturated sediments, whereas further inland the cause is probably clay layers saturated with saline irrigation water resulting from poor drainage. In general, the interpreted resistivities were lowest along the coast and became higher with increasing depth and in the inland direction. Most of the shallow aquifer had very low to low interpreted resistivities (<1 to 4.5 ohm-m) indicating that it contains saline water.

From the three-dimensional geometry of the very low to low interpreted-resistivity body near the coastline and its inland demarcation by a steep-resistivity gradient, we deduce that seawater-saturated layers at depths of about 30 m and deeper probably do not reach inland more than about 2 or 3 km from the coastline. The location of the steep-resistivity gradient at a depth of about 30 m correlates with the 1901 marsh land boundary, indicating that most of the seawater in the sediments is a result of downward seawater migration rather than inland seawater intrusion.

The interpreted-resistivity data for the Oxnard aquifer at depths ranging from 45 to 70 m show that much of the area believed to be intruded by seawater (based on the 100 mg/l contour for chloride concentration) is in fact moderately resistive (greater than 30 ohm-m) and therefore should contain fresh water rather than seawater. The difference in the interpreted resistivity distribution and the reported seawater-intrusion suggests that sources other than seawater may be the cause of the high chloride concentrations in the water from some inland wells in the area. Saline waters from the shallow aquifer probably are contaminating the underlying aquifers by downward leakage through poorly constructed wells and failed well casings.

The resistivity survey showed that it is possible to detect moderately-high resistivity materials (freshwater aquifers?) beneath very-low resistivity materials (saltwater aquifers) at depths of greater than 50 m at locations close to the coastline.

COMPUTERS AND PERIPHERALS

The sounding interpretations were made on a 386 IBM-compatible computer, running at 25 MHz and equipped with a math co-processor. The resistivity maps and cross sections were generated on an Amiga 3000 computer running at 25 MHz, and equipped with 10 megabytes of 32 bit RAM, and a math co-processor. The commercial program Deluxe Paint III (Silva, 1989) was used in generating the color cross sections and in editing and annotating the interpreted-resistivity maps which were generated in color using a pre-publication version of a program written by the first author (Zohdy, 1993). The maps and cross sections were printed on a Xerox 4020 ink-jet color printer. The 3-D resistivity relief image was generated using the program VistaPro (Hinkley and Eksten, 1990). We used a conversion program, originally provided by Virtual Reality Laboratories Inc. and modified by the first author (Zohdy,1993), to input our own digital data of the interpreted-resistivity surface into VistaPro. The tabulations and log-log plots of the sounding curves shown in the appendix were made as follows. The data files from the automatic interpretation program (Zohdy and Bisdorf, 1989) were used to generate graphics and text files compatible with WordPerfect 5.1, using a program written by the third author in Microsoft QuickBASIC 4.5. The output of WordPerfect 5.1 was printed on an HP LaserJet III printer. The maps shown in Figures 3 and 5 are adapted from computer illustrations generated by Steven K. Predmore of the U.S. Geological Survey in San Diego, California.

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Table 1. *Multiple-well monitoring site, well construction, and water-quality data*

[note: all wells are 2" diameter PVC casing except for a 4" well at SWIFT 350']

Common name	Local identifier	Depth of well, total in feet (meters)	Perforated interval, feet (meters)	Chloride concentration (mg/L)	Total dissolved solids (mg/L)	Date sampled
CM-6	01S22W01H01	550 (167.7)	490-550 (149.4-167.7)	1,000	2,830	10-31-90
	01S22W01H02	400 (122.0)	380-400 (115.9-122.0)	380	1,130	11-01-90
	01S22W01H03	330 (100.6)	310-330 (94.5-100.6)	380	1,260	11-01-90
	01S22W01H04	200 (61.0)	180-200 (54.9-61.0)	1,800	3,620	11-01-90
SCE	01N21W19L10	414 (126.2)	394-414 (120.1-126.2)	55	826	06-12-91
	01N21W19L11	320 (97.6)	300-320 (91.5-97.6)	150	977	06-12-91
	01N21W19L12	220 (67.1)	200-220 (61.0-67.1)	470	1,510	06-12-91
	01N21W19L13	130 (39.6)	110-130 (33.5-39.6)	45	832	06-12-91
	01N21W19L14	38 (11.6)	18-38 (5.5-11.6)	2,300	7,220	06-13-91
SWIFT	01N22W26J03	350 (106.7)	310-350 (94.5-106.7)	37	805	10-29-90
	01N22W26J04	205 (62.5)	185-205 (56.4-62.5)	1,000	2,450	09-28-90
	01N22W26J05	65 (19.8)	55-65 (16.8-19.8)	62	1,070	09-28-90
SW	01N22W27C02	295 (90.0)	275-295 (83.8-90.0)	36	541	10-30-90
	01N22W27C03	195 (59.5)	175-195 (53.4-59.5)	2,700	5,750	10-30-90
	01N22W27C04	65 (19.8)	55-65 (16.8-19.8)	450	2,810	10-31-90
CM-4	01N22W28G01	1,395 (425)	1,295-1,395 (394.8-425)	47	577	03-22-90

Common name	Local identifier	Depth of well, total in feet (meters)	Perforated interval, feet (meters)	Chloride concentration (mg/L)	Total dissolved solids (mg/L)	Date sampled
	01N22W28G02	1,095 (333.8)	995-1,095 (303.4-333.8)	39	713	03-22-90
	01N22W28G03	760 (231.7)	720-760 (219.5-231.7)	59	701	04-03-90
	01N22W28G04	275 (83.8)	255-275 (72.7-83.8)	6,200	11,200	10-18-90
	01N22W28G05	200 (61.0)	180-200 (54.9-61.0)	3,100	6,530	10-18-90
DP	01N22W36K05	720 (219.5)	660-720 (201.2-219.5)	1,900	3,170	09-25-90
	01N22W36K06	580 (176.8)	520-580 (158.5-176.8)	460	1,240	09-25-90
	01N22W36K07	450 (137.1)	390-450 (118.9-137.1)	1,200	2,250	09-25-90
	01N22W36K08	330 (100.6)	310-330 (94.5-100.6)	68	881	09-25-90
	01N22W36K09	195 (59.5)	175-195 (53.4-59.5)	900	2,060	09-25-90

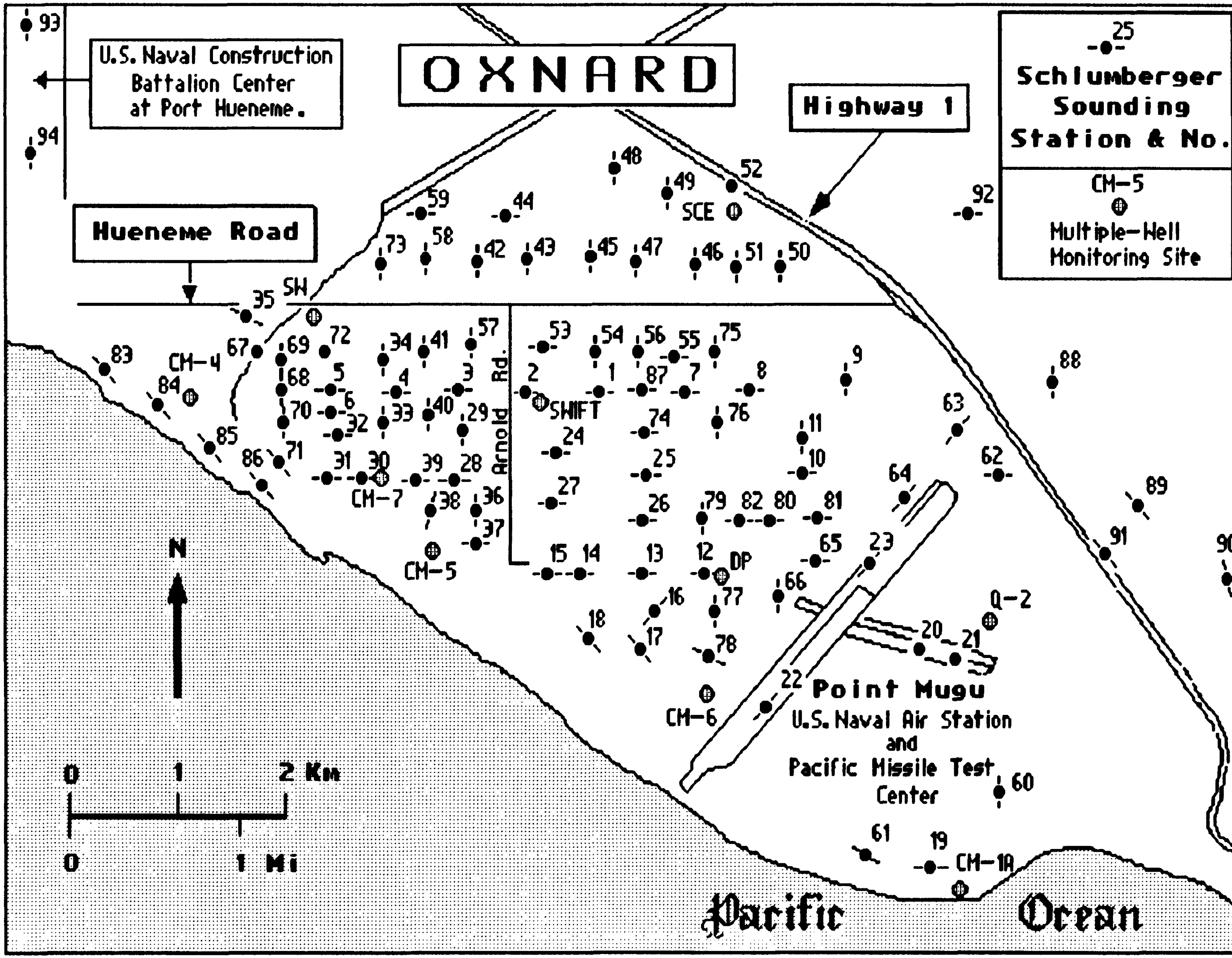


Figure 1. Map showing location of Schlumberger soundings and monitoring wells.

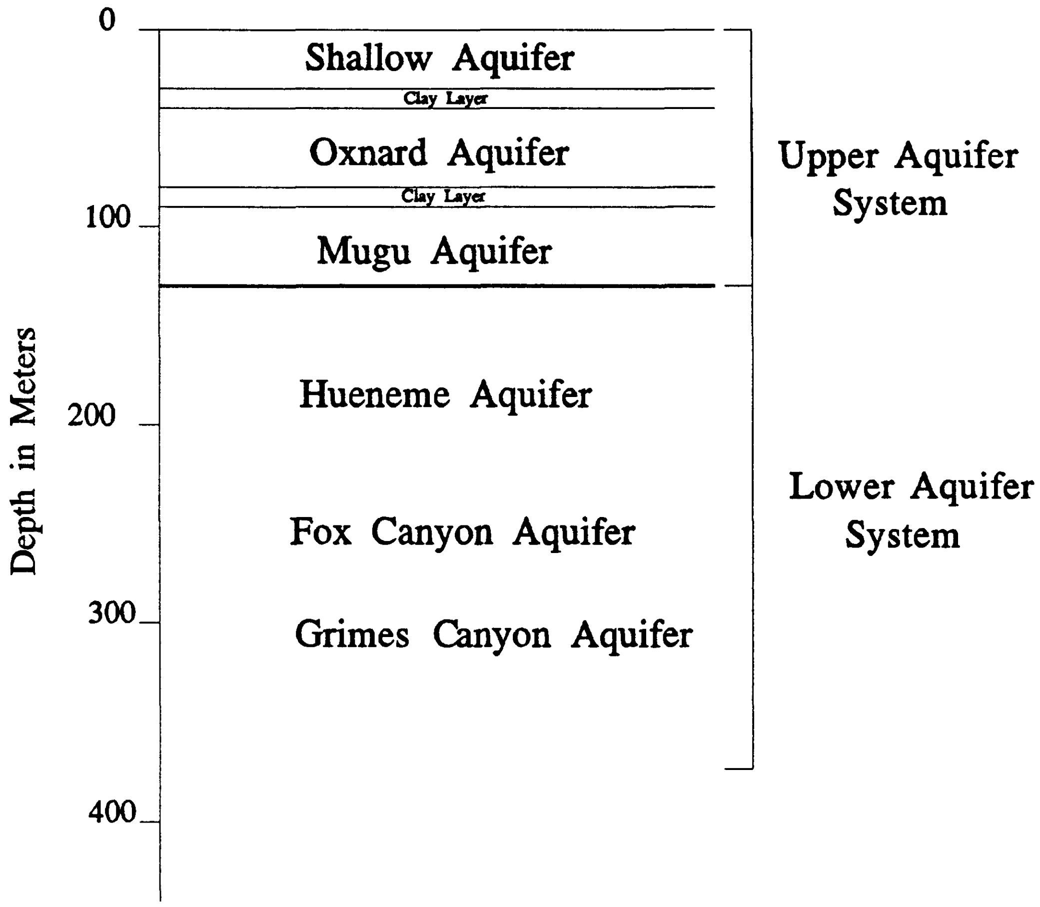


Figure 2. Schematic diagram showing aquifers near the coast beneath the Oxnard Plain.

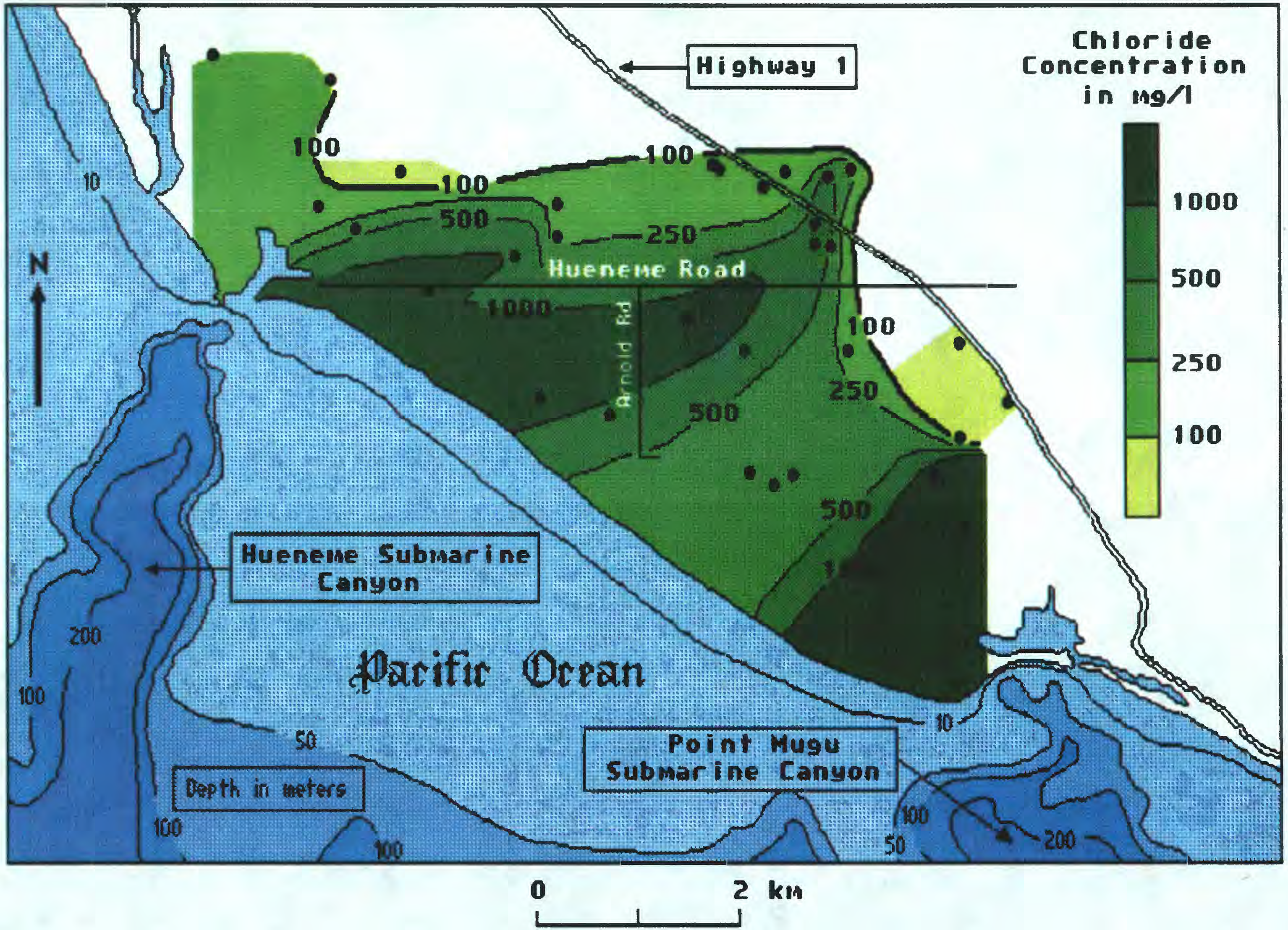


Figure 3. Map showing chloride concentrations (mg/l) in the Oxnard aquifer, 1989 (modified from County of Ventura Public Works Agency, 1990).

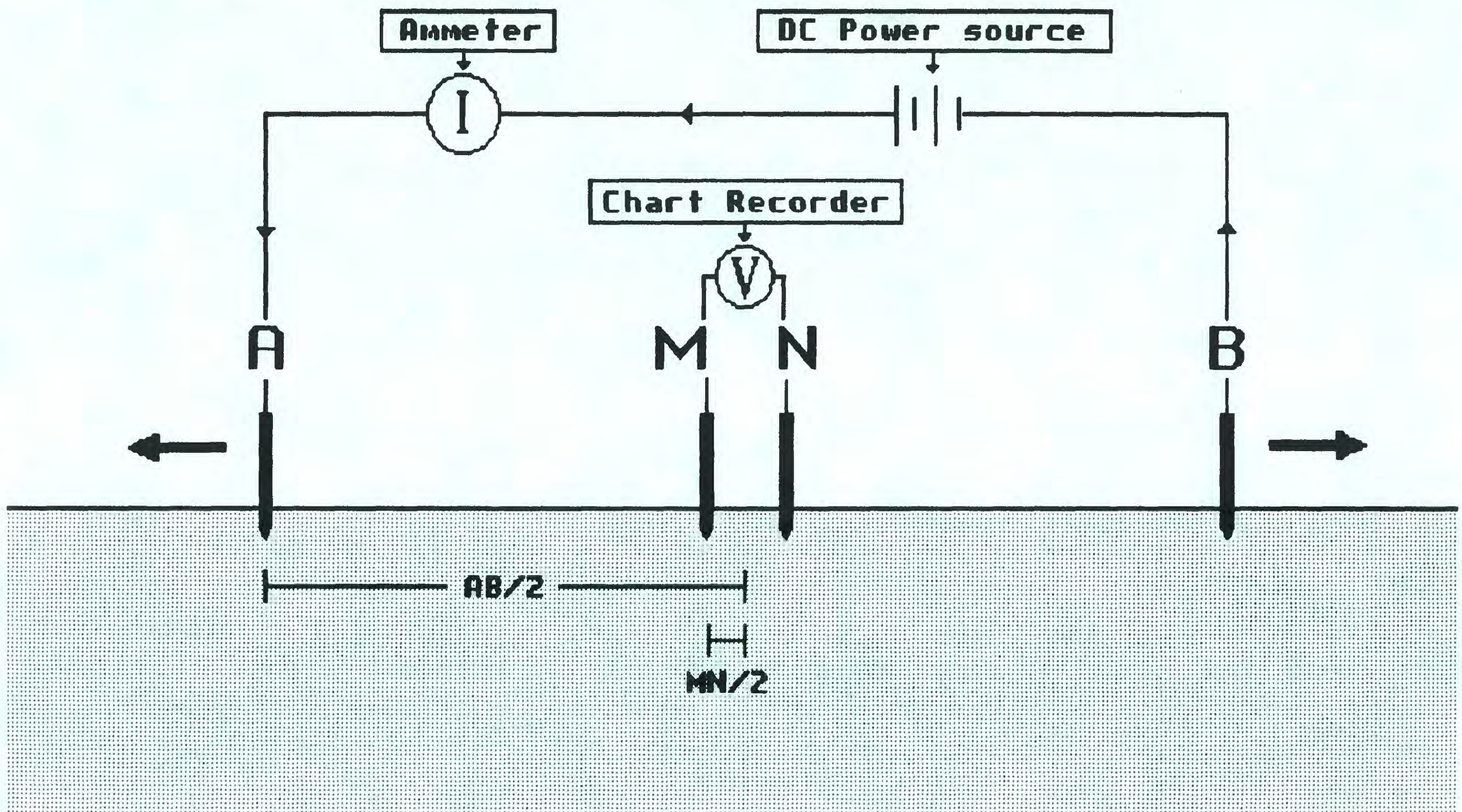


Figure 4. Schlumberger electrode array. A and B, current electrodes; M and N, potential electrodes. Arrows show direction of expansion.

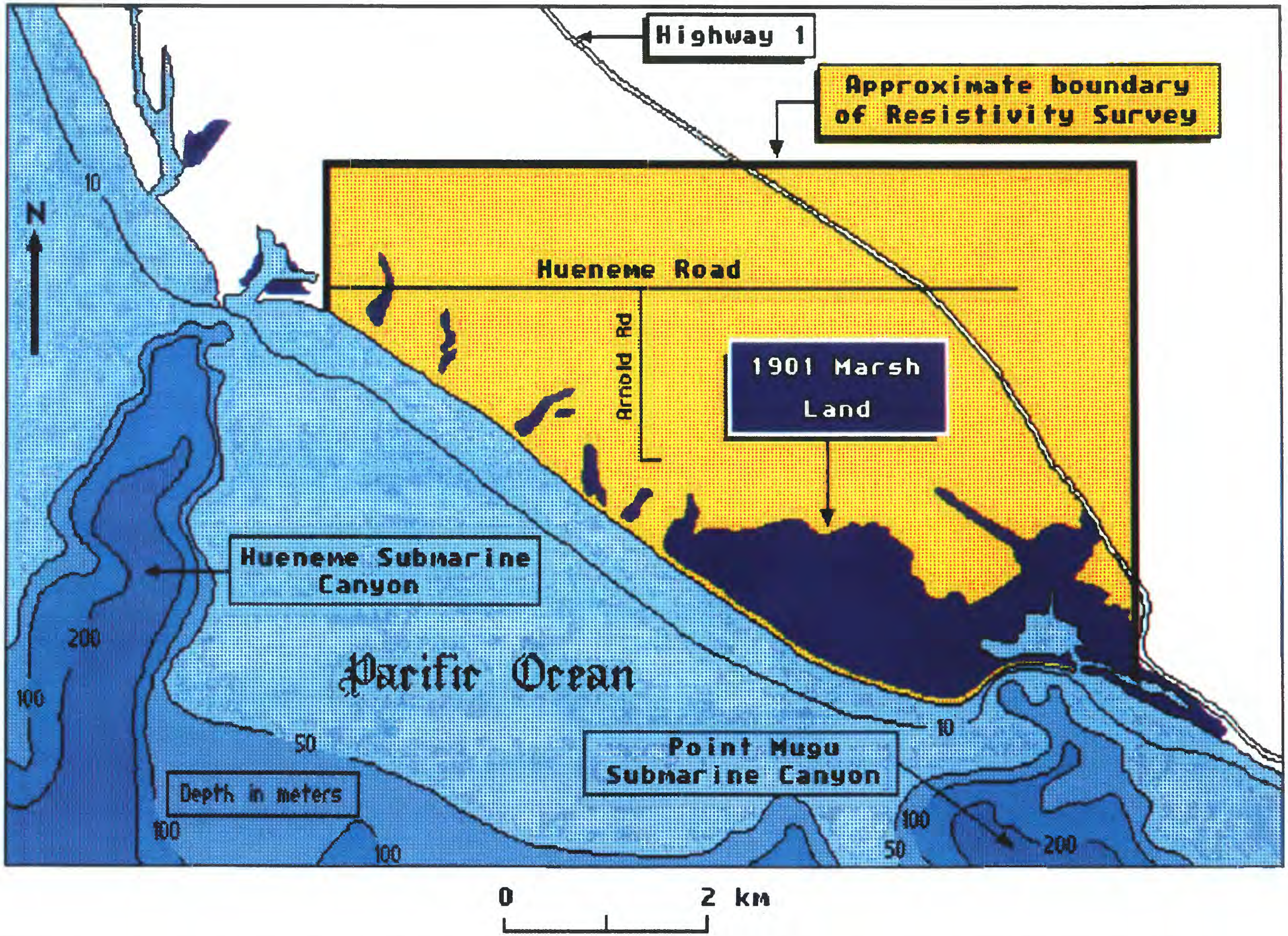


Figure 5. Map showing location of marsh land in 1901, (Modified from California Division of Mines and Geology, 1976).

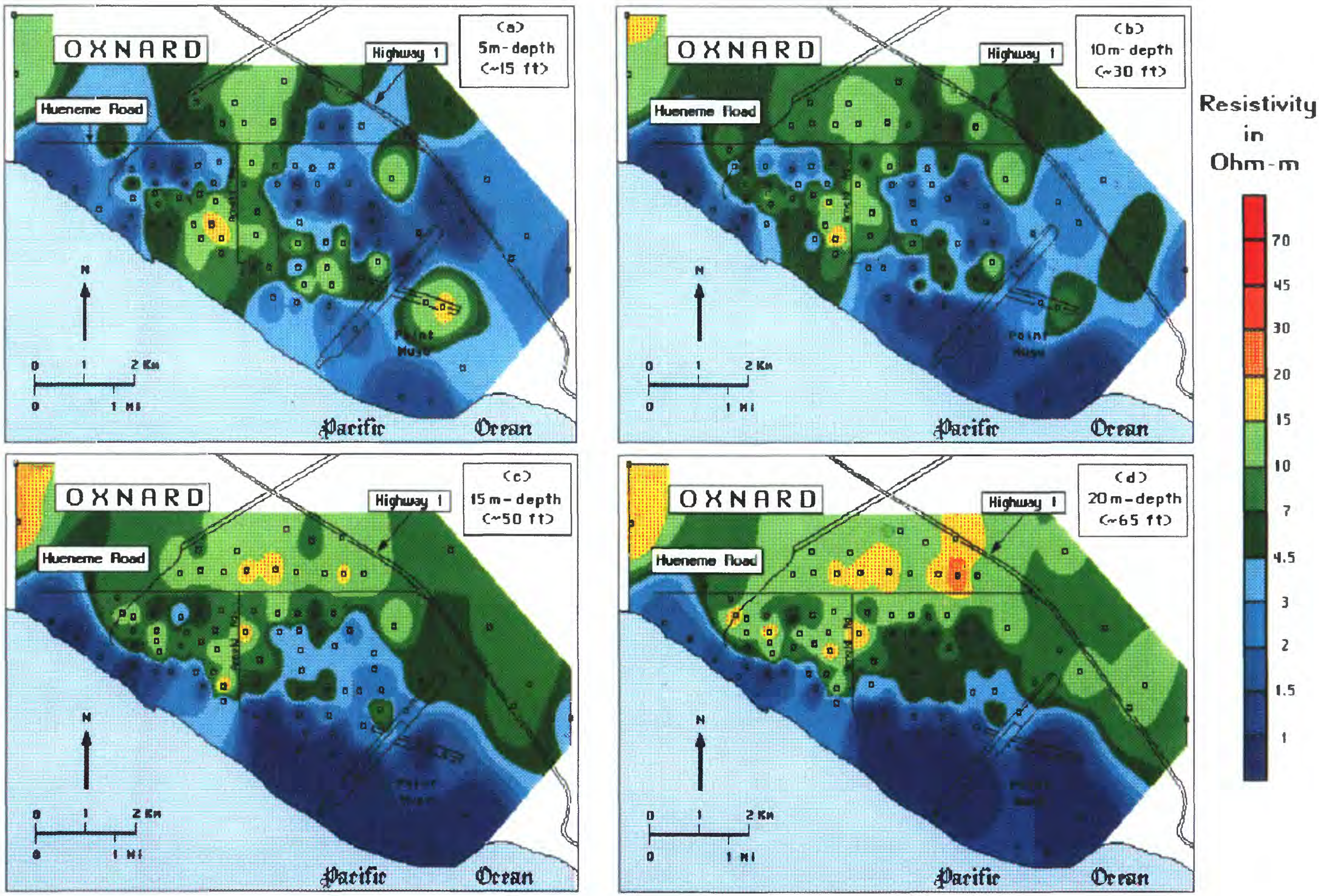


Figure 6. Maps showing interpreted resistivity at 5, 10, 15, and 20 m depths.

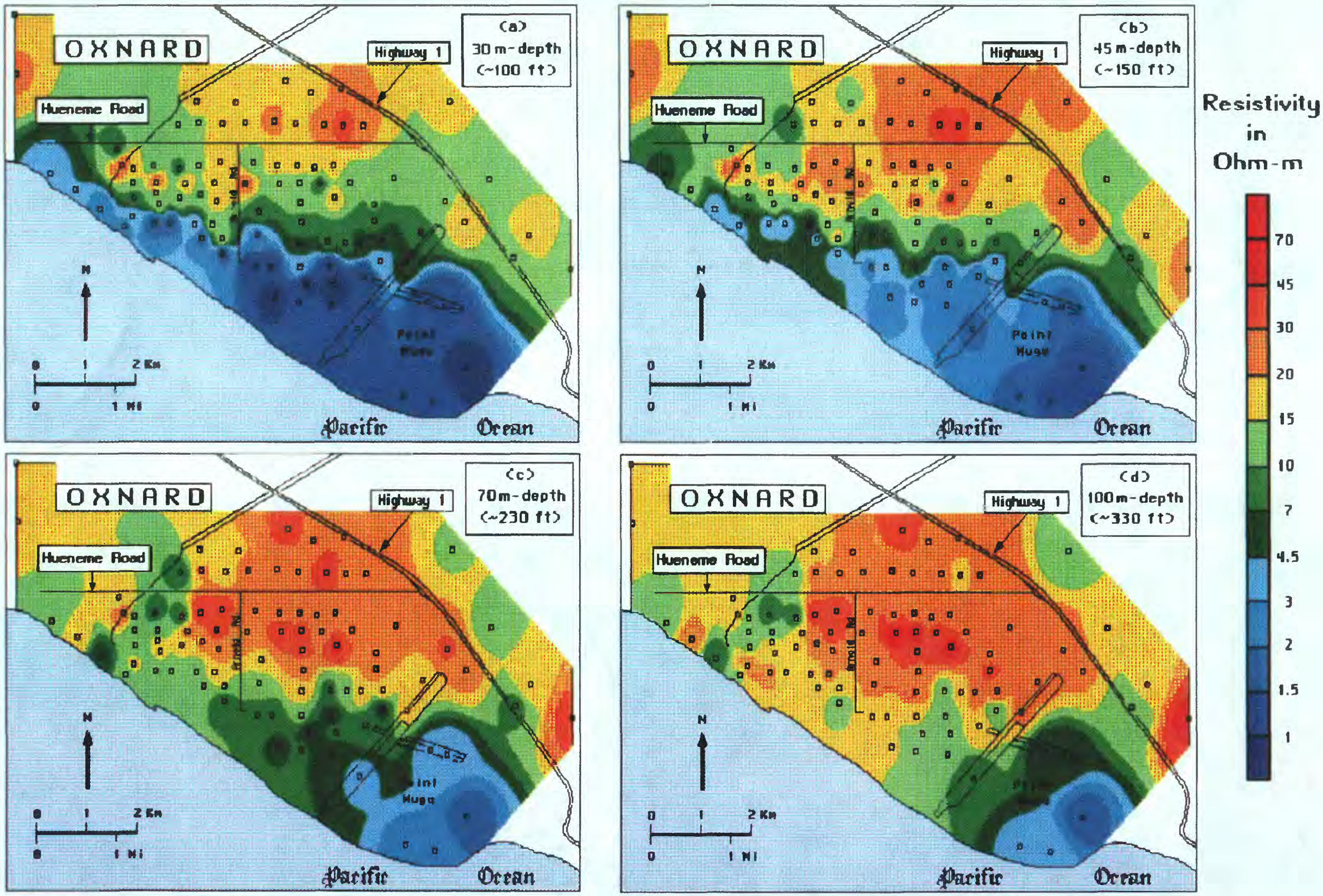


Figure 7. Maps showing interpreted resistivity at 30, 45, 70, and 100 m depths.

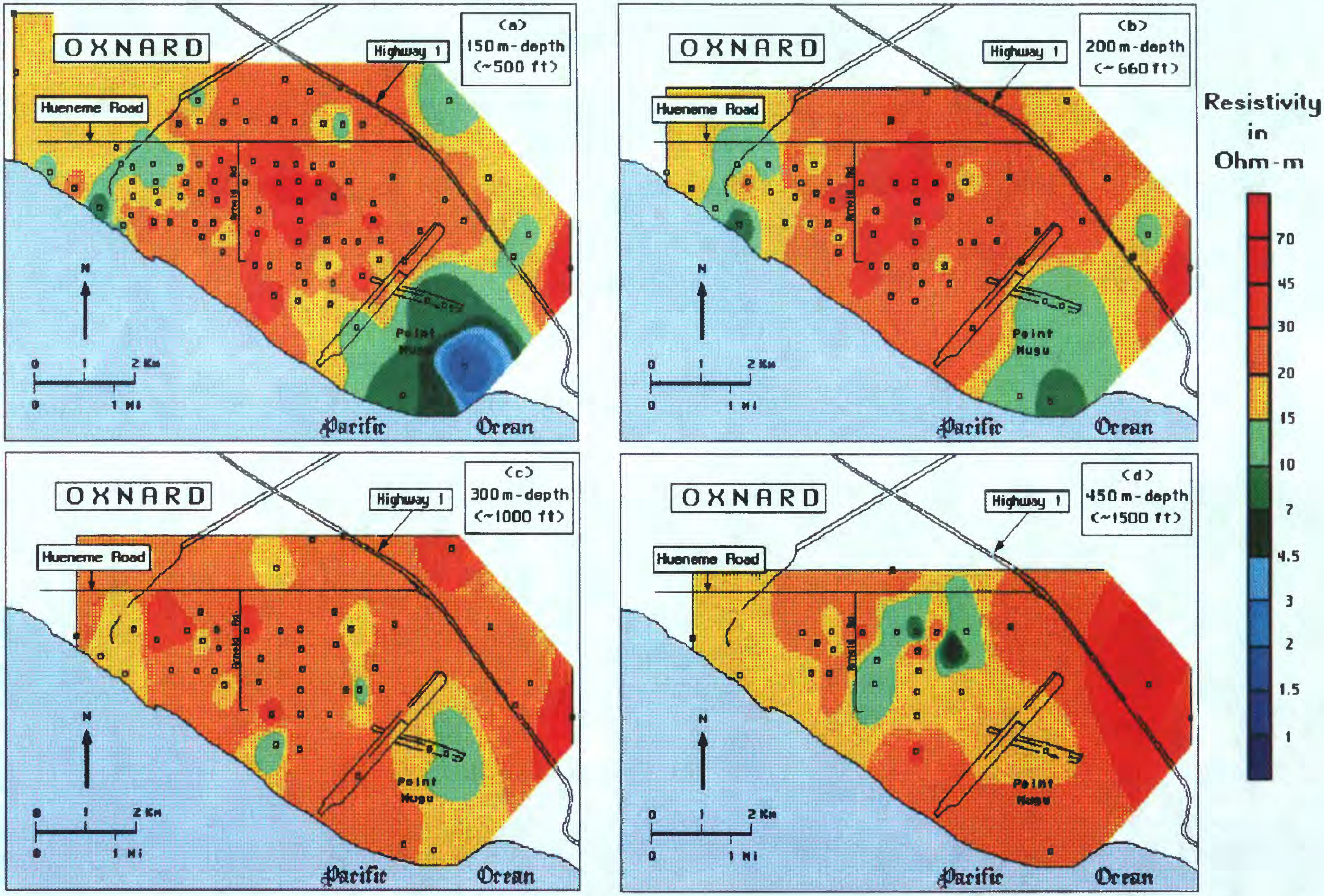


Figure 8. Maps showing interpreted resistivity at 150, 200, 300, and 450 m depths.

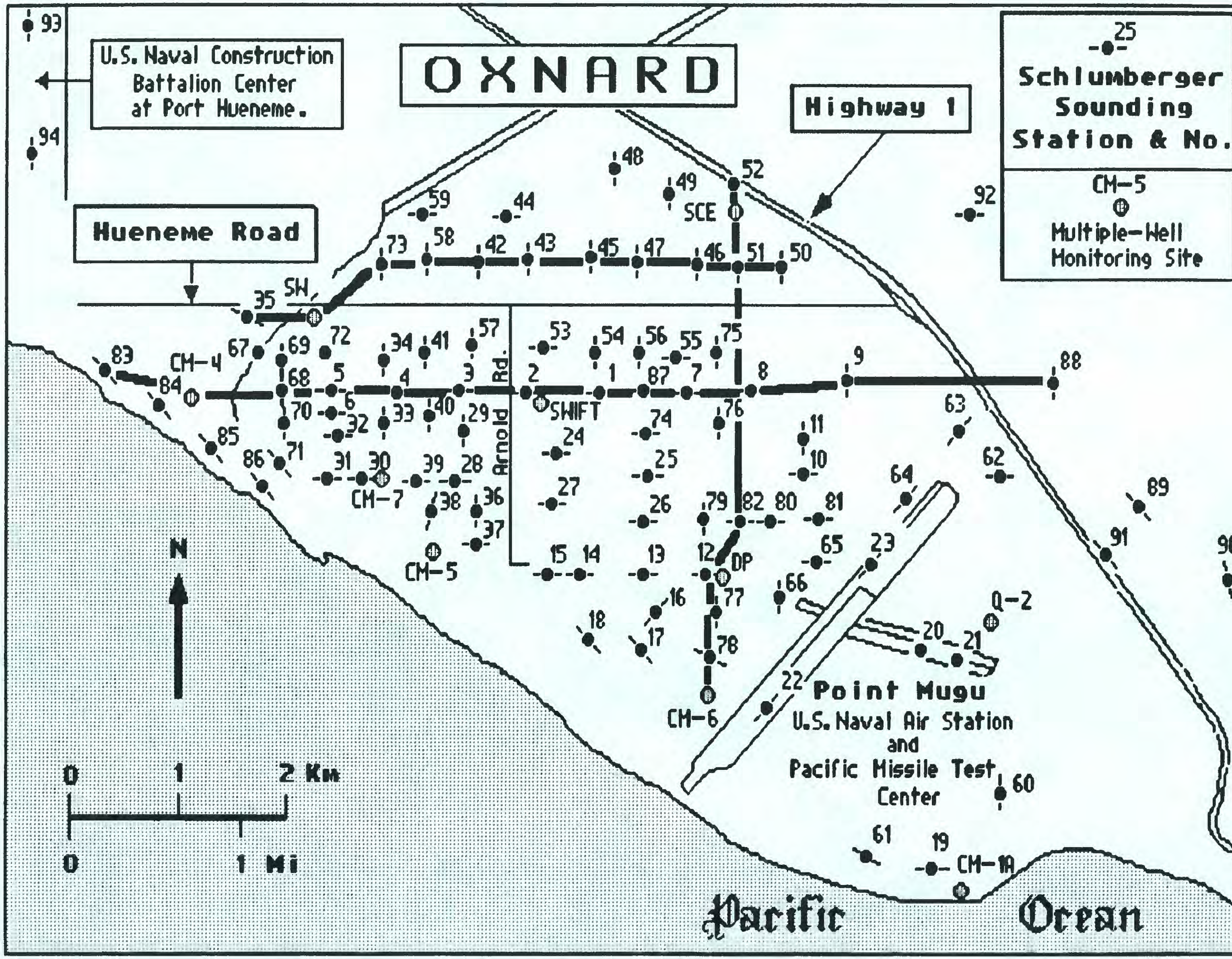


Figure 9. Map showing location of interpreted-resistivity cross sections.

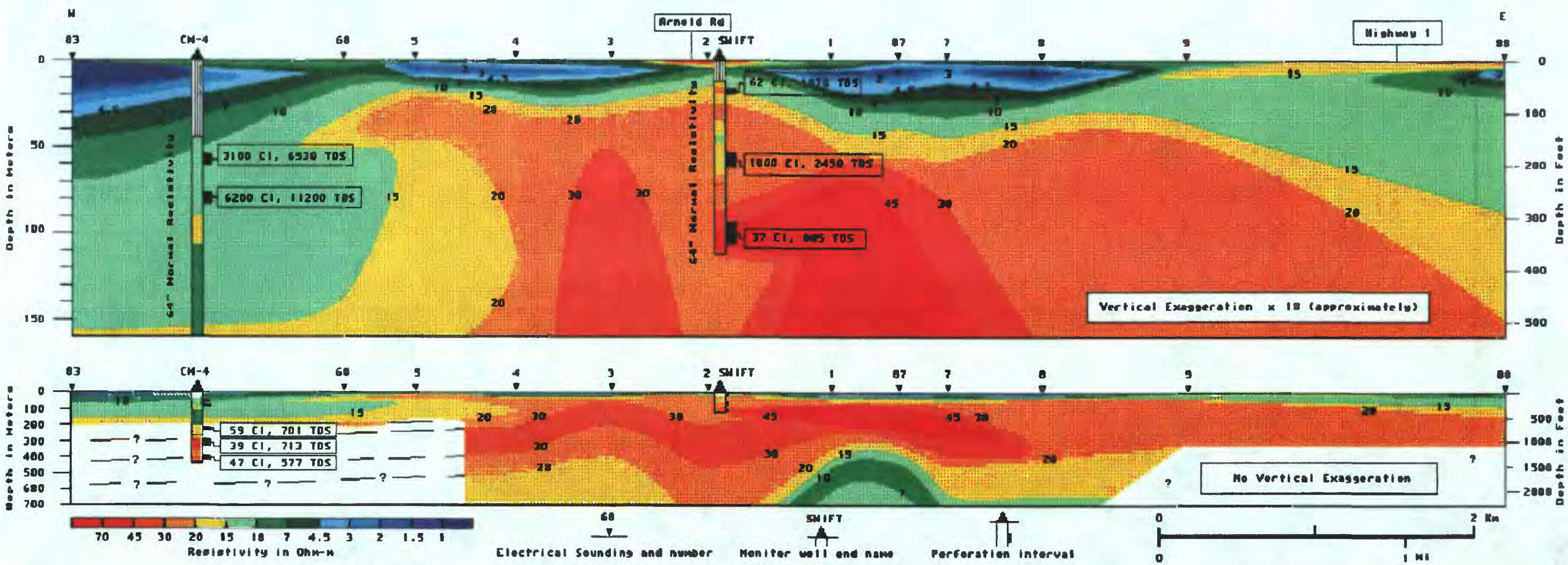


Figure 10. East-west interpreted resistivity cross section 83-88. (See figure 9 for location).

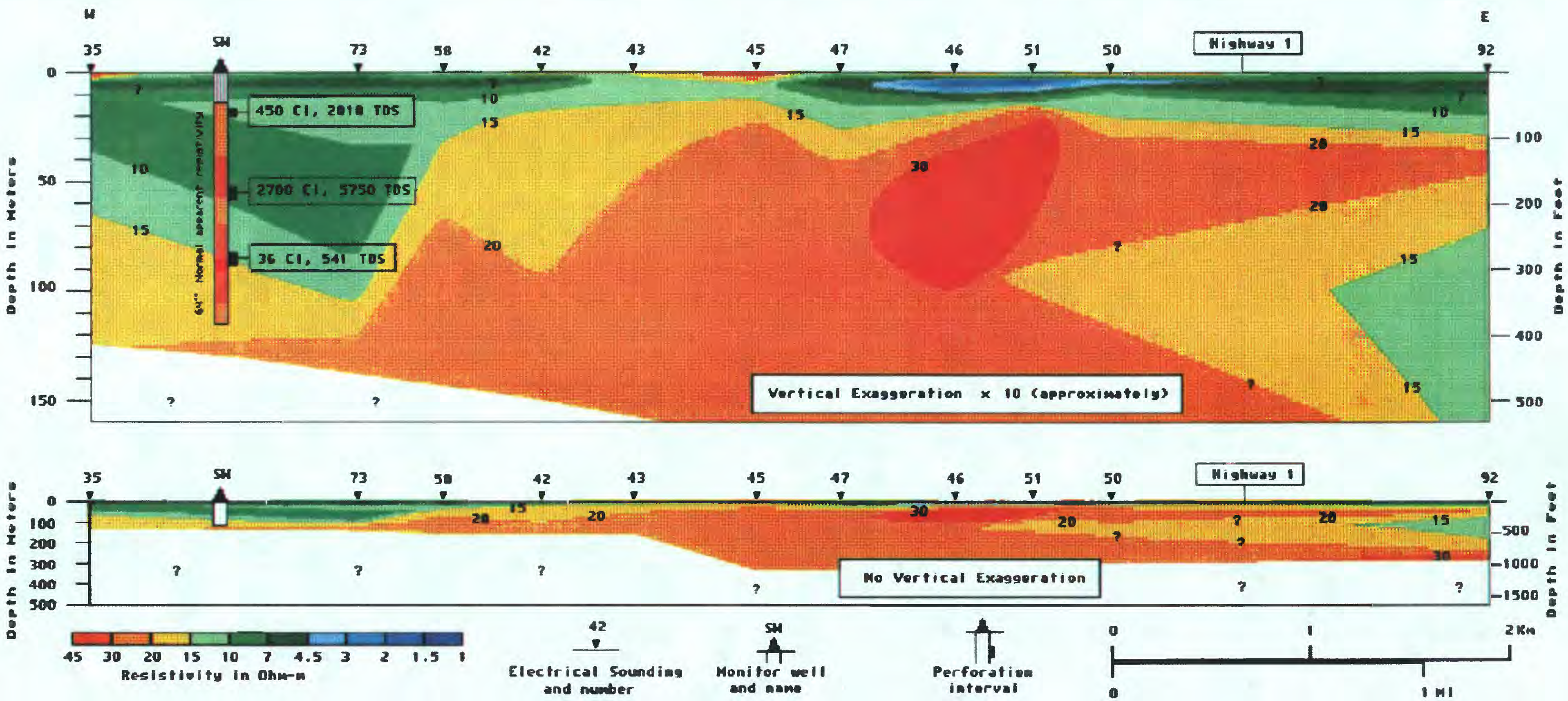


Figure 11. East-west interpreted resistivity cross section 35-92. (See figure 9 for location).

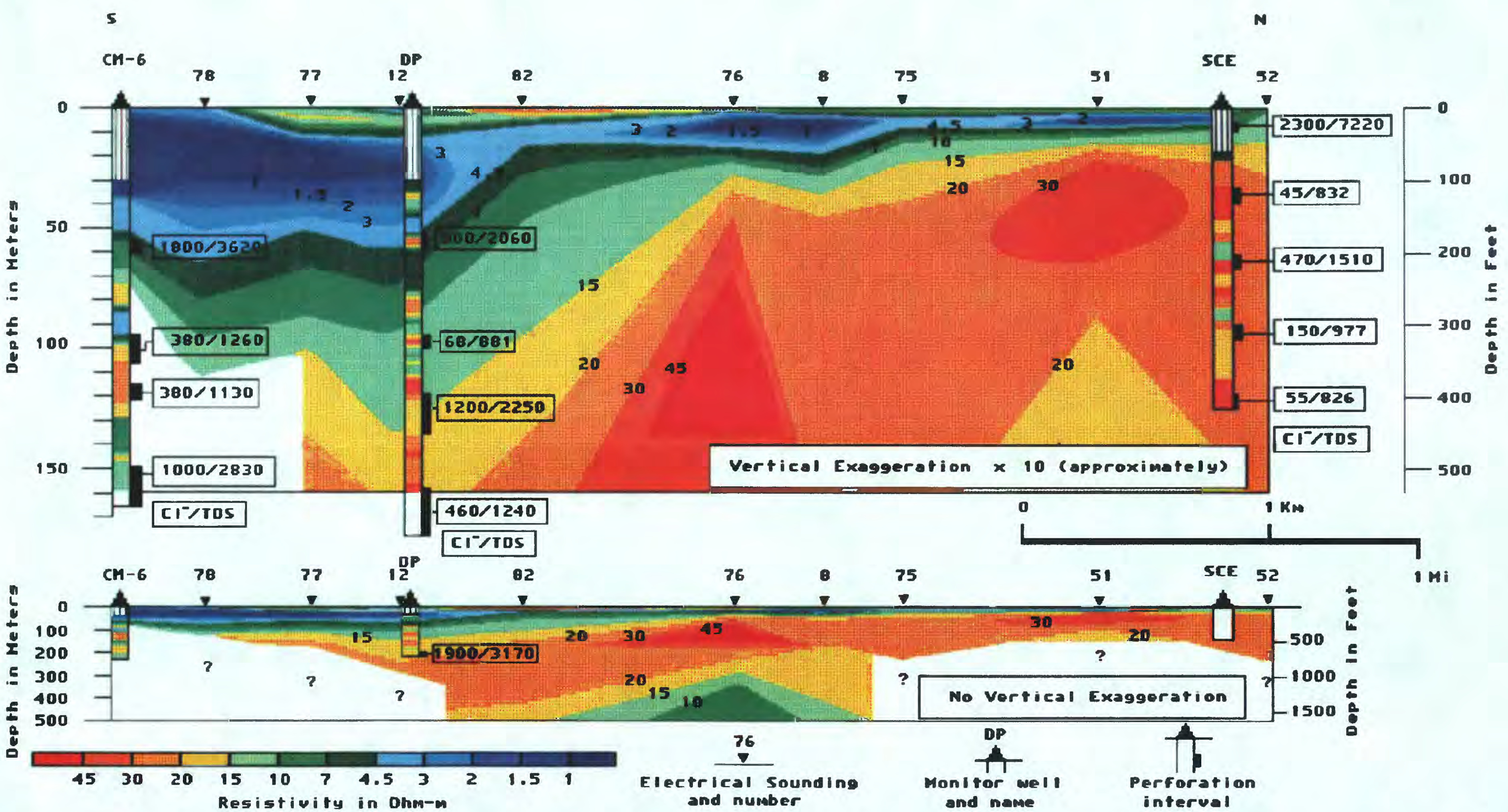


Figure 12. North-south interpreted resistivity cross section CM6-52. (See figure 9 for location).

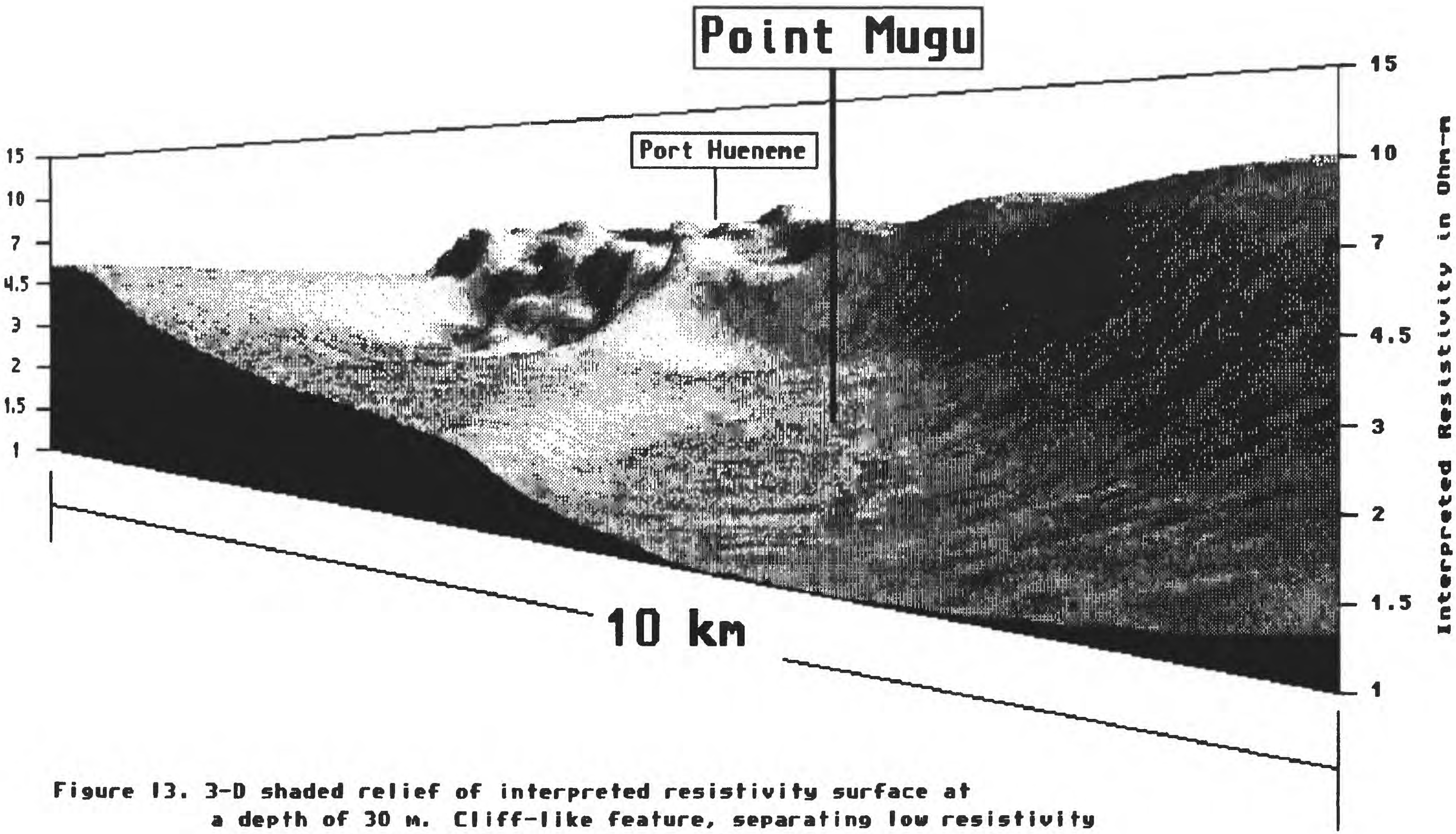


Figure 13. 3-D shaded relief of interpreted resistivity surface at a depth of 30 m. Cliff-like feature, separating low resistivity in foreground from high resistivity in background, represents seawater front in the shallow aquifer (see Figure 7a for reference).

APPENDIX

On the following pages, the data for each sounding curve includes:

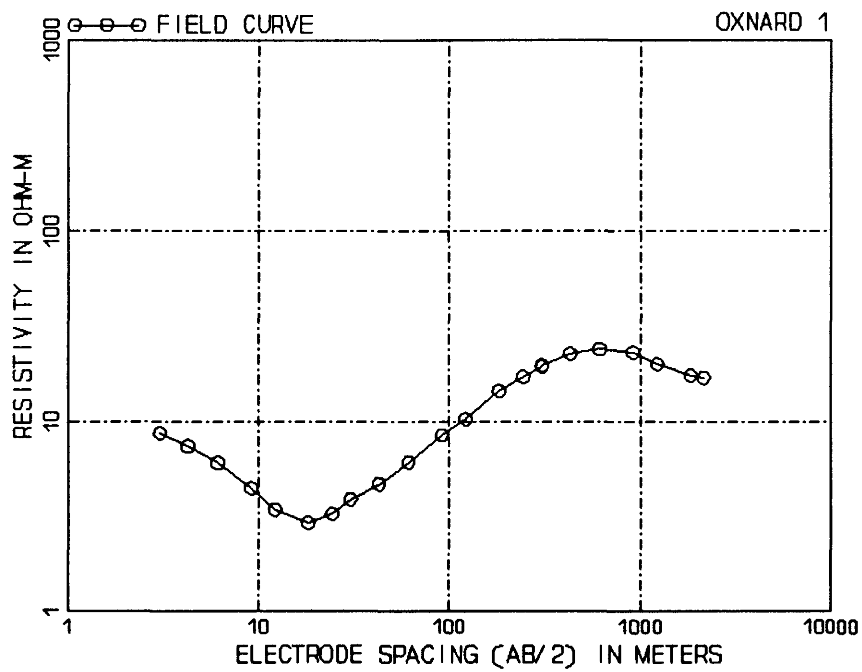
1) A sounding title which is designated by the name of the survey area followed by the sounding number. A few sounding numbers may have the suffix C to indicate that the last measurement (or two) were corrected for non-linear electrode geometry.

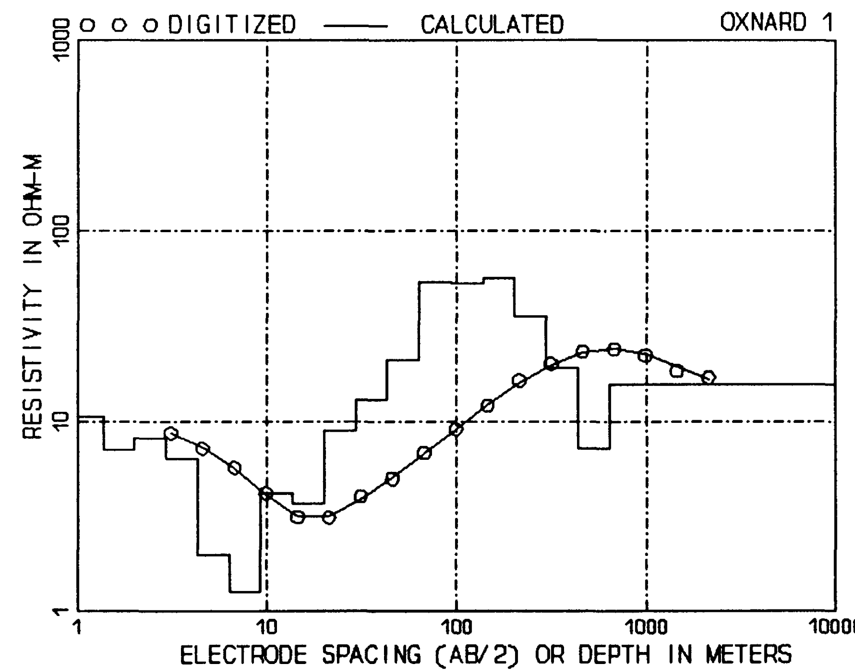
2) A tabulation of the current-electrode spacings (AB/2) in meters (and in feet) and corresponding apparent resistivities in ohm-meters.

3) A log-log plot of the field-sounding data. Each set of data points that was made with the same potential-electrode spacing (MN/2) is connected with a solid line to form a continuous segment on the curve. Measurements were made at the fixed potential-electrode spacings of 2, 20, and 200 ft, respectively.

4) A tabulation of the automatically interpreted layering, with depths in meters (and in feet) and corresponding interpreted resistivities in ohm-meters.

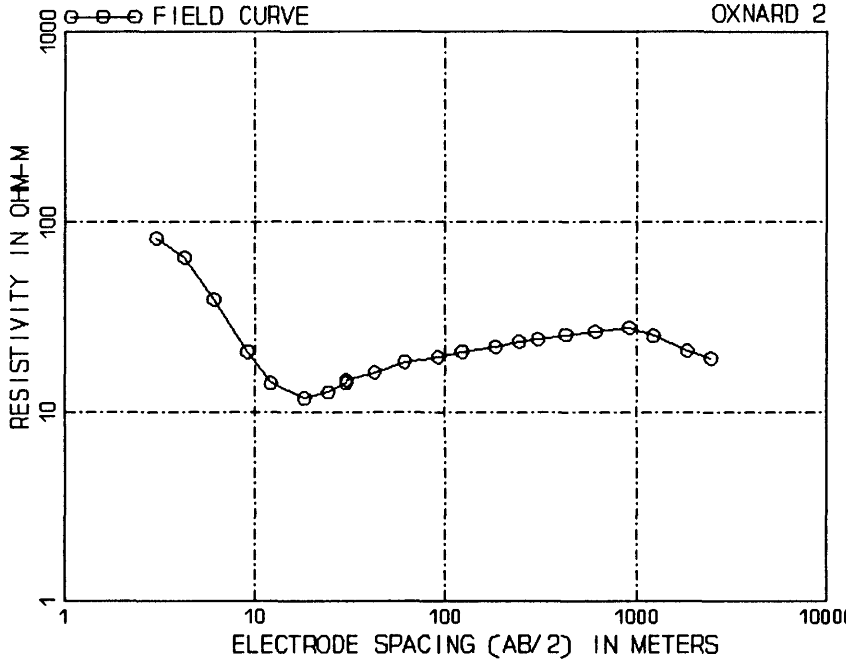
5) A log-log plot of the output of the automatic interpretation program. The circles represent the shifted-digitized sounding curve, the continuous curve represents the calculated sounding curve, and the step-function curve represents the interpreted layering model. Note that the abscissa is used to represent the current-electrode spacing for both the digitized and calculated sounding curves as well as the interpreted depth to the various layers. Similarly, the ordinate is used to represent the digitized and calculated apparent resistivities as well as the interpreted resistivity of the various layers in the step-function model.

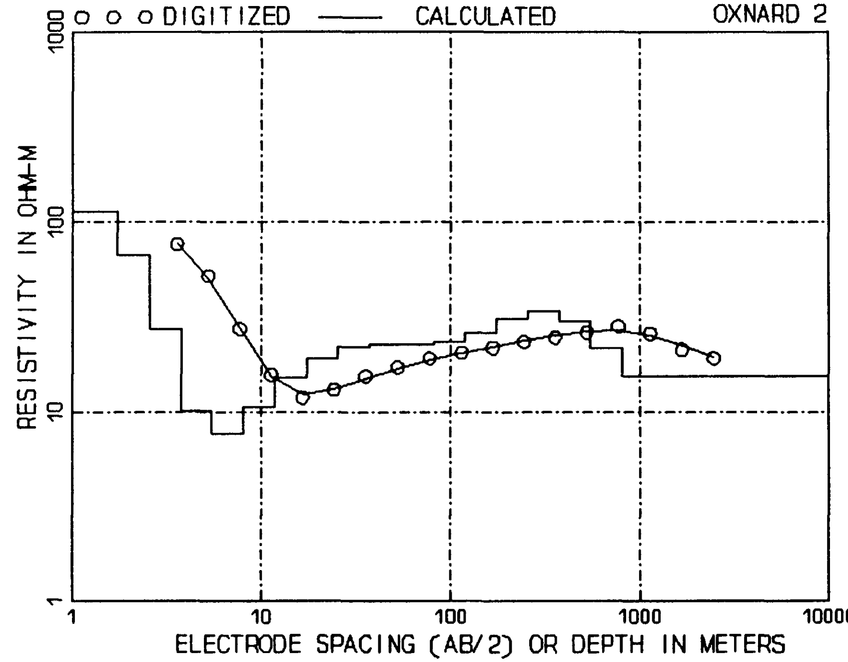




AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	8.70	91.44 (	300.00)	8.50
4.27 (	14.00)	7.40	121.92 (	400.00)	10.30
6.10 (	20.00)	6.05	182.88 (	600.00)	14.50
9.14 (	30.00)	4.45	243.84 (	800.00)	17.20
12.19 (	40.00)	3.45	304.80 (	1000.00)	19.50
18.29 (	60.00)	2.95	304.80 (	1000.00)	19.80
24.38 (	80.00)	3.27	426.72 (	1400.00)	22.80
30.48 (	100.00)	3.90	609.60 (	2000.00)	24.00
30.48 (	100.00)	3.90	914.40 (	3000.00)	23.00
42.67 (	140.00)	4.70	1219.20 (	4000.00)	20.00
60.96 (	200.00)	6.11	1828.80 (	6000.00)	17.50
			2133.60 (	7000.00)	17.00

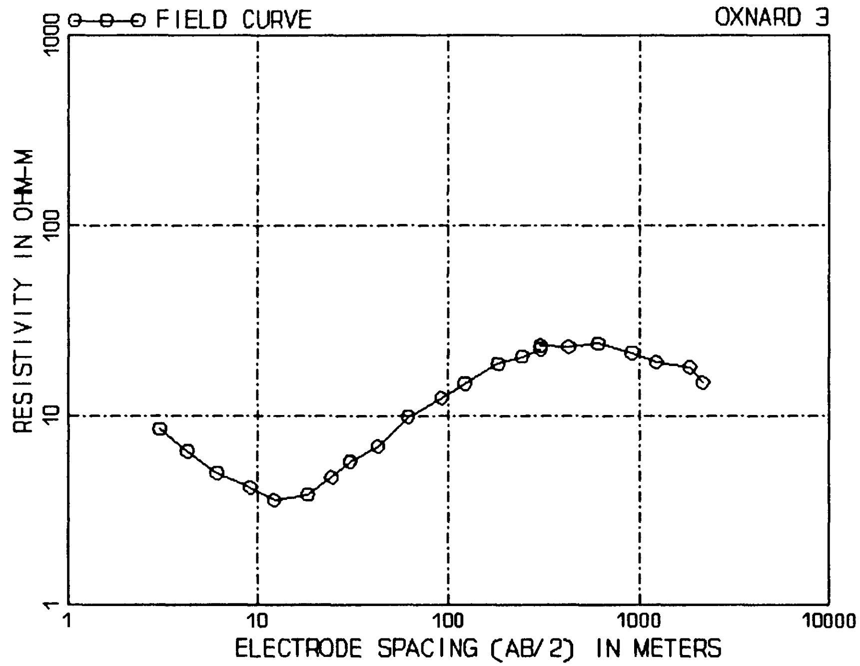
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.37 (	4.49)	10.63	43.32 (	142.12)	12.94
2.01 (	6.60)	7.12	63.58 (	208.60)	20.90
2.95 (	9.68)	8.15	93.32 (	306.18)	53.69
4.33 (	14.21)	6.41	136.98 (	449.41)	52.81
6.36 (	20.86)	2.01	201.06 (	659.65)	56.52
9.33 (	30.62)	1.28	295.12 (	968.23)	35.66
13.70 (	44.94)	4.18	433.17 (	1421.16)	19.08
20.11 (	65.96)	3.69	635.81 (	2085.98)	7.20
29.51 (	96.82)	8.90	99999.00 (	99999.00)	15.67

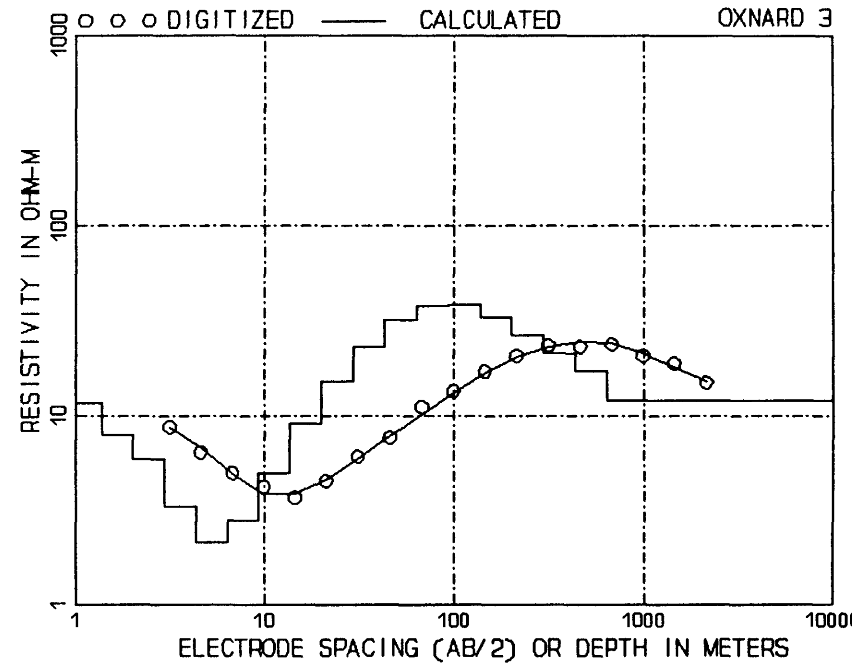




AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	82.00	91.44	(300.00)	19.50
4.27	(14.00)	65.00	121.92	(400.00)	20.80
6.10	(20.00)	39.00	182.88	(600.00)	22.00
9.14	(30.00)	20.80	243.84	(800.00)	23.50
12.19	(40.00)	14.20	304.80	(1000.00)	24.20
18.29	(60.00)	11.80	304.80	(1000.00)	24.10
24.38	(80.00)	12.70	426.72	(1400.00)	25.50
30.48	(100.00)	14.20	609.60	(2000.00)	26.50
30.48	(100.00)	14.70	914.40	(3000.00)	27.80
42.67	(140.00)	16.20	1219.20	(4000.00)	25.20
60.96	(200.00)	18.40	1828.80	(6000.00)	21.00
			2438.40	(8000.00)	19.20

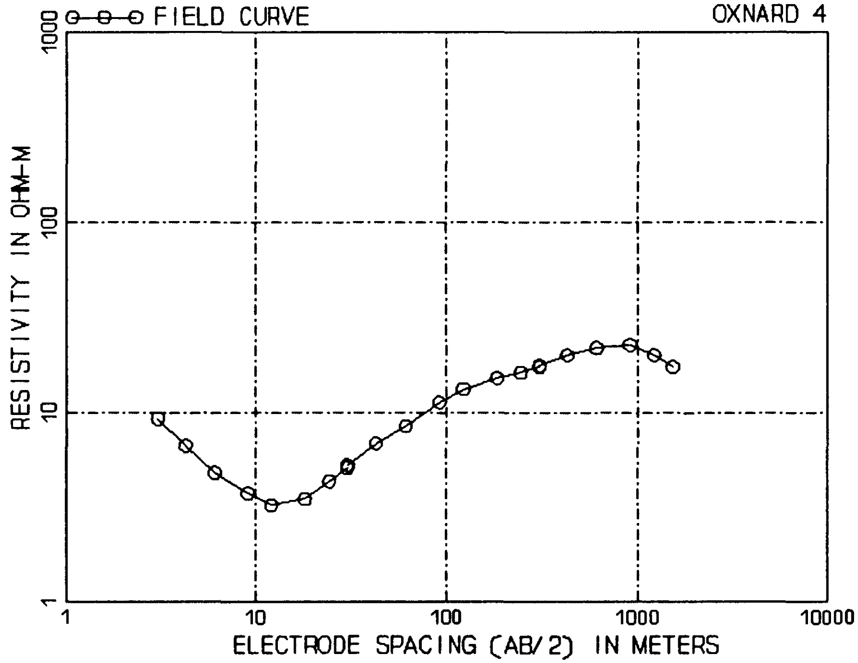
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.74	(5.71)	114.57	55.01	(180.46)	22.76
2.55	(8.38)	67.37	80.74	(264.89)	22.75
3.75	(12.29)	27.38	118.51	(388.80)	23.29
5.50	(18.05)	10.19	173.94	(570.68)	25.93
8.07	(26.49)	7.69	255.31	(837.64)	30.86
11.85	(38.88)	10.61	374.75	(1229.49)	34.09
17.39	(57.07)	15.05	550.06	(1804.65)	30.15
25.53	(83.76)	19.17	807.37	(2648.86)	21.67
37.47	(122.95)	21.84	99999.00	(99999.00)	15.49

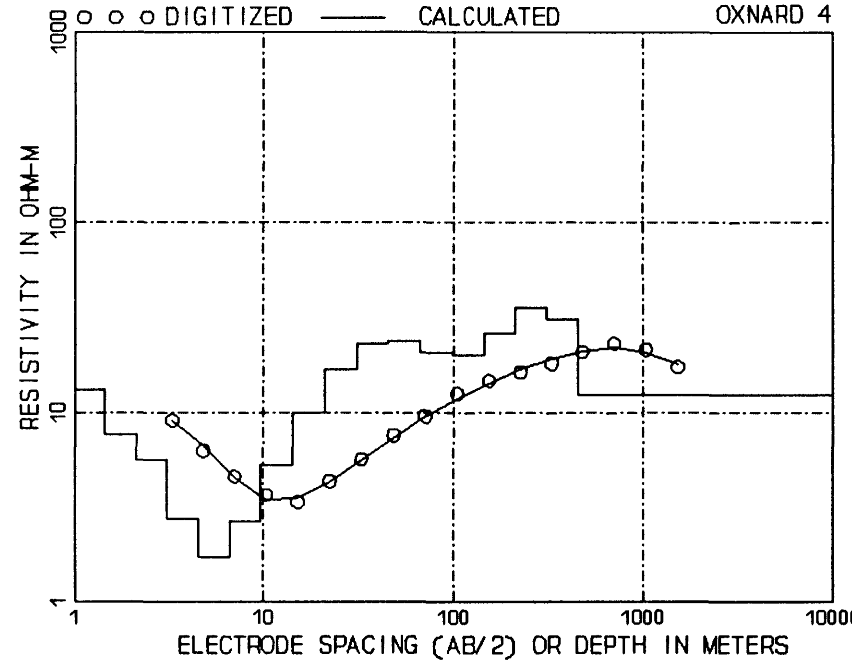




AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	8.50	91.44 (	300.00)	12.40
4.27 (	14.00)	6.50	121.92 (	400.00)	14.80
6.10 (	20.00)	5.00	182.88 (	600.00)	18.70
9.14 (	30.00)	4.20	243.84 (	800.00)	20.50
12.19 (	40.00)	3.60	304.80 (	1000.00)	22.50
18.29 (	60.00)	3.85	304.80 (	1000.00)	23.40
24.38 (	80.00)	4.75	426.72 (	1400.00)	23.00
30.48 (	100.00)	5.70	609.60 (	2000.00)	24.00
30.48 (	100.00)	5.75	914.40 (	3000.00)	21.50
42.67 (	140.00)	6.90	1219.20 (	4000.00)	19.20
60.96 (	200.00)	9.90	1828.80 (	6000.00)	18.00
			2133.60 (	7000.00)	15.00

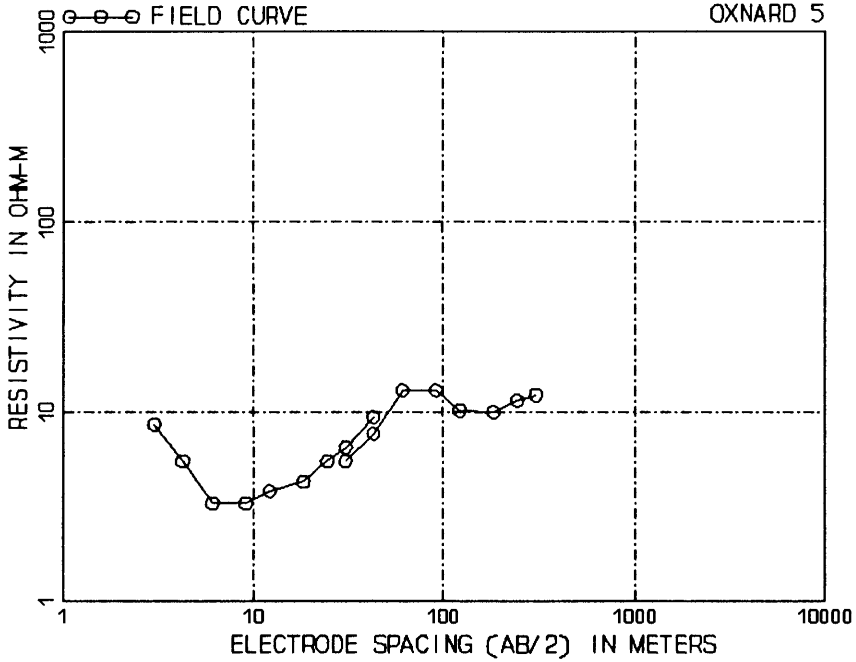
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.37 (	4.49)	11.71	43.32 (	142.12)	23.05
2.01 (	6.60)	7.90	63.58 (	208.60)	31.70
2.95 (	9.68)	5.92	93.32 (	306.18)	38.01
4.33 (	14.21)	3.33	136.98 (	449.41)	38.32
6.36 (	20.86)	2.14	201.06 (	659.65)	33.08
9.33 (	30.62)	2.82	295.12 (	968.23)	26.51
13.70 (	44.94)	5.01	433.17 (	1421.16)	21.48
20.11 (	65.96)	9.04	635.81 (	2085.98)	17.19
29.51 (	96.82)	15.15	99999.00 (	99999.00)	12.09



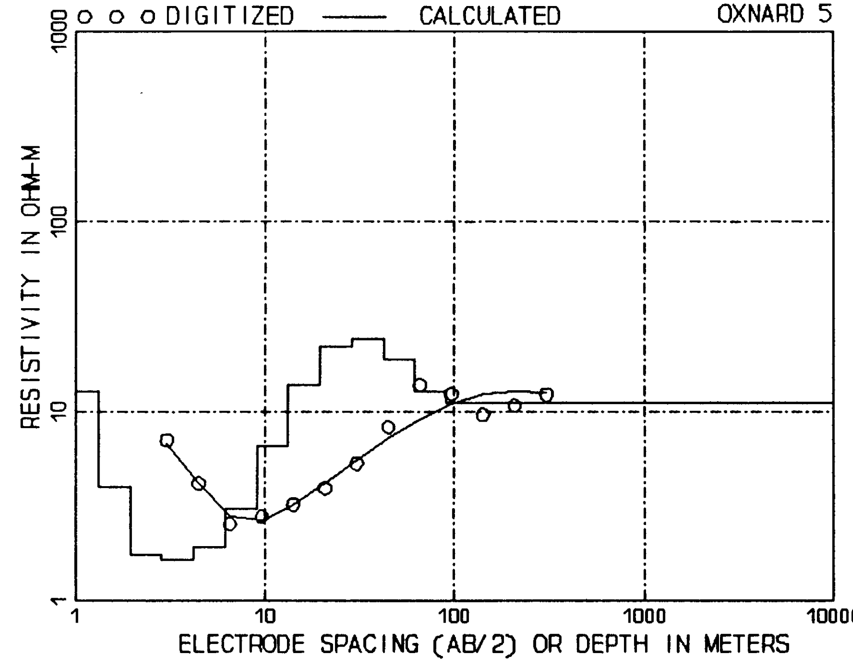


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.30	91.44 (	300.00)	11.30
4.27 (	14.00)	6.70	121.92 (	400.00)	13.30
6.10 (	20.00)	4.80	182.88 (	600.00)	15.20
9.14 (	30.00)	3.75	243.84 (	800.00)	16.30
12.19 (	40.00)	3.25	304.80 (	1000.00)	17.40
18.29 (	60.00)	3.52	304.80 (	1000.00)	17.70
24.38 (	80.00)	4.35	426.72 (	1400.00)	20.00
30.48 (	100.00)	5.10	609.60 (	2000.00)	21.90
30.48 (	100.00)	5.30	914.40 (	3000.00)	22.80
42.67 (	140.00)	6.90	1219.20 (	4000.00)	20.00
60.96 (	200.00)	8.50	1524.00 (	5000.00)	17.40

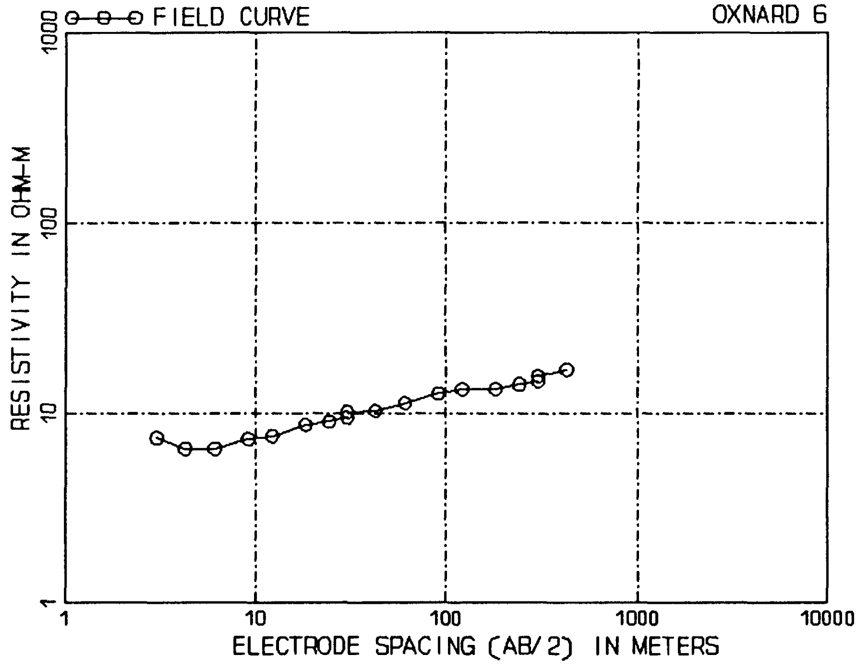
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.44 (	4.71)	13.15	30.94 (	101.51)	16.81
2.11 (	6.92)	7.69	45.41 (	149.00)	22.90
3.09 (	10.15)	5.65	66.66 (	218.70)	23.64
4.54 (	14.90)	2.75	97.84 (	321.01)	20.56
6.67 (	21.87)	1.73	143.61 (	471.17)	19.96
9.78 (	32.10)	2.69	210.80 (	691.59)	25.92
14.36 (	47.12)	5.30	309.41 (	1015.12)	35.37
21.08 (	69.16)	9.98	454.15 (	1489.99)	31.14
			99999.00 (	99999.00)	12.47



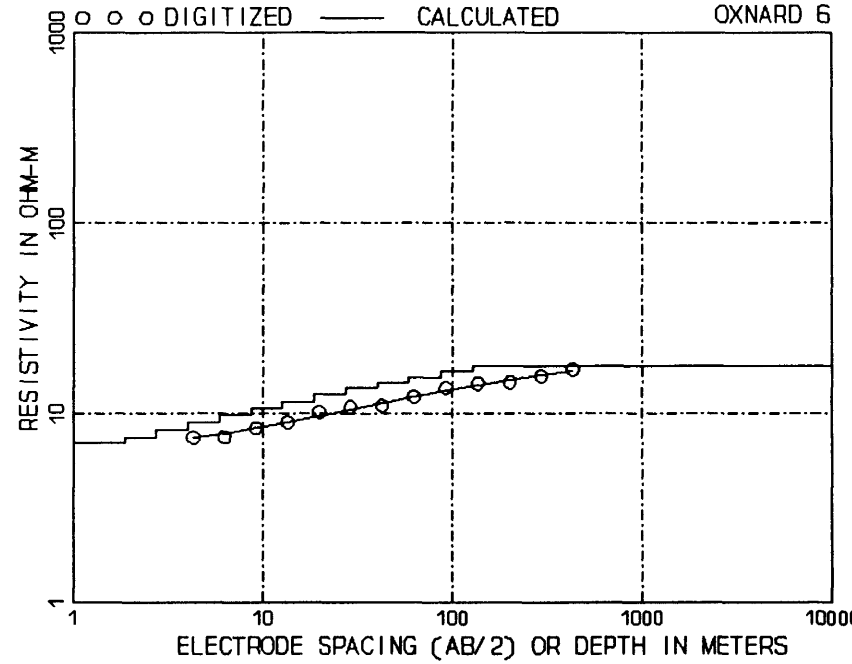
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.60	42.67	(140.00)	9.40
4.27	(14.00)	5.50	30.48	(100.00)	5.50
6.10	(20.00)	3.30	42.67	(140.00)	7.70
9.14	(30.00)	3.30	60.96	(200.00)	13.00
12.19	(40.00)	3.82	91.44	(300.00)	13.00
18.29	(60.00)	4.30	121.92	(400.00)	10.20
24.38	(80.00)	5.50	182.88	(600.00)	10.00
30.48	(100.00)	6.50	243.84	(800.00)	11.50
			304.80	(1000.00)	12.30



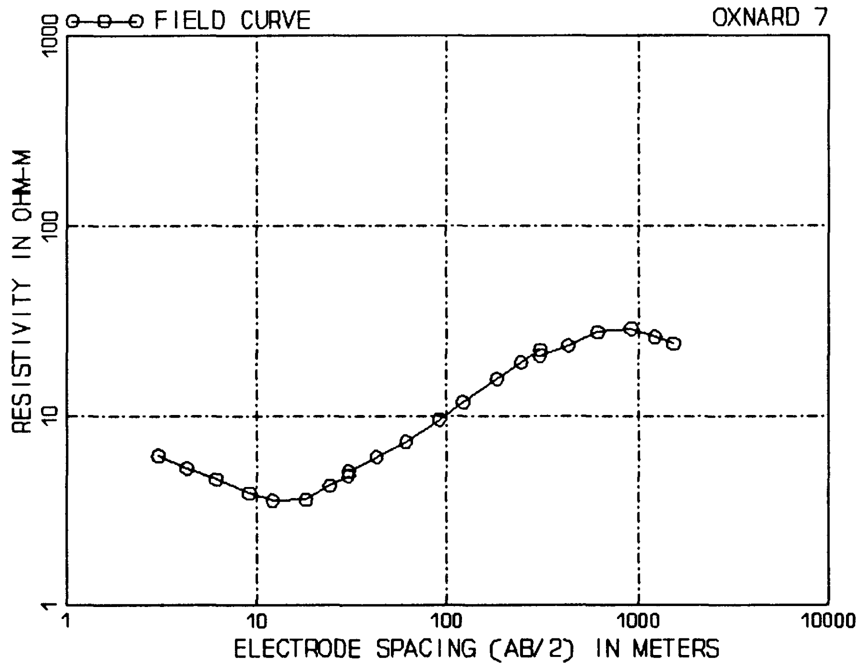
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.33	(4.37)	12.80	13.33	(43.74)	6.60
1.96	(6.42)	4.02	19.57	(64.20)	13.79
2.87	(9.42)	1.77	28.72	(94.23)	21.99
4.22	(13.83)	1.66	42.16	(138.32)	24.16
6.19	(20.30)	1.93	61.88	(203.02)	18.79
9.08	(29.80)	3.10	90.83	(298.00)	12.81
			99999.00	(99999.00)	11.13



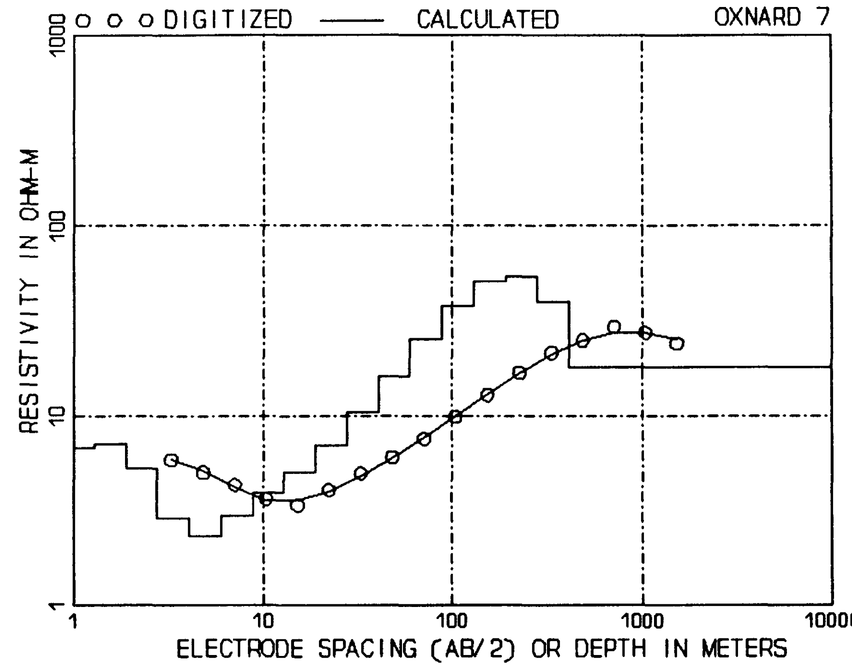
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	7.40	42.67 (	140.00)	10.30
4.27 (	14.00)	6.50	60.96 (	200.00)	11.35
6.10 (	20.00)	6.50	91.44 (	300.00)	12.70
9.14 (	30.00)	7.30	121.92 (	400.00)	13.40
12.19 (	40.00)	7.60	182.88 (	600.00)	13.40
18.29 (	60.00)	8.70	243.84 (	800.00)	14.20
24.38 (	80.00)	9.05	304.80 (	1000.00)	14.70
30.48 (	100.00)	9.50	304.80 (	1000.00)	15.70
30.48 (	100.00)	10.20	426.72 (	1400.00)	17.00



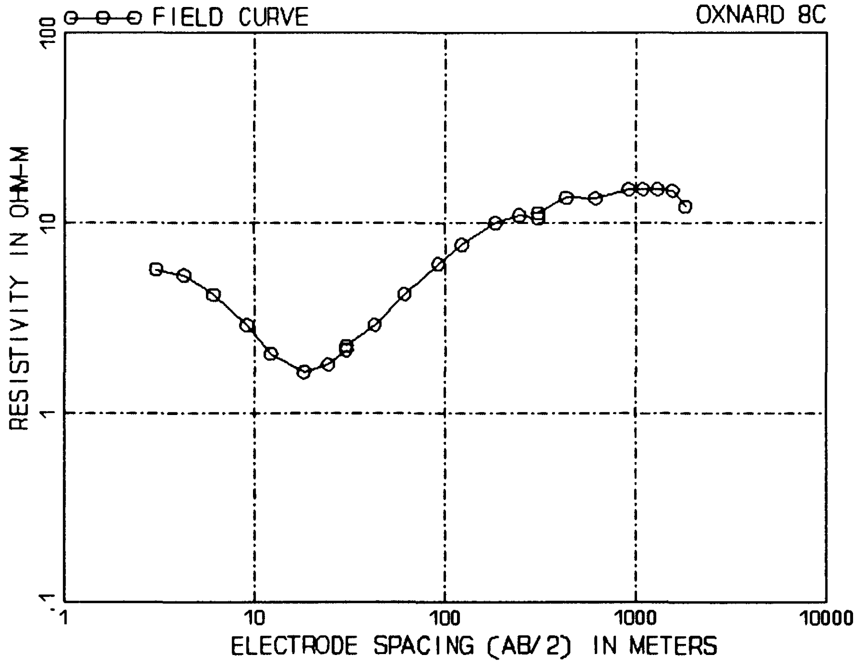
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.87 (	6.12)	7.03	18.66 (	61.24)	11.53
2.74 (	8.99)	7.41	27.40 (	89.88)	12.56
4.02 (	13.19)	8.12	40.21 (	131.93)	13.58
5.90 (	19.36)	9.02	59.02 (	193.65)	14.47
8.66 (	28.42)	9.89	86.63 (	284.23)	15.39
12.72 (	41.72)	10.68	127.16 (	417.20)	16.56
			99999.00 (	99999.00)	17.84



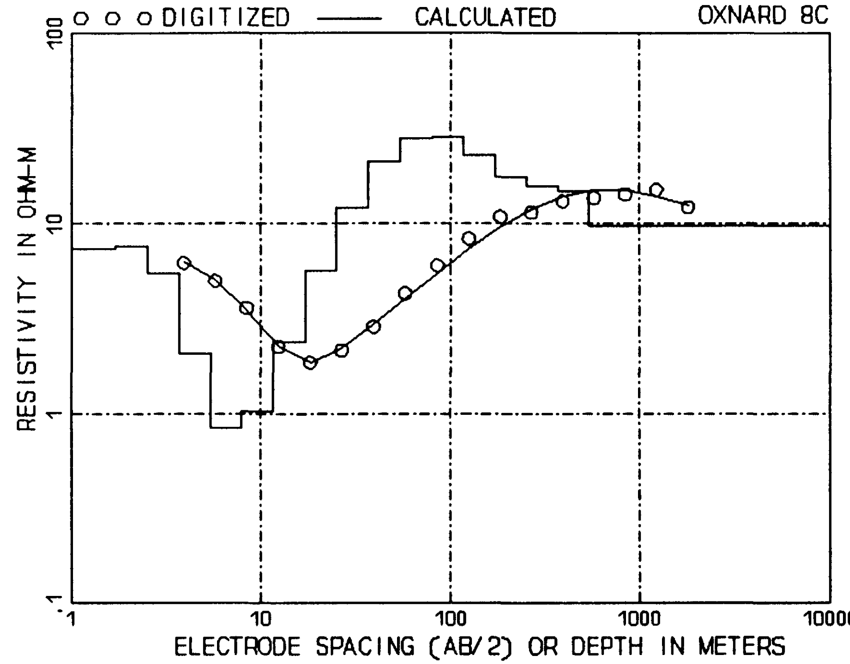
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	6.15	91.44	(300.00)	9.60
4.27	(14.00)	5.30	121.92	(400.00)	11.80
6.10	(20.00)	4.65	182.88	(600.00)	15.70
9.14	(30.00)	3.92	243.84	(800.00)	19.10
12.19	(40.00)	3.58	304.80	(1000.00)	22.20
18.29	(60.00)	3.62	304.80	(1000.00)	20.80
24.38	(80.00)	4.30	426.72	(1400.00)	23.50
30.48	(100.00)	4.85	609.60	(2000.00)	27.60
30.48	(100.00)	5.10	914.40	(3000.00)	28.80
42.67	(140.00)	6.10	1219.20	(4000.00)	26.00
60.96	(200.00)	7.30	1524.00	(5000.00)	24.00



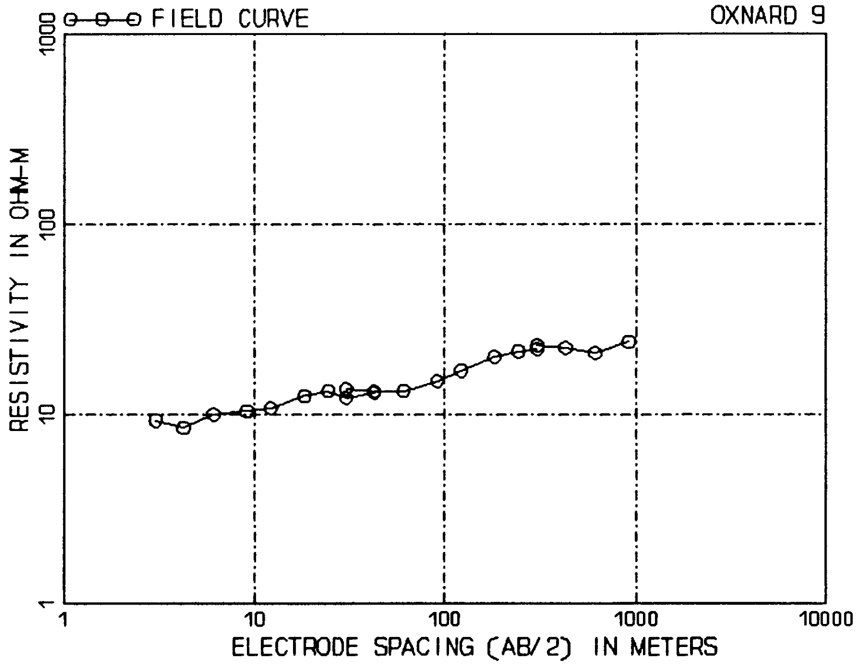
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.29	(4.24)	6.81	27.85	(91.36)	7.03
1.90	(6.22)	7.16	40.87	(134.10)	10.44
2.78	(9.14)	5.30	59.99	(196.83)	16.17
4.09	(13.41)	2.91	88.06	(288.91)	25.14
6.00	(19.68)	2.34	129.25	(424.06)	37.69
8.81	(28.89)	2.97	189.72	(622.43)	50.81
12.93	(42.41)	3.91	278.47	(913.60)	54.22
18.97	(62.24)	5.09	408.73	(1340.99)	39.38
			99999.00	(99999.00)	17.97



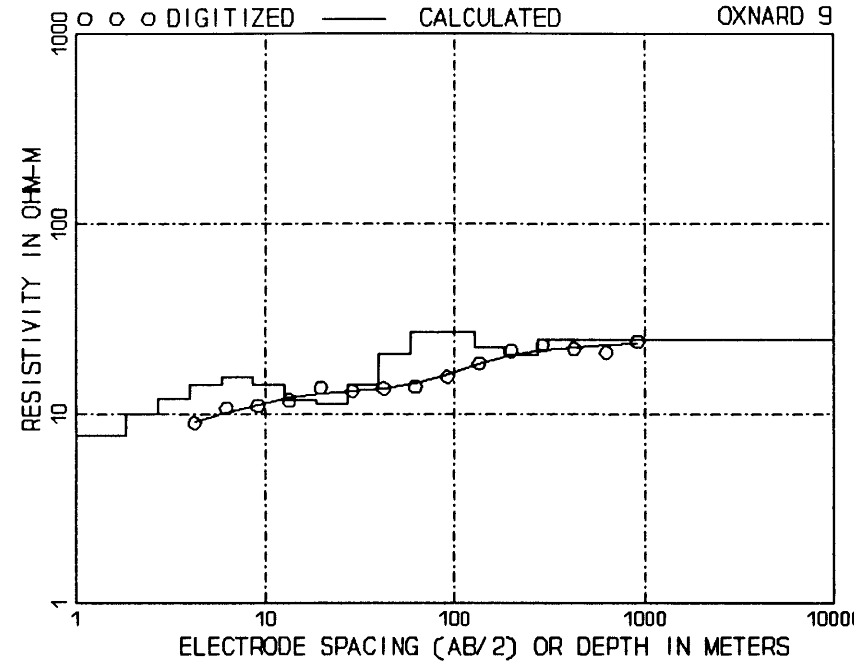
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	5.70	121.92 (	400.00)	7.70
4.27 (	14.00)	5.30	182.88 (	600.00)	10.00
6.10 (	20.00)	4.20	243.84 (	800.00)	11.00
9.14 (	30.00)	2.90	304.80 (	1000.00)	10.60
12.19 (	40.00)	2.05	304.80 (	1000.00)	11.30
18.29 (	60.00)	1.65	426.72 (	1400.00)	13.60
24.38 (	80.00)	1.80	609.60 (	2000.00)	13.50
30.48 (	100.00)	2.15	914.40 (	3000.00)	15.00
30.48 (	100.00)	2.26	1090.27 (	3577.00)	15.10
42.67 (	140.00)	2.92	1302.11 (	4272.00)	15.00
60.96 (	200.00)	4.23	1566.06 (	5138.00)	14.77
91.44 (	300.00)	6.10	1821.18 (	5975.00)	12.20



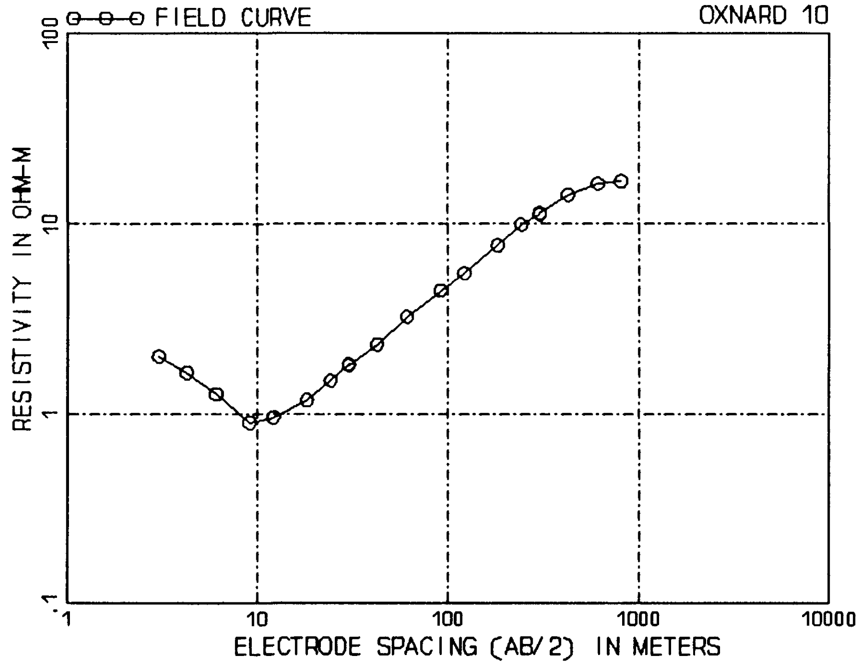
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.72 (	5.63)	7.41	36.97 (	121.31)	12.06
2.52 (	8.26)	7.64	54.27 (	178.05)	21.01
3.70 (	12.13)	5.52	79.66 (	261.35)	28.12
5.43 (	17.81)	2.08	116.92 (	383.60)	28.35
7.97 (	26.13)	0.84	171.62 (	563.05)	22.91
11.69 (	38.36)	1.04	251.90 (	826.45)	17.67
17.16 (	56.31)	2.36	369.74 (	1213.06)	15.76
25.19 (	82.65)	5.67	542.71 (	1780.53)	14.85
			99999.00 (	99999.00)	9.78

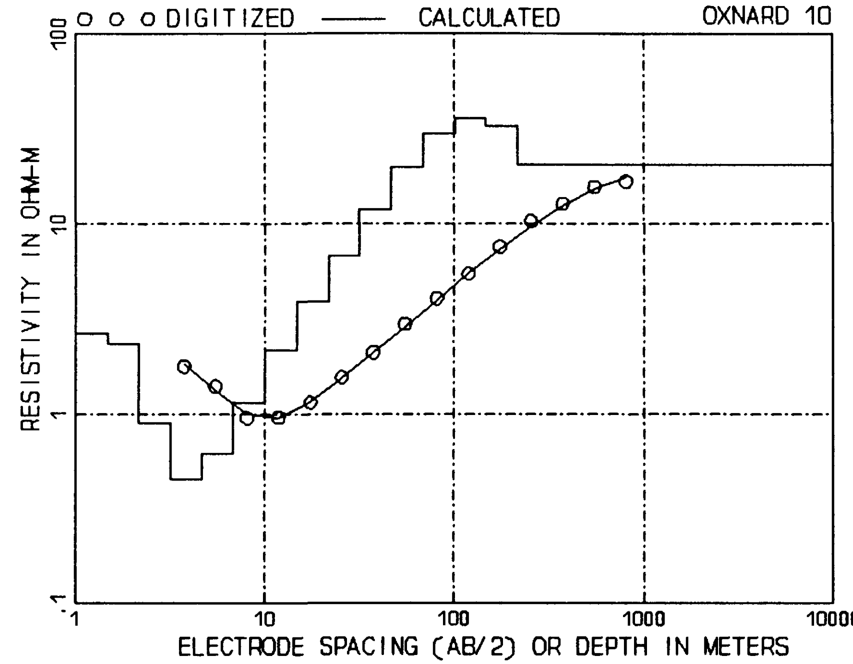


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.30	42.67 (	140.00)	13.20
4.27 (	14.00)	8.50	60.96 (	200.00)	13.30
6.10 (	20.00)	10.00	91.44 (	300.00)	15.00
9.14 (	30.00)	10.40	121.92 (	400.00)	17.00
12.19 (	40.00)	10.80	182.88 (	600.00)	20.00
18.29 (	60.00)	12.50	243.84 (	800.00)	21.50
24.38 (	80.00)	13.30	304.80 (	1000.00)	22.00
30.48 (	100.00)	12.20	304.80 (	1000.00)	23.00
42.67 (	140.00)	13.00	426.72 (	1400.00)	22.40
30.48 (	100.00)	13.60	609.60 (	2000.00)	21.00
			914.40 (	3000.00)	24.00



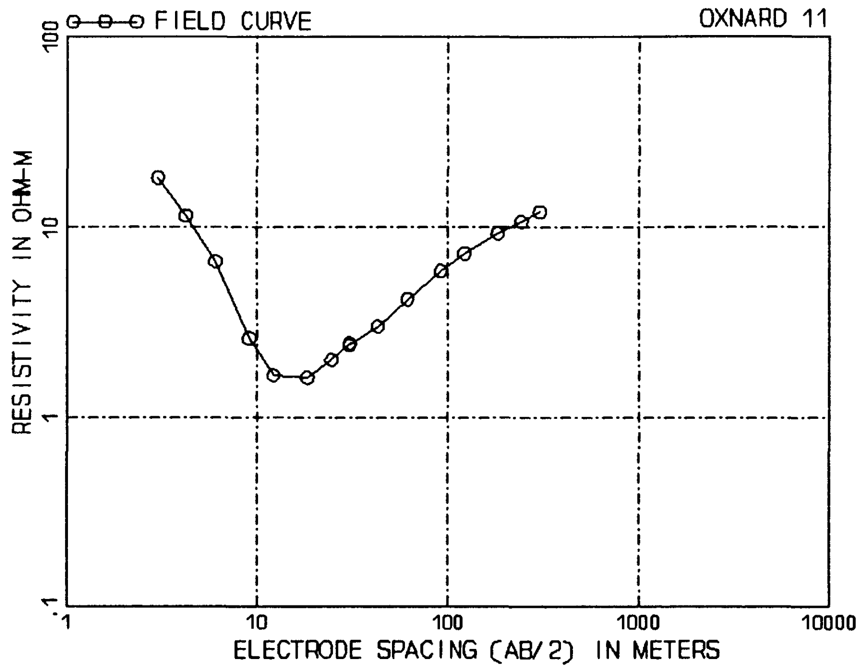
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.86 (	6.09)	7.68	27.25 (	89.40)	11.29
2.72 (	8.94)	10.01	40.00 (	131.22)	14.27
4.00 (	13.12)	12.02	58.71 (	192.60)	20.72
5.87 (	19.26)	14.25	86.17 (	282.71)	26.81
8.62 (	28.27)	15.54	126.48 (	414.95)	26.79
12.65 (	41.50)	14.26	185.64 (	609.07)	22.29
18.56 (	60.91)	11.86	272.49 (	893.99)	20.46
			99999.00 (	99999.00)	24.66



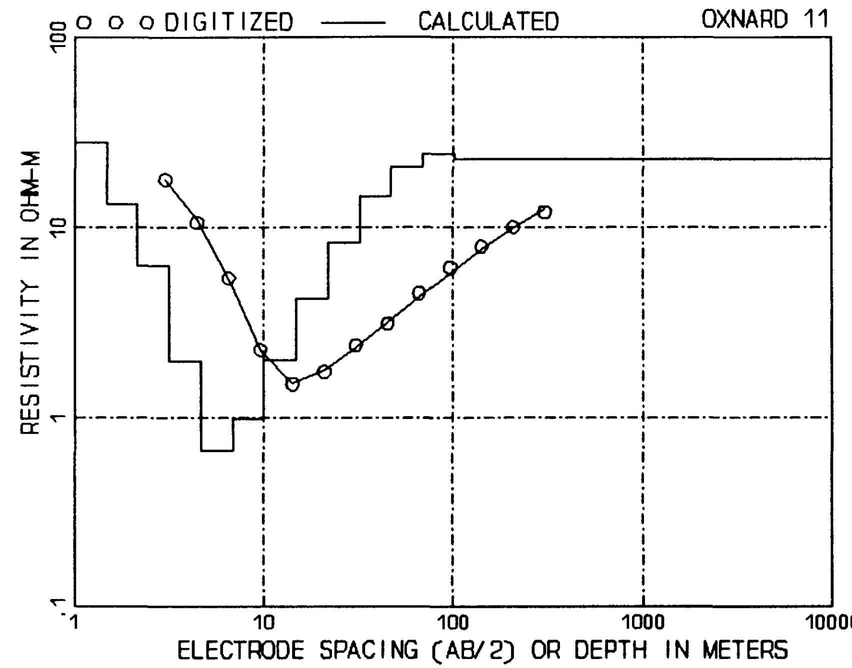


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	2.00	60.96 (	200.00)	3.25
4.27 (	14.00)	1.65	91.44 (	300.00)	4.45
6.10 (	20.00)	1.27	121.92 (	400.00)	5.50
9.14 (	30.00)	0.90	182.88 (	600.00)	7.70
12.19 (	40.00)	0.96	243.84 (	800.00)	9.90
18.29 (	60.00)	1.18	304.80 (	1000.00)	11.20
24.38 (	80.00)	1.50	304.80 (	1000.00)	11.40
30.48 (	100.00)	1.82	426.72 (	1400.00)	14.20
30.48 (	100.00)	1.80	609.60 (	2000.00)	16.20
42.67 (	140.00)	2.32	807.72 (	2650.00)	16.70

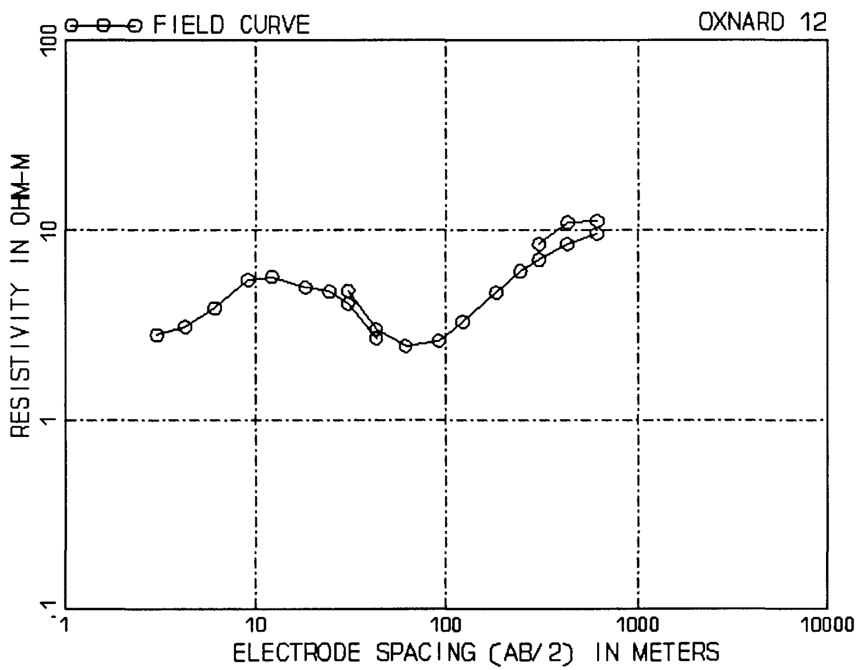
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.84)	2.65	21.66 (	71.07)	3.88
2.17 (	7.11)	2.36	31.80 (	104.32)	6.84
3.18 (	10.43)	0.89	46.67 (	153.12)	11.96
4.67 (	15.31)	0.45	68.50 (	224.75)	19.99
6.85 (	22.48)	0.61	100.55 (	329.89)	29.71
10.06 (	32.99)	1.15	147.59 (	484.21)	36.04
14.76 (	48.42)	2.16	216.63 (	710.72)	32.52
			99999.00 (	99999.00)	20.43



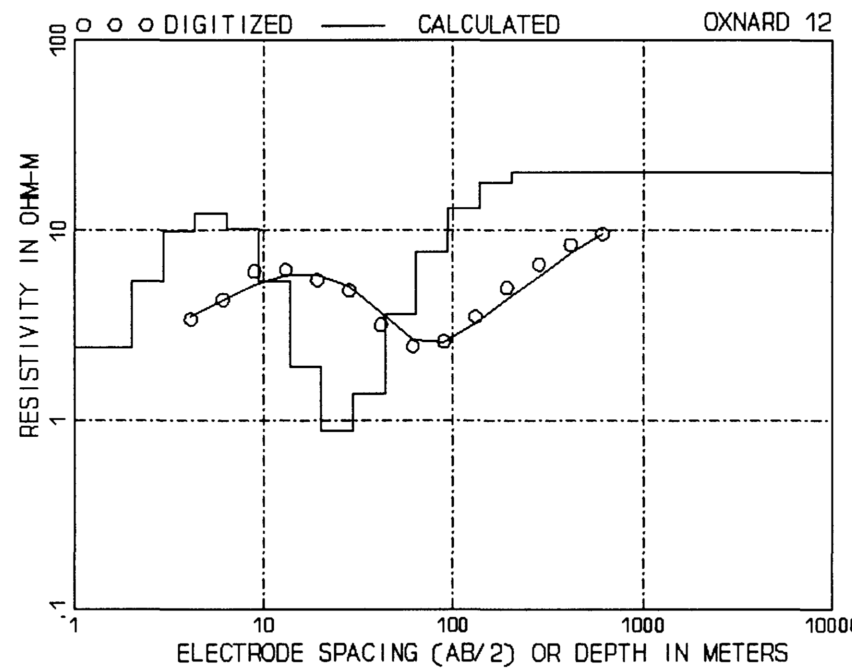
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	18.20	30.48	(100.00)	2.40
4.27	(14.00)	11.50	42.67	(140.00)	3.00
6.10	(20.00)	6.60	60.96	(200.00)	4.18
9.14	(30.00)	2.60	91.44	(300.00)	5.90
12.19	(40.00)	1.66	121.92	(400.00)	7.30
18.29	(60.00)	1.62	182.88	(600.00)	9.30
24.38	(80.00)	2.00	243.84	(800.00)	10.70
30.48	(100.00)	2.45	304.80	(1000.00)	12.00



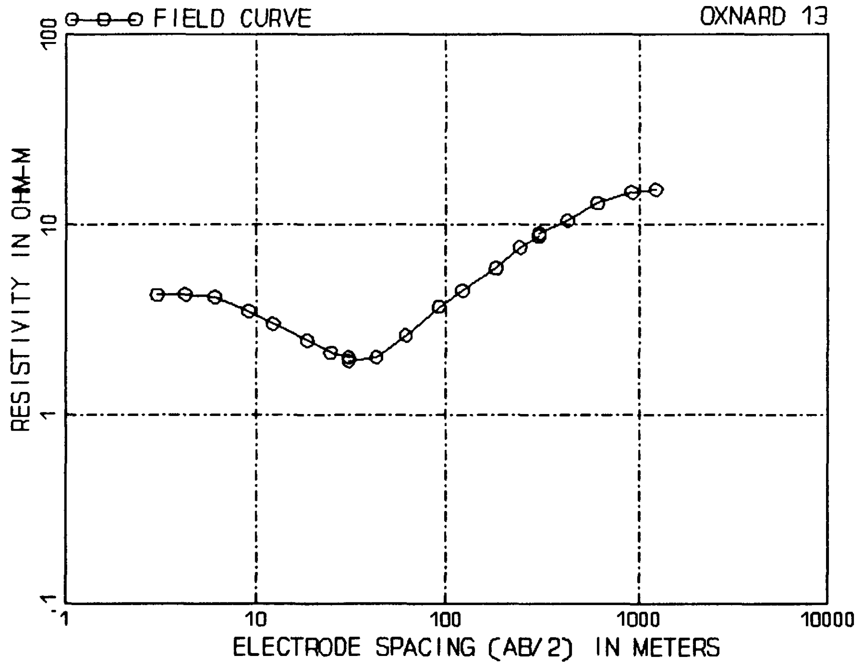
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.48	(4.86)	28.01	14.81	(48.60)	2.02
2.17	(7.13)	13.27	21.74	(71.34)	4.20
3.19	(10.47)	6.29	31.91	(104.71)	8.38
4.68	(15.37)	1.97	46.84	(153.69)	14.56
6.88	(22.56)	0.67	68.76	(225.58)	20.92
10.09	(33.11)	0.98	100.92	(331.11)	24.35
			99999.00	(99999.00)	23.01

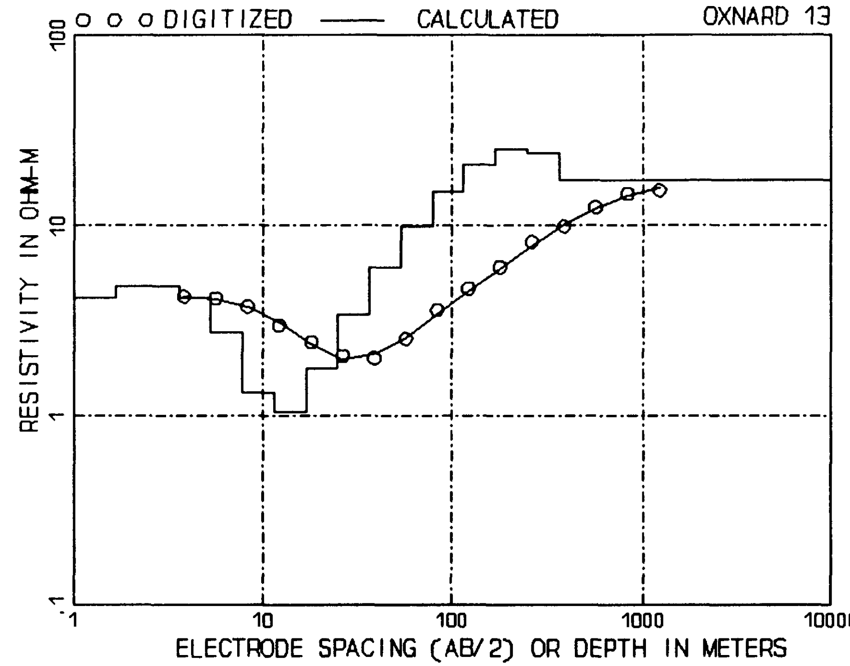


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	2.80	60.96	(200.00)	2.45
4.27	(14.00)	3.10	91.44	(300.00)	2.62
6.10	(20.00)	3.88	121.92	(400.00)	3.30
9.14	(30.00)	5.50	182.88	(600.00)	4.70
12.19	(40.00)	5.70	243.84	(800.00)	6.10
18.29	(60.00)	5.00	304.80	(1000.00)	7.00
24.38	(80.00)	4.75	426.72	(1400.00)	8.50
30.48	(100.00)	4.10	609.60	(2000.00)	9.60
42.67	(140.00)	2.70	304.80	(1000.00)	8.50
30.48	(100.00)	4.80	426.72	(1400.00)	11.00
42.67	(140.00)	3.00	609.60	(2000.00)	11.20



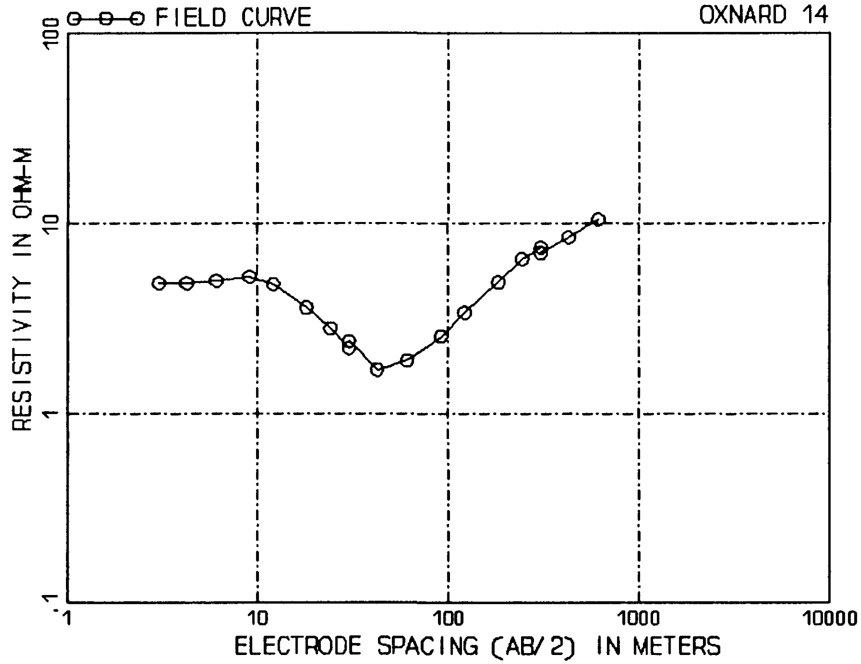
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
2.02	(6.62)	2.42	29.63	(97.20)	0.88
2.96	(9.72)	5.41	43.49	(142.67)	1.39
4.35	(14.27)	9.85	63.83	(209.41)	3.62
6.38	(20.94)	12.34	93.69	(307.37)	7.72
9.37	(30.74)	10.28	137.51	(451.16)	13.03
13.75	(45.12)	5.44	201.84	(662.22)	17.78
20.18	(66.22)	1.91	99999.00	(99999.00)	20.20

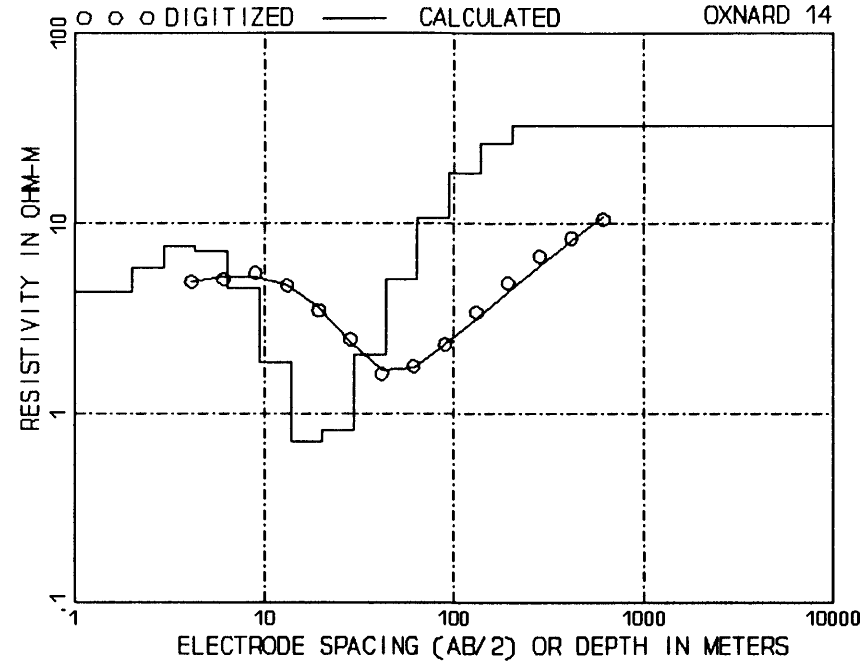




AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	4.25	60.96	(200.00)	2.62
4.27	(14.00)	4.30	91.44	(300.00)	3.70
6.10	(20.00)	4.15	121.92	(400.00)	4.50
9.14	(30.00)	3.50	182.88	(600.00)	5.90
12.19	(40.00)	3.00	243.84	(800.00)	7.60
18.29	(60.00)	2.45	304.80	(1000.00)	8.70
24.38	(80.00)	2.12	304.80	(1000.00)	9.00
30.48	(100.00)	2.00	426.72	(1400.00)	10.50
30.48	(100.00)	1.92	609.60	(2000.00)	13.00
42.67	(140.00)	2.00	914.40	(3000.00)	14.80
			1219.20	(4000.00)	15.30

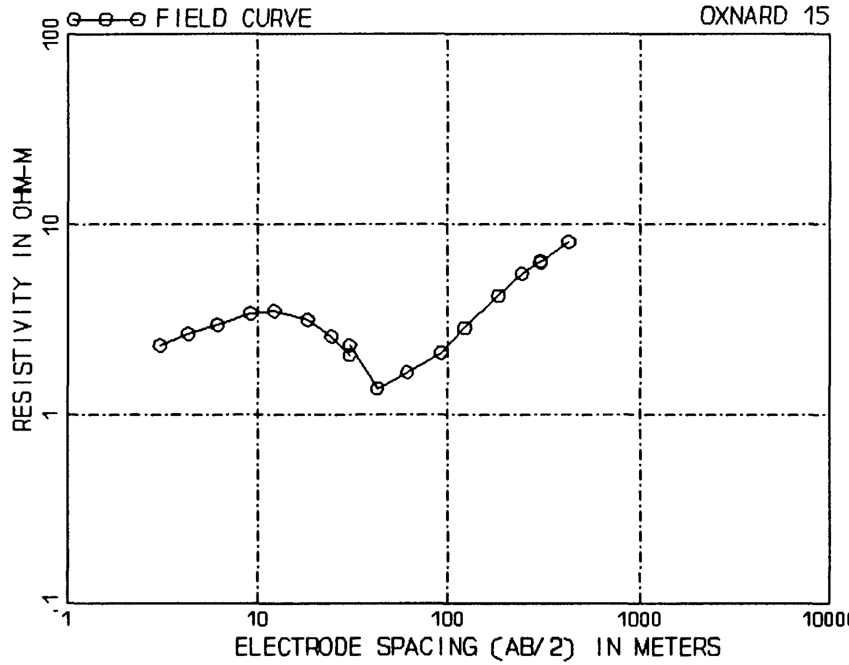
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.69	(5.53)	4.13	36.33	(119.20)	3.42
2.48	(8.12)	4.78	53.33	(174.96)	6.05
3.63	(11.92)	4.78	78.27	(256.81)	9.90
5.33	(17.50)	4.12	114.89	(376.94)	14.99
7.83	(25.68)	2.73	168.64	(553.27)	20.72
11.49	(37.69)	1.32	247.53	(812.09)	24.94
16.86	(55.33)	1.04	363.32	(1191.99)	23.95
24.75	(81.21)	1.77	99999.00	(99999.00)	17.35



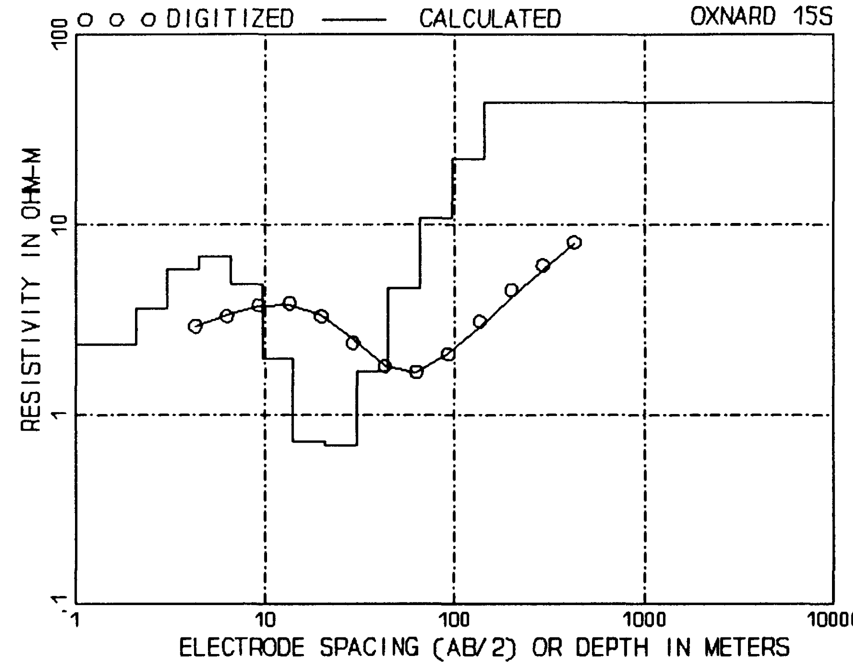


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	4.85	42.67 (	140.00)	1.70
4.27 (	14.00)	4.85	60.96 (	200.00)	1.90
6.10 (	20.00)	5.00	91.44 (	300.00)	2.55
9.14 (	30.00)	5.25	121.92 (	400.00)	3.40
12.19 (	40.00)	4.80	182.88 (	600.00)	4.90
18.29 (	60.00)	3.60	243.84 (	800.00)	6.50
24.38 (	80.00)	2.80	304.80 (	1000.00)	7.50
30.48 (	100.00)	2.20	304.80 (	1000.00)	7.00
30.48 (	100.00)	2.40	426.72 (	1400.00)	8.50
			609.60 (	2000.00)	10.50

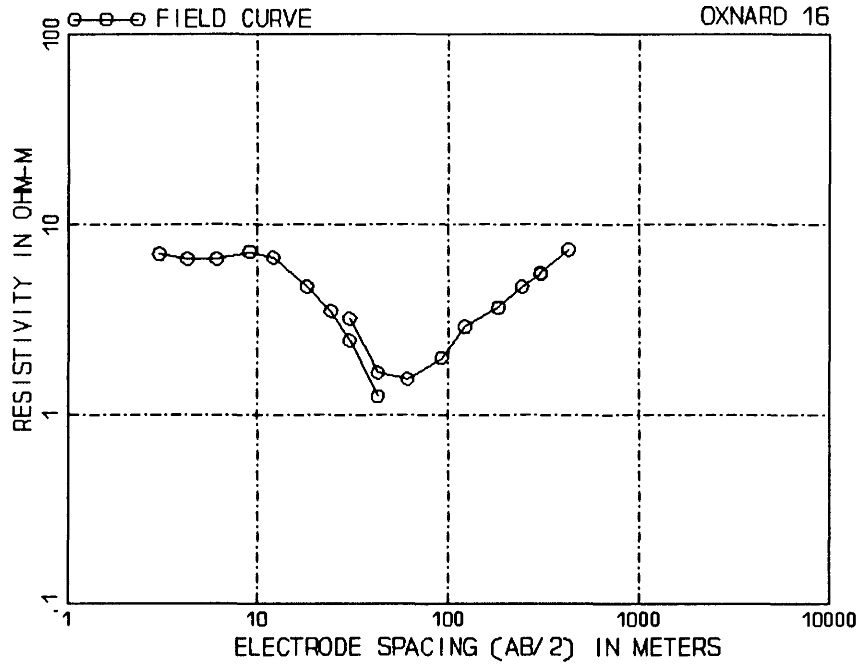
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.02 (	6.62)	4.34	29.63 (	97.20)	0.82
2.96 (	9.72)	5.85	43.49 (	142.67)	2.04
4.35 (	14.27)	7.56	63.83 (	209.41)	5.08
6.38 (	20.94)	7.19	93.69 (	307.37)	10.65
9.37 (	30.74)	4.59	137.51 (	451.16)	18.32
13.75 (	45.12)	1.87	201.84 (	662.22)	26.32
20.18 (	66.22)	0.71	99999.00	(99999.00)	32.65

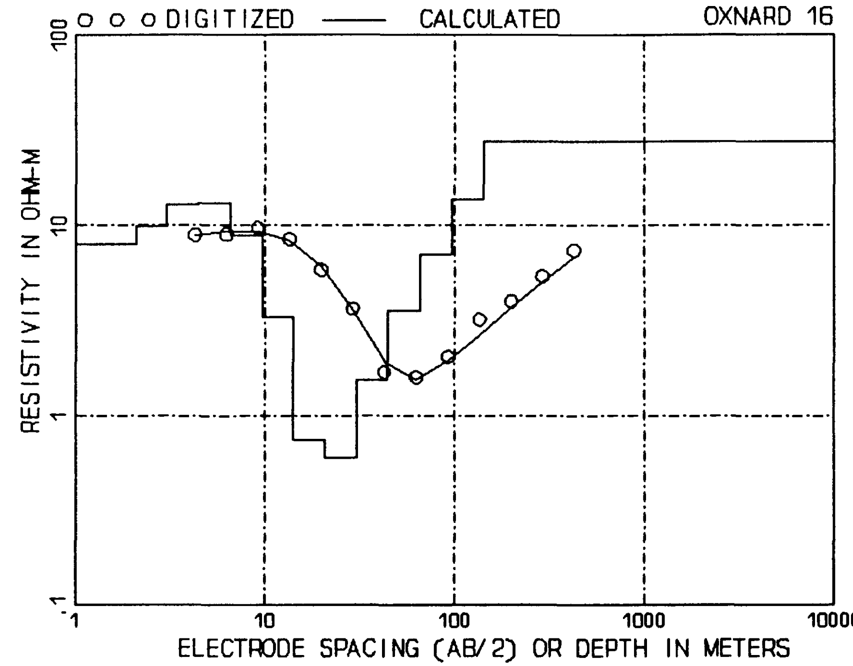


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	2.30	42.67	(140.00)	1.37
4.27	(14.00)	2.65	60.96	(200.00)	1.66
6.10	(20.00)	2.95	91.44	(300.00)	2.11
9.14	(30.00)	3.40	121.92	(400.00)	2.85
12.19	(40.00)	3.50	182.88	(600.00)	4.20
18.29	(60.00)	3.15	243.84	(800.00)	5.50
24.38	(80.00)	2.58	304.80	(1000.00)	6.40
30.48	(100.00)	2.05	304.80	(1000.00)	6.30
30.48	(100.00)	2.30	426.72	(1400.00)	8.10



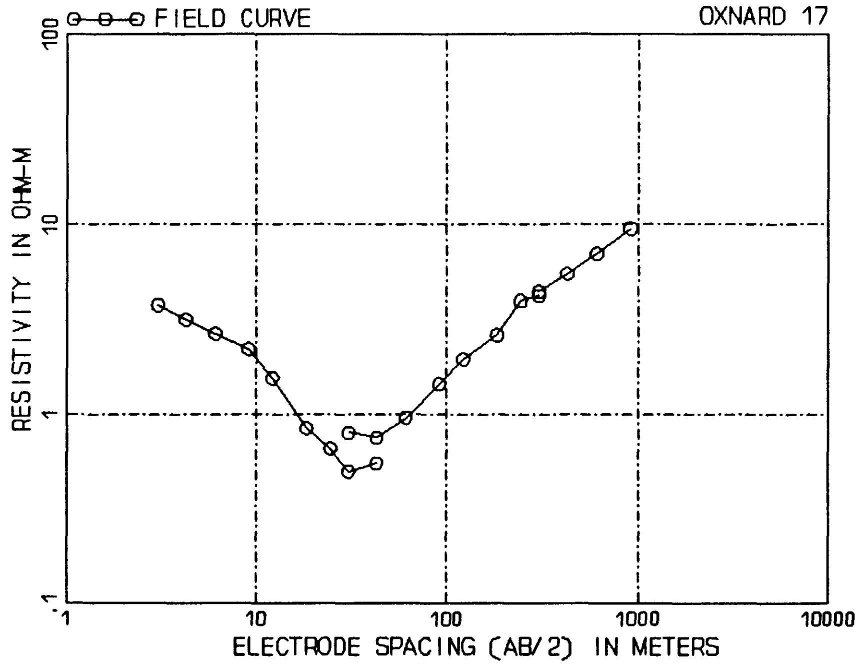
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
2.07	(6.80)	2.32	20.74	(68.04)	0.73
3.04	(9.99)	3.64	30.44	(99.87)	0.69
4.47	(14.66)	5.81	44.68	(146.59)	1.69
6.56	(21.52)	6.86	65.58	(215.16)	4.65
9.63	(31.58)	4.82	96.26	(315.81)	10.81
14.13	(46.36)	1.97	141.29	(463.55)	22.21
			99999.00	(99999.00)	43.66



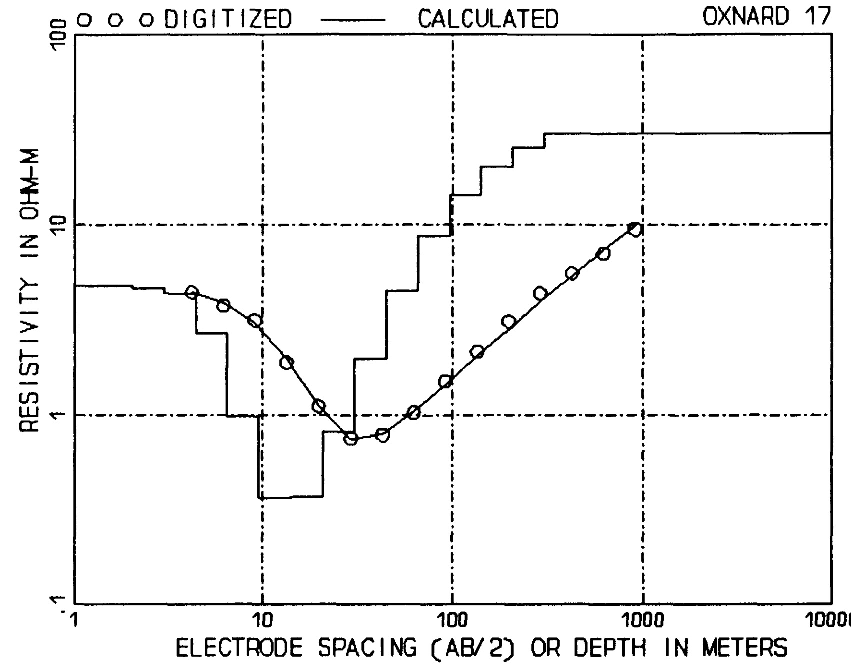


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	7.00	30.48 (	100.00)	3.20
4.27 (	14.00)	6.60	42.67 (	140.00)	1.66
6.10 (	20.00)	6.60	60.96 (	200.00)	1.54
9.14 (	30.00)	7.20	91.44 (	300.00)	1.99
12.19 (	40.00)	6.70	121.92 (	400.00)	2.90
18.29 (	60.00)	4.70	182.88 (	600.00)	3.65
24.38 (	80.00)	3.50	243.84 (	800.00)	4.70
30.48 (	100.00)	2.45	304.80 (	1000.00)	5.50
42.67 (	140.00)	1.25	304.80 (	1000.00)	5.60
			426.72 (	1400.00)	7.40

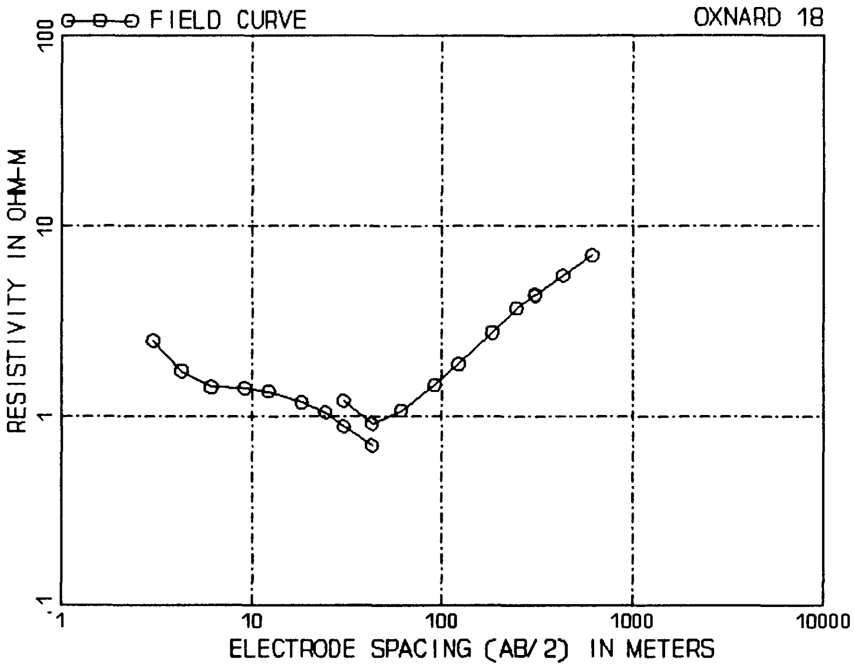
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.07 (	6.80)	8.00	20.74 (	68.04)	0.75
3.04 (	9.99)	9.94	30.44 (	99.87)	0.59
4.47 (	14.66)	12.94	44.68 (	146.59)	1.54
6.56 (	21.52)	13.14	65.58 (	215.16)	3.57
9.63 (	31.58)	8.82	96.26 (	315.81)	7.08
14.13 (	46.36)	3.27	141.29 (	463.55)	13.70
			99999.00 (	99999.00)	27.48



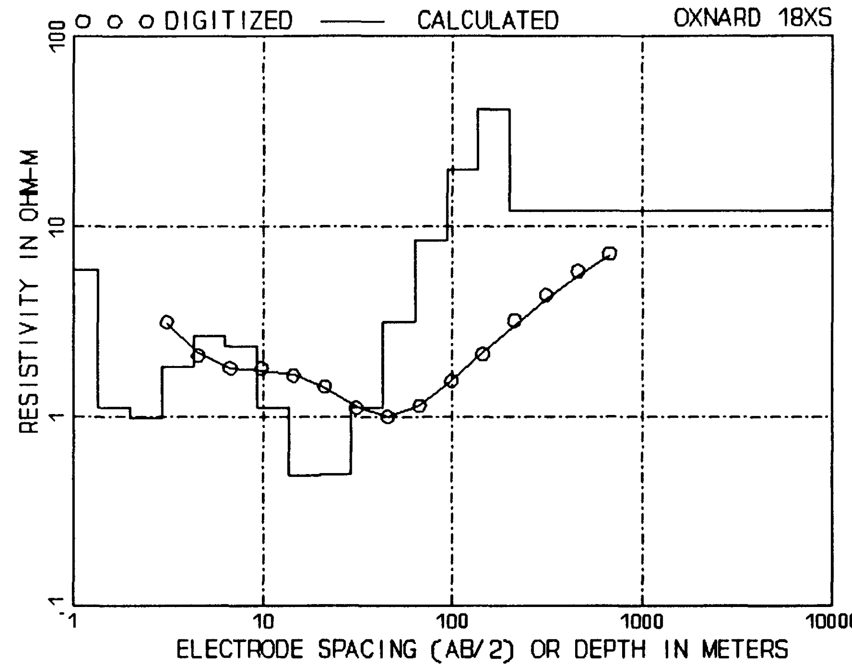
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	3.75	42.67	(140.00)	0.75
4.27	(14.00)	3.15	60.96	(200.00)	0.96
6.10	(20.00)	2.65	91.44	(300.00)	1.44
9.14	(30.00)	2.20	121.92	(400.00)	1.95
12.19	(40.00)	1.55	182.88	(600.00)	2.60
18.29	(60.00)	0.84	243.84	(800.00)	3.95
24.38	(80.00)	0.66	304.80	(1000.00)	4.20
30.48	(100.00)	0.50	304.80	(1000.00)	4.40
42.67	(140.00)	0.55	426.72	(1400.00)	5.50
30.48	(100.00)	0.80	609.60	(2000.00)	7.00
			914.40	(3000.00)	9.50



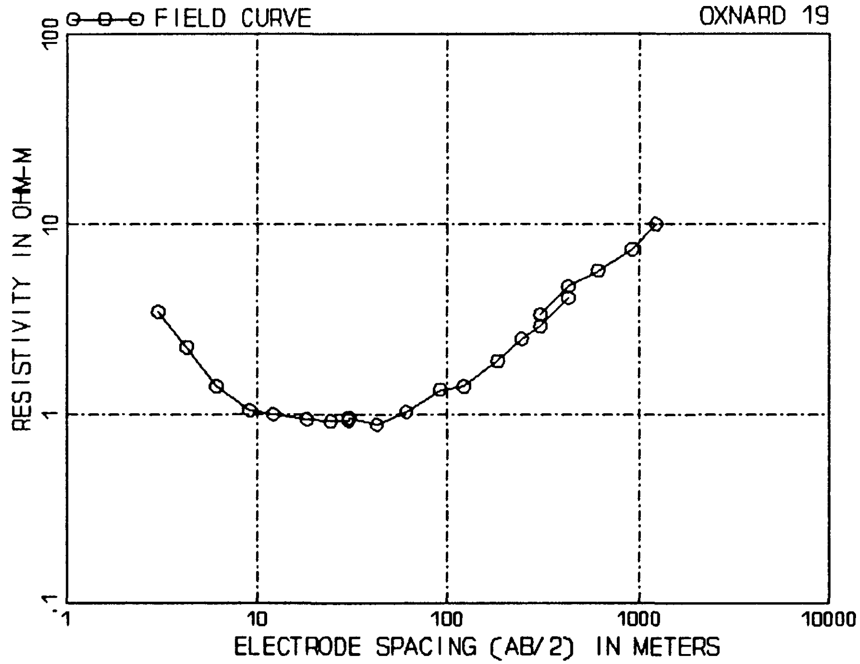
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
2.06	(6.77)	4.80	30.28	(99.33)	0.81
3.03	(9.93)	4.63	44.44	(145.80)	1.99
4.44	(14.58)	4.32	65.23	(214.01)	4.47
6.52	(21.40)	2.67	95.74	(314.12)	8.72
9.57	(31.41)	0.98	140.53	(461.06)	14.40
14.05	(46.11)	0.36	206.27	(676.74)	20.24
20.63	(67.67)	0.37	302.77	(993.32)	25.43
			99999.00	(99999.00)	30.22



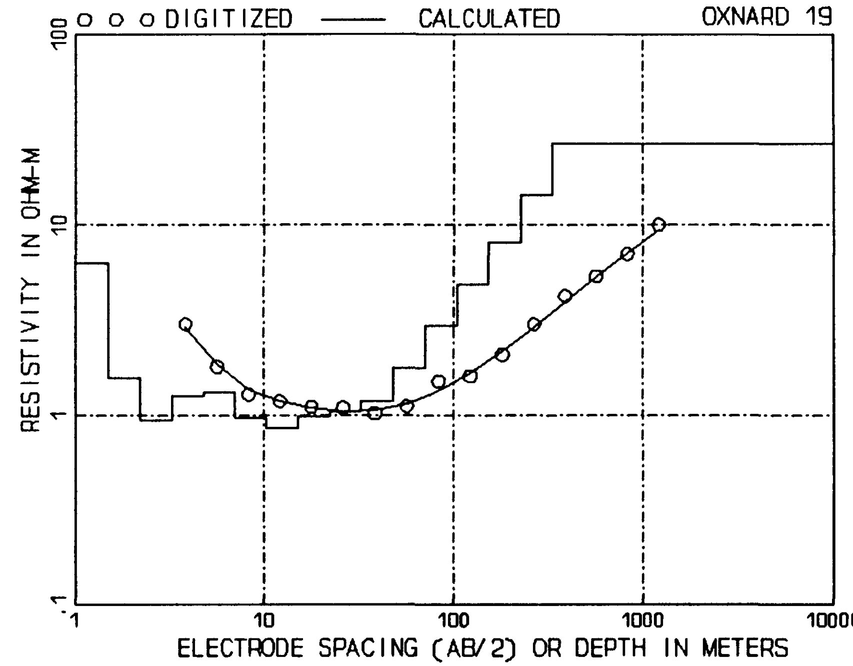
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	2.50	42.67 (	140.00)	0.91
4.27 (	14.00)	1.73	60.96 (	200.00)	1.07
6.10 (	20.00)	1.42	91.44 (	300.00)	1.46
9.14 (	30.00)	1.40	121.92 (	400.00)	1.88
12.19 (	40.00)	1.35	182.88 (	600.00)	2.75
18.29 (	60.00)	1.18	243.84 (	800.00)	3.70
24.38 (	80.00)	1.05	304.80 (	1000.00)	4.35
30.48 (	100.00)	0.88	304.80 (	1000.00)	4.30
42.67 (	140.00)	0.70	426.72 (	1400.00)	5.50
30.48 (	100.00)	1.20	609.60 (	2000.00)	7.00



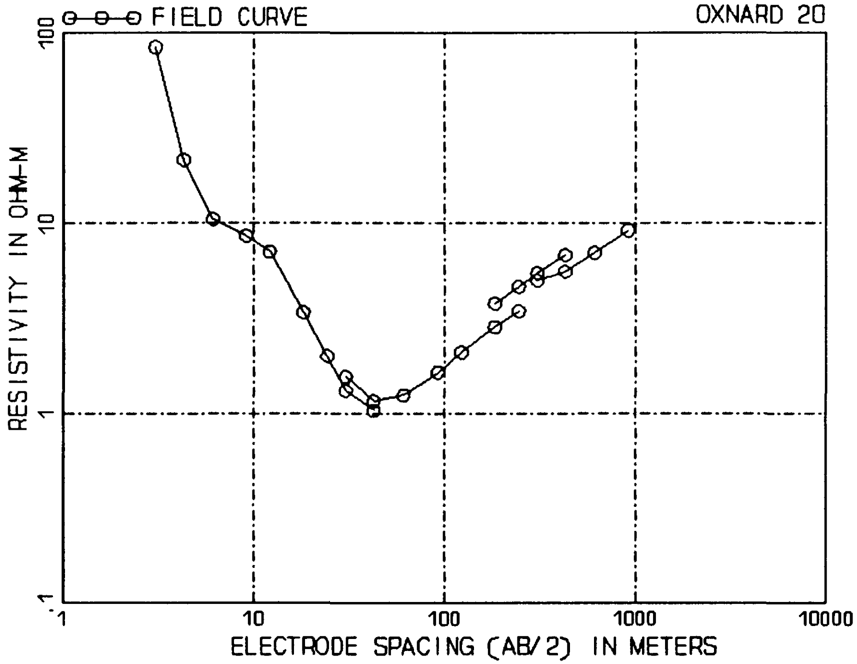
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.36 (	4.47)	5.97	19.98 (	65.56)	0.49
2.00 (	6.56)	1.11	29.33 (	96.23)	0.50
2.93 (	9.62)	0.98	43.05 (	141.24)	1.11
4.31 (	14.12)	1.83	63.19 (	207.32)	3.14
6.32 (	20.73)	2.65	92.75 (	304.30)	8.45
9.28 (	30.43)	2.35	136.14 (	446.65)	19.99
13.61 (	44.67)	1.12	199.82 (	655.59)	41.08
			99999.00 (	99999.00)	12.00



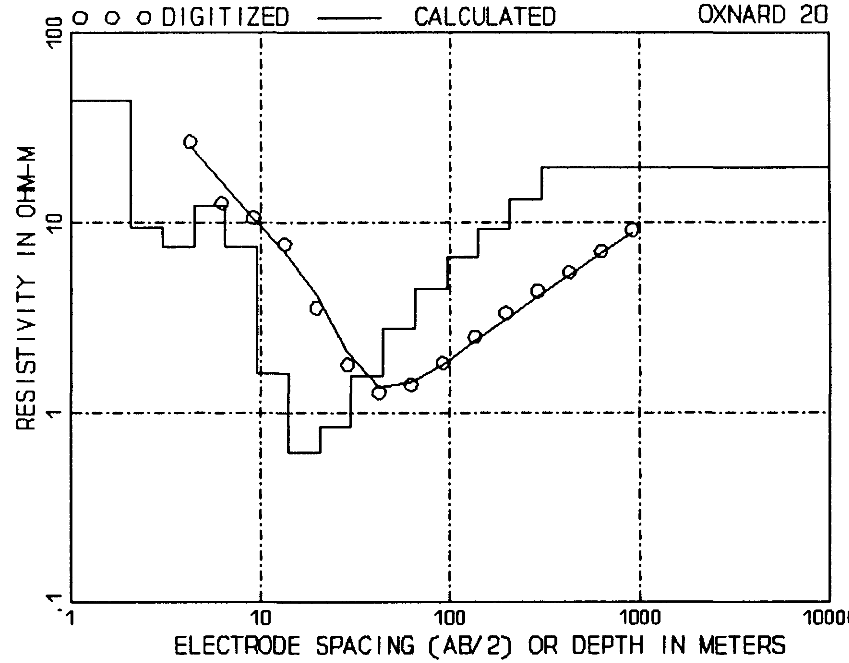
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	3.45	91.44	(300.00)	1.35
4.27	(14.00)	2.25	121.92	(400.00)	1.40
6.10	(20.00)	1.40	182.88	(600.00)	1.90
9.14	(30.00)	1.05	243.84	(800.00)	2.50
12.19	(40.00)	1.00	304.80	(1000.00)	2.90
18.29	(60.00)	0.94	426.72	(1400.00)	4.10
24.38	(80.00)	0.92	304.80	(1000.00)	3.35
30.48	(100.00)	0.93	426.72	(1400.00)	4.70
30.48	(100.00)	0.96	609.60	(2000.00)	5.70
42.67	(140.00)	0.88	914.40	(3000.00)	7.40
60.96	(200.00)	1.03	1219.20	(4000.00)	10.00



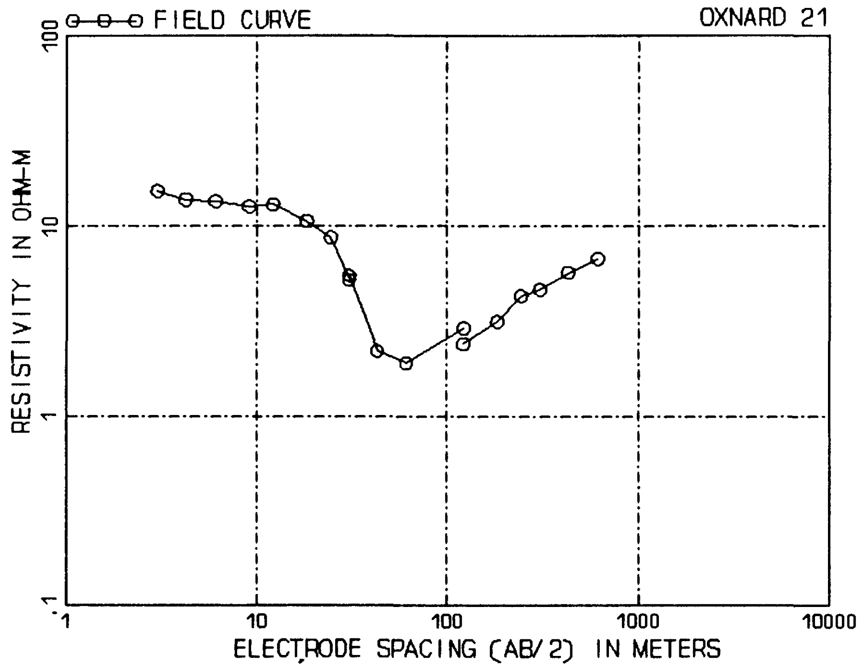
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.52	(4.98)	6.29	32.70	(107.28)	1.04
2.23	(7.31)	1.57	48.00	(157.46)	1.18
3.27	(10.73)	0.94	70.45	(231.13)	1.76
4.80	(15.75)	1.26	103.40	(339.25)	2.96
7.04	(23.11)	1.33	151.77	(497.95)	4.86
10.34	(33.92)	0.97	222.77	(730.88)	8.06
15.18	(49.79)	0.85	326.99	(1072.79)	14.24
22.28	(73.09)	0.98	99999.00	(99999.00)	26.84

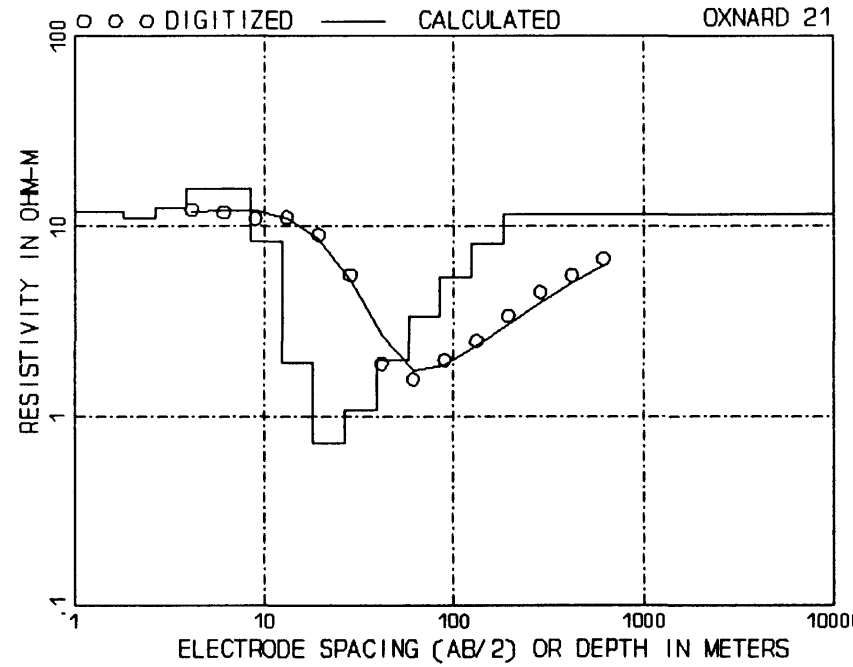


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	83.50	91.44	(300.00)	1.65
4.27	(14.00)	21.50	121.92	(400.00)	2.10
6.10	(20.00)	10.50	182.88	(600.00)	2.85
9.14	(30.00)	8.60	243.84	(800.00)	3.45
12.19	(40.00)	7.10	182.88	(600.00)	3.80
18.29	(60.00)	3.40	243.84	(800.00)	4.65
24.38	(80.00)	2.00	304.80	(1000.00)	5.50
30.48	(100.00)	1.32	426.72	(1400.00)	6.80
42.67	(140.00)	1.04	304.80	(1000.00)	5.00
30.48	(100.00)	1.56	426.72	(1400.00)	5.60
42.67	(140.00)	1.16	609.60	(2000.00)	7.00
60.96	(200.00)	1.25	914.40	(3000.00)	9.20



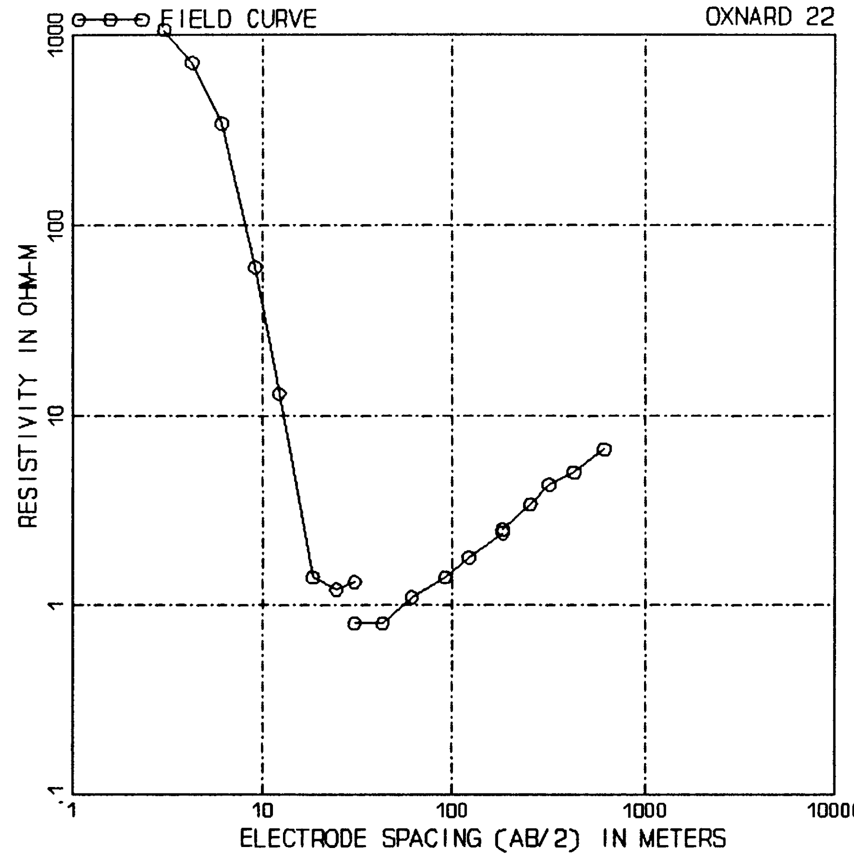
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
2.06	(6.77)	43.61	30.28	(99.33)	0.85
3.03	(9.93)	9.47	44.44	(145.80)	1.56
4.44	(14.58)	7.44	65.23	(214.01)	2.79
6.52	(21.40)	12.38	95.74	(314.12)	4.49
9.57	(31.41)	7.51	140.53	(461.06)	6.60
14.05	(46.11)	1.61	206.27	(676.74)	9.33
20.63	(67.67)	0.62	302.77	(993.32)	13.33
			99999.00	(99999.00)	19.43

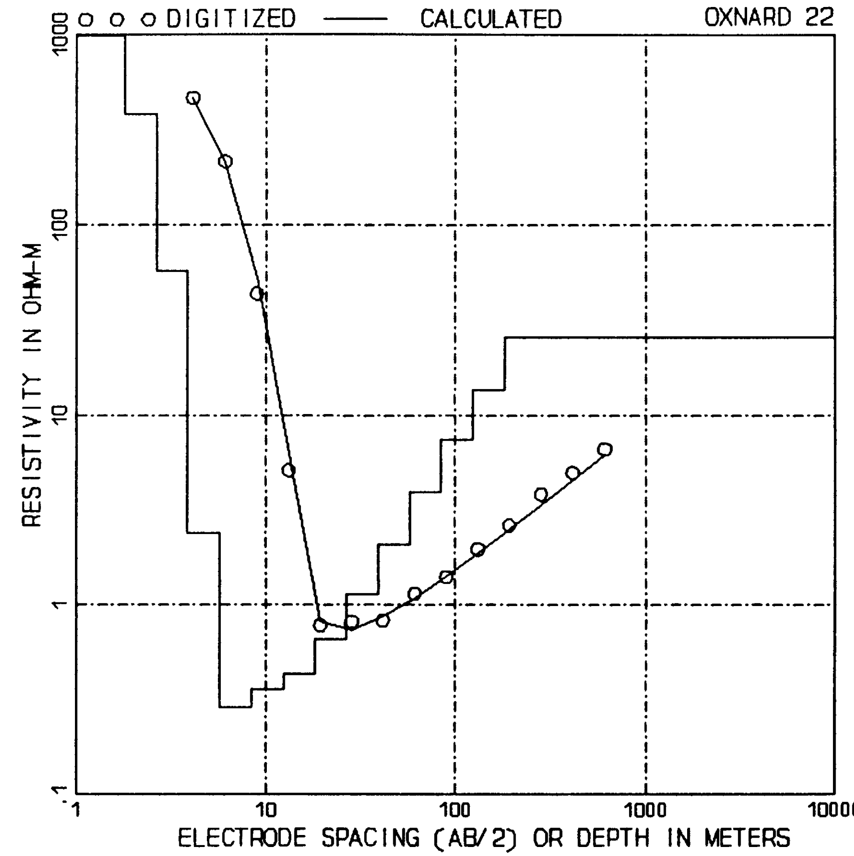




AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	15.30	42.67	(140.00)	2.20
4.27	(14.00)	13.80	60.96	(200.00)	1.90
6.10	(20.00)	13.50	121.92	(400.00)	2.90
9.14	(30.00)	12.70	121.92	(400.00)	2.40
12.19	(40.00)	13.00	182.88	(600.00)	3.15
18.29	(60.00)	10.60	243.84	(800.00)	4.30
24.38	(80.00)	8.70	304.80	(1000.00)	4.62
30.48	(100.00)	5.20	426.72	(1400.00)	5.70
30.48	(100.00)	5.50	609.60	(2000.00)	6.75

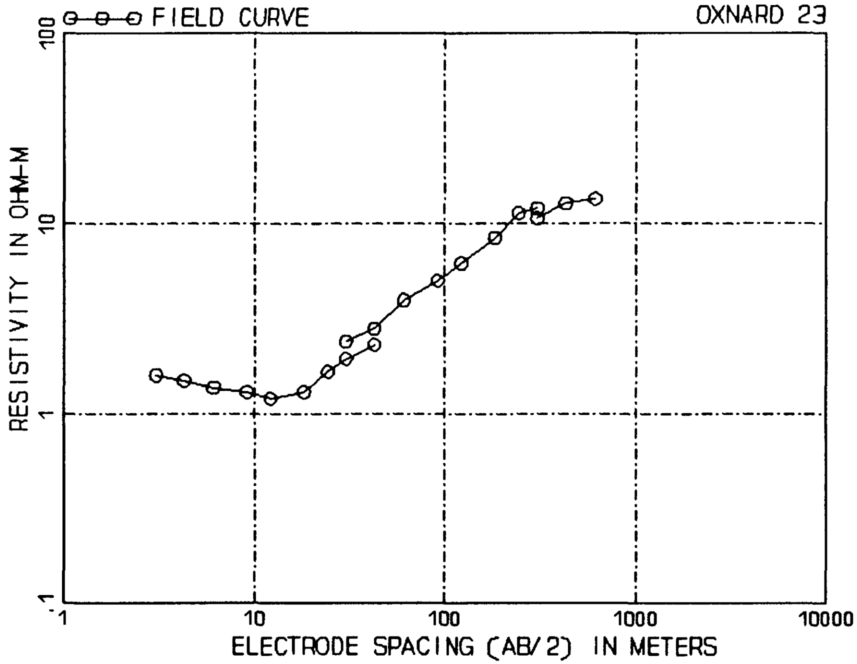
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	11.89	26.66	(87.48)	0.72
2.67	(8.75)	10.95	39.14	(128.40)	1.08
3.91	(12.84)	12.53	57.45	(188.47)	1.97
5.74	(18.85)	15.85	84.32	(276.64)	3.37
8.43	(27.66)	15.80	123.76	(406.05)	5.36
12.38	(40.60)	8.29	181.66	(595.99)	8.07
18.17	(59.60)	1.91	99999.00	(99999.00)	11.63



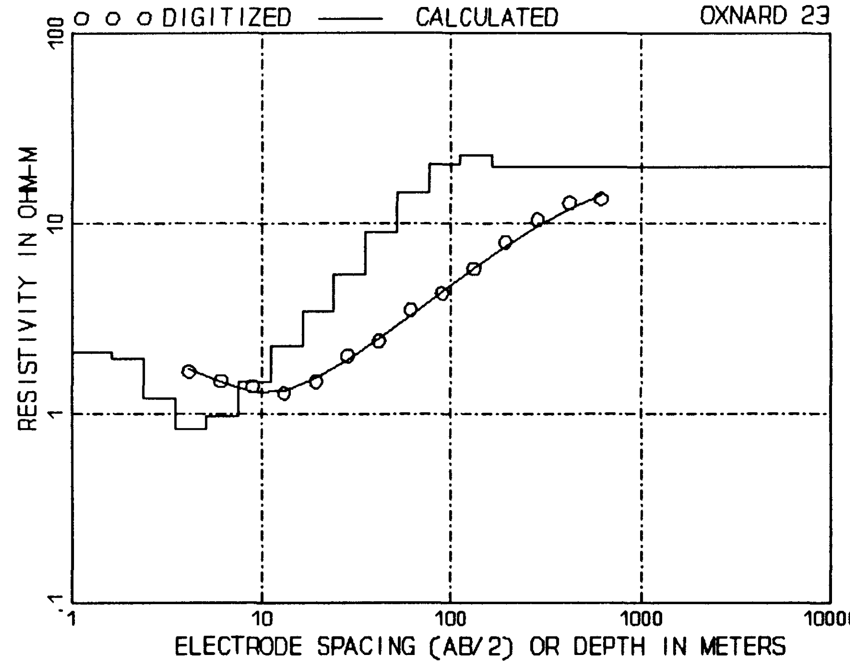


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	1050.00	42.67 (	140.00)	0.80
4.27 (	14.00)	710.00	60.96 (	200.00)	1.10
6.10 (	20.00)	340.00	91.44 (	300.00)	1.40
9.14 (	30.00)	60.00	121.92 (	400.00)	1.78
12.19 (	40.00)	13.00	182.88 (	600.00)	2.40
18.29 (	60.00)	1.40	182.88 (	600.00)	2.50
24.38 (	80.00)	1.20	254.20 (	834.00)	3.38
30.48 (	100.00)	1.32	318.21 (	1044.00)	4.30
30.48 (	100.00)	0.80	426.72 (	1400.00)	5.00
			609.60 (	2000.00)	6.60

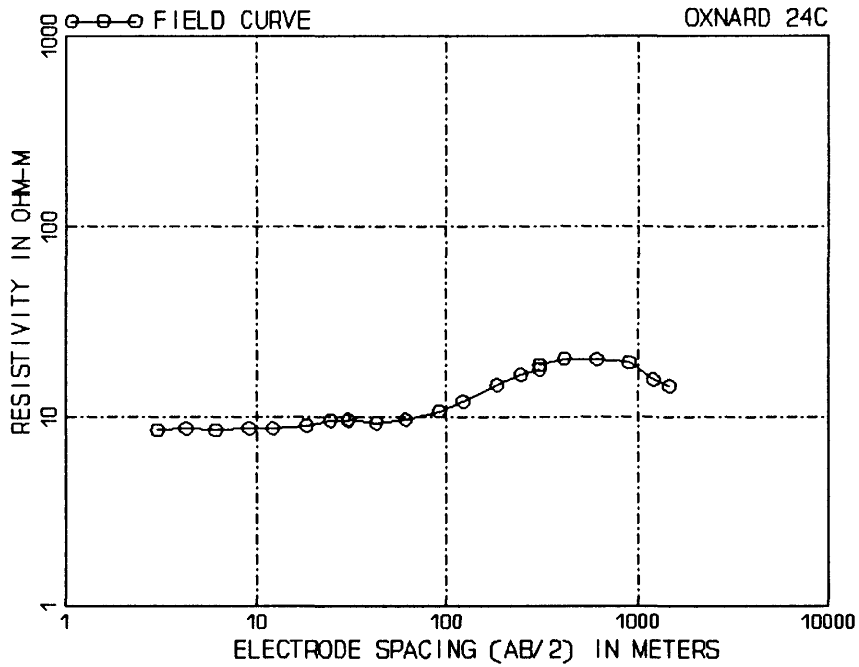
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.82 (	5.96)	982.62	26.66 (	87.48)	0.66
2.67 (	8.75)	382.84	39.14 (	128.40)	1.13
3.91 (	12.84)	57.53	57.45 (	188.47)	2.09
5.74 (	18.85)	2.37	84.32 (	276.64)	3.94
8.43 (	27.66)	0.29	123.76 (	406.05)	7.36
12.38 (	40.60)	0.36	181.66 (	595.99)	13.62
18.17 (	59.60)	0.43	99999.00 (	99999.00)	25.68



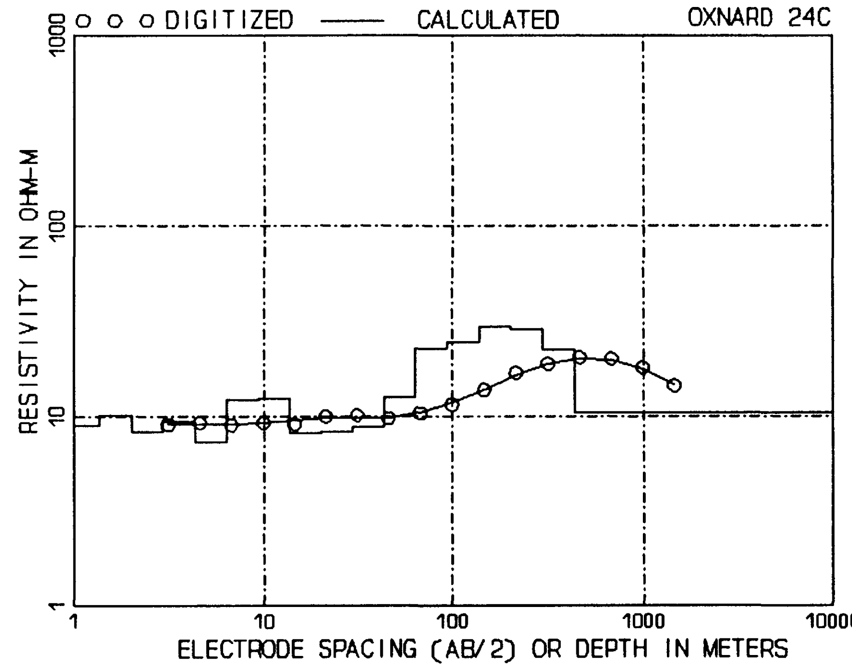
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	1.60	42.67 (	140.00)	2.80
4.27 (	14.00)	1.50	60.96 (	200.00)	3.95
6.10 (	20.00)	1.37	91.44 (	300.00)	5.00
9.14 (	30.00)	1.30	121.92 (	400.00)	6.20
12.19 (	40.00)	1.20	182.88 (	600.00)	8.40
18.29 (	60.00)	1.30	243.84 (	800.00)	11.40
24.38 (	80.00)	1.67	304.80 (	1000.00)	12.00
30.48 (	100.00)	1.95	304.80 (	1000.00)	10.70
42.67 (	140.00)	2.30	426.72 (	1400.00)	12.80
30.48 (	100.00)	2.40	609.60 (	2000.00)	13.50



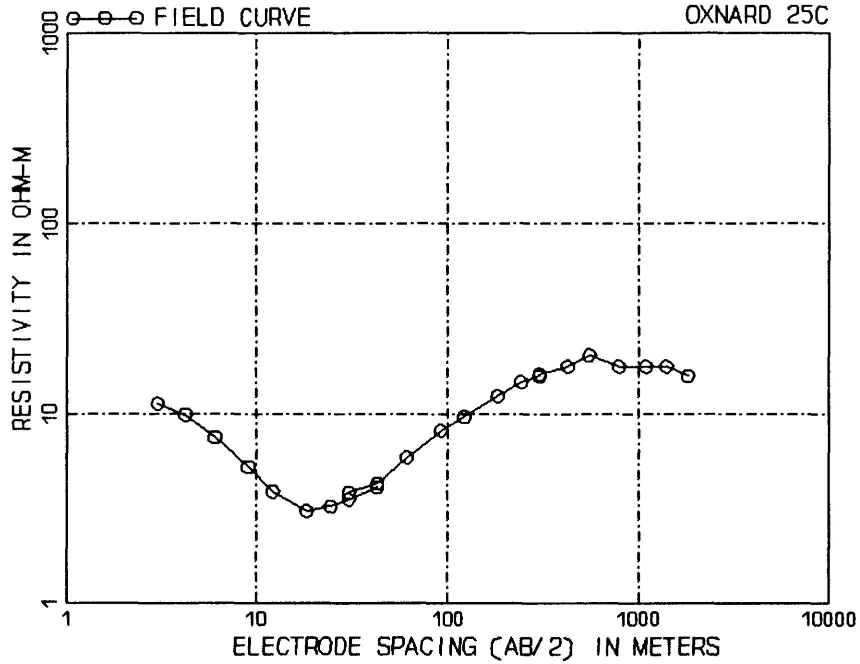
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.63 (	5.36)	2.09	24.00 (	78.73)	3.44
2.40 (	7.87)	1.93	35.22 (	115.56)	5.42
3.52 (	11.56)	1.19	51.70 (	169.62)	9.03
5.17 (	16.96)	0.82	75.89 (	248.97)	14.63
7.59 (	24.90)	0.97	111.39 (	365.44)	20.53
11.14 (	36.54)	1.46	163.49 (	536.39)	22.98
16.35 (	53.64)	2.26	99999.00 (	99999.00)	20.03



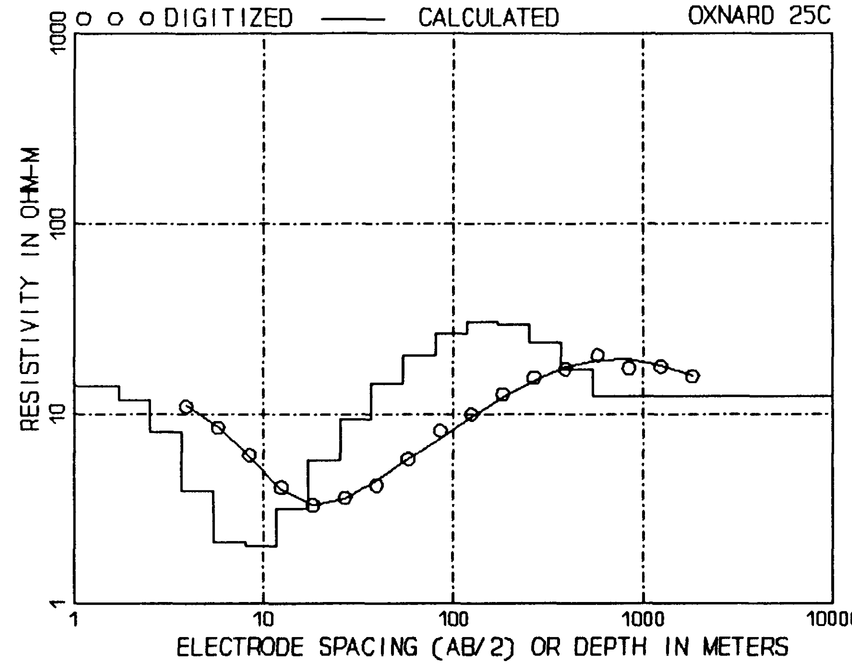
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	8.50	91.44 (	300.00)	10.70
4.27 (	14.00)	8.70	121.92 (	400.00)	12.00
6.10 (	20.00)	8.50	182.88 (	600.00)	14.70
9.14 (	30.00)	8.70	243.84 (	800.00)	16.70
12.19 (	40.00)	8.70	304.80 (	1000.00)	17.80
18.29 (	60.00)	9.00	304.80 (	1000.00)	18.70
24.38 (	80.00)	9.60	411.48 (	1350.00)	20.20
30.48 (	100.00)	9.60	609.60 (	2000.00)	20.10
30.48 (	100.00)	9.70	899.16 (	2950.00)	19.30
42.67 (	140.00)	9.30	1203.96 (	3950.00)	15.70
60.96 (	200.00)	9.70	1455.42 (	4775.00)	14.50



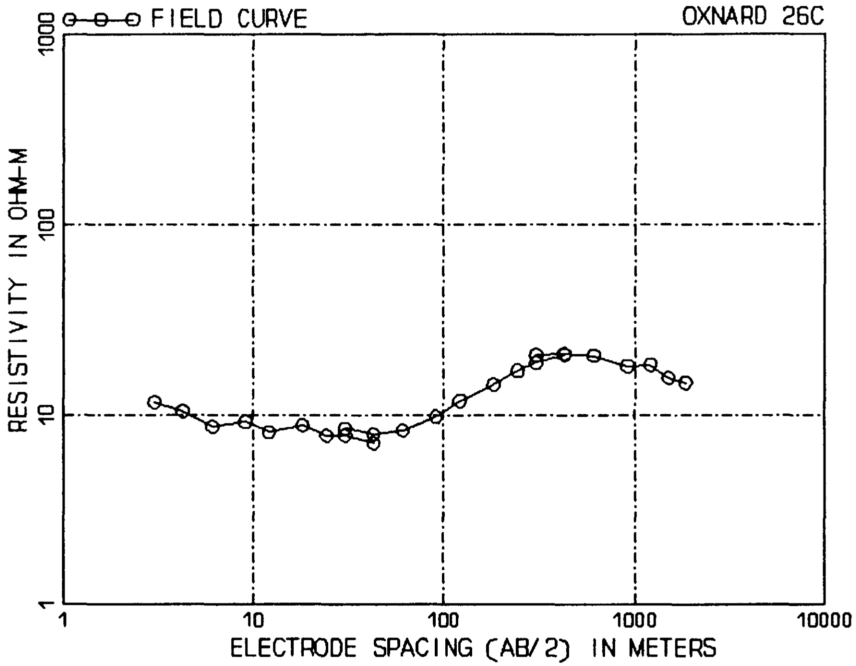
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.37 (	4.50)	8.91	29.55 (	96.94)	8.29
2.01 (	6.60)	10.14	43.37 (	142.29)	8.83
2.95 (	9.69)	8.31	63.66 (	208.86)	12.57
4.34 (	14.23)	9.33	93.44 (	306.56)	22.56
6.37 (	20.89)	7.34	137.15 (	449.97)	24.67
9.34 (	30.66)	12.14	201.31 (	660.47)	29.58
13.72 (	45.00)	12.48	295.48 (	969.44)	28.50
20.13 (	66.05)	8.16	433.71 (	1422.94)	22.28
			99999.00 (	99999.00)	10.42



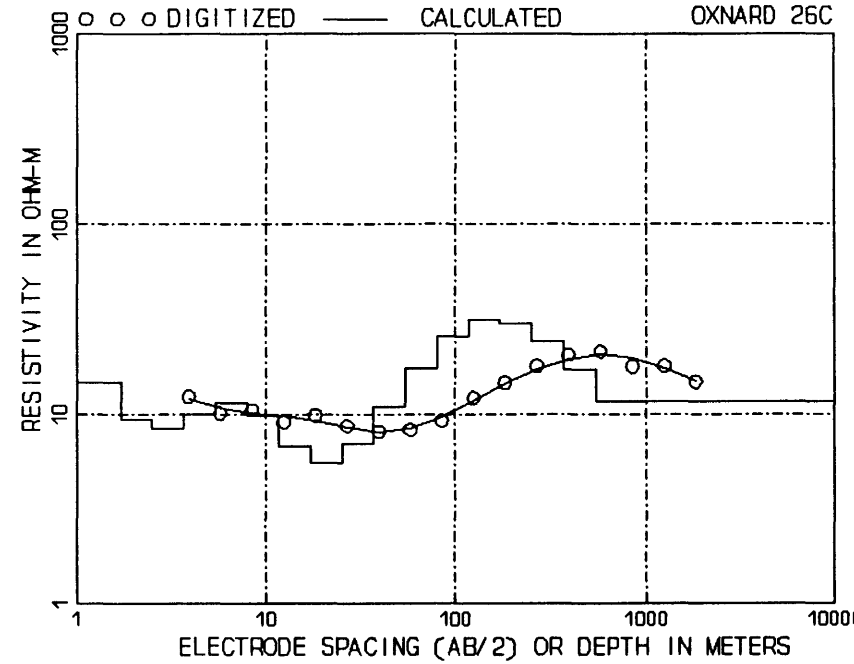
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	11.30	91.44 (	300.00)	8.15
4.27 (	14.00)	9.90	121.92 (	400.00)	9.64
6.10 (	20.00)	7.50	182.88 (	600.00)	12.40
9.14 (	30.00)	5.25	243.84 (	800.00)	14.70
12.19 (	40.00)	3.90	304.80 (	1000.00)	15.80
18.29 (	60.00)	3.08	304.80 (	1000.00)	16.20
24.38 (	80.00)	3.25	426.72 (	1400.00)	17.70
30.48 (	100.00)	3.55	553.52 (	1816.00)	20.30
42.67 (	140.00)	4.10	792.48 (	2600.00)	17.70
30.48 (	100.00)	3.86	1097.28 (	3600.00)	17.70
42.67 (	140.00)	4.30	1402.08 (	4600.00)	17.70
60.96 (	200.00)	5.90	1828.80 (	6000.00)	15.80



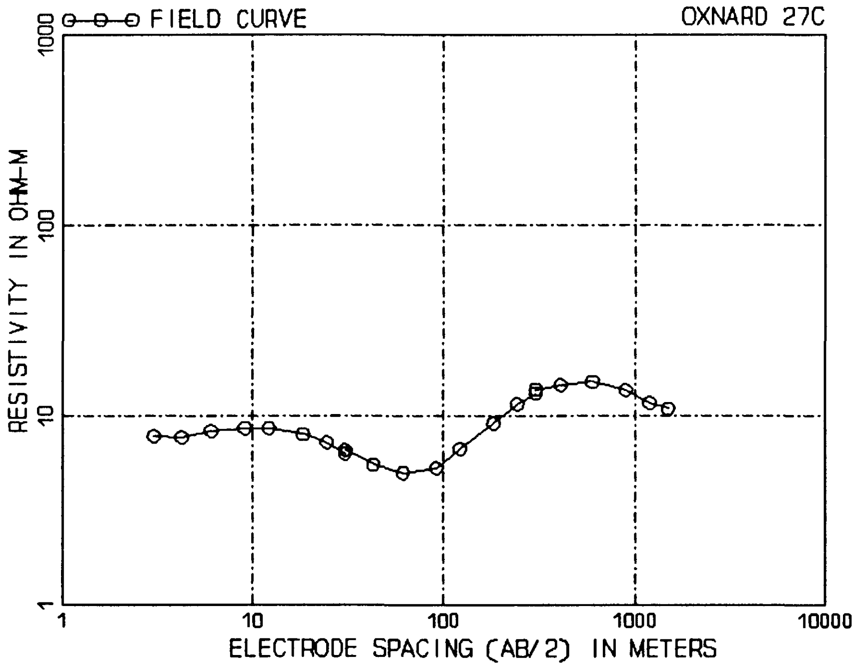
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.72 (	5.65)	14.10	37.13 (	121.81)	9.46
2.53 (	8.30)	11.88	54.50 (	178.80)	14.45
3.71 (	12.18)	7.99	79.99 (	262.44)	20.42
5.45 (	17.88)	3.96	117.41 (	385.21)	26.47
8.00 (	26.24)	2.12	172.34 (	565.41)	30.43
11.74 (	38.52)	2.04	252.96 (	829.91)	29.47
17.23 (	56.54)	3.19	371.29 (	1218.14)	23.80
25.30 (	82.99)	5.67	544.98 (	1787.98)	17.21
			99999.00 (	99999.00)	12.47

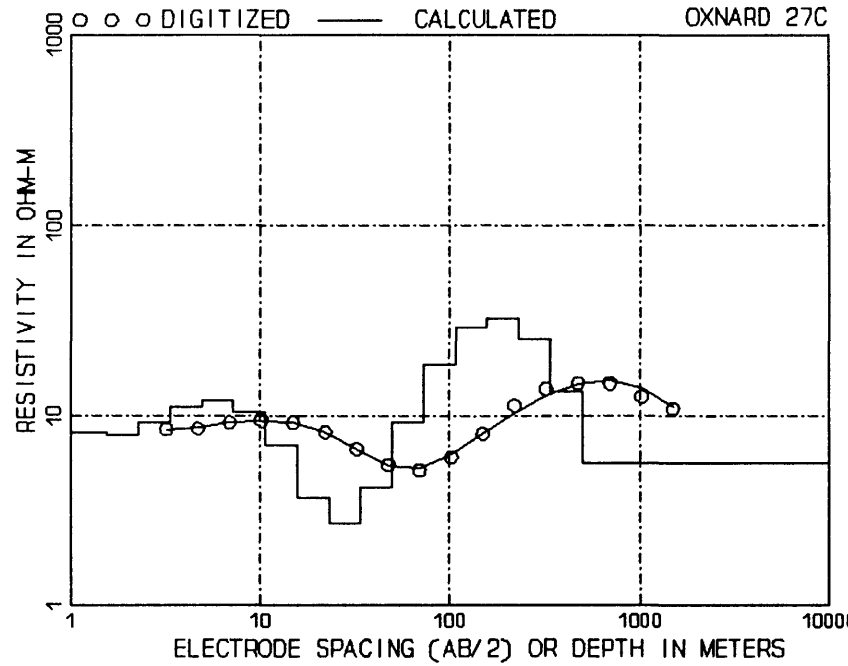


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	11.70	91.44 (	300.00)	9.80
4.27 (	14.00)	10.50	121.92 (	400.00)	11.90
6.10 (	20.00)	8.70	182.88 (	600.00)	14.50
9.14 (	30.00)	9.20	243.84 (	800.00)	17.10
12.19 (	40.00)	8.10	304.80 (	1000.00)	18.80
18.29 (	60.00)	8.80	426.72 (	1400.00)	20.80
24.38 (	80.00)	7.80	304.80 (	1000.00)	20.60
30.48 (	100.00)	7.80	426.72 (	1400.00)	21.00
42.67 (	140.00)	7.10	609.60 (	2000.00)	20.50
30.48 (	100.00)	8.50	914.40 (	3000.00)	18.10
42.67 (	140.00)	7.90	1196.04 (	3924.00)	18.40
60.96 (	200.00)	8.30	1485.29 (	4873.00)	15.70
			1828.80 (	6000.00)	14.80



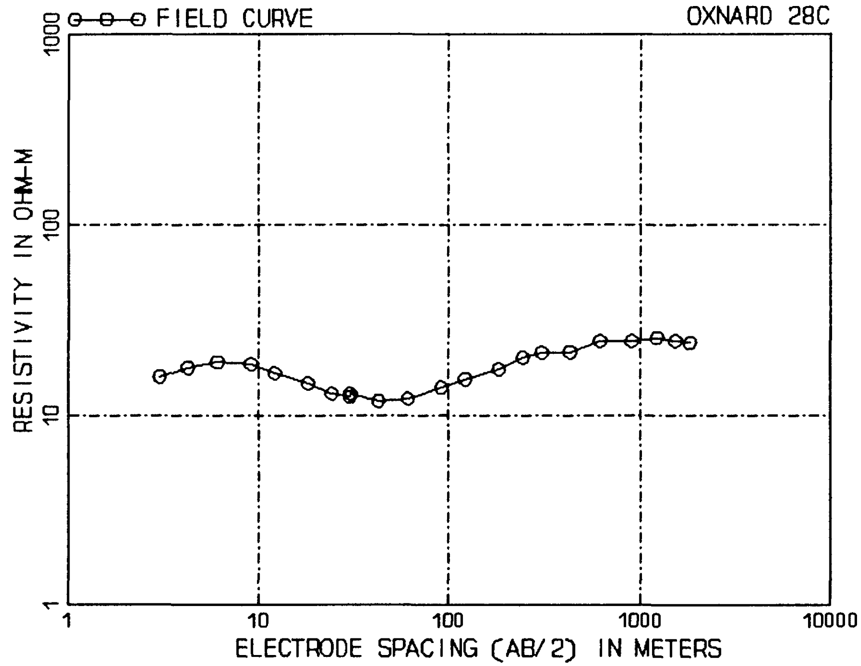
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.72 (	5.65)	14.60	37.13 (	121.81)	6.99
2.53 (	8.30)	9.39	54.50 (	178.80)	10.99
3.71 (	12.18)	8.47	79.99 (	262.44)	17.55
5.45 (	17.88)	9.92	117.41 (	385.21)	25.69
8.00 (	26.24)	11.46	172.34 (	565.41)	31.34
11.74 (	38.52)	9.88	252.96 (	829.91)	30.20
17.23 (	56.54)	6.77	371.29 (	1218.14)	24.00
25.30 (	82.99)	5.56	544.98 (	1787.98)	17.15
			99999.00 (	99999.00)	11.66

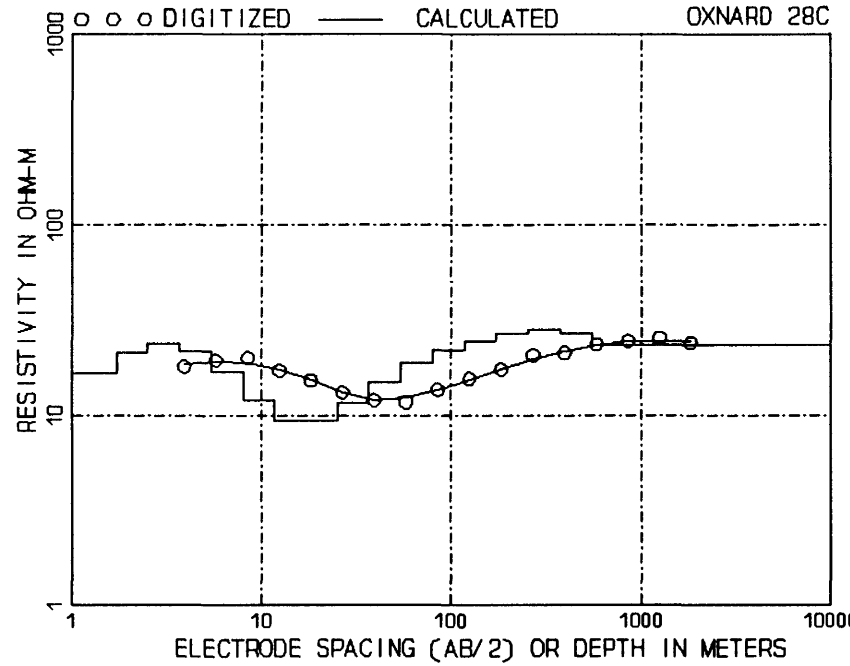




AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	7.80	91.44 (	300.00)	5.30
4.27 (	14.00)	7.70	121.92 (	400.00)	6.70
6.10 (	20.00)	8.30	182.88 (	600.00)	9.10
9.14 (	30.00)	8.60	243.84 (	800.00)	11.50
12.19 (	40.00)	8.60	304.80 (	1000.00)	13.10
18.29 (	60.00)	8.00	304.80 (	1000.00)	13.70
24.38 (	80.00)	7.20	411.48 (	1350.00)	14.46
30.48 (	100.00)	6.30	601.98 (	1975.00)	15.10
30.48 (	100.00)	6.60	895.20 (	2937.00)	13.60
42.67 (	140.00)	5.50	1188.72 (	3900.00)	11.70
60.96 (	200.00)	5.00	1493.52 (	4900.00)	10.90

DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.56 (	5.13)	8.17	33.69 (	110.53)	2.71
2.30 (	7.53)	7.97	49.45 (	162.24)	4.18
3.37 (	11.05)	9.25	72.59 (	238.14)	9.26
4.95 (	16.22)	11.09	106.54 (	349.54)	18.61
7.26 (	23.81)	11.96	156.38 (	513.06)	28.89
10.65 (	34.95)	10.49	229.53 (	753.06)	32.61
15.64 (	51.31)	6.94	336.91 (	1105.35)	25.34
22.95 (	75.31)	3.72	494.52 (	1622.43)	13.40
			99999.00 (	99999.00)	5.65



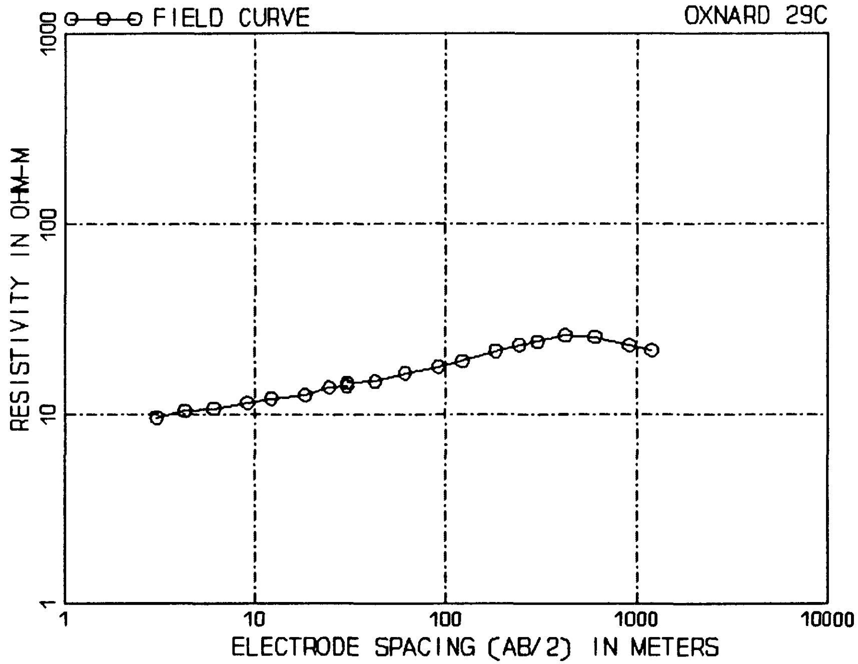


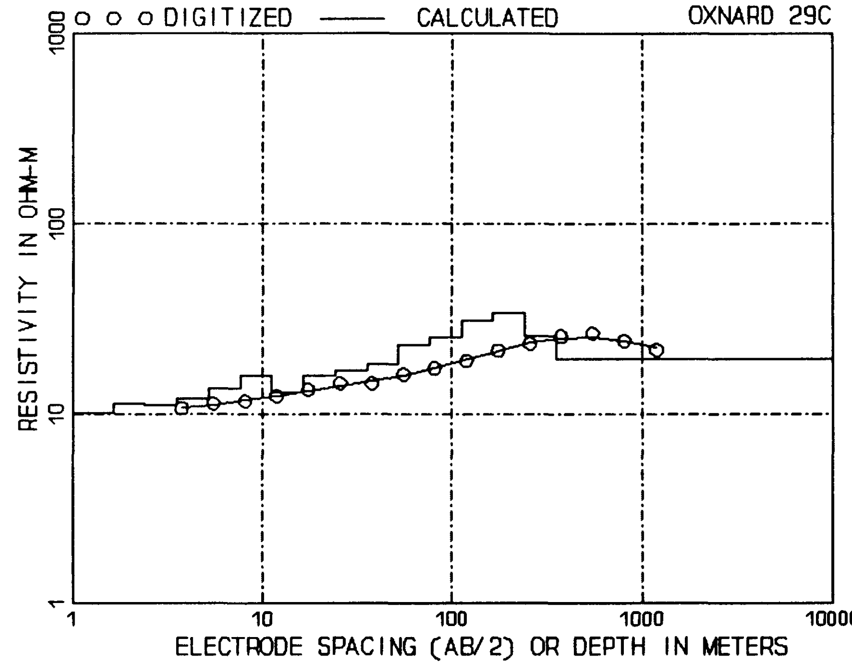
AB/2, m	(ft)	App. Res.
3.05	(10.00)	16.00
4.27	(14.00)	17.80
6.10	(20.00)	19.00
9.14	(30.00)	18.60
12.19	(40.00)	16.70
18.29	(60.00)	14.70
24.38	(80.00)	13.00
30.48	(100.00)	12.50
30.48	(100.00)	13.00
42.67	(140.00)	11.90
60.96	(200.00)	12.20

AB/2, m	(ft)	App. Res.
91.44	(300.00)	14.00
121.92	(400.00)	15.50
182.88	(600.00)	17.50
243.84	(800.00)	20.00
304.80	(1000.00)	21.40
304.80	(1000.00)	21.40
426.72	(1400.00)	21.50
609.60	(2000.00)	24.60
899.16	(2950.00)	24.50
1219.20	(4000.00)	25.50
1524.00	(5000.00)	24.50
1828.80	(6000.00)	24.00

DEPTH, m	(ft)	RESIS.
1.72	(5.65)	16.63
2.53	(8.30)	21.43
3.71	(12.18)	23.69
5.45	(17.88)	21.66
8.00	(26.24)	16.91
11.74	(38.52)	12.08
17.23	(56.54)	9.35
25.30	(82.99)	9.45

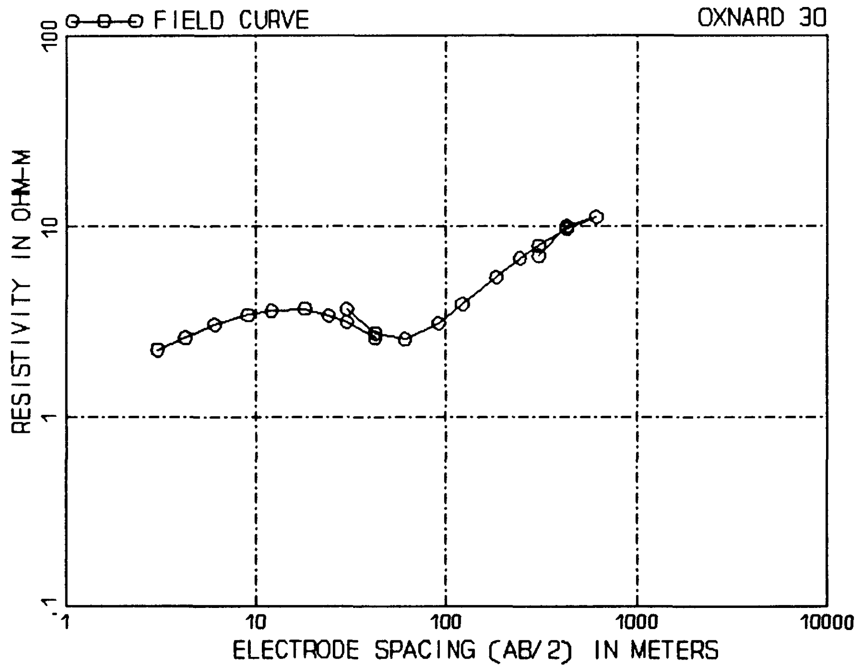
DEPTH, m	(ft)	RESIS.
37.13	(121.81)	11.68
54.50	(178.80)	15.02
79.99	(262.44)	18.70
117.41	(385.21)	21.92
172.34	(565.41)	24.60
252.96	(829.91)	26.98
371.29	(1218.14)	28.19
544.98	(1787.98)	26.83
99999.00	(99999.00)	23.38



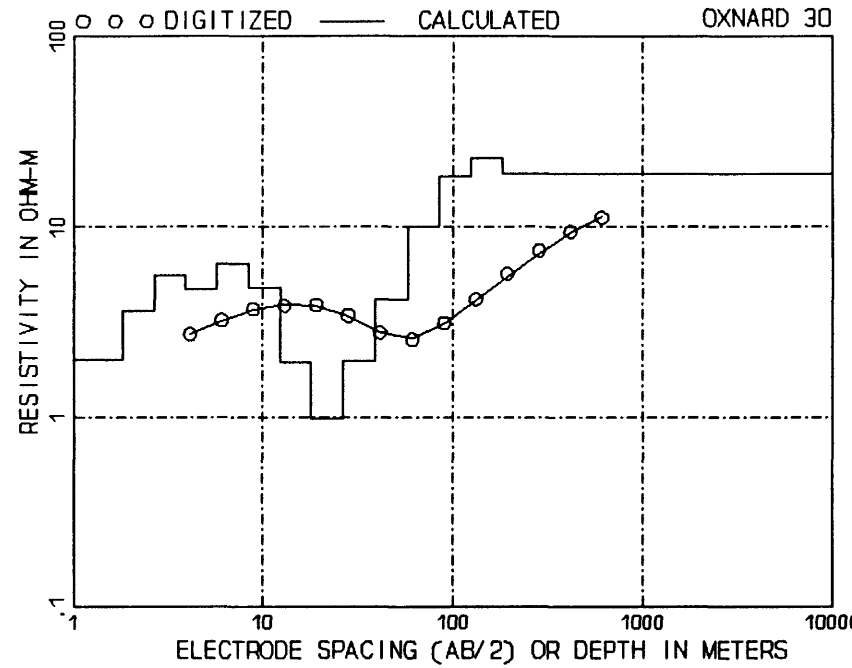


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.60	60.96 (	200.00)	16.50
4.27 (	14.00)	10.40	91.44 (	300.00)	17.80
6.10 (	20.00)	10.70	121.92 (	400.00)	19.00
9.14 (	30.00)	11.50	182.88 (	600.00)	21.50
12.19 (	40.00)	12.10	243.84 (	800.00)	23.20
18.29 (	60.00)	12.60	304.80 (	1000.00)	24.00
24.38 (	80.00)	13.80	304.80 (	1000.00)	24.00
30.48 (	100.00)	14.00	426.72 (	1400.00)	26.00
30.48 (	100.00)	14.60	609.60 (	2000.00)	25.50
42.67 (	140.00)	14.90	914.40 (	3000.00)	23.00
			1188.72 (	3900.00)	21.70

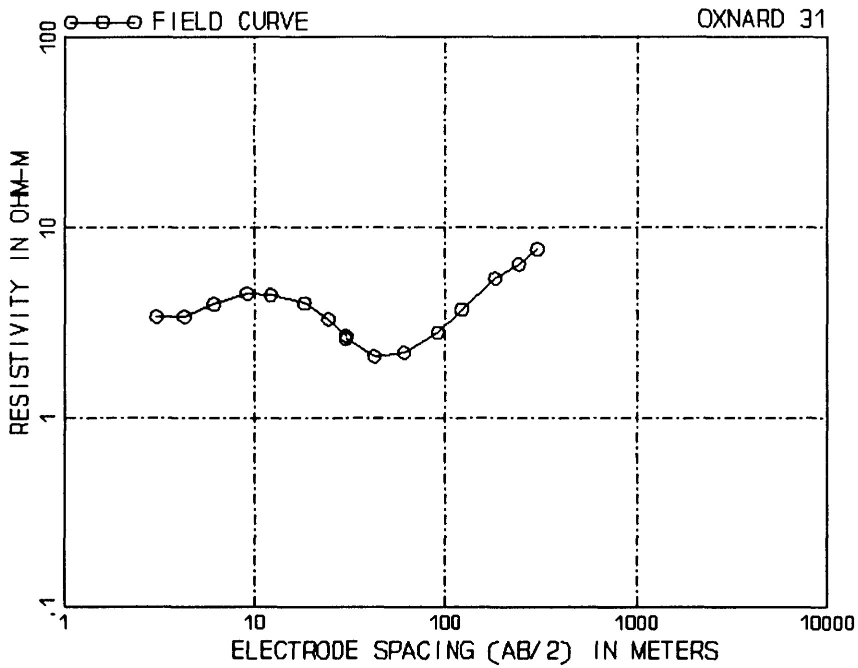
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.64 (	5.39)	10.15	35.42 (	116.22)	16.94
2.41 (	7.92)	11.31	51.99 (	170.59)	18.29
3.54 (	11.62)	11.13	76.32 (	250.39)	22.98
5.20 (	17.06)	12.09	112.02 (	367.52)	25.22
7.63 (	25.04)	13.70	164.42 (	539.44)	30.83
11.20 (	36.75)	15.89	241.34 (	791.79)	33.98
16.44 (	53.94)	12.98	354.24 (	1162.19)	25.54
24.13 (	79.18)	16.00	99999.00	(99999.00)	19.61



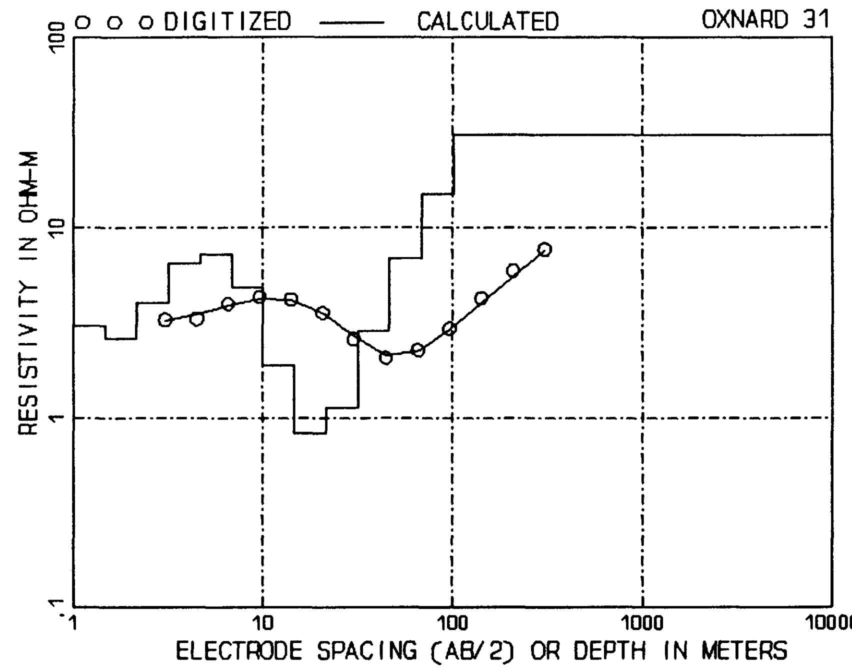
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	2.25	60.96	(200.00)	2.56
4.27	(14.00)	2.60	91.44	(300.00)	3.10
6.10	(20.00)	3.05	121.92	(400.00)	3.90
9.14	(30.00)	3.43	182.88	(600.00)	5.40
12.19	(40.00)	3.60	243.84	(800.00)	6.80
18.29	(60.00)	3.70	304.80	(1000.00)	7.90
24.38	(80.00)	3.41	426.72	(1400.00)	9.70
30.48	(100.00)	3.15	609.60	(2000.00)	11.20
42.67	(140.00)	2.60	304.80	(1000.00)	7.00
30.48	(100.00)	3.67	426.72	(1400.00)	10.00
42.67	(140.00)	2.75	609.60	(2000.00)	11.20



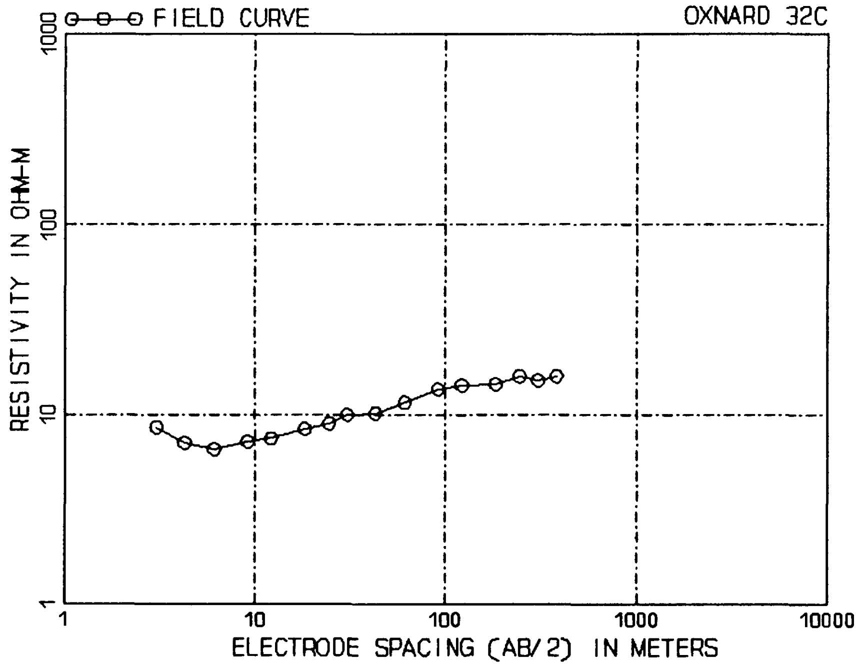
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	2.01	26.66	(87.48)	0.98
2.67	(8.75)	3.61	39.14	(128.40)	1.99
3.91	(12.84)	5.62	57.45	(188.47)	4.17
5.74	(18.85)	4.71	84.32	(276.64)	9.98
8.43	(27.66)	6.39	123.76	(406.05)	18.36
12.38	(40.60)	4.77	181.66	(595.99)	22.98
18.17	(59.60)	1.93	99999.00	(99999.00)	18.92



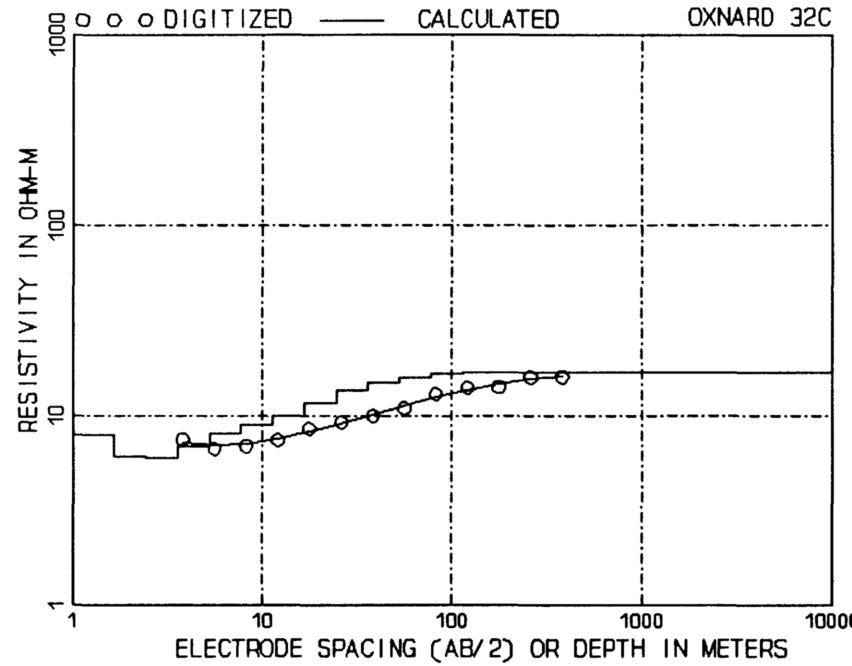
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	3.40	30.48 (	100.00)	2.60
4.27 (	14.00)	3.40	42.67 (	140.00)	2.10
6.10 (	20.00)	3.95	60.96 (	200.00)	2.20
9.14 (	30.00)	4.50	91.44 (	300.00)	2.80
12.19 (	40.00)	4.40	121.92 (	400.00)	3.70
18.29 (	60.00)	4.00	182.88 (	600.00)	5.40
24.38 (	80.00)	3.30	243.84 (	800.00)	6.40
30.48 (	100.00)	2.70	304.80 (	1000.00)	7.70



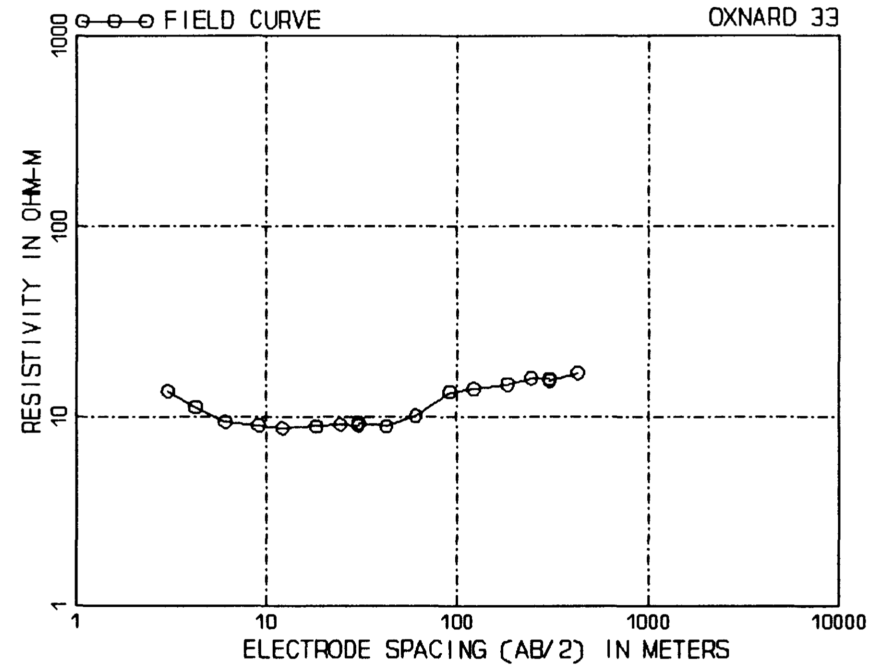
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.86)	3.04	14.81 (	48.60)	1.87
2.17 (	7.13)	2.60	21.74 (	71.34)	0.83
3.19 (	10.47)	4.03	31.91 (	104.71)	1.14
4.68 (	15.37)	6.46	46.84 (	153.69)	2.85
6.88 (	22.56)	7.27	68.76 (	225.58)	6.92
10.09 (	33.11)	4.84	100.92 (	331.11)	15.01
			99999.00 (	99999.00)	30.80



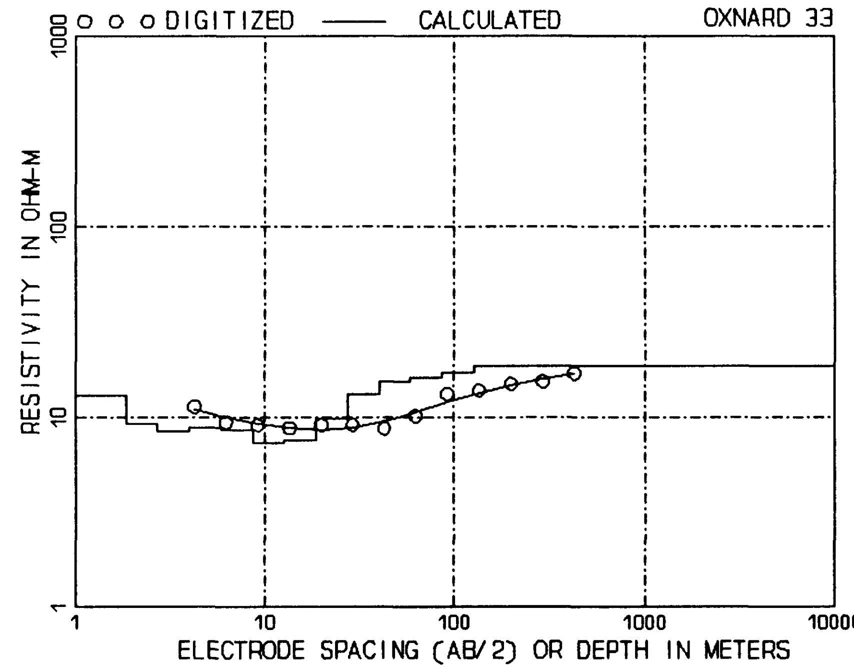
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.60	30.48	(100.00)	10.00
4.27	(14.00)	7.10	42.67	(140.00)	10.20
6.10	(20.00)	6.60	60.96	(200.00)	11.60
9.14	(30.00)	7.20	91.44	(300.00)	13.60
12.19	(40.00)	7.50	121.92	(400.00)	14.30
18.29	(60.00)	8.40	182.88	(600.00)	14.50
24.38	(80.00)	9.00	243.84	(800.00)	16.00
30.48	(100.00)	10.00	304.80	(1000.00)	15.20
			381.00	(1250.00)	16.00



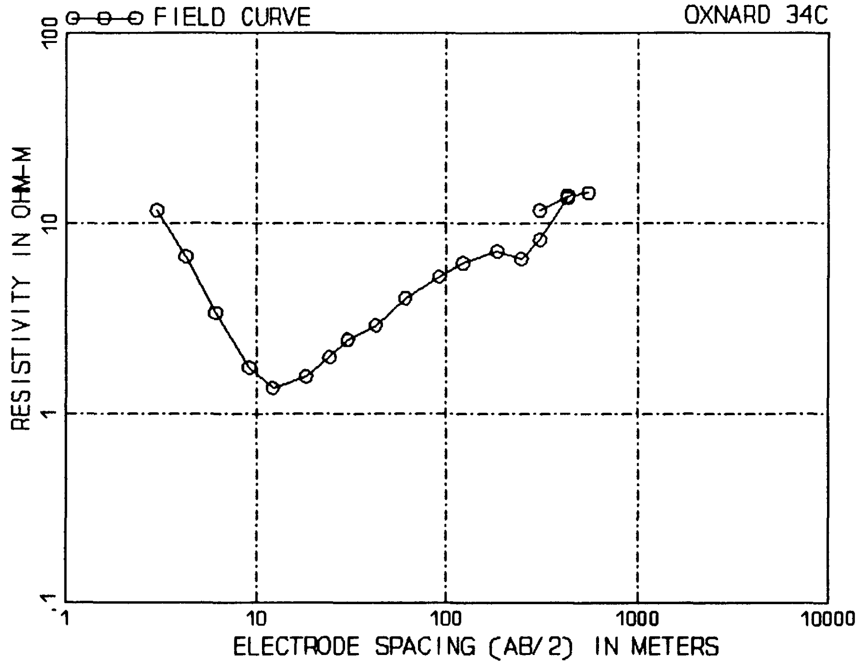
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.67	(5.47)	7.96	16.66	(54.67)	10.06
2.45	(8.03)	6.12	24.46	(80.25)	11.72
3.59	(11.78)	5.96	35.90	(117.79)	13.62
5.27	(17.29)	6.92	52.70	(172.90)	15.04
7.74	(25.38)	8.09	77.35	(253.78)	15.99
11.35	(37.25)	9.01	113.54	(372.50)	16.65
			99999.00	(99999.00)	16.86



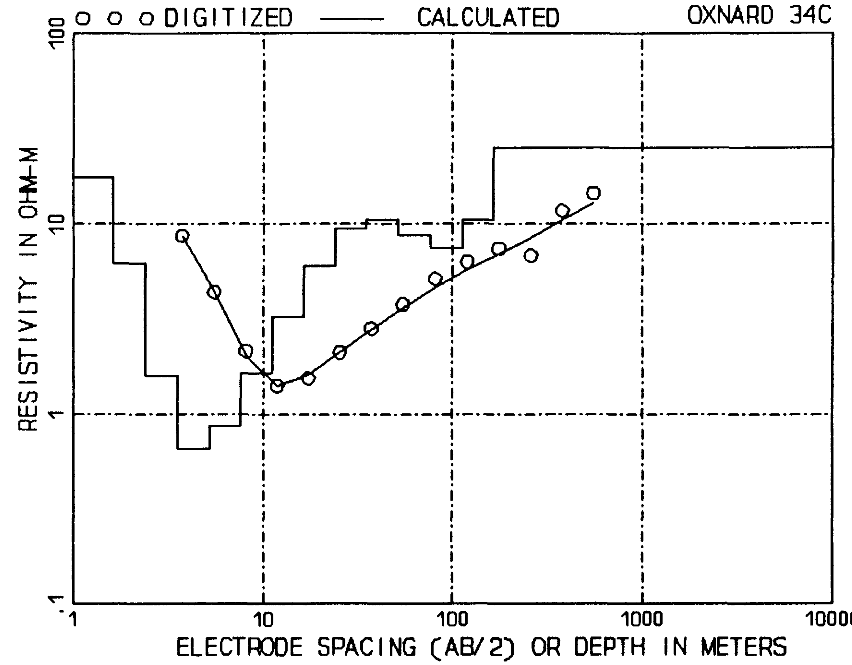
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	13.60	42.67	(140.00)	8.90
4.27	(14.00)	11.20	60.96	(200.00)	10.10
6.10	(20.00)	9.40	91.44	(300.00)	13.50
9.14	(30.00)	9.00	121.92	(400.00)	14.00
12.19	(40.00)	8.70	182.88	(600.00)	14.80
18.29	(60.00)	8.90	243.84	(800.00)	16.00
24.38	(80.00)	9.10	304.80	(1000.00)	15.80
30.48	(100.00)	9.00	304.80	(1000.00)	15.50
30.48	(100.00)	9.30	426.72	(1400.00)	17.00



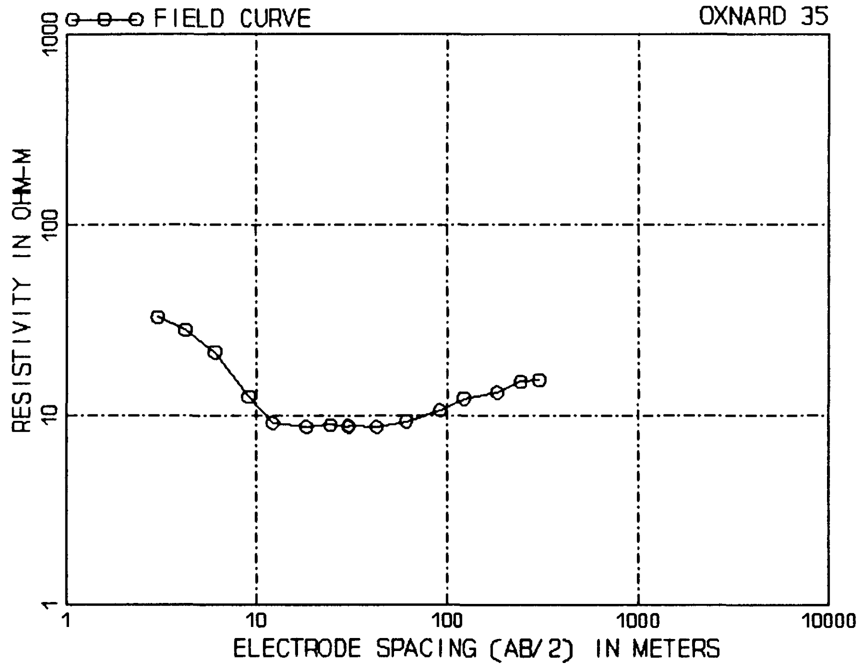
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.87	(6.12)	13.03	18.66	(61.24)	7.52
2.74	(8.99)	9.30	27.40	(89.88)	9.90
4.02	(13.19)	8.43	40.21	(131.93)	13.16
5.90	(19.36)	8.89	59.02	(193.65)	15.33
8.66	(28.42)	8.53	86.63	(284.23)	16.24
12.72	(41.72)	7.34	127.16	(417.20)	17.07
			99999.00	(99999.00)	18.54



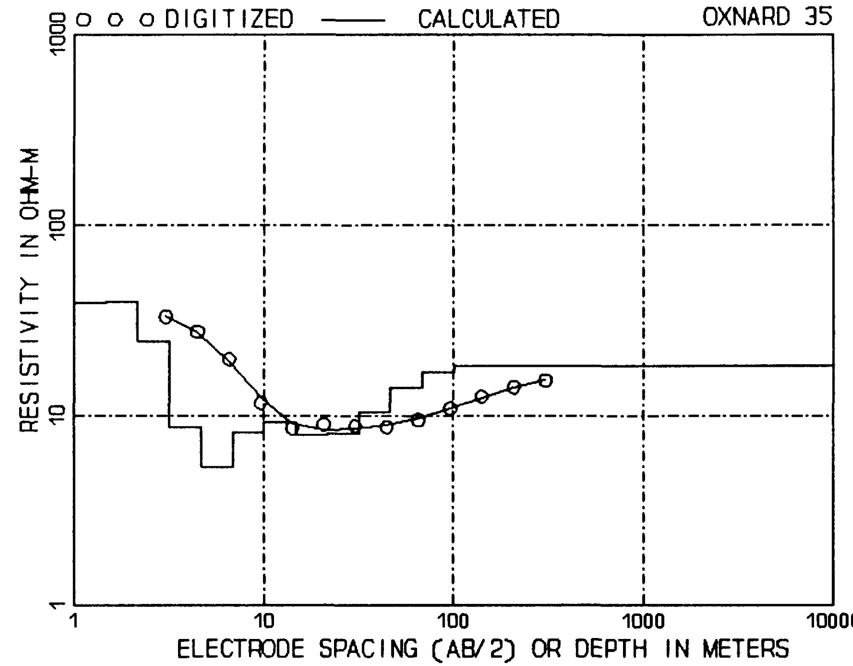
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	11.70	60.96	(200.00)	4.05
4.27	(14.00)	6.70	91.44	(300.00)	5.25
6.10	(20.00)	3.38	121.92	(400.00)	6.20
9.14	(30.00)	1.75	182.88	(600.00)	7.15
12.19	(40.00)	1.36	243.84	(800.00)	6.50
18.29	(60.00)	1.57	304.80	(1000.00)	8.20
24.38	(80.00)	1.98	426.72	(1400.00)	13.60
30.48	(100.00)	2.45	304.80	(1000.00)	11.70
30.48	(100.00)	2.44	426.72	(1400.00)	14.00
42.67	(140.00)	2.92	550.16	(1805.00)	14.50



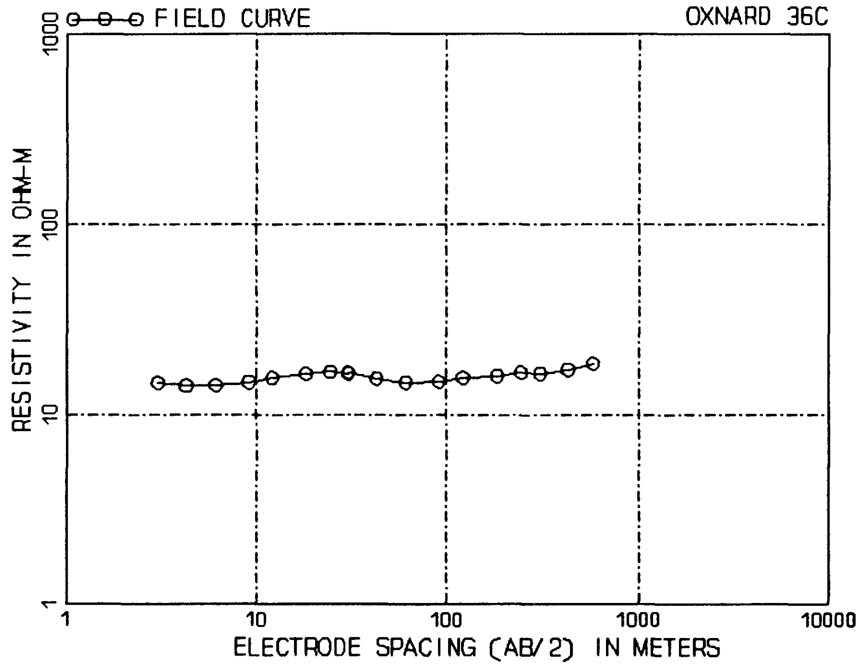
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.64	(5.38)	17.55	24.06	(78.95)	6.06
2.41	(7.90)	6.21	35.32	(115.88)	9.43
3.53	(11.59)	1.60	51.84	(170.09)	10.57
5.18	(17.01)	0.66	76.10	(249.66)	8.72
7.61	(24.97)	0.87	111.70	(366.46)	7.50
11.17	(36.65)	1.64	163.95	(537.88)	10.56
16.39	(53.79)	3.22	99999.00	(99999.00)	25.20



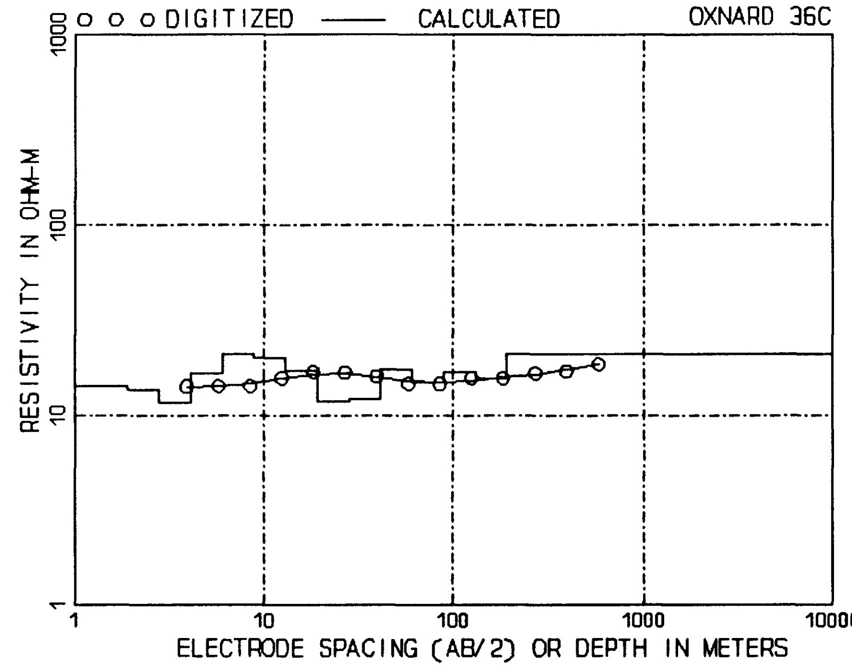
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	32.70	30.48 (	100.00)	8.80
4.27 (	14.00)	28.00	42.67 (	140.00)	8.70
6.10 (	20.00)	21.50	60.96 (	200.00)	9.30
9.14 (	30.00)	12.50	91.44 (	300.00)	10.60
12.19 (	40.00)	9.10	121.92 (	400.00)	12.30
18.29 (	60.00)	8.70	182.88 (	600.00)	13.20
24.38 (	80.00)	8.90	243.84 (	800.00)	15.10
30.48 (	100.00)	8.70	304.80 (	1000.00)	15.30



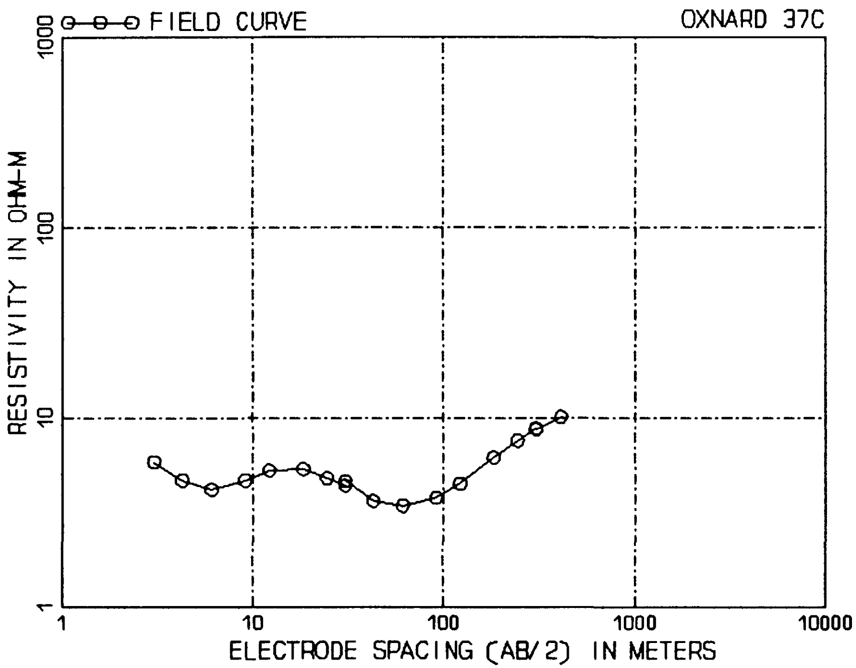
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.86)	38.91	14.81 (	48.60)	9.31
2.17 (	7.13)	39.74	21.74 (	71.34)	7.92
3.19 (	10.47)	24.46	31.91 (	104.71)	7.98
4.68 (	15.37)	8.63	46.84 (	153.69)	10.39
6.88 (	22.56)	5.36	68.76 (	225.58)	14.04
10.09 (	33.11)	8.14	100.92 (	331.11)	16.98
			99999.00 (	99999.00)	18.25



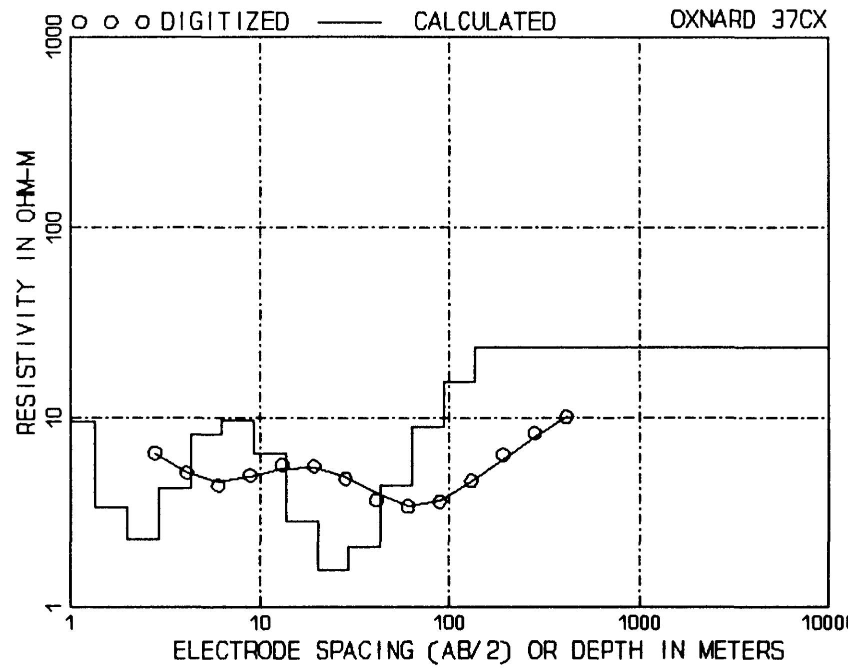
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	14.70	42.67	(140.00)	15.50
4.27	(14.00)	14.20	60.96	(200.00)	14.80
6.10	(20.00)	14.30	91.44	(300.00)	15.00
9.14	(30.00)	14.80	121.92	(400.00)	15.70
12.19	(40.00)	15.60	182.88	(600.00)	16.00
18.29	(60.00)	16.40	243.84	(800.00)	16.60
24.38	(80.00)	16.80	304.80	(1000.00)	16.50
30.48	(100.00)	16.50	304.80	(1000.00)	16.50
30.48	(100.00)	16.60	426.72	(1400.00)	17.30
			578.21	(1897.00)	18.60



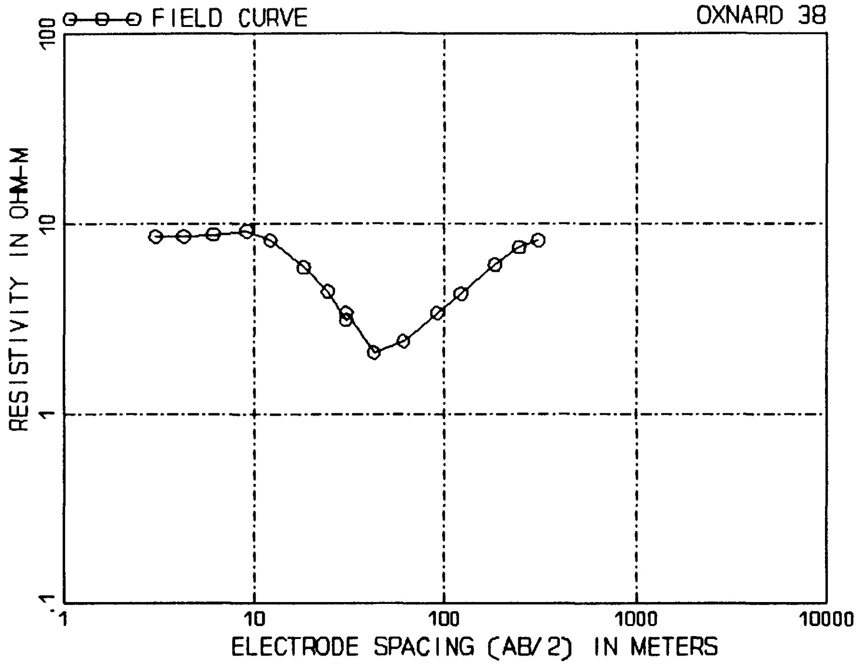
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.91	(6.28)	14.30	28.10	(92.19)	11.89
2.81	(9.22)	13.62	41.25	(135.32)	12.30
4.12	(13.53)	11.60	60.54	(198.63)	17.43
6.05	(19.86)	16.64	88.86	(291.54)	14.82
8.89	(29.15)	20.94	130.43	(427.93)	16.95
13.04	(42.79)	20.00	191.45	(628.11)	15.74
19.14	(62.81)	17.05	99999.00	(99999.00)	20.92

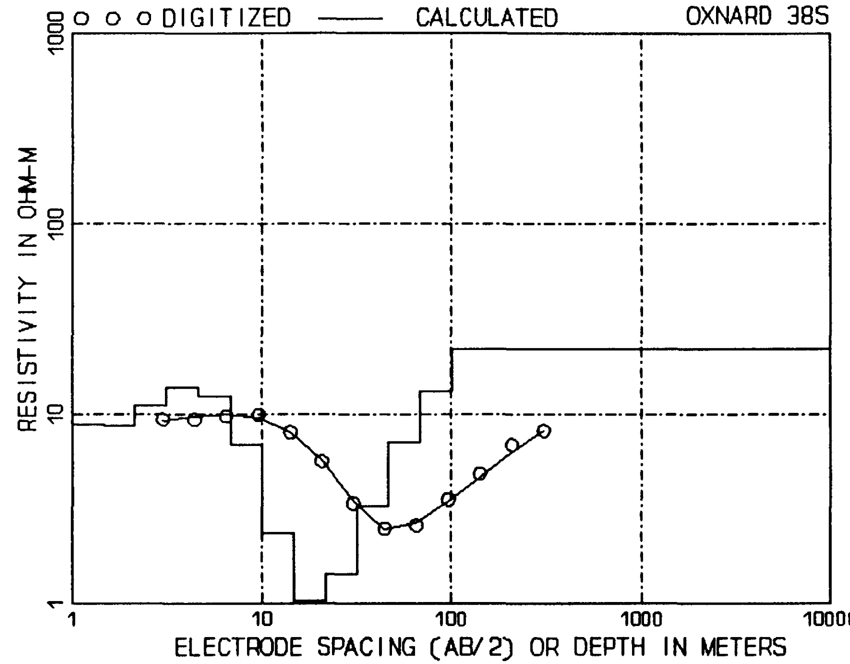


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	5.85	42.67	(140.00)	3.65
4.27	(14.00)	4.70	60.96	(200.00)	3.45
6.10	(20.00)	4.20	91.44	(300.00)	3.80
9.14	(30.00)	4.70	121.92	(400.00)	4.50
12.19	(40.00)	5.30	182.88	(600.00)	6.20
18.29	(60.00)	5.40	243.84	(800.00)	7.60
24.38	(80.00)	4.80	304.80	(1000.00)	8.80
30.48	(100.00)	4.40	304.80	(1000.00)	8.70
30.48	(100.00)	4.65	411.48	(1350.00)	10.10



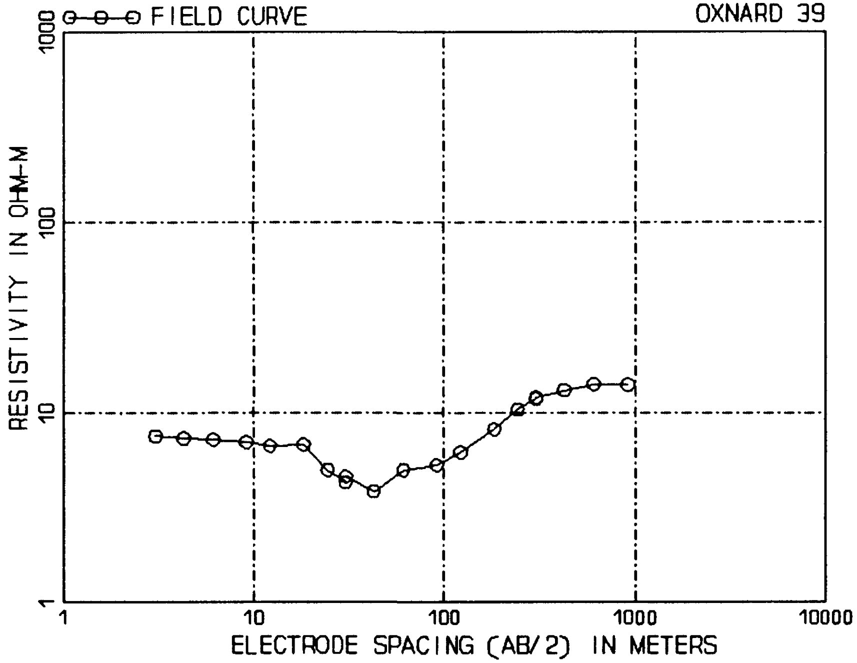
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.36	(4.47)	9.51	20.00	(65.61)	2.84
2.00	(6.56)	3.38	29.35	(96.30)	1.59
2.94	(9.63)	2.29	43.08	(141.35)	2.09
4.31	(14.14)	4.23	63.24	(207.48)	4.41
6.32	(20.75)	8.13	92.82	(304.53)	8.93
9.28	(30.45)	9.67	136.24	(447.00)	15.38
13.62	(44.70)	6.49	99999.00	(99999.00)	23.26



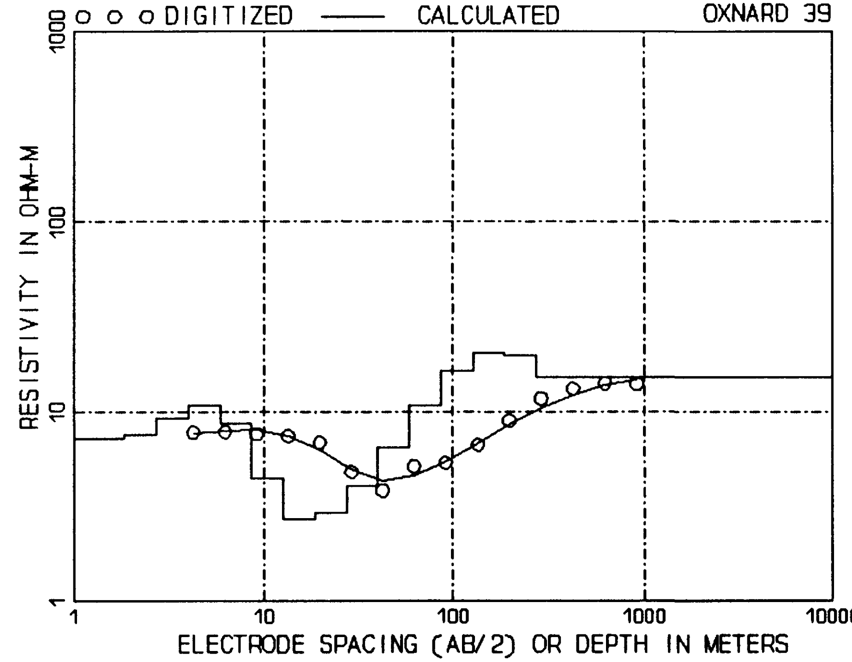


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	8.60	30.48 (	100.00)	3.40
4.27 (	14.00)	8.60	42.67 (	140.00)	2.10
6.10 (	20.00)	8.80	60.96 (	200.00)	2.41
9.14 (	30.00)	9.20	91.44 (	300.00)	3.40
12.19 (	40.00)	8.20	121.92 (	400.00)	4.30
18.29 (	60.00)	5.90	182.88 (	600.00)	6.10
24.38 (	80.00)	4.40	243.84 (	800.00)	7.55
30.48 (	100.00)	3.12	304.80 (	1000.00)	8.20

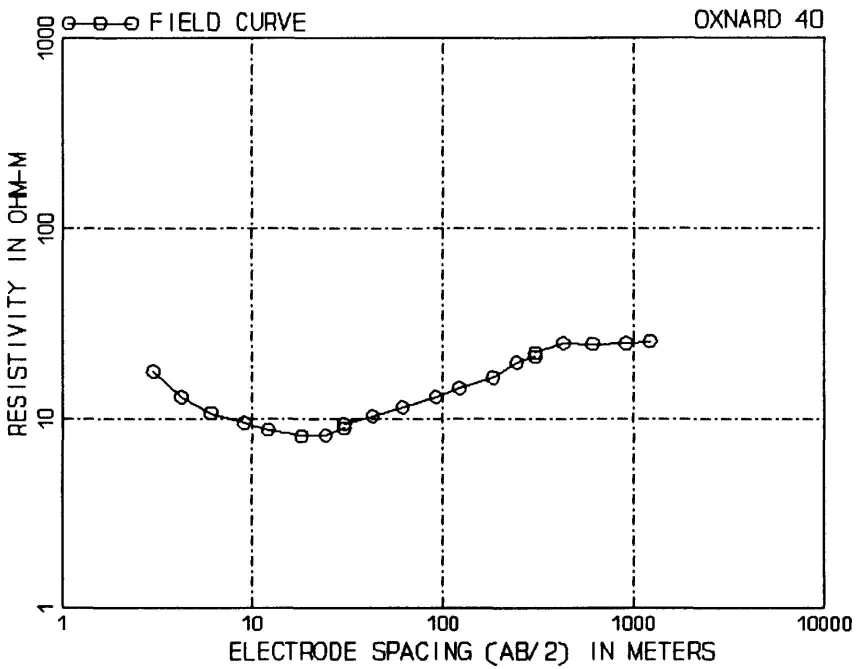
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.86)	8.87	14.81 (	48.60)	2.36
2.17 (	7.13)	8.71	21.74 (	71.34)	1.05
3.19 (	10.47)	11.14	31.91 (	104.71)	1.44
4.68 (	15.37)	13.86	46.84 (	153.69)	3.28
6.88 (	22.56)	12.41	68.76 (	225.58)	7.06
10.09 (	33.11)	6.84	100.92 (	331.11)	13.22
			99999.00 (	99999.00)	22.00

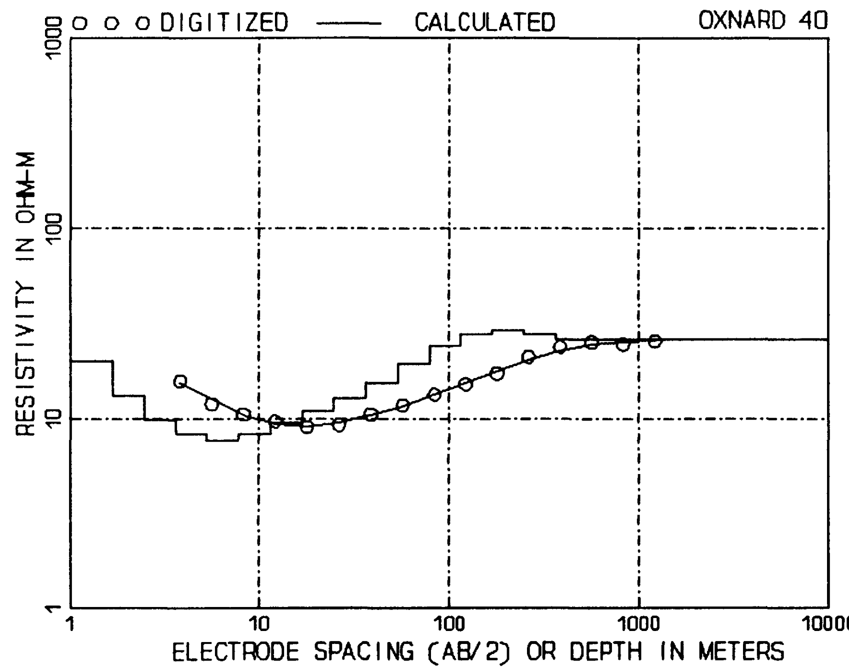


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	7.50	60.96 (	200.00)	5.00
4.27 (	14.00)	7.30	91.44 (	300.00)	5.30
6.10 (	20.00)	7.20	121.92 (	400.00)	6.20
9.14 (	30.00)	7.00	182.88 (	600.00)	8.20
12.19 (	40.00)	6.70	243.84 (	800.00)	10.40
18.29 (	60.00)	6.80	304.80 (	1000.00)	11.80
24.38 (	80.00)	5.00	304.80 (	1000.00)	12.00
30.48 (	100.00)	4.30	426.72 (	1400.00)	13.10
30.48 (	100.00)	4.60	609.60 (	2000.00)	14.10
42.67 (	140.00)	3.85	914.40 (	3000.00)	14.00



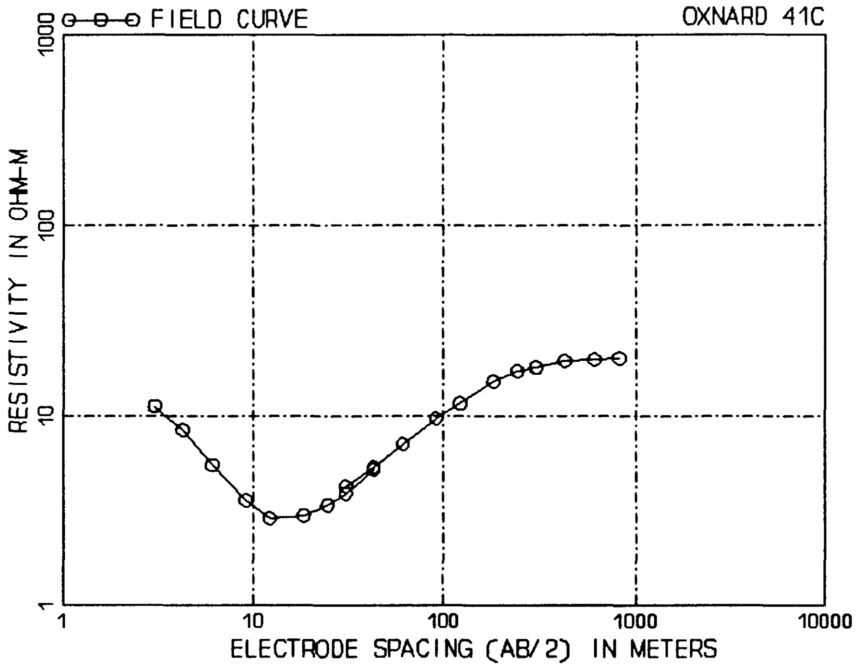
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.86 (	6.09)	7.26	27.25 (	89.40)	2.96
2.72 (	8.94)	7.61	40.00 (	131.22)	4.07
4.00 (	13.12)	9.18	58.71 (	192.60)	6.46
5.87 (	19.26)	10.76	86.17 (	282.71)	10.88
8.62 (	28.27)	8.67	126.48 (	414.95)	16.50
12.65 (	41.50)	4.44	185.64 (	609.07)	20.39
18.56 (	60.91)	2.71	272.49 (	893.99)	19.70
			99999.00 (	99999.00)	15.20



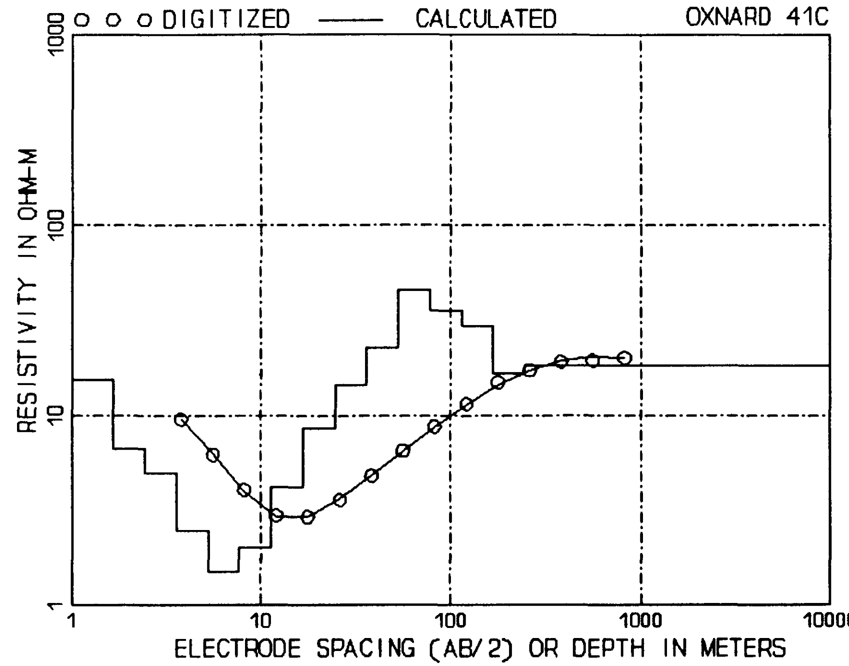


AB/2, m (ft)	App. Res.	AB/2, m (ft)	App. Res.
3.05 (10.00)	17.70	60.96 (200.00)	11.50
4.27 (14.00)	13.00	91.44 (300.00)	13.00
6.10 (20.00)	10.70	121.92 (400.00)	14.50
9.14 (30.00)	9.50	182.88 (600.00)	16.50
12.19 (40.00)	8.75	243.84 (800.00)	19.70
18.29 (60.00)	8.10	304.80 (1000.00)	21.20
24.38 (80.00)	8.20	304.80 (1000.00)	22.20
30.48 (100.00)	8.90	426.72 (1400.00)	25.00
30.48 (100.00)	9.40	609.60 (2000.00)	24.70
42.67 (140.00)	10.30	914.40 (3000.00)	24.80
		1219.20 (4000.00)	25.50

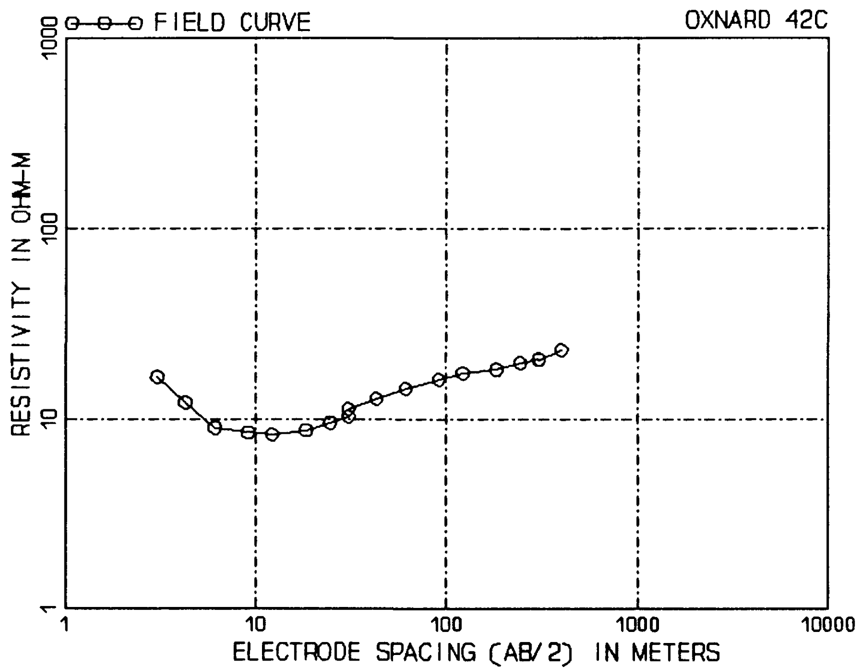
DEPTH, m (ft)	RESIS.	DEPTH, m (ft)	RESIS.
1.69 (5.53)	19.96	36.33 (119.20)	12.73
2.48 (8.12)	13.16	53.33 (174.96)	15.34
3.63 (11.92)	9.82	78.27 (256.81)	19.34
5.33 (17.50)	8.25	114.89 (376.94)	24.20
7.83 (25.68)	7.70	168.64 (553.27)	27.93
11.49 (37.69)	8.23	247.53 (812.09)	28.87
16.86 (55.33)	9.46	363.32 (1191.99)	27.60
24.75 (81.21)	10.96	99999.00 (99999.00)	25.94



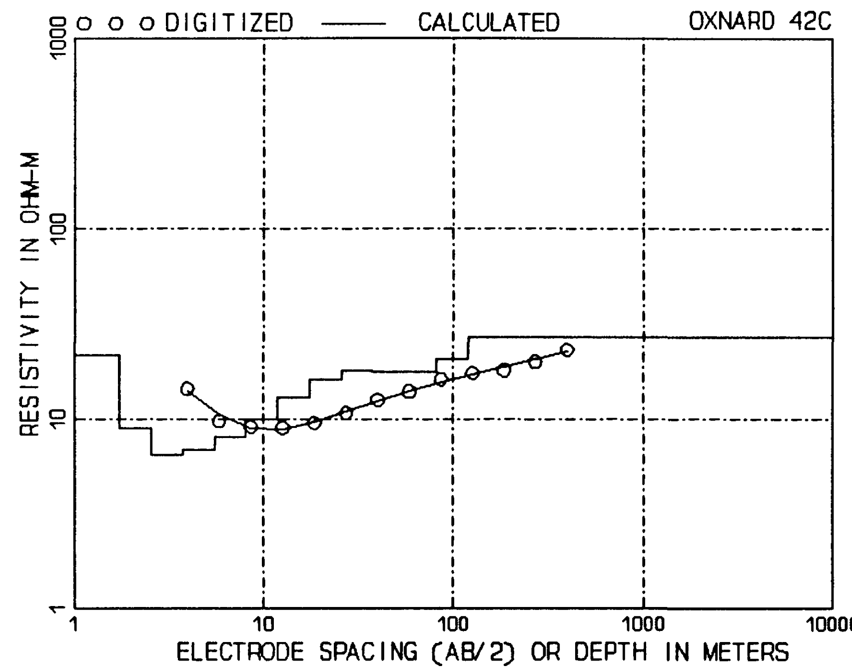
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	11.20	42.67 (	140.00)	5.35
4.27 (	14.00)	8.40	60.96 (	200.00)	7.10
6.10 (	20.00)	5.50	91.44 (	300.00)	9.70
9.14 (	30.00)	3.60	121.92 (	400.00)	11.60
12.19 (	40.00)	2.90	182.88 (	600.00)	15.20
18.29 (	60.00)	3.00	243.84 (	800.00)	17.20
24.38 (	80.00)	3.40	304.80 (	1000.00)	18.00
30.48 (	100.00)	3.90	304.80 (	1000.00)	17.90
42.67 (	140.00)	5.20	426.72 (	1400.00)	19.40
30.48 (	100.00)	4.25	609.60 (	2000.00)	19.70
			821.13 (	2694.00)	20.10



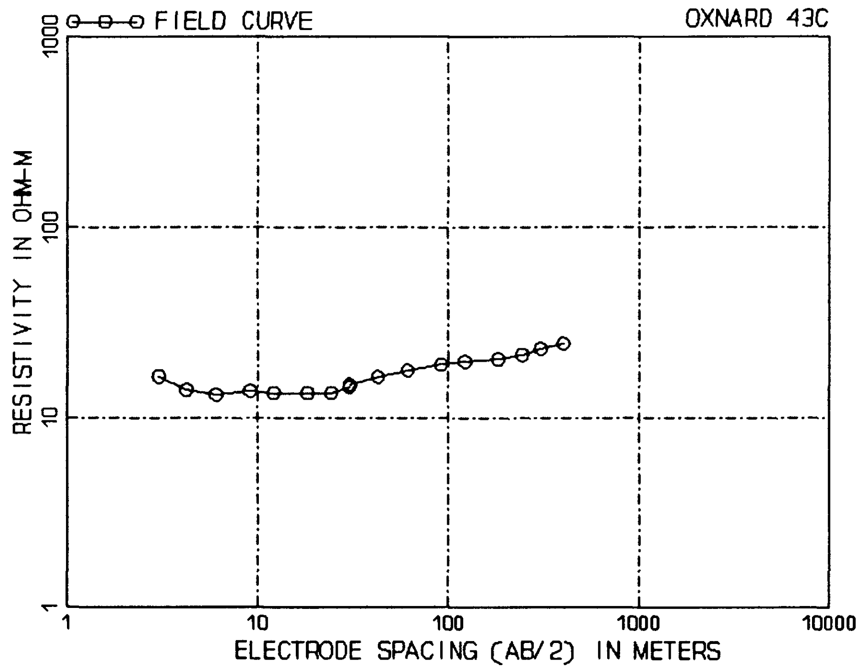
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.67 (	5.47)	15.49	24.47 (	80.28)	8.61
2.45 (	8.03)	6.71	35.92 (	117.84)	14.42
3.59 (	11.78)	4.99	52.72 (	172.96)	22.64
5.27 (	17.30)	2.47	77.38 (	253.87)	45.89
7.74 (	25.39)	1.52	113.58 (	372.63)	35.50
11.36 (	37.26)	2.02	166.71 (	546.94)	29.55
16.67 (	54.69)	4.19	244.69 (	802.80)	16.67
			99999.00 (	99999.00)	18.31



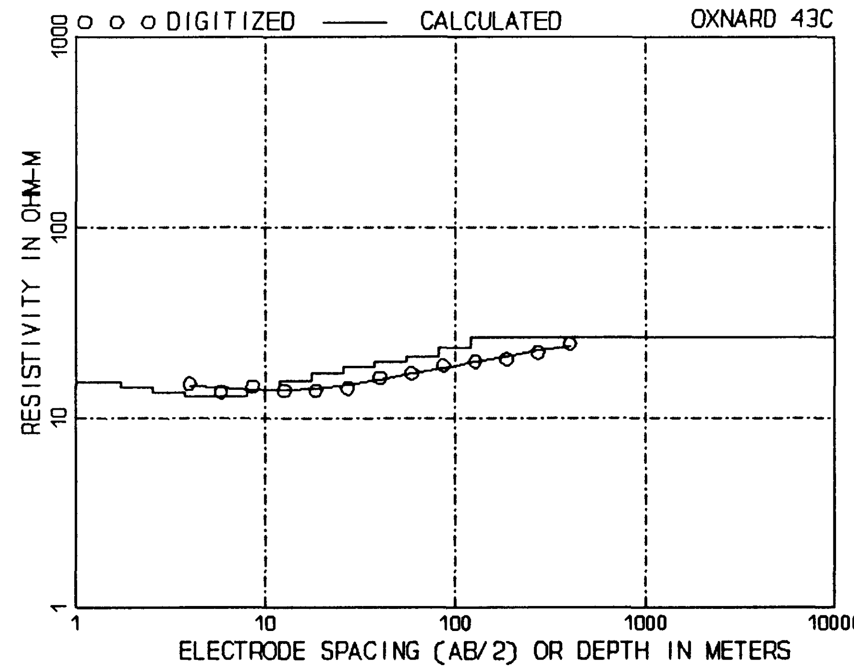
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	16.70	42.67	(140.00)	12.80
4.27	(14.00)	12.20	60.96	(200.00)	14.50
6.10	(20.00)	9.00	91.44	(300.00)	16.20
9.14	(30.00)	8.50	121.92	(400.00)	17.50
12.19	(40.00)	8.30	182.88	(600.00)	18.20
18.29	(60.00)	8.75	243.84	(800.00)	19.80
24.38	(80.00)	9.60	304.80	(1000.00)	20.70
30.48	(100.00)	10.30	304.80	(1000.00)	20.50
30.48	(100.00)	11.30	398.98	(1309.00)	23.00



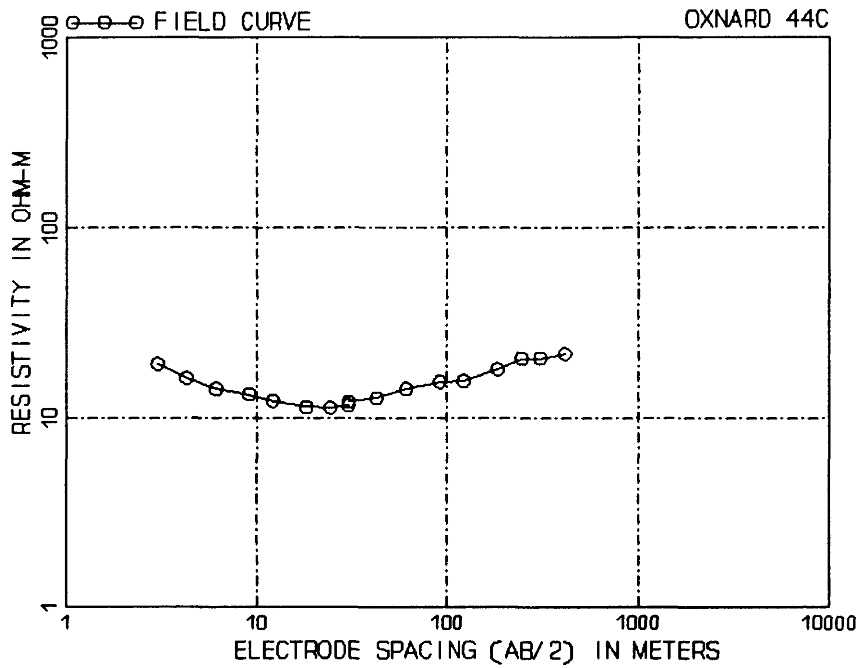
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.75	(5.73)	21.64	17.45	(57.26)	12.91
2.56	(8.40)	8.93	25.62	(84.04)	16.12
3.76	(12.34)	6.46	37.60	(123.35)	18.00
5.52	(18.11)	6.85	55.19	(181.06)	17.83
8.10	(26.58)	7.98	81.00	(265.76)	17.81
11.89	(39.01)	9.99	118.90	(390.08)	20.57
			99999.00	(99999.00)	26.83



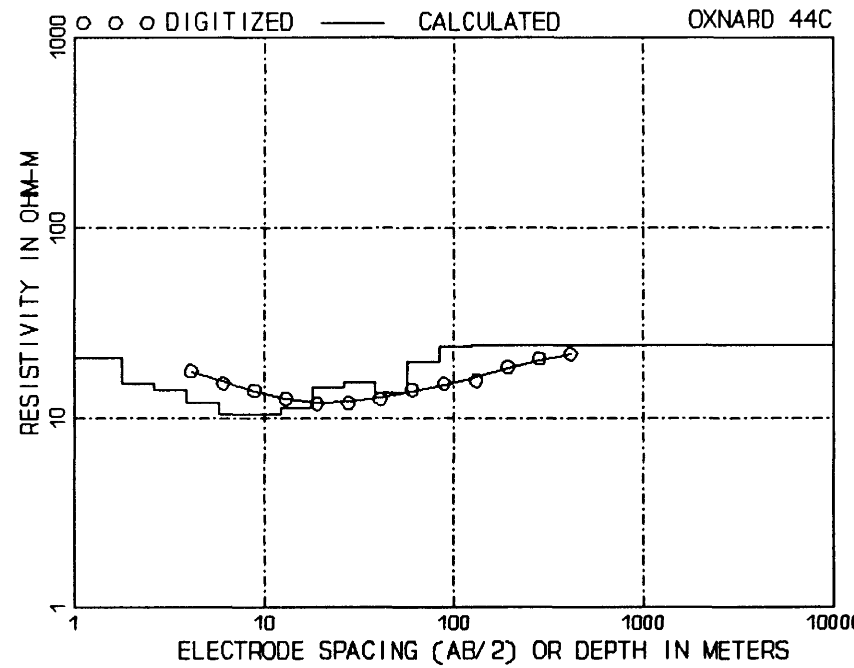
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	16.50	30.48	(100.00)	15.00
4.27	(14.00)	14.00	42.67	(140.00)	16.40
6.10	(20.00)	13.20	60.96	(200.00)	17.70
9.14	(30.00)	13.80	91.44	(300.00)	19.00
12.19	(40.00)	13.50	121.92	(400.00)	19.80
18.29	(60.00)	13.50	182.88	(600.00)	20.30
24.38	(80.00)	13.50	243.84	(800.00)	21.50
30.48	(100.00)	14.50	304.80	(1000.00)	23.00
			398.98	(1309.00)	24.50



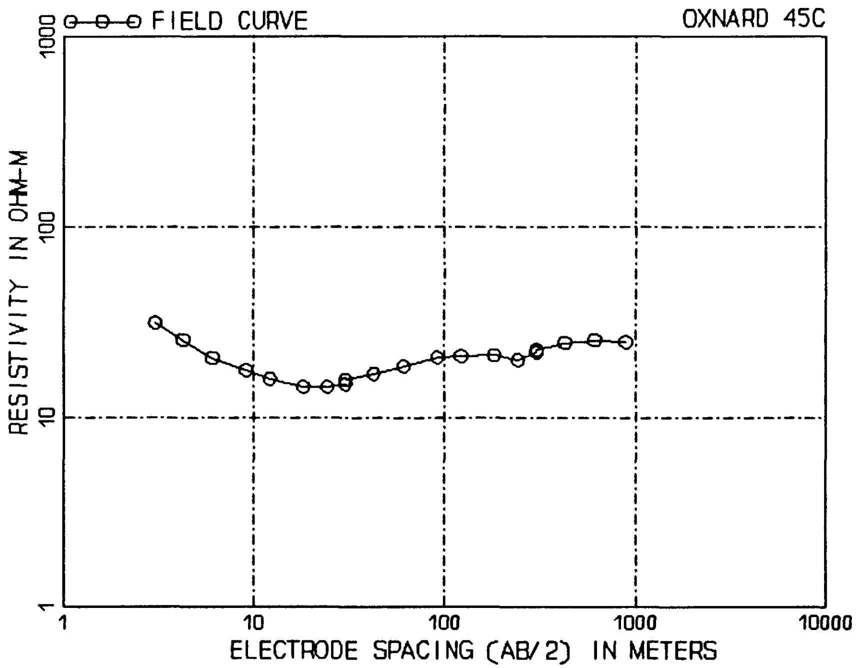
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.75	(5.73)	15.47	17.45	(57.26)	15.59
2.56	(8.40)	14.41	25.62	(84.04)	17.26
3.76	(12.34)	13.67	37.60	(123.35)	18.61
5.52	(18.11)	13.10	55.19	(181.06)	19.69
8.10	(26.58)	13.10	81.00	(265.76)	21.14
11.89	(39.01)	14.01	118.90	(390.08)	23.45
			99999.00	(99999.00)	26.32



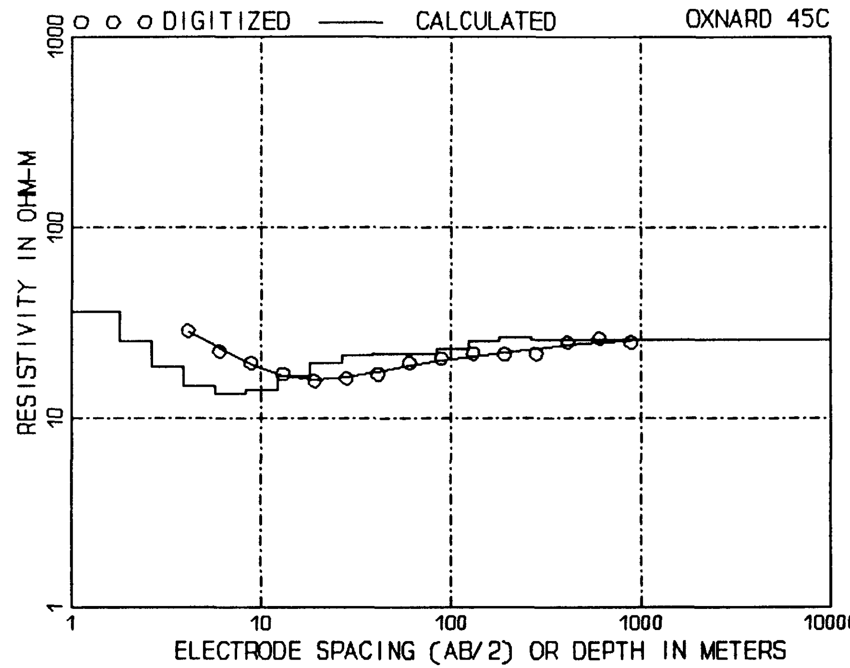
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	19.20	30.48	(100.00)	12.15
4.27	(14.00)	16.20	42.67	(140.00)	12.70
6.10	(20.00)	14.20	60.96	(200.00)	14.20
9.14	(30.00)	13.30	91.44	(300.00)	15.50
12.19	(40.00)	12.30	121.92	(400.00)	15.60
18.29	(60.00)	11.40	182.88	(600.00)	18.00
24.38	(80.00)	11.30	243.84	(800.00)	20.50
30.48	(100.00)	11.60	304.80	(1000.00)	20.50
			411.48	(1350.00)	21.70



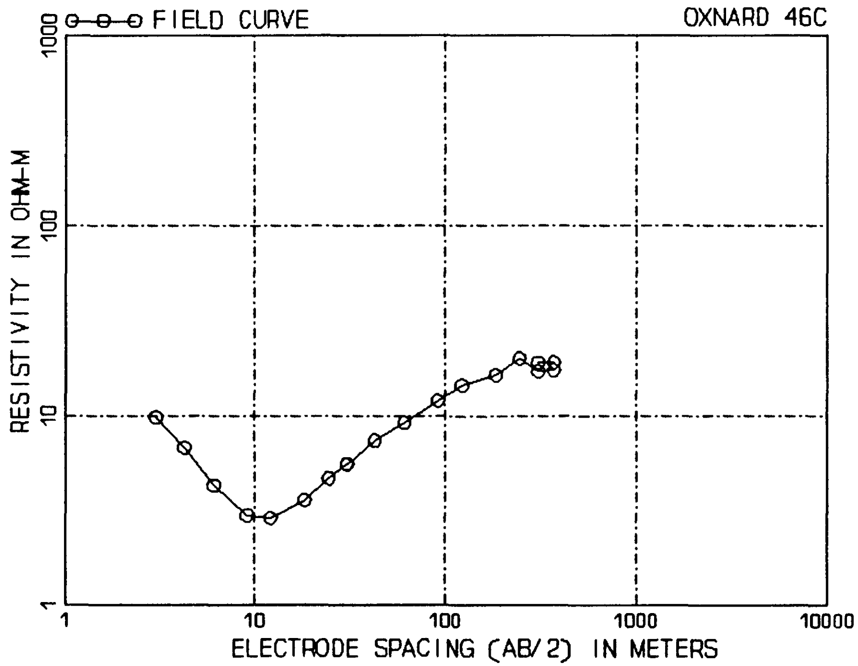
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.80	(5.90)	20.75	18.00	(59.05)	11.33
2.64	(8.67)	15.12	26.42	(86.67)	14.45
3.88	(12.72)	14.14	38.78	(127.22)	15.43
5.69	(18.67)	12.11	56.92	(186.73)	13.55
8.35	(27.41)	10.47	83.54	(274.08)	19.72
12.26	(40.23)	10.44	122.62	(402.30)	23.61
			99999.00	(99999.00)	24.25



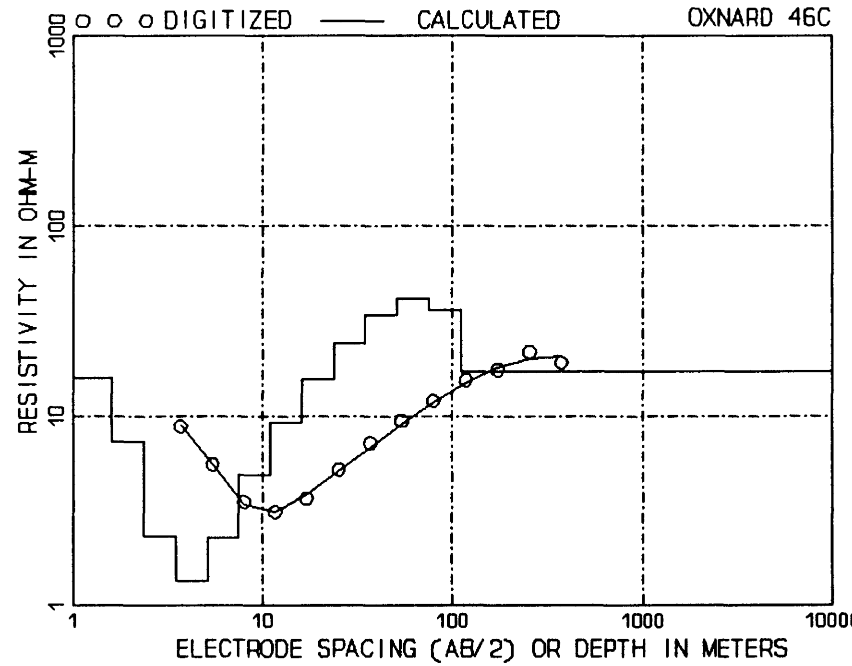
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	31.50	60.96	(200.00)	18.60
4.27	(14.00)	25.50	91.44	(300.00)	20.70
6.10	(20.00)	20.50	121.92	(400.00)	21.00
9.14	(30.00)	17.70	182.88	(600.00)	21.20
12.19	(40.00)	16.00	243.84	(800.00)	20.00
18.29	(60.00)	14.50	304.80	(1000.00)	22.00
24.38	(80.00)	14.50	304.80	(1000.00)	22.70
30.48	(100.00)	15.00	426.72	(1400.00)	24.70
30.48	(100.00)	15.80	609.60	(2000.00)	25.50
42.67	(140.00)	17.00	886.66	(2909.00)	24.97



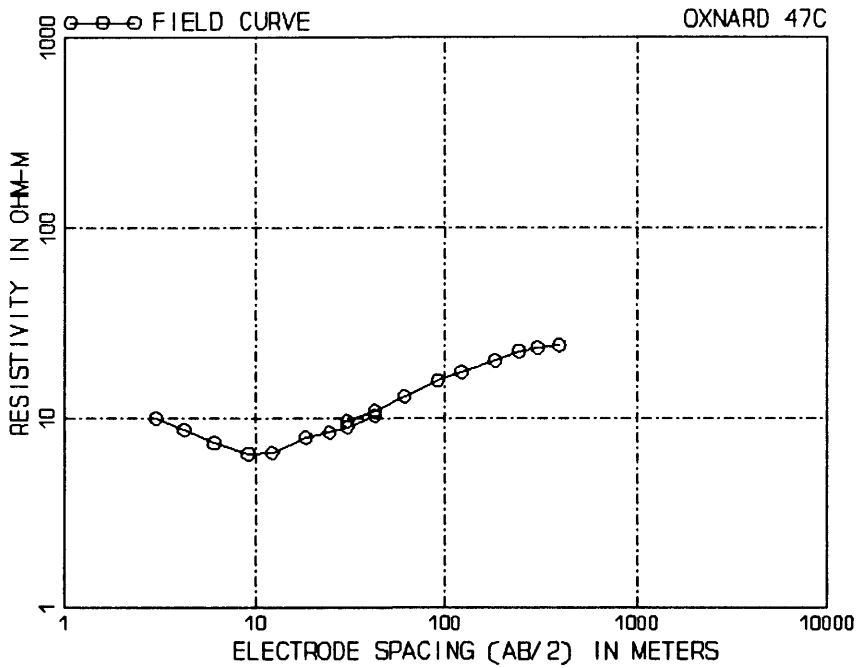
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.80	(5.91)	35.96	26.42	(86.69)	19.56
2.64	(8.67)	25.25	38.78	(127.24)	21.44
3.88	(12.72)	18.49	56.93	(186.76)	21.64
5.69	(18.68)	14.74	83.55	(274.13)	21.53
8.36	(27.41)	13.35	122.64	(402.37)	22.91
12.26	(40.24)	14.14	180.01	(590.59)	25.33
18.00	(59.06)	16.61	264.22	(866.87)	26.54
			99999.00	(99999.00)	25.75



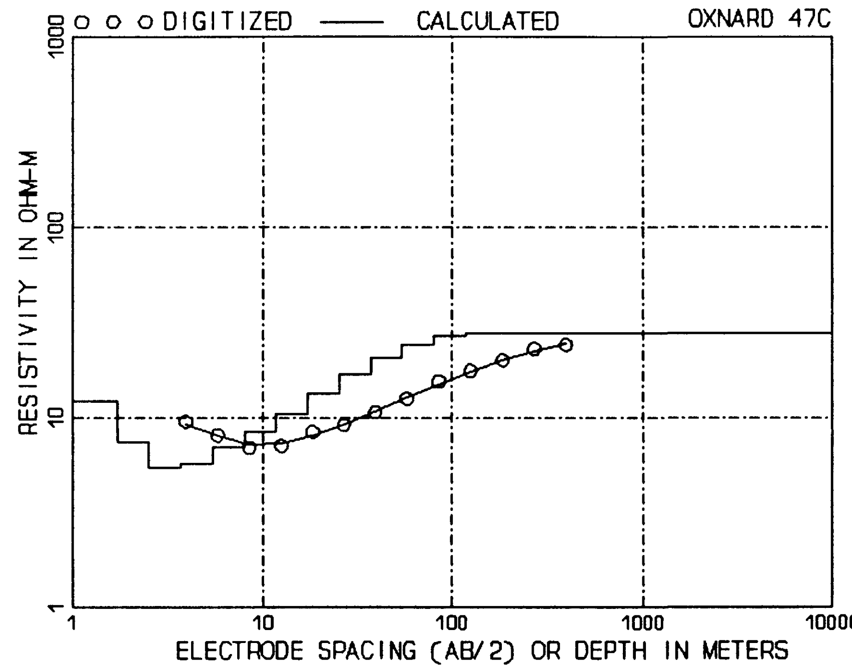
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	9.80	42.67	(140.00)	7.40
4.27	(14.00)	6.80	60.96	(200.00)	9.20
6.10	(20.00)	4.30	91.44	(300.00)	12.00
9.14	(30.00)	3.00	121.92	(400.00)	14.50
12.19	(40.00)	2.90	182.88	(600.00)	16.40
18.29	(60.00)	3.60	243.84	(800.00)	20.00
24.38	(80.00)	4.70	304.80	(1000.00)	17.20
30.48	(100.00)	5.60	369.42	(1212.00)	17.40
30.48	(100.00)	5.55	304.80	(1000.00)	19.00
			369.42	(1212.00)	19.10



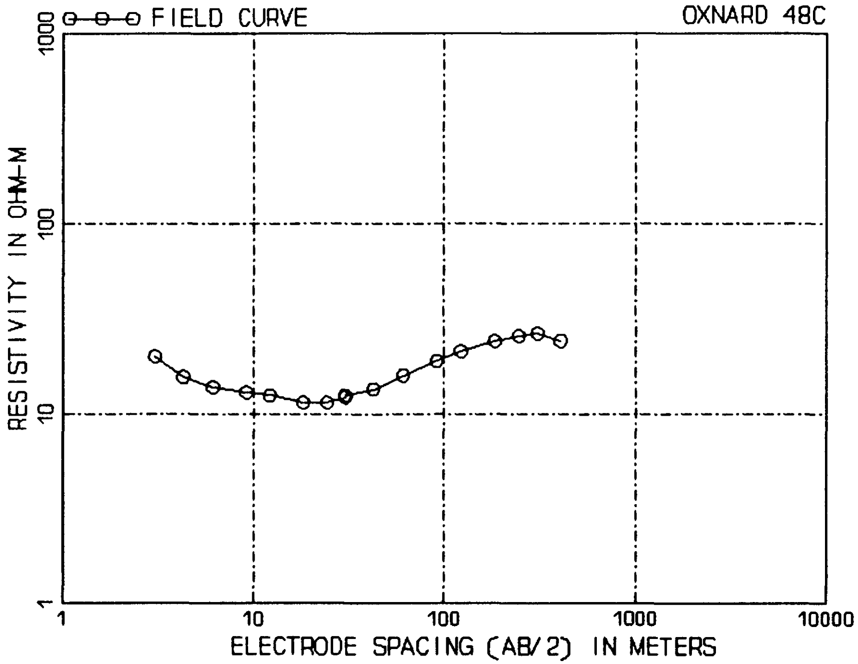
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.62	(5.30)	15.76	16.16	(53.01)	9.29
2.37	(7.78)	7.34	23.72	(77.81)	15.67
3.48	(11.42)	2.34	34.81	(114.21)	24.17
5.11	(16.76)	1.35	51.10	(167.64)	34.21
7.50	(24.61)	2.30	75.00	(246.06)	41.63
11.01	(36.12)	4.90	110.09	(361.17)	36.07
			99999.00	(99999.00)	17.24



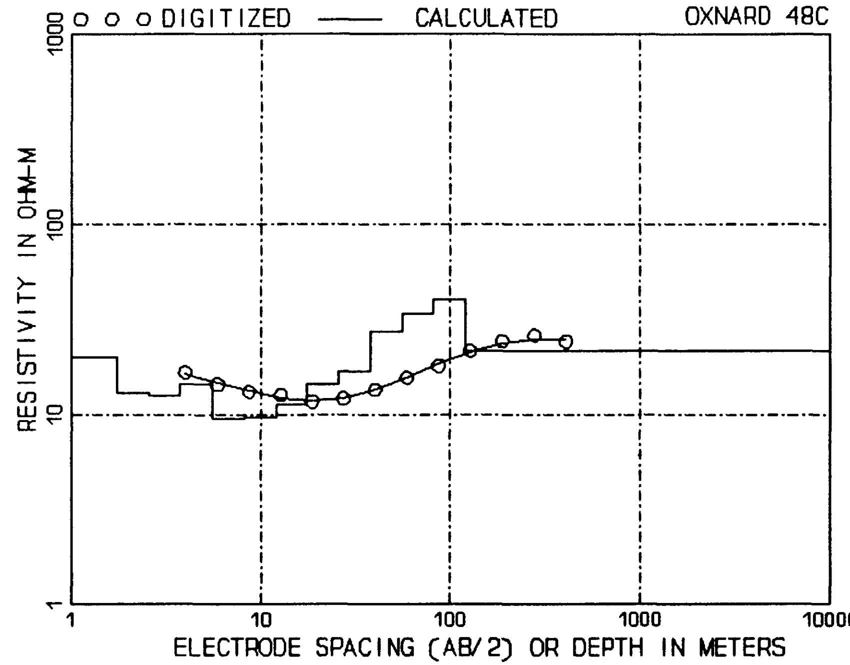
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	10.00	30.48 (	100.00)	9.70
4.27 (	14.00)	8.70	42.67 (	140.00)	11.00
6.10 (	20.00)	7.40	60.96 (	200.00)	13.00
9.14 (	30.00)	6.50	91.44 (	300.00)	15.80
12.19 (	40.00)	6.60	121.92 (	400.00)	17.50
18.29 (	60.00)	7.90	182.88 (	600.00)	20.10
24.38 (	80.00)	8.40	243.84 (	800.00)	22.50
30.48 (	100.00)	9.00	304.80 (	1000.00)	23.40
42.67 (	140.00)	10.30	394.41 (	1294.00)	24.10



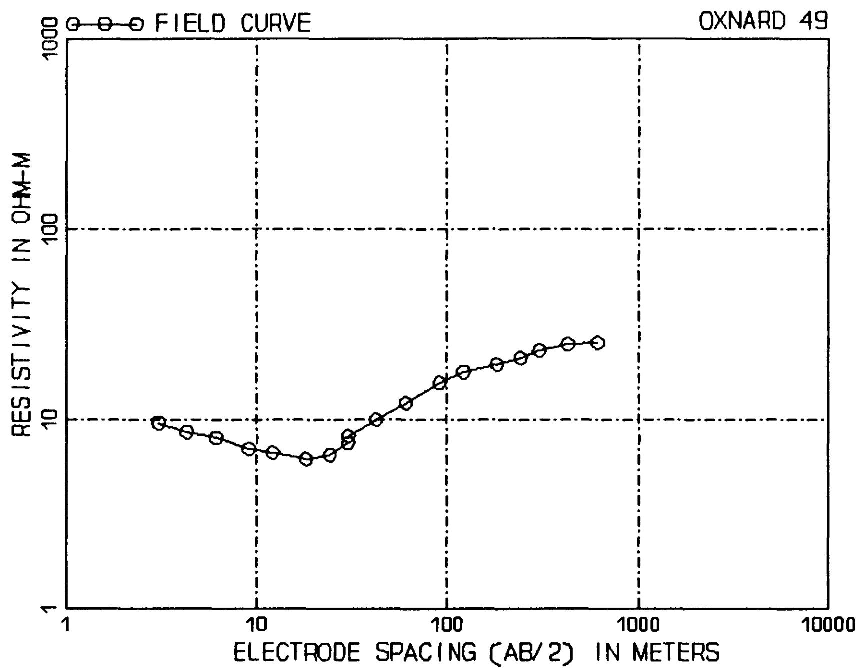
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.73 (	5.66)	12.19	17.25 (	56.60)	10.45
2.53 (	8.31)	7.47	25.32 (	83.08)	13.40
3.72 (	12.19)	5.49	37.17 (	121.94)	17.00
5.46 (	17.90)	5.76	54.55 (	178.98)	20.78
8.01 (	26.27)	6.94	80.07 (	262.71)	24.33
11.75 (	38.56)	8.39	117.53 (	385.61)	26.89
			99999.00 (	99999.00)	27.94



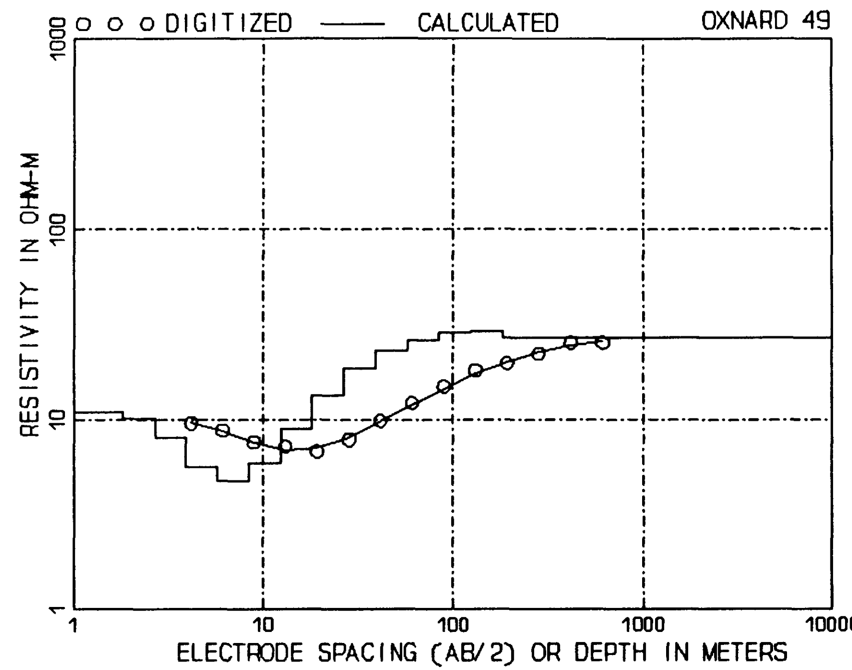
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	20.00	30.48 (	100.00)	12.50
4.27 (	14.00)	15.60	42.67 (	140.00)	13.50
6.10 (	20.00)	13.80	60.96 (	200.00)	16.00
9.14 (	30.00)	13.00	91.44 (	300.00)	19.00
12.19 (	40.00)	12.50	121.92 (	400.00)	21.30
18.29 (	60.00)	11.50	182.88 (	600.00)	24.20
24.38 (	80.00)	11.50	243.84 (	800.00)	25.80
30.48 (	100.00)	12.20	304.80 (	1000.00)	26.50
			402.34 (	1320.00)	24.30



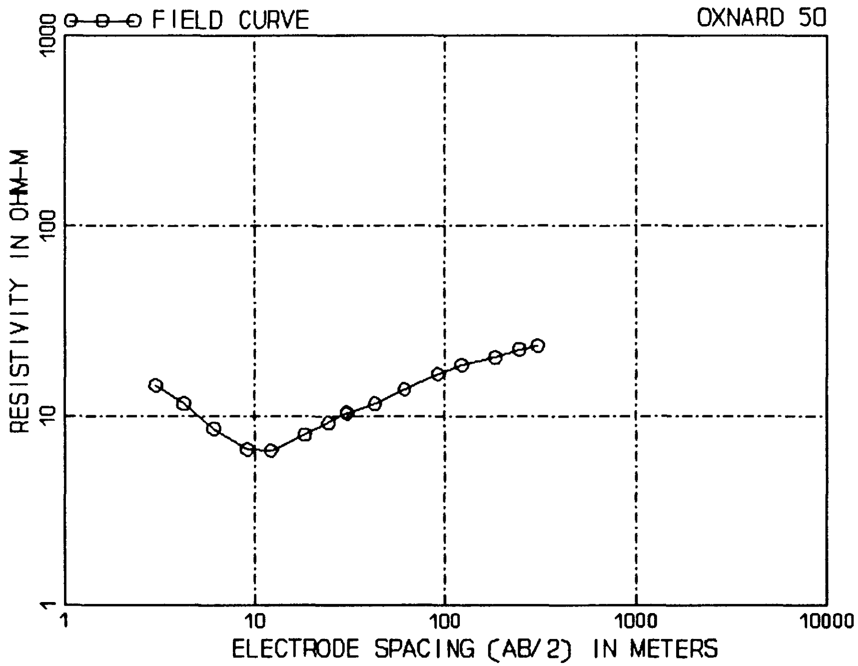
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.76 (	5.77)	20.00	17.60 (	57.74)	11.26
2.58 (	8.47)	13.07	25.83 (	84.75)	14.46
3.79 (	12.44)	12.68	37.91 (	124.39)	16.98
5.57 (	18.26)	14.38	55.65 (	182.58)	27.23
8.17 (	26.80)	9.59	81.68 (	267.99)	34.11
11.99 (	39.34)	9.65	119.89 (	393.36)	40.36
			99999.00 (	99999.00)	21.77



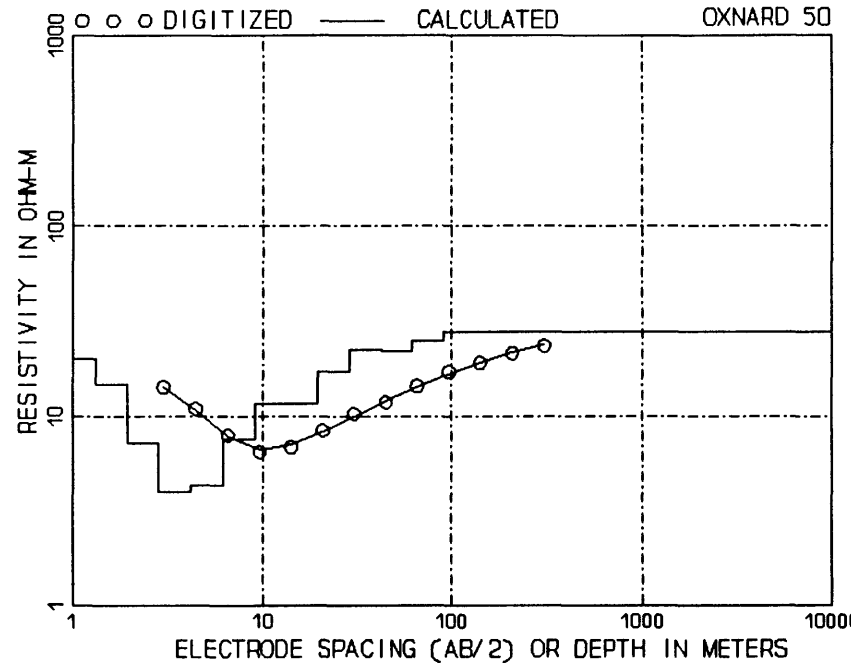
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.60	42.67 (	140.00)	10.00
4.27 (	14.00)	8.60	60.96 (	200.00)	12.20
6.10 (	20.00)	8.00	91.44 (	300.00)	15.60
9.14 (	30.00)	7.00	121.92 (	400.00)	17.80
12.19 (	40.00)	6.70	182.88 (	600.00)	19.50
18.29 (	60.00)	6.20	243.84 (	800.00)	21.00
24.38 (	80.00)	6.50	304.80 (	1000.00)	23.00
30.48 (	100.00)	7.50	304.80 (	1000.00)	23.00
30.48 (	100.00)	8.20	426.72 (	1400.00)	24.80
			609.60 (	2000.00)	25.40



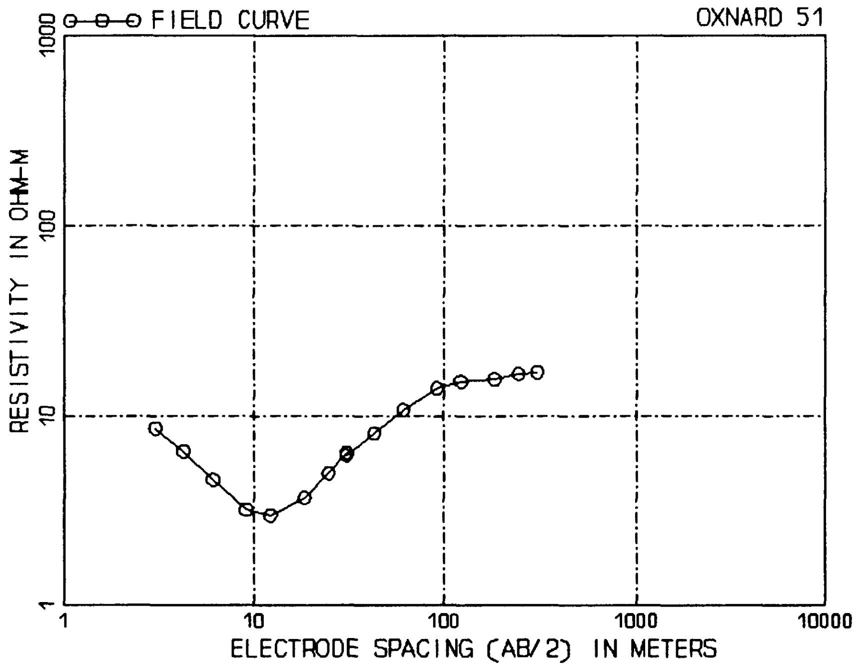
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.82 (	5.96)	10.98	26.66 (	87.48)	13.45
2.67 (	8.75)	10.13	39.14 (	128.40)	18.58
3.91 (	12.84)	8.09	57.45 (	188.47)	22.99
5.74 (	18.85)	5.65	84.32 (	276.64)	26.23
8.43 (	27.66)	4.72	123.76 (	406.05)	28.52
12.38 (	40.60)	5.89	181.66 (	595.99)	29.04
18.17 (	59.60)	8.94	99999.00 (	99999.00)	27.04



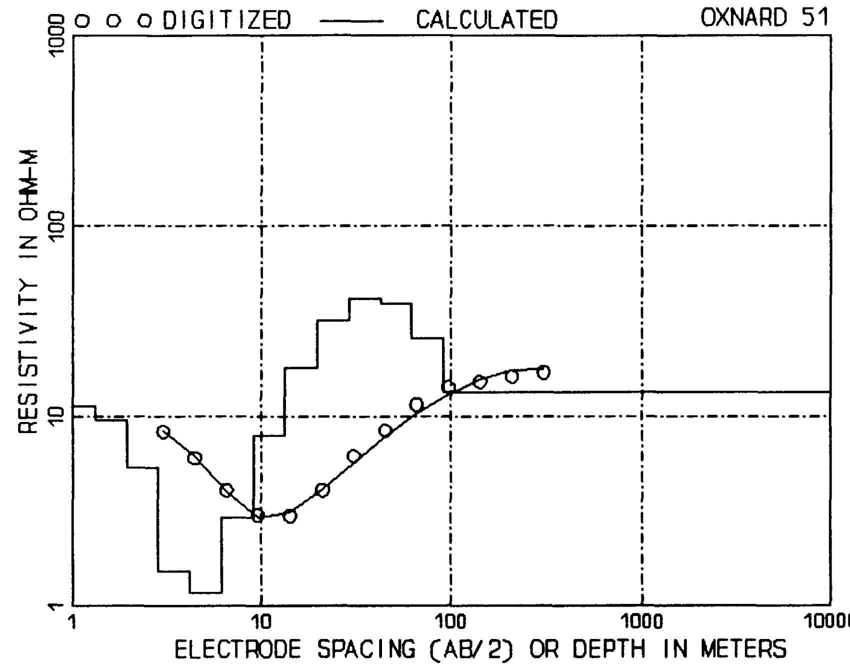
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	14.50	30.48	(100.00)	10.30
4.27	(14.00)	11.60	42.67	(140.00)	11.60
6.10	(20.00)	8.60	60.96	(200.00)	13.80
9.14	(30.00)	6.70	91.44	(300.00)	16.70
12.19	(40.00)	6.60	121.92	(400.00)	18.60
18.29	(60.00)	8.00	182.88	(600.00)	20.30
24.38	(80.00)	9.20	243.84	(800.00)	22.50
30.48	(100.00)	10.50	304.80	(1000.00)	23.50



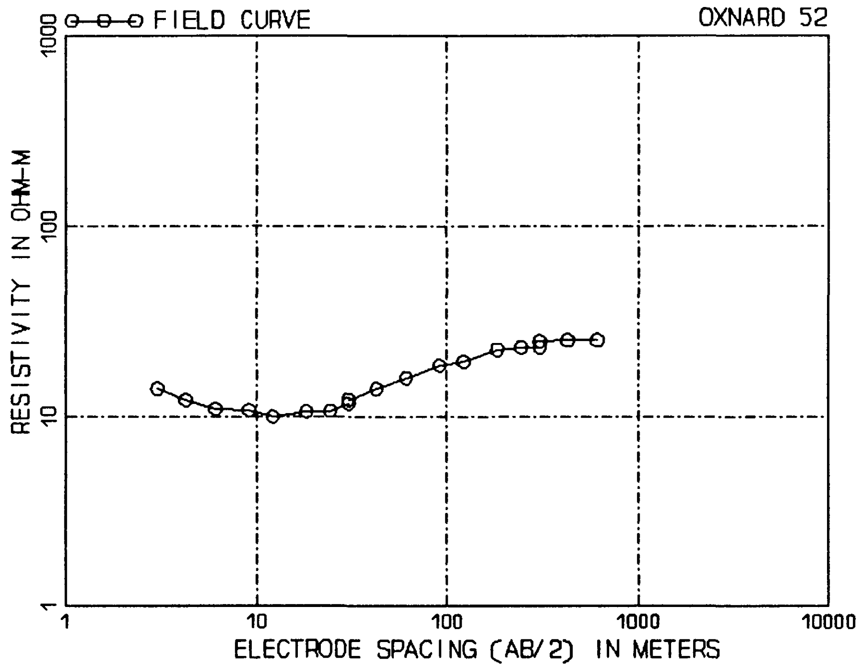
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.33	(4.37)	20.03	13.33	(43.74)	11.59
1.96	(6.42)	14.68	19.57	(64.20)	11.71
2.87	(9.42)	7.26	28.72	(94.23)	17.14
4.22	(13.83)	3.98	42.16	(138.32)	22.49
6.19	(20.30)	4.32	61.88	(203.02)	21.91
9.08	(29.80)	7.53	90.83	(298.00)	24.94
			99999.00	(99999.00)	27.65



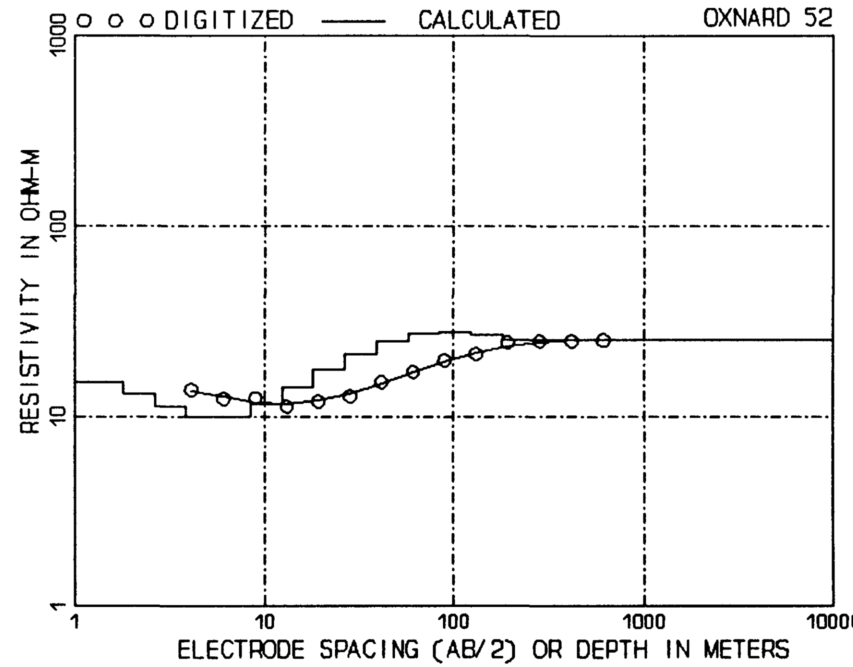
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	8.60	30.48 (	100.00)	6.20
4.27 (	14.00)	6.50	42.67 (	140.00)	8.10
6.10 (	20.00)	4.60	60.96 (	200.00)	10.80
9.14 (	30.00)	3.20	91.44 (	300.00)	14.00
12.19 (	40.00)	3.00	121.92 (	400.00)	15.20
18.29 (	60.00)	3.70	182.88 (	600.00)	15.60
24.38 (	80.00)	5.00	243.84 (	800.00)	16.60
30.48 (	100.00)	6.40	304.80 (	1000.00)	17.00



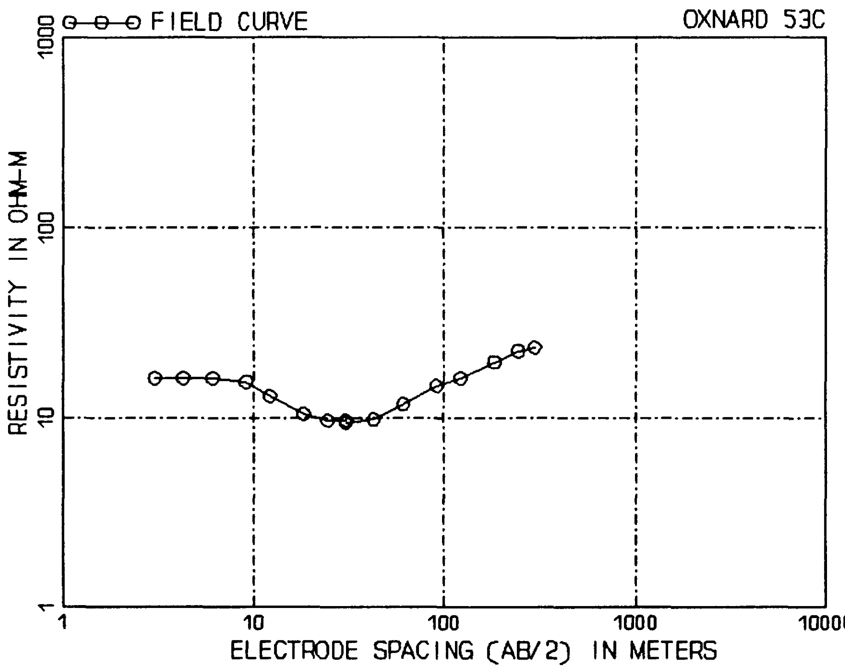
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.33 (	4.37)	11.27	13.33 (	43.74)	7.94
1.96 (	6.42)	9.58	19.57 (	64.20)	17.90
2.87 (	9.42)	5.34	28.72 (	94.23)	31.80
4.22 (	13.83)	1.53	42.16 (	138.32)	41.76
6.19 (	20.30)	1.17	61.88 (	203.02)	38.83
9.08 (	29.80)	2.94	90.83 (	298.00)	25.71
			99999.00 (	99999.00)	13.34



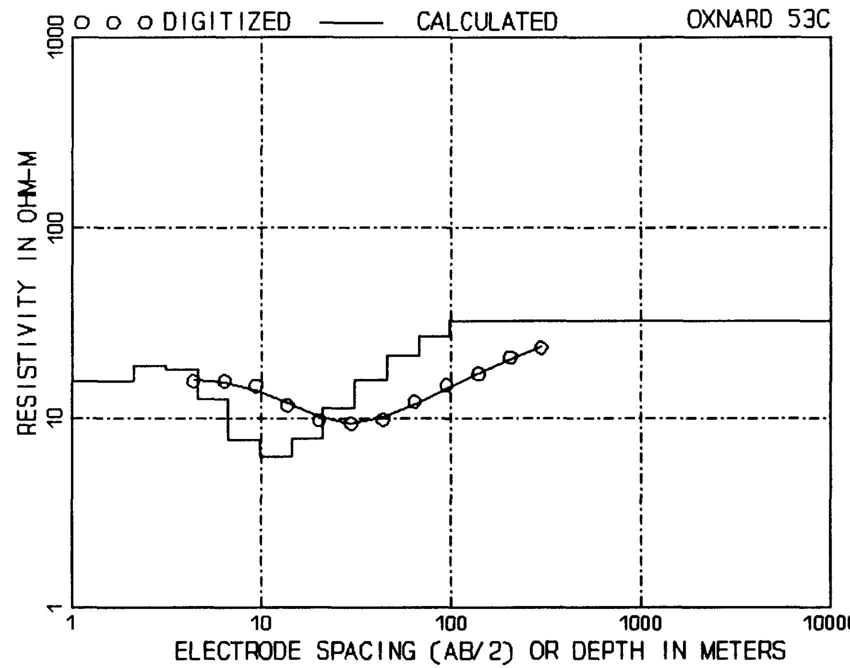
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	14.00	42.67	(140.00)	14.00
4.27	(14.00)	12.20	60.96	(200.00)	16.00
6.10	(20.00)	11.00	91.44	(300.00)	18.60
9.14	(30.00)	10.80	121.92	(400.00)	19.40
12.19	(40.00)	10.00	182.88	(600.00)	22.50
18.29	(60.00)	10.60	243.84	(800.00)	23.20
24.38	(80.00)	10.70	304.80	(1000.00)	23.20
30.48	(100.00)	11.70	304.80	(1000.00)	25.00
30.48	(100.00)	12.30	426.72	(1400.00)	25.20
			609.60	(2000.00)	25.20



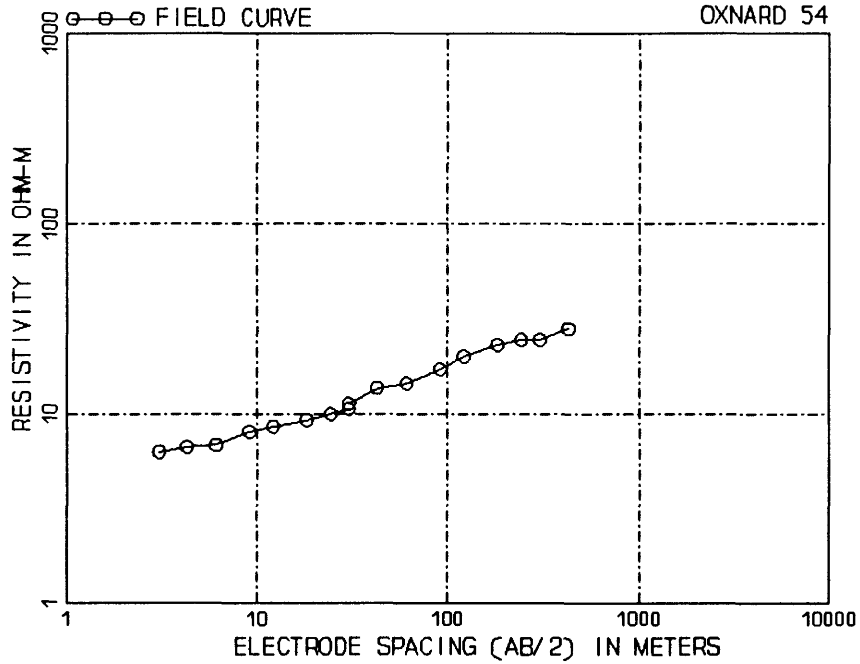
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	15.25	26.66	(87.48)	17.64
2.67	(8.75)	13.22	39.14	(128.40)	21.27
3.91	(12.84)	11.30	57.45	(188.47)	24.89
5.74	(18.85)	10.00	84.32	(276.64)	27.44
8.43	(27.66)	10.05	123.76	(406.05)	27.93
12.38	(40.60)	11.61	181.66	(595.99)	26.79
18.17	(59.60)	14.31	99999.00	(99999.00)	25.27



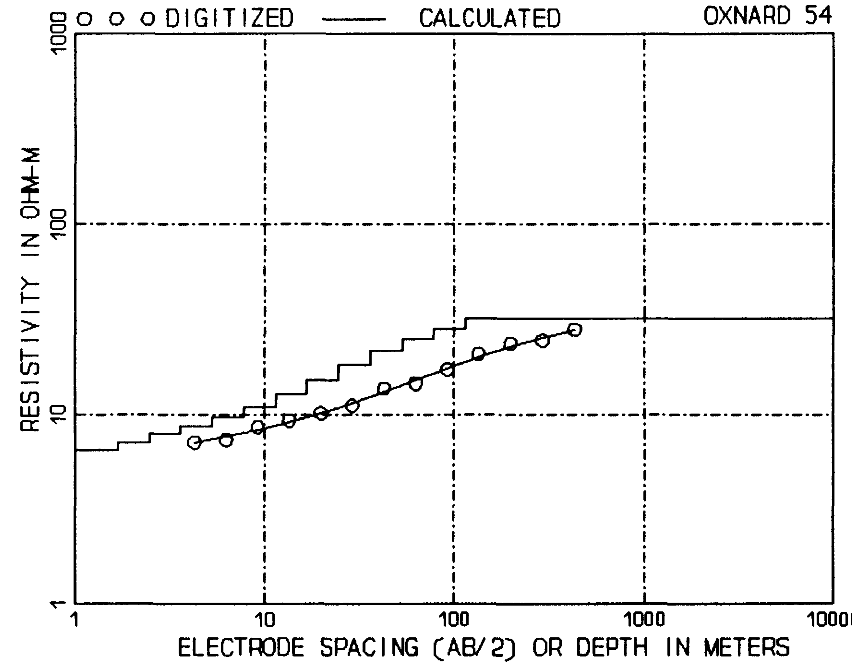
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	16.20	30.48 (	100.00)	9.40
4.27 (	14.00)	16.20	42.67 (	140.00)	9.80
6.10 (	20.00)	16.20	60.96 (	200.00)	11.80
9.14 (	30.00)	15.50	91.44 (	300.00)	14.70
12.19 (	40.00)	13.00	121.92 (	400.00)	16.20
18.29 (	60.00)	10.50	182.88 (	600.00)	19.60
24.38 (	80.00)	9.70	243.84 (	800.00)	22.50
30.48 (	100.00)	9.70	297.79 (	977.00)	23.50



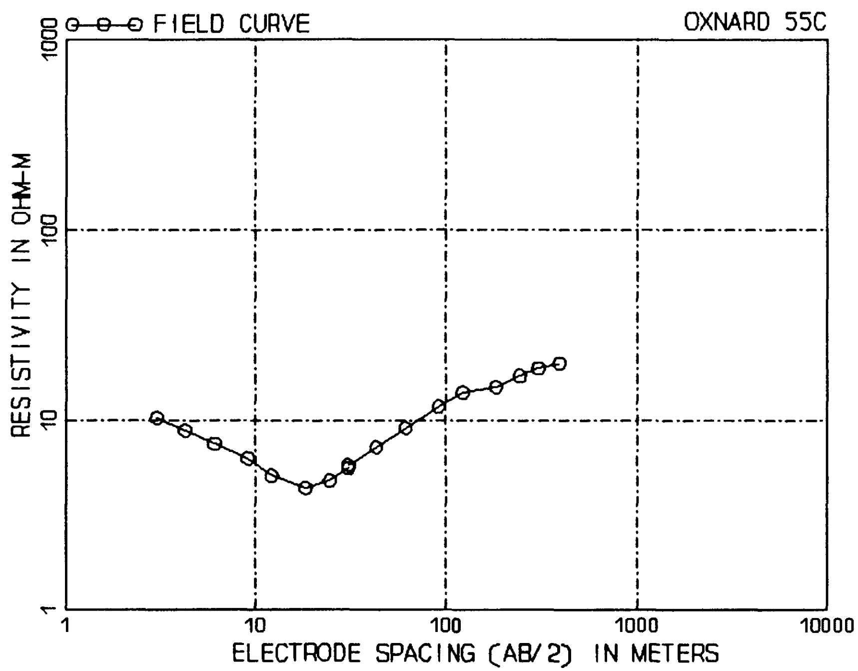
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.12 (	6.97)	15.65	21.24 (	69.69)	7.79
3.12 (	10.23)	18.93	31.18 (	102.30)	11.36
4.58 (	15.02)	18.07	45.77 (	150.15)	15.98
6.72 (	22.04)	12.51	67.18 (	220.39)	21.22
9.86 (	32.35)	7.70	98.60 (	323.49)	26.95
14.47 (	47.48)	6.30	99999.00 (	99999.00)	32.59

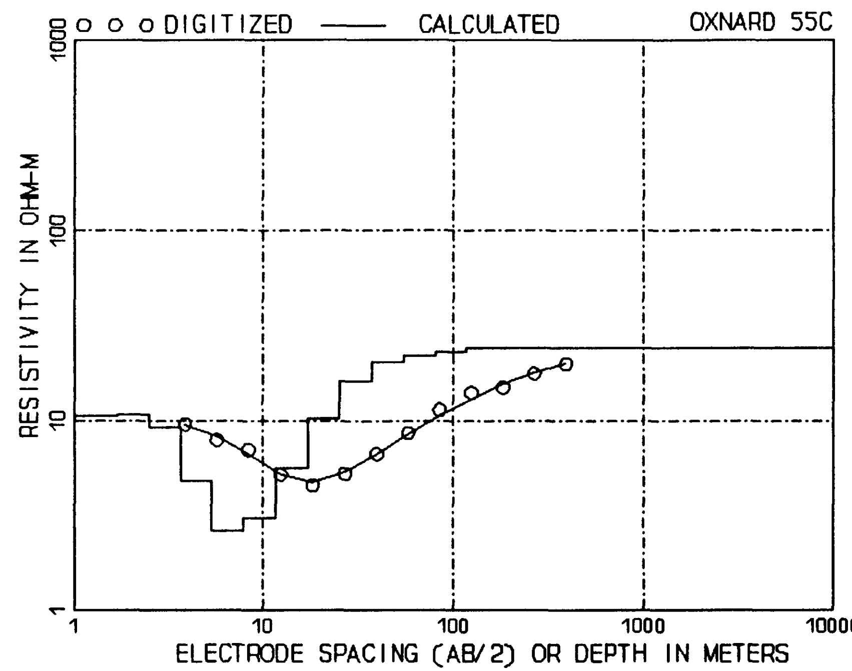


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	6.30	30.48	(100.00)	11.30
4.27	(14.00)	6.70	42.67	(140.00)	13.70
6.10	(20.00)	6.85	60.96	(200.00)	14.50
9.14	(30.00)	8.05	91.44	(300.00)	17.20
12.19	(40.00)	8.60	121.92	(400.00)	20.00
18.29	(60.00)	9.30	182.88	(600.00)	23.00
24.38	(80.00)	10.00	243.84	(800.00)	24.50
30.48	(100.00)	10.60	304.80	(1000.00)	24.50
			426.72	(1400.00)	28.00



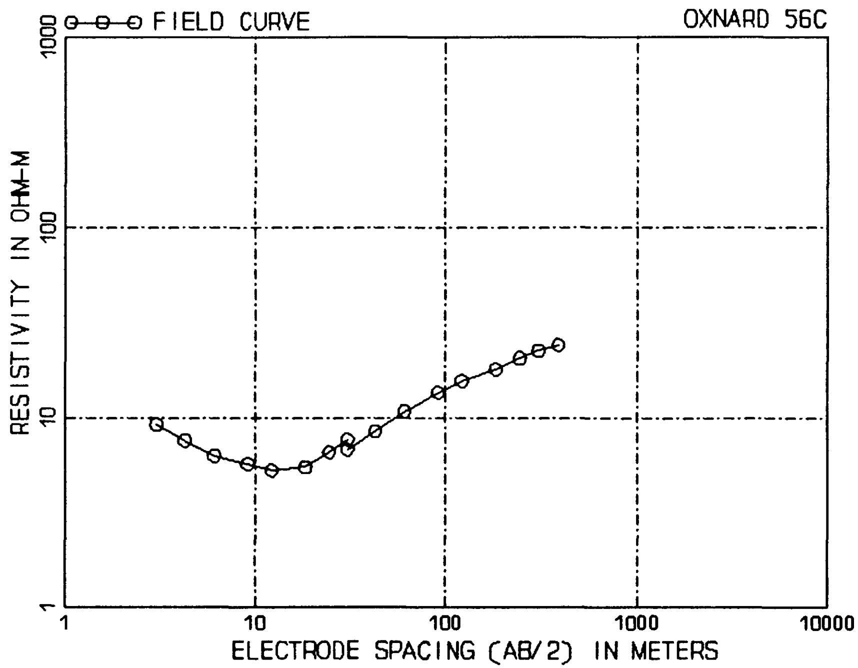
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.68	(5.51)	6.50	16.80	(55.11)	12.72
2.47	(8.09)	7.12	24.66	(80.89)	15.06
3.62	(11.87)	7.90	36.19	(118.74)	18.13
5.31	(17.43)	8.71	53.12	(174.28)	21.55
7.80	(25.58)	9.70	77.97	(255.81)	24.95
11.44	(37.55)	11.01	114.45	(375.48)	28.36
			99999.00	(99999.00)	31.78

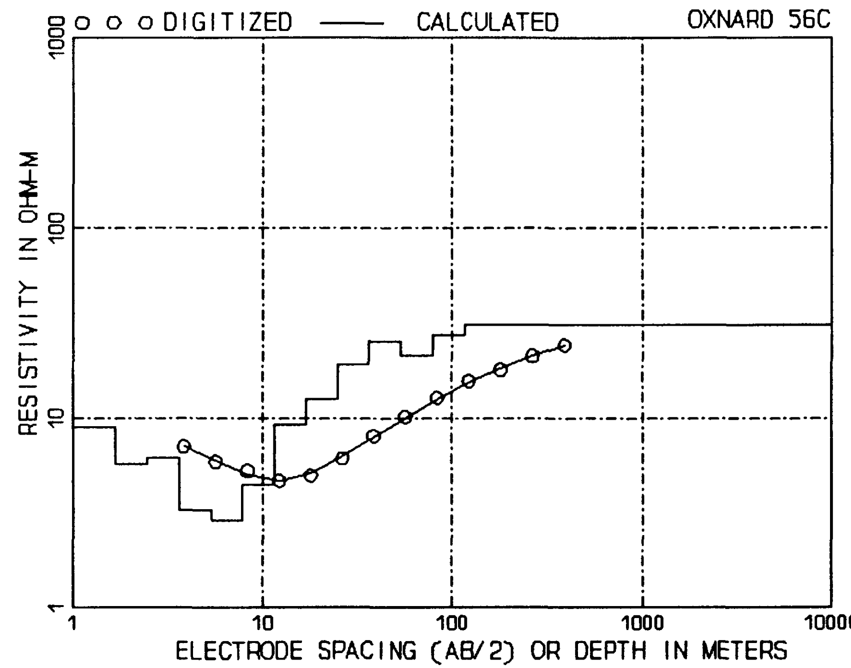




AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	10.30	30.48	(100.00)	5.80
4.27	(14.00)	8.80	42.67	(140.00)	7.20
6.10	(20.00)	7.50	60.96	(200.00)	9.10
9.14	(30.00)	6.30	91.44	(300.00)	11.80
12.19	(40.00)	5.10	121.92	(400.00)	14.00
18.29	(60.00)	4.40	182.88	(600.00)	15.00
24.38	(80.00)	4.80	243.84	(800.00)	17.10
30.48	(100.00)	5.60	304.80	(1000.00)	18.70
			391.67	(1285.00)	19.90

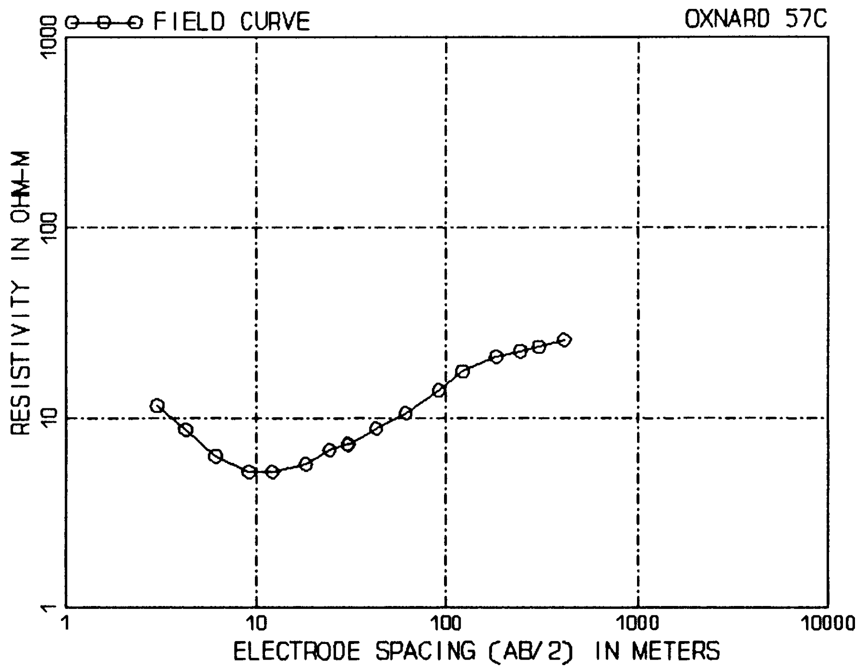
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.71	(5.62)	10.69	17.13	(56.21)	5.59
2.51	(8.25)	10.83	25.15	(82.50)	10.28
3.69	(12.11)	9.24	36.91	(121.09)	16.12
5.42	(17.77)	4.80	54.17	(177.74)	20.42
7.95	(26.09)	2.62	79.52	(260.88)	22.15
11.67	(38.29)	3.09	116.72	(382.93)	22.90
			99999.00	(99999.00)	24.12



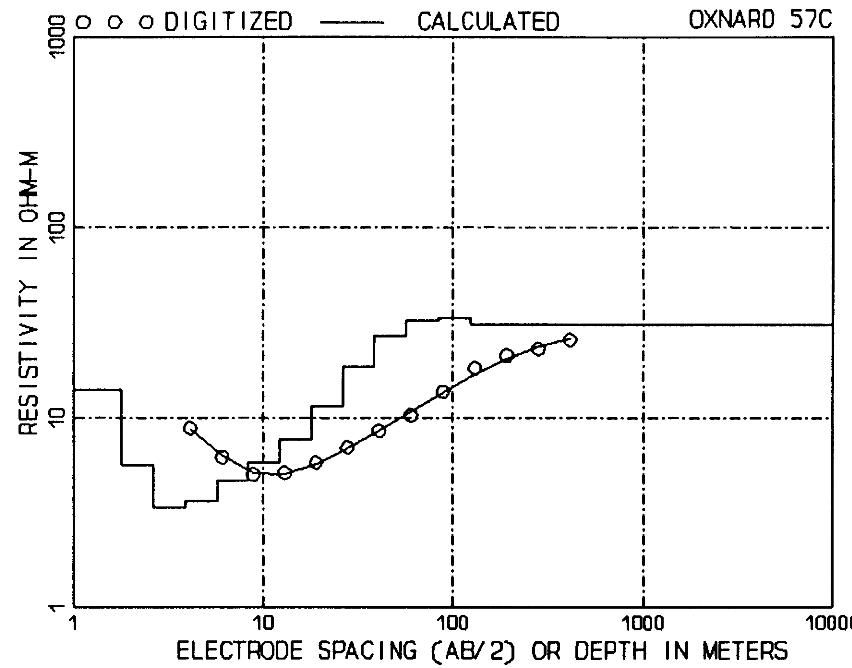


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	9.20	30.48	(100.00)	6.80
4.27	(14.00)	7.60	42.67	(140.00)	8.50
6.10	(20.00)	6.30	60.96	(200.00)	10.85
9.14	(30.00)	5.70	91.44	(300.00)	13.60
12.19	(40.00)	5.30	121.92	(400.00)	15.70
18.29	(60.00)	5.50	182.88	(600.00)	18.00
24.38	(80.00)	6.60	243.84	(800.00)	20.60
30.48	(100.00)	7.70	304.80	(1000.00)	22.60
			386.79	(1269.00)	24.10

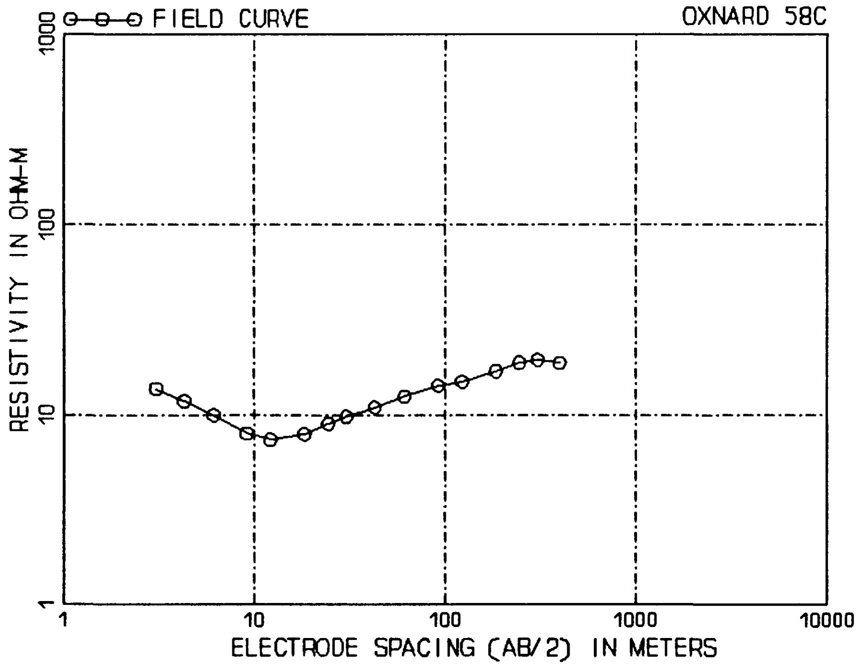
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.69	(5.55)	9.03	16.92	(55.51)	9.23
2.48	(8.15)	5.67	24.83	(81.47)	12.59
3.64	(11.96)	6.14	36.45	(119.58)	19.22
5.35	(17.55)	3.25	53.50	(175.53)	25.41
7.85	(25.76)	2.88	78.53	(257.64)	21.32
11.53	(37.82)	4.45	115.26	(378.16)	27.47
			99999.00	(99999.00)	31.13



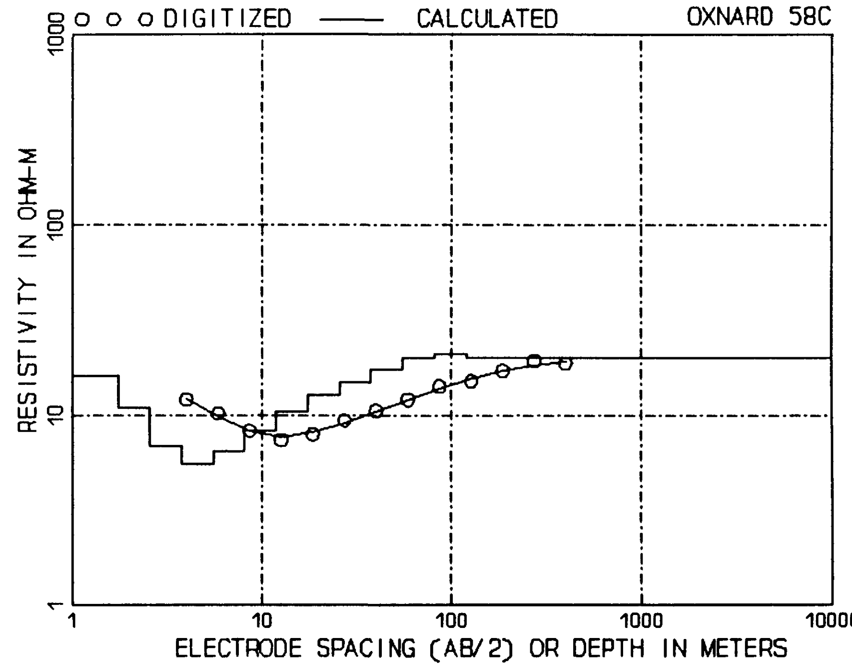
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	11.60	30.48	(100.00)	7.20
4.27	(14.00)	8.70	42.67	(140.00)	8.80
6.10	(20.00)	6.30	60.96	(200.00)	10.60
9.14	(30.00)	5.20	91.44	(300.00)	14.00
12.19	(40.00)	5.20	121.92	(400.00)	17.60
18.29	(60.00)	5.70	182.88	(600.00)	21.00
24.38	(80.00)	6.80	243.84	(800.00)	22.50
30.48	(100.00)	7.30	304.80	(1000.00)	23.60
			411.48	(1350.00)	25.70



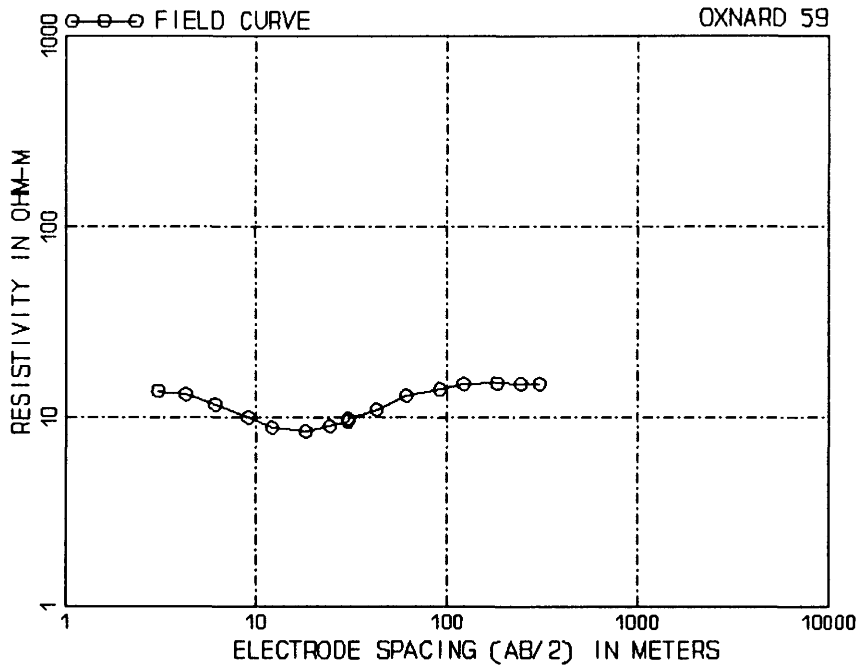
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.80	(5.90)	14.11	18.00	(59.05)	7.65
2.64	(8.67)	5.63	26.42	(86.67)	11.54
3.88	(12.72)	3.38	38.78	(127.22)	18.46
5.69	(18.67)	3.66	56.92	(186.73)	26.82
8.35	(27.41)	4.66	83.54	(274.08)	32.65
12.26	(40.23)	5.82	122.62	(402.30)	33.60
			99999.00	(99999.00)	30.90



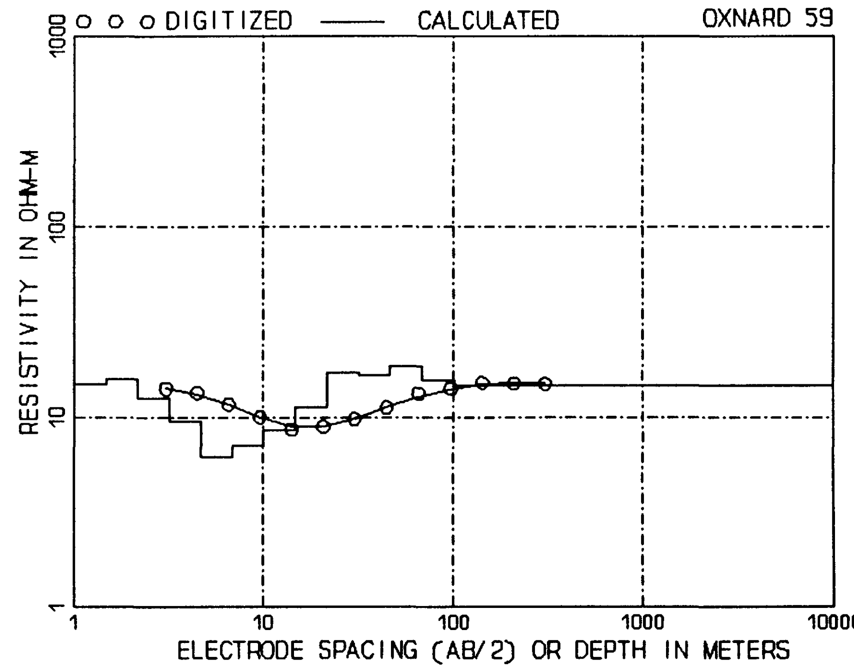
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	13.70	30.48 (	100.00)	9.80
4.27 (	14.00)	11.80	42.67 (	140.00)	11.00
6.10 (	20.00)	10.00	60.96 (	200.00)	12.50
9.14 (	30.00)	8.00	91.44 (	300.00)	14.30
12.19 (	40.00)	7.40	121.92 (	400.00)	15.00
18.29 (	60.00)	7.90	182.88 (	600.00)	17.00
24.38 (	80.00)	9.00	243.84 (	800.00)	18.80
30.48 (	100.00)	9.80	304.80 (	1000.00)	19.50
			399.90 (	1312.00)	18.70



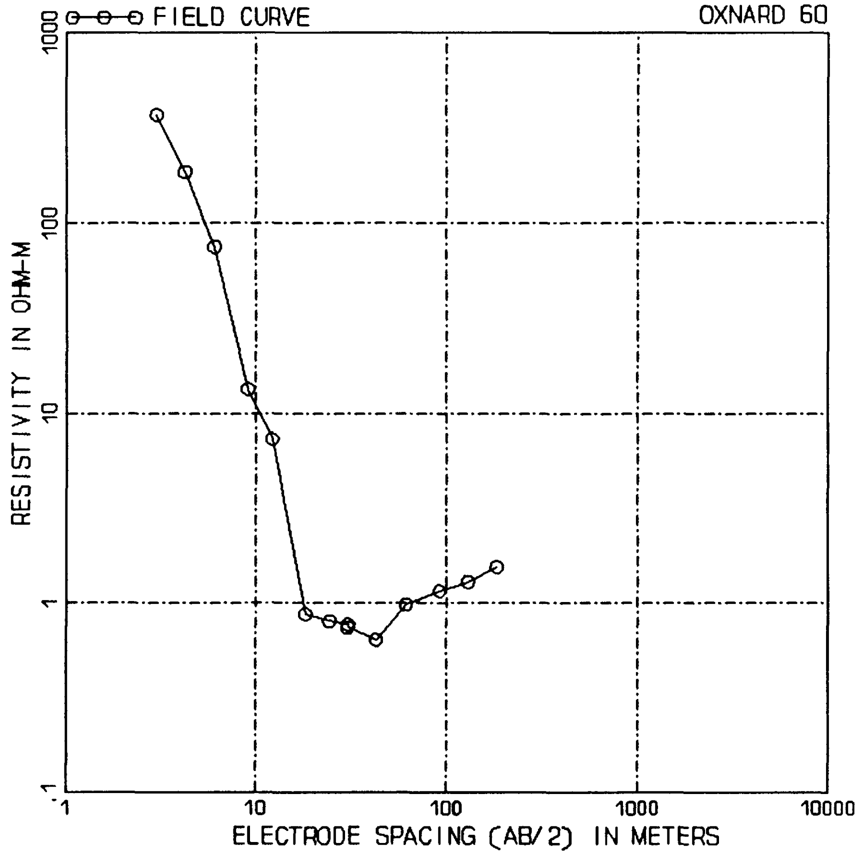
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.75 (	5.74)	16.15	17.49 (	57.39)	10.44
2.57 (	8.42)	11.01	25.67 (	84.23)	12.72
3.77 (	12.36)	6.87	37.68 (	123.64)	15.02
5.53 (	18.15)	5.55	55.31 (	181.47)	17.55
8.12 (	26.64)	6.42	81.19 (	266.37)	20.08
11.92 (	39.10)	8.27	119.17 (	390.97)	21.16
			99999.00 (	99999.00)	19.96

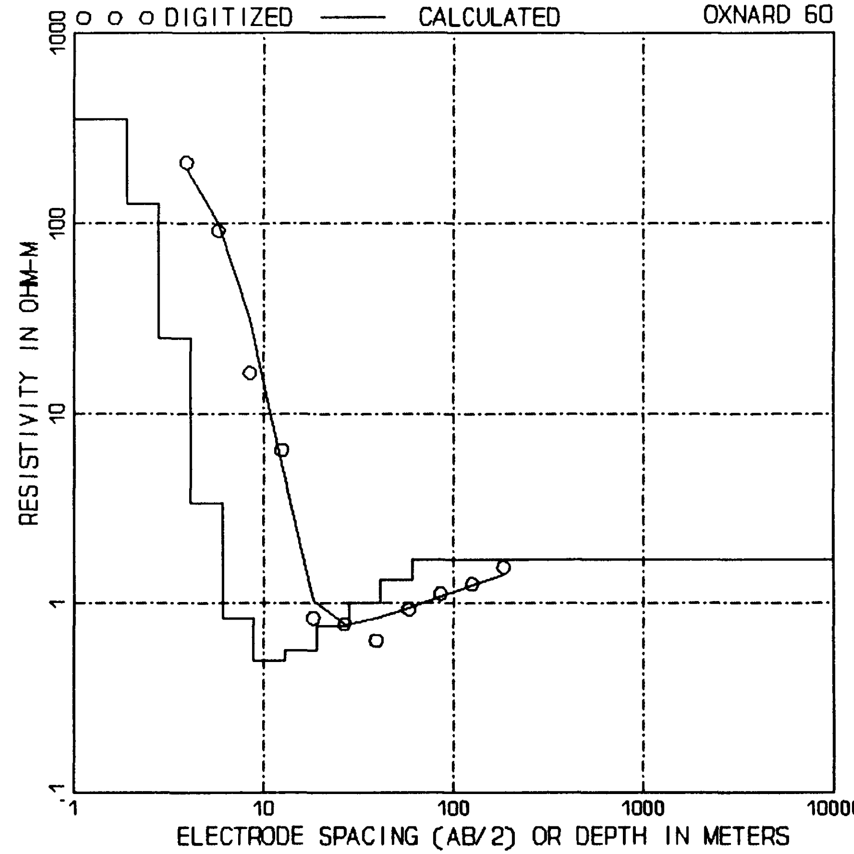


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	13.70	30.48	(100.00)	9.80
4.27	(14.00)	13.20	42.67	(140.00)	11.00
6.10	(20.00)	11.70	60.96	(200.00)	13.00
9.14	(30.00)	10.00	91.44	(300.00)	14.00
12.19	(40.00)	8.80	121.92	(400.00)	15.00
18.29	(60.00)	8.40	182.88	(600.00)	15.10
24.38	(80.00)	8.95	243.84	(800.00)	15.00
30.48	(100.00)	9.50	304.80	(1000.00)	15.00



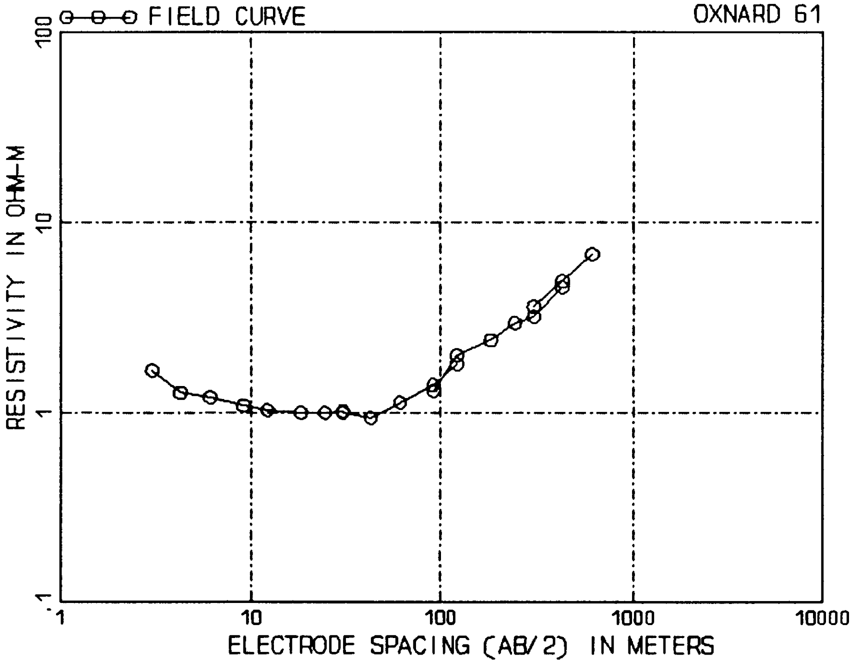
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.48	(4.86)	15.03	14.81	(48.60)	8.55
2.17	(7.13)	16.00	21.74	(71.34)	11.33
3.19	(10.47)	12.56	31.91	(104.71)	17.09
4.68	(15.37)	9.58	46.84	(153.69)	16.65
6.88	(22.56)	6.20	68.76	(225.58)	18.55
10.09	(33.11)	7.16	100.92	(331.11)	15.68
			99999.00	(99999.00)	14.60

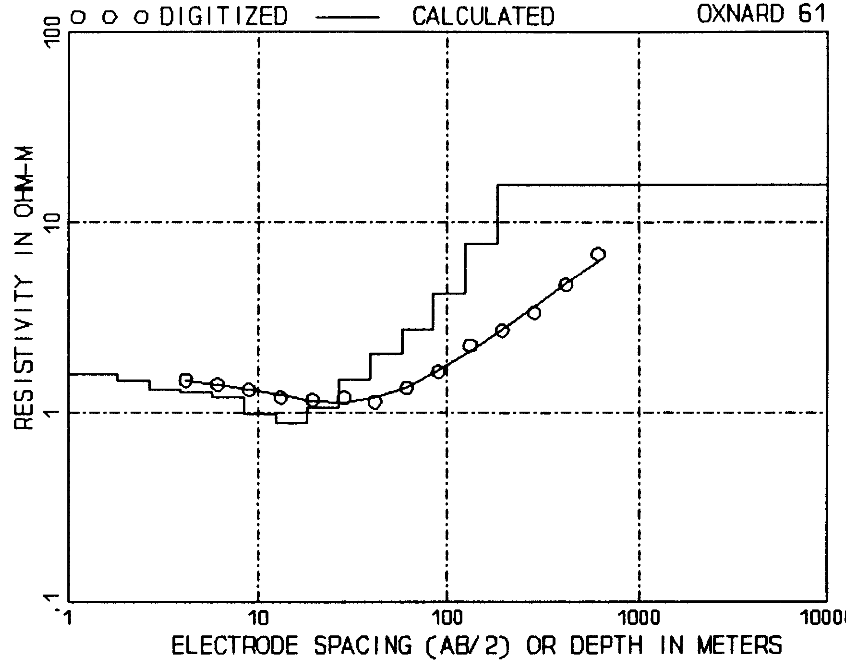




AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	370.00	30.48	(100.00)	0.77
4.27	(14.00)	185.00	30.48	(100.00)	0.74
6.10	(20.00)	75.00	42.67	(140.00)	0.64
9.14	(30.00)	13.40	60.96	(200.00)	0.98
12.19	(40.00)	7.30	91.44	(300.00)	1.15
18.29	(60.00)	0.87	129.24	(424.00)	1.29
24.38	(80.00)	0.80	182.88	(600.00)	1.55

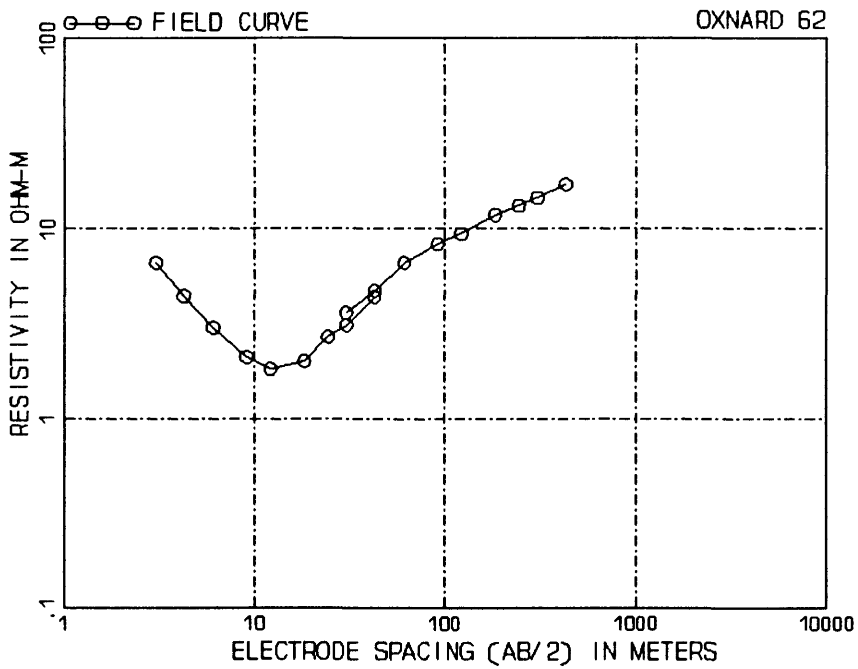
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.91	(6.28)	352.47	13.05	(42.80)	0.50
2.81	(9.22)	126.38	19.15	(62.82)	0.57
4.13	(13.53)	24.70	28.11	(92.21)	0.76
6.06	(19.87)	3.36	41.25	(135.35)	1.01
8.89	(29.16)	0.83	60.55	(198.66)	1.32
			99999.00	(99999.00)	1.70



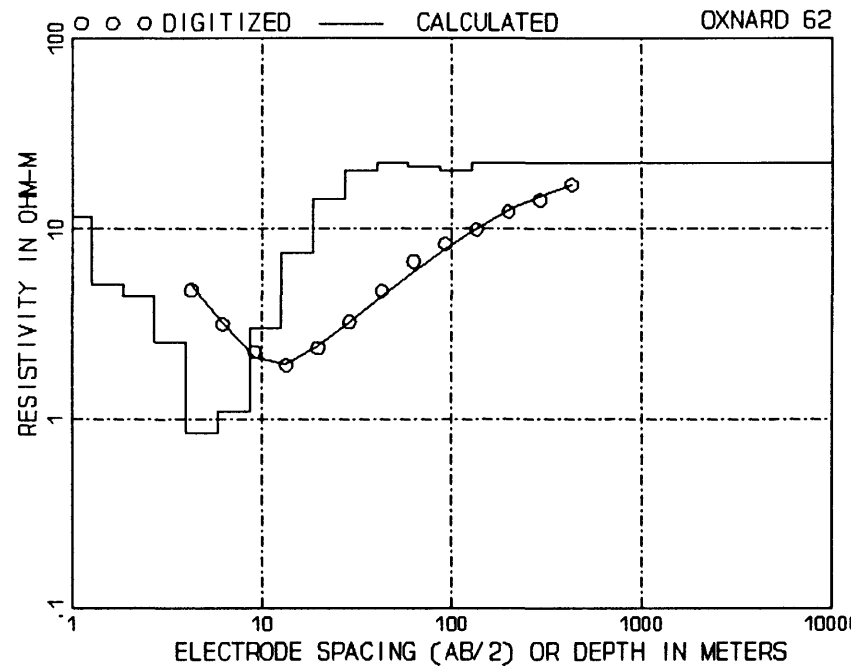


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	1.67	91.44	(300.00)	1.40
4.27	(14.00)	1.27	121.92	(400.00)	1.80
6.10	(20.00)	1.20	91.44	(300.00)	1.30
9.14	(30.00)	1.09	121.92	(400.00)	2.00
12.19	(40.00)	1.03	182.88	(600.00)	2.40
18.29	(60.00)	1.00	243.84	(800.00)	2.95
24.38	(80.00)	1.00	304.80	(1000.00)	3.20
30.48	(100.00)	1.02	426.72	(1400.00)	4.55
30.48	(100.00)	1.00	304.80	(1000.00)	3.60
42.67	(140.00)	0.94	426.72	(1400.00)	4.90
60.96	(200.00)	1.13	609.60	(2000.00)	6.80

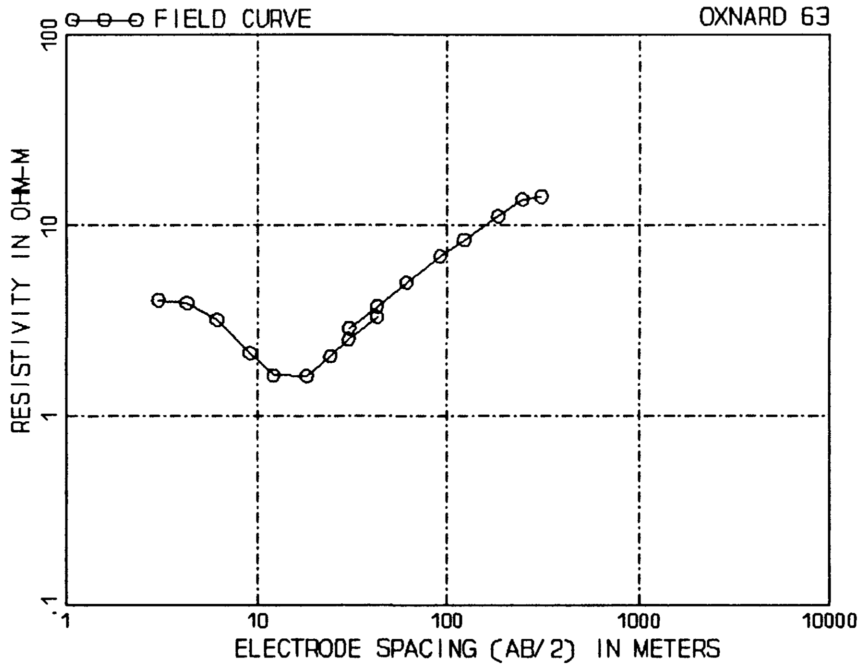
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	1.58	26.66	(87.48)	1.06
2.67	(8.75)	1.46	39.14	(128.40)	1.50
3.91	(12.84)	1.33	57.45	(188.47)	2.03
5.74	(18.85)	1.27	84.32	(276.64)	2.73
8.43	(27.66)	1.20	123.76	(406.05)	4.23
12.38	(40.60)	0.99	181.66	(595.99)	7.76
18.17	(59.60)	0.88	99999.00	(99999.00)	15.66

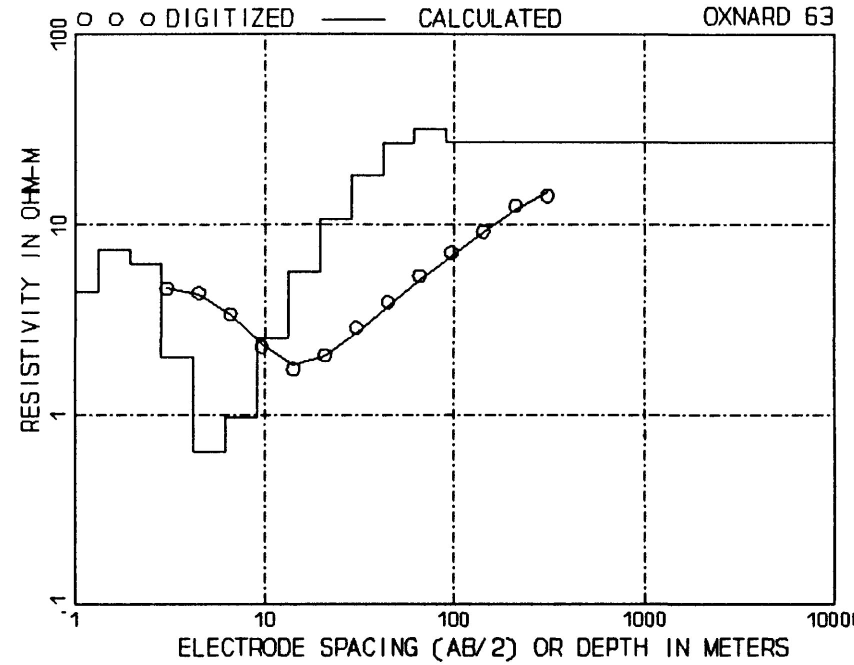


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	6.60	30.48	(100.00)	3.60
4.27	(14.00)	4.40	42.67	(140.00)	4.70
6.10	(20.00)	3.00	60.96	(200.00)	6.60
9.14	(30.00)	2.10	91.44	(300.00)	8.30
12.19	(40.00)	1.82	121.92	(400.00)	9.40
18.29	(60.00)	2.00	182.88	(600.00)	11.80
24.38	(80.00)	2.70	243.84	(800.00)	13.20
30.48	(100.00)	3.10	304.80	(1000.00)	14.50
42.67	(140.00)	4.35	426.72	(1400.00)	17.00



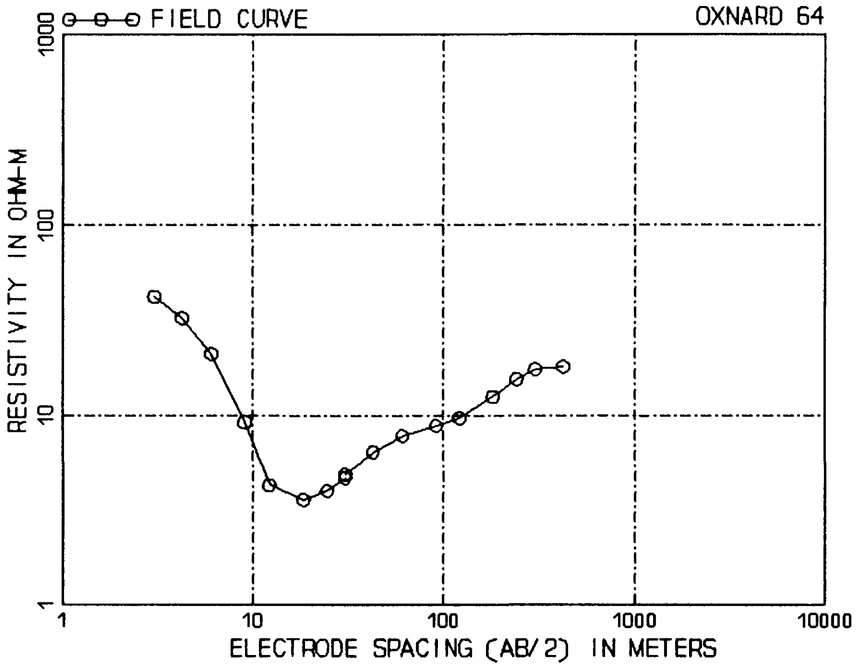
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.27	(4.17)	11.47	18.66	(61.24)	7.51
1.87	(6.12)	5.06	27.40	(89.88)	14.24
2.74	(8.99)	4.45	40.21	(131.93)	20.13
4.02	(13.19)	2.52	59.02	(193.65)	22.20
5.90	(19.36)	0.84	86.63	(284.23)	21.12
8.66	(28.42)	1.10	127.16	(417.20)	20.23
12.72	(41.72)	2.99	99999.00	(99999.00)	22.18



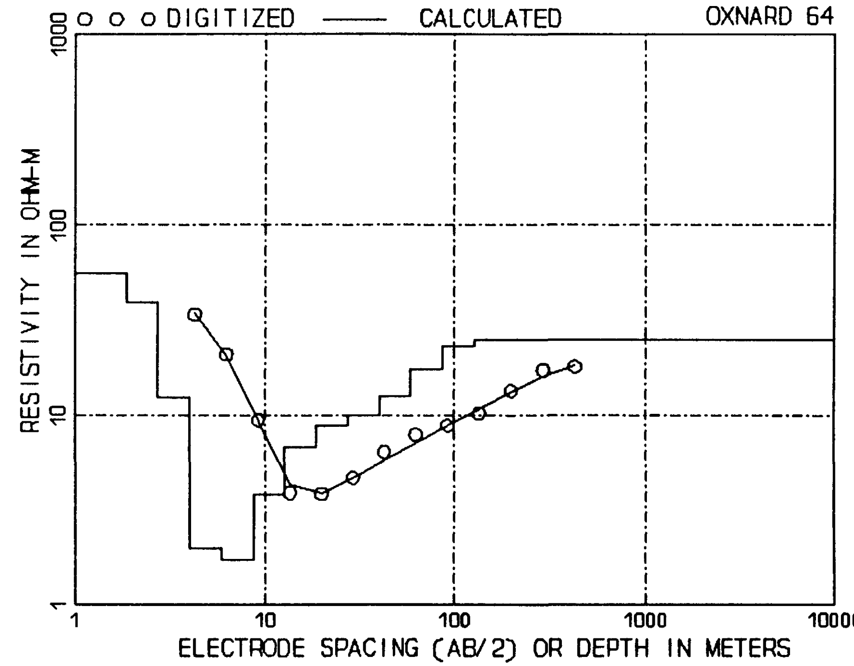


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	4.05	42.67 (	140.00)	3.30
4.27 (	14.00)	3.90	30.48 (	100.00)	2.88
6.10 (	20.00)	3.20	42.67 (	140.00)	3.75
9.14 (	30.00)	2.13	60.96 (	200.00)	5.00
12.19 (	40.00)	1.63	91.44 (	300.00)	6.90
18.29 (	60.00)	1.62	121.92 (	400.00)	8.40
24.38 (	80.00)	2.05	182.88 (	600.00)	11.20
30.48 (	100.00)	2.52	243.84 (	800.00)	13.70
			304.80 (	1000.00)	14.20

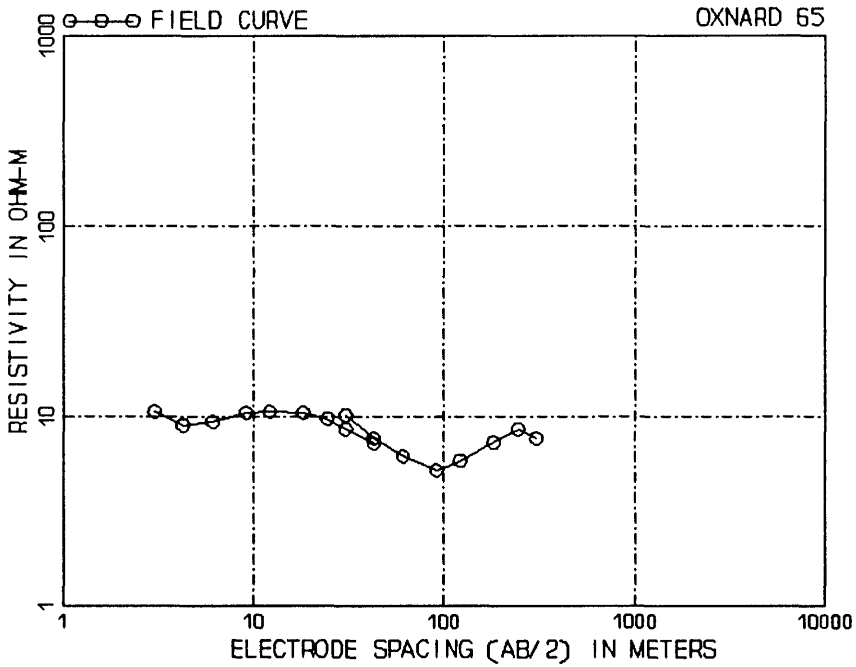
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.33 (	4.37)	4.39	13.33 (	43.74)	2.55
1.96 (	6.42)	7.33	19.57 (	64.20)	5.67
2.87 (	9.42)	6.23	28.72 (	94.23)	10.77
4.22 (	13.83)	2.01	42.16 (	138.32)	18.20
6.19 (	20.30)	0.64	61.88 (	203.02)	26.79
9.08 (	29.80)	0.97	90.83 (	298.00)	31.39
			99999.00 (	99999.00)	26.89



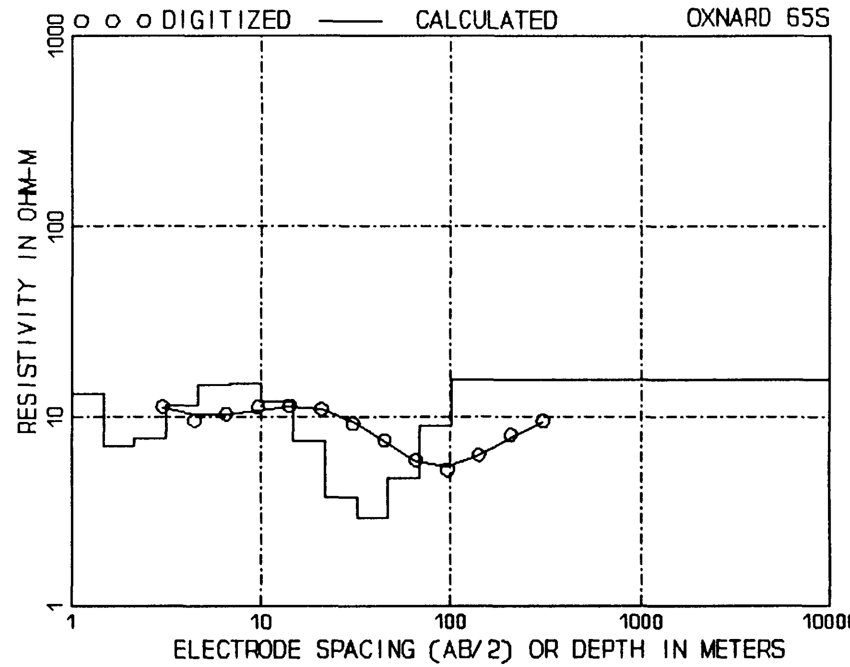
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	42.00	30.48	(100.00)	4.90
4.27	(14.00)	32.40	42.67	(140.00)	6.40
6.10	(20.00)	21.00	60.96	(200.00)	7.80
9.14	(30.00)	9.20	91.44	(300.00)	8.80
12.19	(40.00)	4.30	121.92	(400.00)	9.70
18.29	(60.00)	3.60	182.88	(600.00)	12.50
24.38	(80.00)	4.00	243.84	(800.00)	15.50
30.48	(100.00)	4.70	304.80	(1000.00)	17.50
			426.72	(1400.00)	18.00



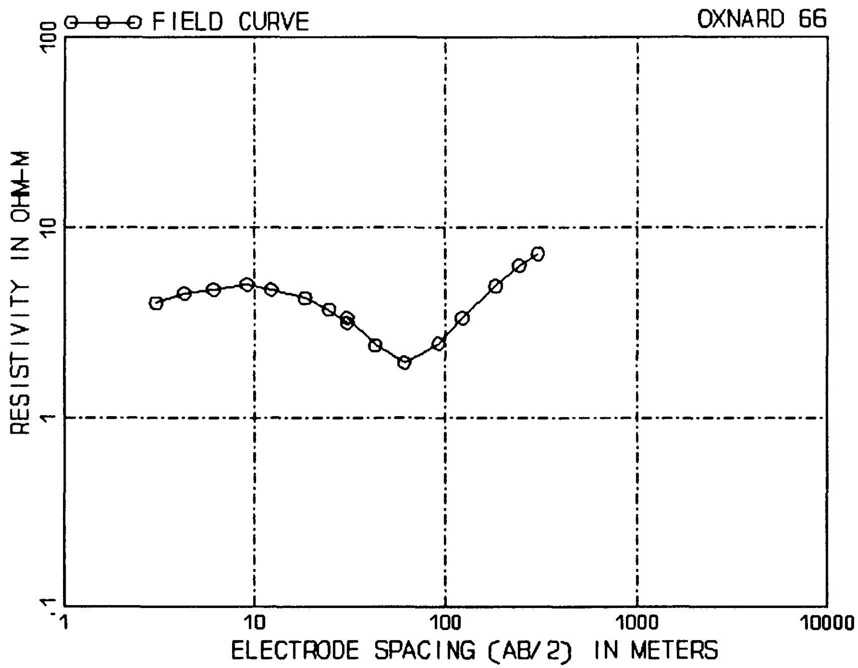
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.87	(6.12)	55.48	18.66	(61.24)	6.78
2.74	(8.99)	38.79	27.40	(89.88)	8.83
4.02	(13.19)	12.31	40.21	(131.93)	10.05
5.90	(19.36)	2.00	59.02	(193.65)	12.53
8.66	(28.42)	1.74	86.63	(284.23)	17.58
12.72	(41.72)	3.83	127.16	(417.20)	23.10
			99999.00	(99999.00)	25.09



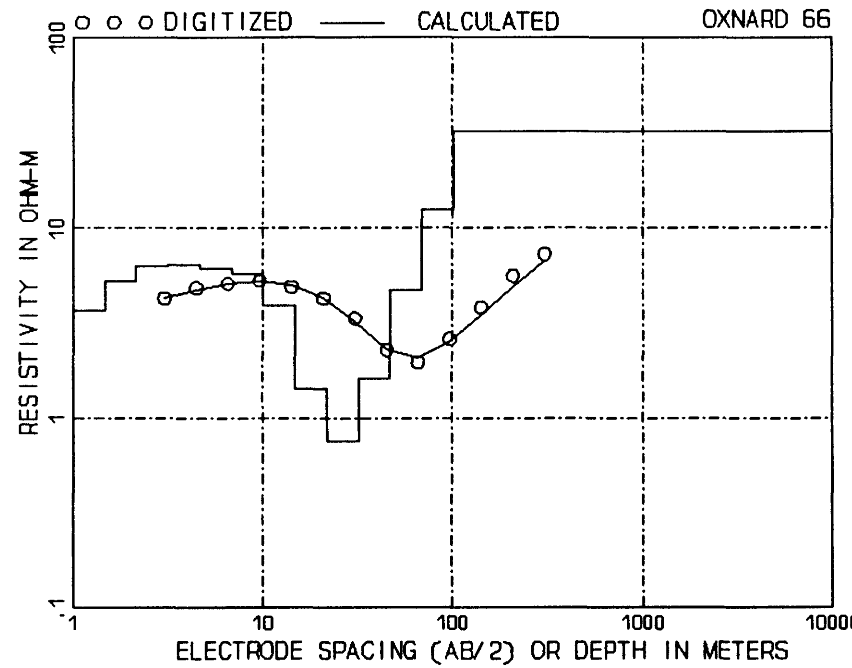
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	10.60	42.67 (	140.00)	7.20
4.27 (	14.00)	9.00	30.48 (	100.00)	10.20
6.10 (	20.00)	9.40	42.67 (	140.00)	7.70
9.14 (	30.00)	10.50	60.96 (	200.00)	6.20
12.19 (	40.00)	10.60	91.44 (	300.00)	5.20
18.29 (	60.00)	10.50	121.92 (	400.00)	5.85
24.38 (	80.00)	9.75	182.88 (	600.00)	7.30
30.48 (	100.00)	8.60	243.84 (	800.00)	8.60
			304.80 (	1000.00)	7.70



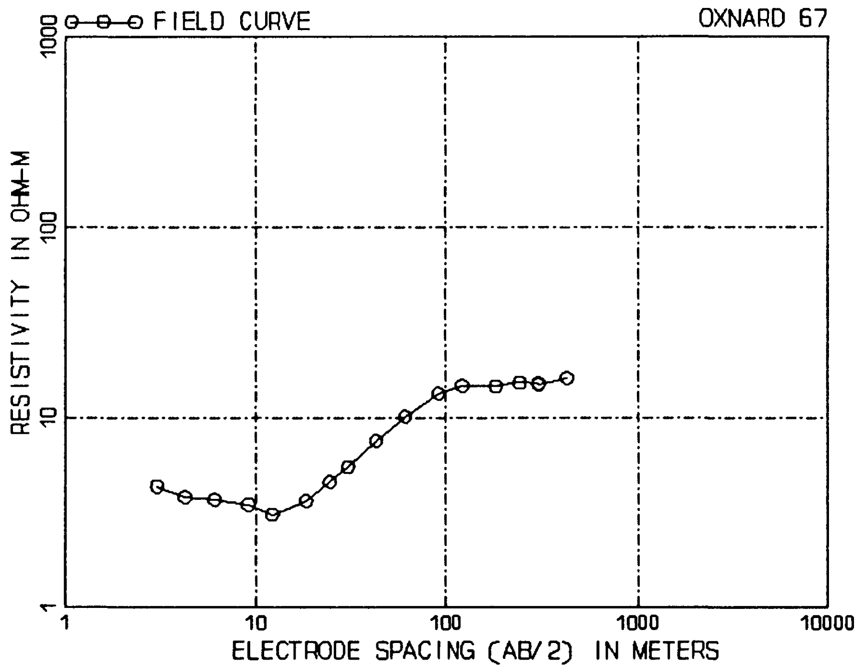
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.86)	13.26	14.81 (	48.60)	11.97
2.17 (	7.13)	7.03	21.74 (	71.34)	7.42
3.19 (	10.47)	7.72	31.91 (	104.71)	3.78
4.68 (	15.37)	11.57	46.84 (	153.69)	2.94
6.88 (	22.56)	14.75	68.76 (	225.58)	4.73
10.09 (	33.11)	14.87	100.92 (	331.11)	8.97
			99999.00 (	99999.00)	15.62

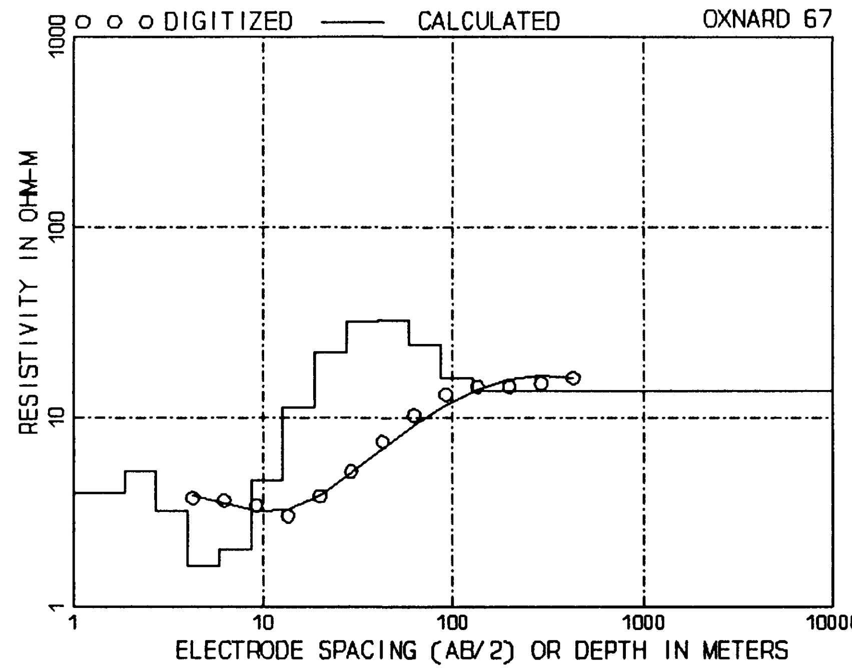


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	4.00	30.48	(100.00)	3.35
4.27	(14.00)	4.50	42.67	(140.00)	2.40
6.10	(20.00)	4.70	60.96	(200.00)	1.95
9.14	(30.00)	5.00	91.44	(300.00)	2.45
12.19	(40.00)	4.70	121.92	(400.00)	3.35
18.29	(60.00)	4.25	182.88	(600.00)	4.90
24.38	(80.00)	3.70	243.84	(800.00)	6.30
30.48	(100.00)	3.15	304.80	(1000.00)	7.30



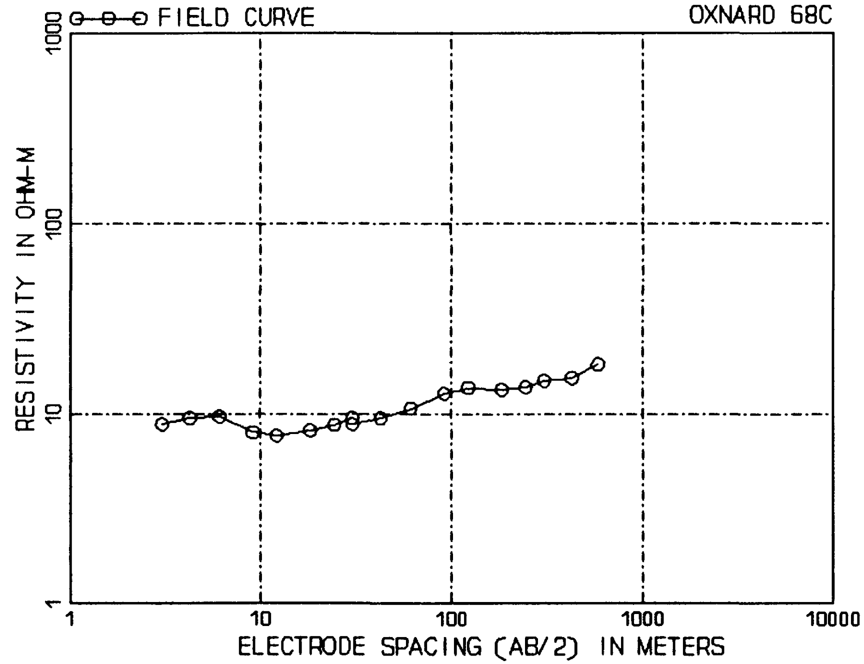
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.48	(4.86)	3.65	14.81	(48.60)	3.92
2.17	(7.13)	5.26	21.74	(71.34)	1.42
3.19	(10.47)	6.29	31.91	(104.71)	0.75
4.68	(15.37)	6.40	46.84	(153.69)	1.61
6.88	(22.56)	6.14	68.76	(225.58)	4.74
10.09	(33.11)	5.73	100.92	(331.11)	12.53
			99999.00	(99999.00)	32.36



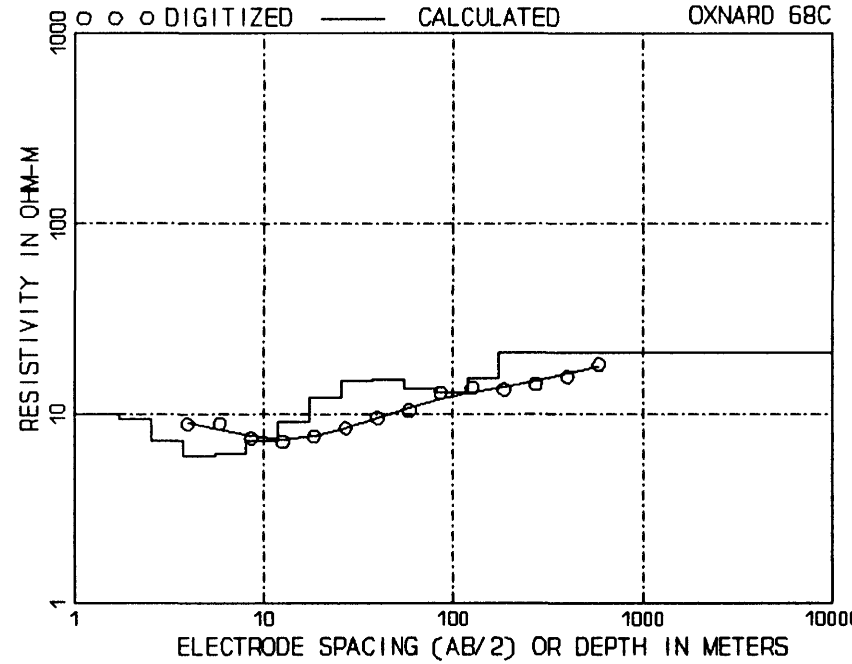


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	4.35	42.67	(140.00)	7.55
4.27	(14.00)	3.82	60.96	(200.00)	10.15
6.10	(20.00)	3.70	91.44	(300.00)	13.40
9.14	(30.00)	3.50	121.92	(400.00)	14.70
12.19	(40.00)	3.10	182.88	(600.00)	14.60
18.29	(60.00)	3.65	243.84	(800.00)	15.30
24.38	(80.00)	4.60	304.80	(1000.00)	15.20
30.48	(100.00)	5.50	304.80	(1000.00)	15.00
30.48	(100.00)	5.50	426.72	(1400.00)	16.20

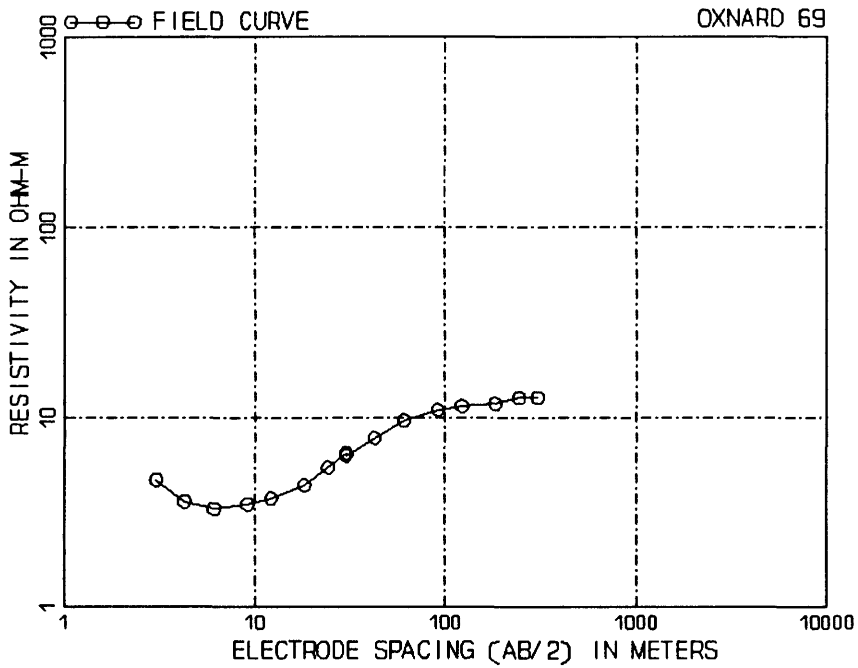
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.87	(6.12)	4.03	18.66	(61.24)	11.25
2.74	(8.99)	5.20	27.40	(89.88)	22.15
4.02	(13.19)	3.23	40.21	(131.93)	32.13
5.90	(19.36)	1.65	59.02	(193.65)	32.59
8.66	(28.42)	2.02	86.63	(284.23)	24.17
12.72	(41.72)	4.68	127.16	(417.20)	16.24
			99999.00	(99999.00)	13.85



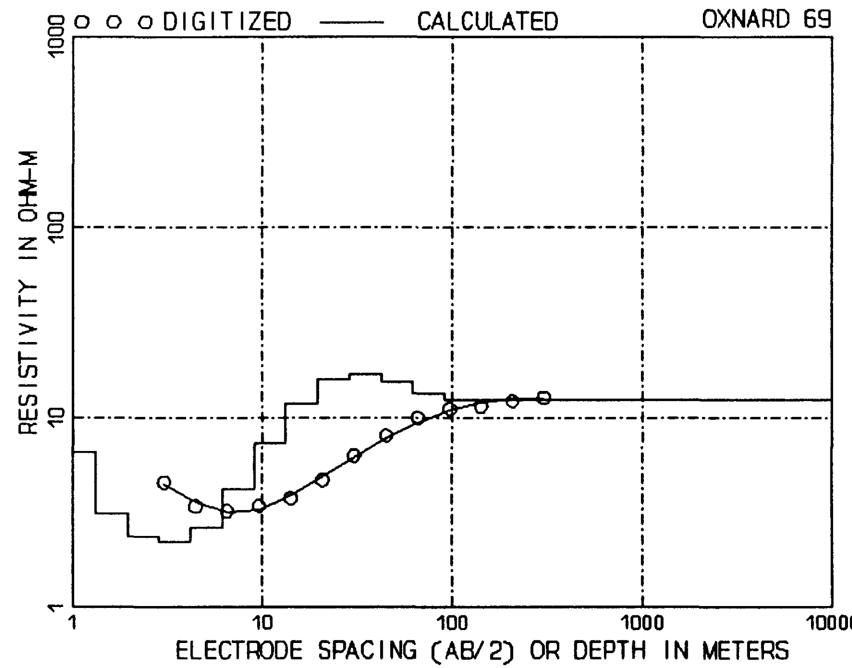
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.80	42.67	(140.00)	9.50
4.27	(14.00)	9.50	60.96	(200.00)	10.70
6.10	(20.00)	9.70	91.44	(300.00)	12.80
9.14	(30.00)	8.00	121.92	(400.00)	13.70
12.19	(40.00)	7.70	182.88	(600.00)	13.40
18.29	(60.00)	8.20	243.84	(800.00)	13.80
24.38	(80.00)	8.75	304.80	(1000.00)	15.00
30.48	(100.00)	9.50	304.80	(1000.00)	15.00
30.48	(100.00)	8.80	426.72	(1400.00)	15.50
			586.13	(1923.00)	18.20



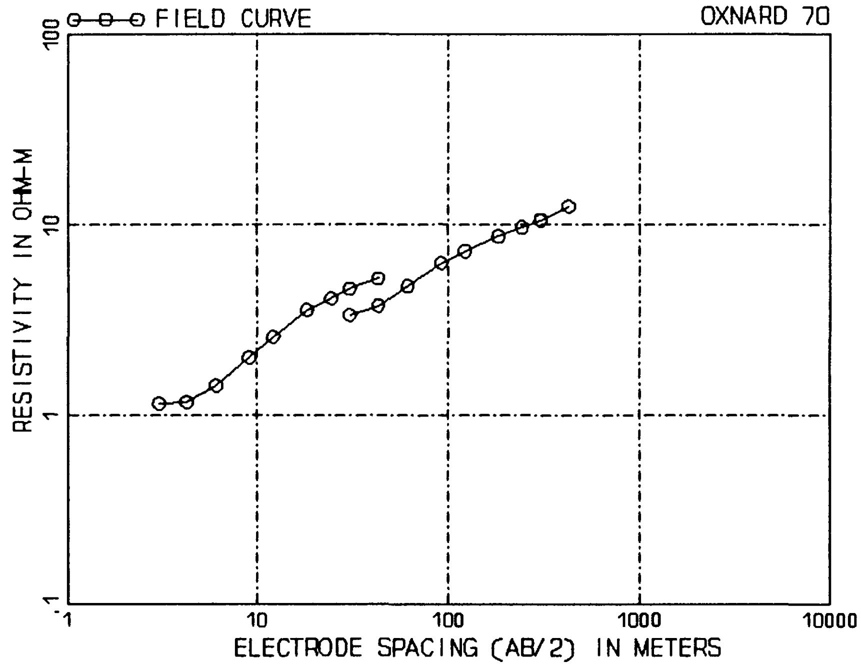
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.75	(5.73)	9.98	25.64	(84.11)	12.12
2.56	(8.41)	9.39	37.63	(123.46)	15.01
3.76	(12.35)	7.22	55.23	(181.21)	15.25
5.52	(18.12)	5.97	81.07	(265.99)	13.55
8.11	(26.60)	6.16	119.00	(390.41)	12.99
11.90	(39.04)	7.18	174.67	(573.05)	15.45
17.47	(57.30)	9.05	99999.00	(99999.00)	21.16



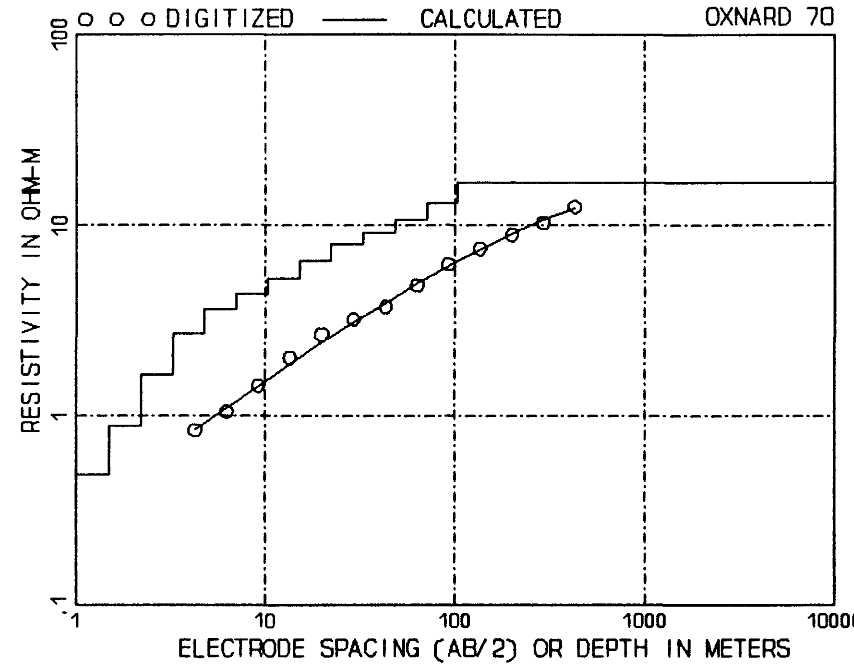
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	4.70	30.48	(100.00)	6.30
4.27	(14.00)	3.61	42.67	(140.00)	7.80
6.10	(20.00)	3.30	60.96	(200.00)	9.65
9.14	(30.00)	3.50	91.44	(300.00)	11.00
12.19	(40.00)	3.75	121.92	(400.00)	11.50
18.29	(60.00)	4.40	182.88	(600.00)	11.80
24.38	(80.00)	5.45	243.84	(800.00)	12.70
30.48	(100.00)	6.50	304.80	(1000.00)	12.70



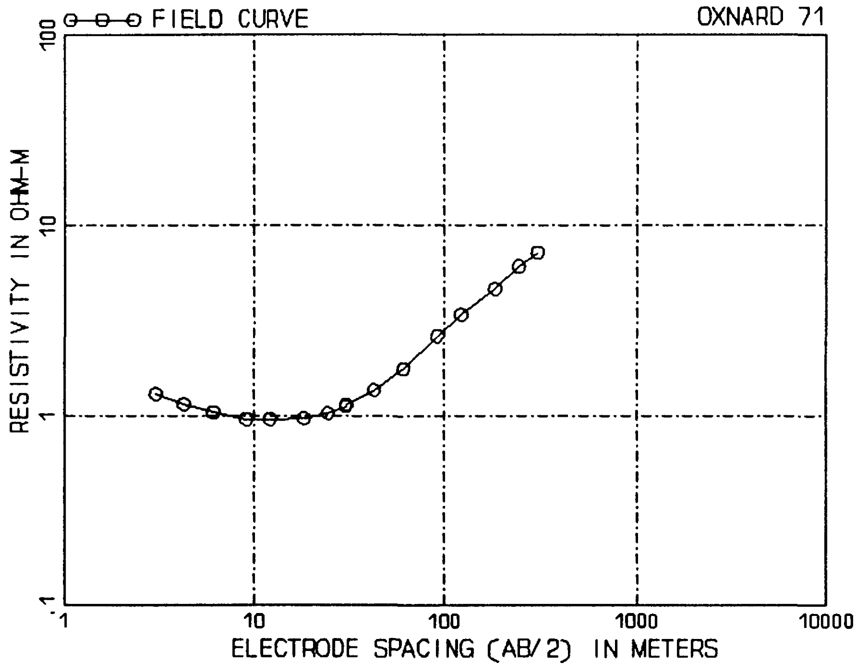
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.33	(4.37)	6.54	13.33	(43.74)	7.38
1.96	(6.42)	3.13	19.57	(64.20)	11.91
2.87	(9.42)	2.35	28.72	(94.23)	15.90
4.22	(13.83)	2.23	42.16	(138.32)	17.04
6.19	(20.30)	2.62	61.88	(203.02)	15.47
9.08	(29.80)	4.18	90.83	(298.00)	13.40
			99999.00	(99999.00)	12.30



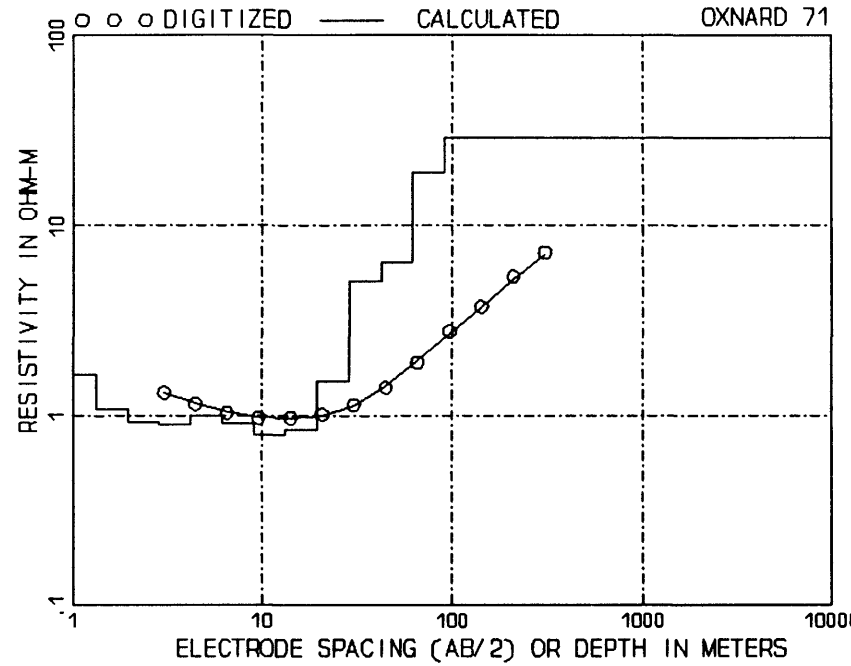
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	1.15	30.48 (	100.00)	3.35
4.27 (	14.00)	1.17	42.67 (	140.00)	3.75
6.10 (	20.00)	1.43	60.96 (	200.00)	4.75
9.14 (	30.00)	2.00	91.44 (	300.00)	6.30
12.19 (	40.00)	2.57	121.92 (	400.00)	7.30
18.29 (	60.00)	3.55	182.88 (	600.00)	8.70
24.38 (	80.00)	4.10	243.84 (	800.00)	9.70
30.48 (	100.00)	4.60	304.80 (	1000.00)	10.60
42.67 (	140.00)	5.20	304.80 (	1000.00)	10.50
			426.72 (	1400.00)	12.50



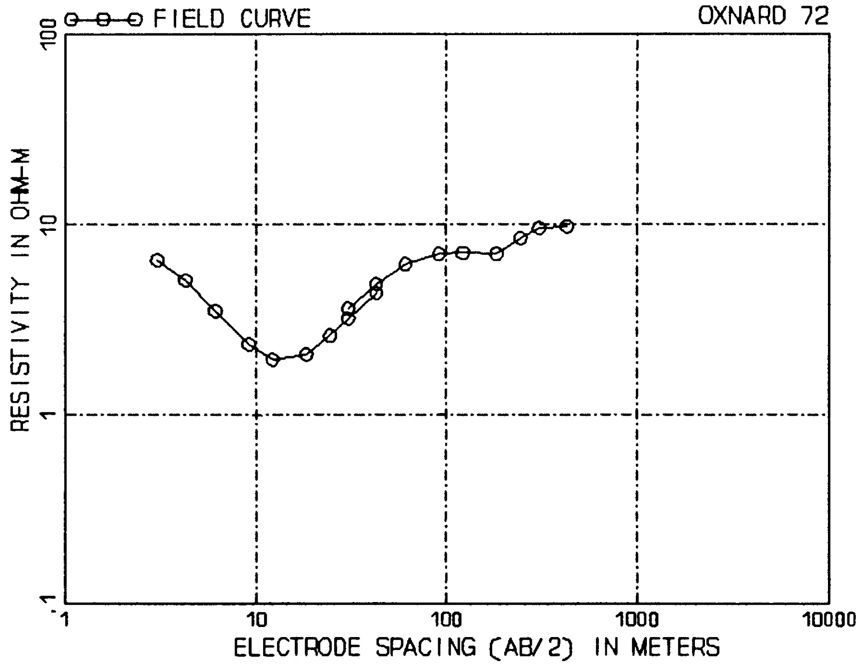
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.51 (	4.96)	0.49	15.12 (	49.60)	5.21
2.22 (	7.28)	0.88	22.19 (	72.80)	6.47
3.26 (	10.69)	1.64	32.57 (	106.86)	7.91
4.78 (	15.69)	2.68	47.81 (	156.85)	9.19
7.02 (	23.02)	3.63	70.17 (	230.23)	10.64
10.30 (	33.79)	4.36	103.00 (	337.93)	13.01
			99999.00 (	99999.00)	16.74



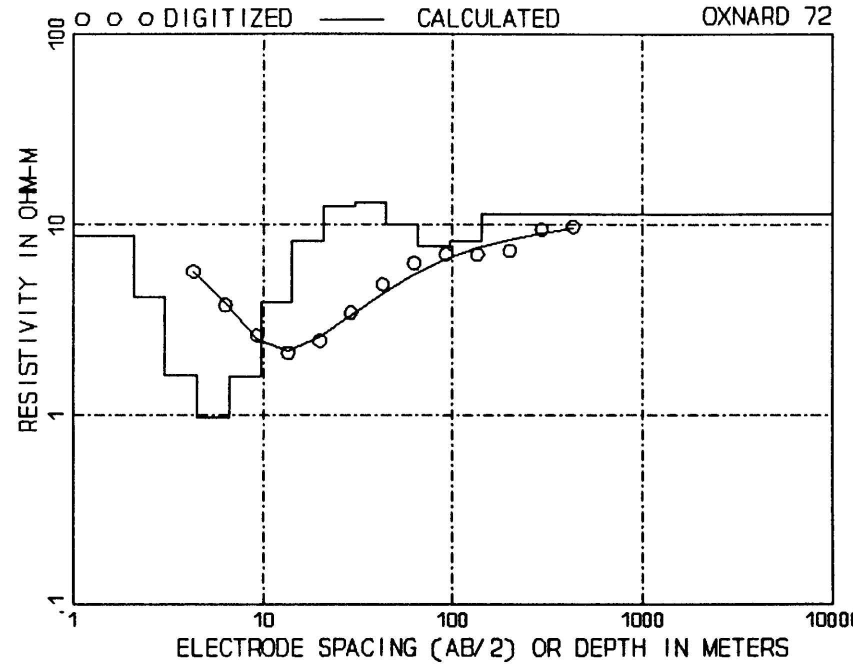
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	1.30	30.48 (	100.00)	1.14
4.27 (	14.00)	1.15	42.67 (	140.00)	1.36
6.10 (	20.00)	1.04	60.96 (	200.00)	1.76
9.14 (	30.00)	0.96	91.44 (	300.00)	2.63
12.19 (	40.00)	0.96	121.92 (	400.00)	3.40
18.29 (	60.00)	0.97	182.88 (	600.00)	4.65
24.38 (	80.00)	1.03	243.84 (	800.00)	6.10
30.48 (	100.00)	1.12	304.80 (	1000.00)	7.20



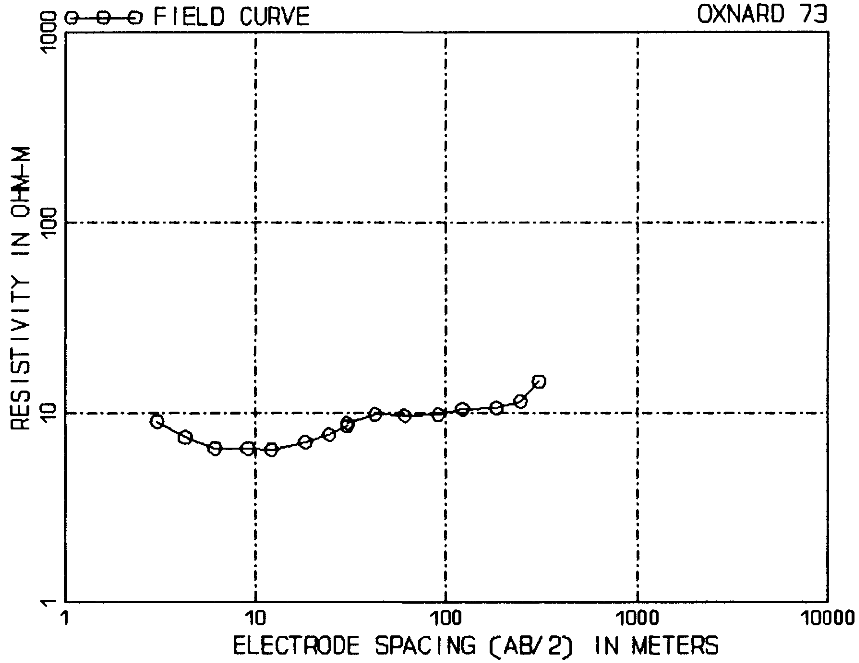
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.33 (	4.37)	1.63	13.33 (	43.74)	0.80
1.96 (	6.42)	1.09	19.57 (	64.20)	0.85
2.87 (	9.42)	0.93	28.72 (	94.23)	1.52
4.22 (	13.83)	0.89	42.16 (	138.32)	5.08
6.19 (	20.30)	0.99	61.88 (	203.02)	6.40
9.08 (	29.80)	0.91	90.83 (	298.00)	19.07
			99999.00 (	99999.00)	28.72



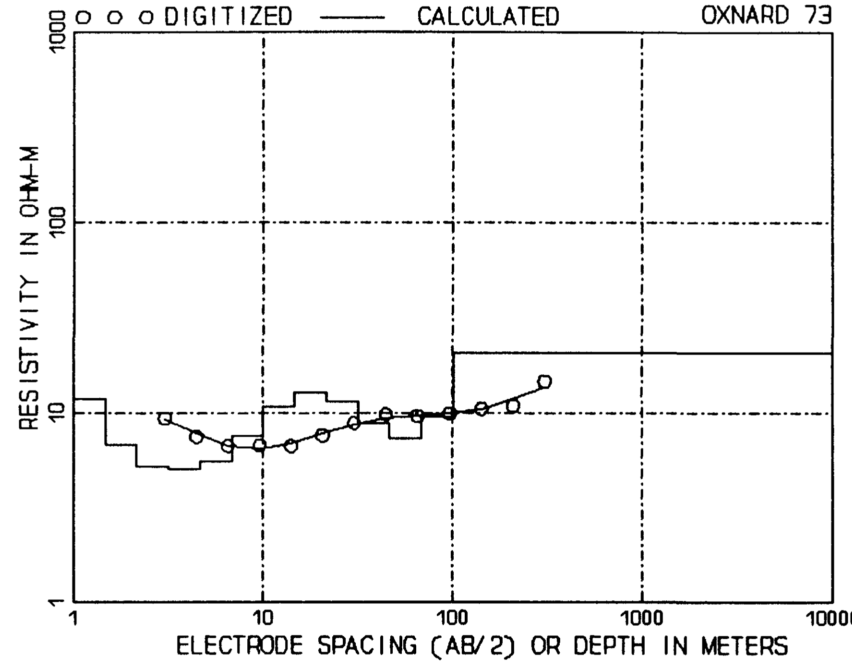
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	6.50	30.48 (	100.00)	3.60
4.27 (	14.00)	5.10	42.67 (	140.00)	4.85
6.10 (	20.00)	3.50	60.96 (	200.00)	6.20
9.14 (	30.00)	2.35	91.44 (	300.00)	7.00
12.19 (	40.00)	1.95	121.92 (	400.00)	7.10
18.29 (	60.00)	2.07	182.88 (	600.00)	7.00
24.38 (	80.00)	2.60	243.84 (	800.00)	8.50
30.48 (	100.00)	3.20	304.80 (	1000.00)	9.60
42.67 (	140.00)	4.35	426.72 (	1400.00)	9.80



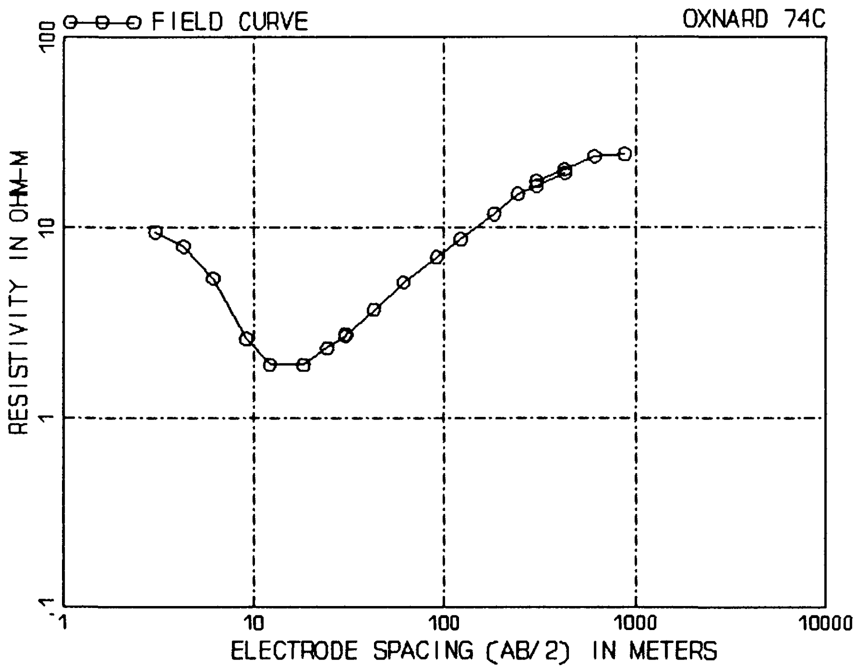
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.07 (	6.80)	8.80	20.74 (	68.04)	8.26
3.04 (	9.99)	4.15	30.44 (	99.87)	12.58
4.47 (	14.66)	1.63	44.68 (	146.59)	13.10
6.56 (	21.52)	0.96	65.58 (	215.16)	10.09
9.63 (	31.58)	1.60	96.26 (	315.81)	7.72
14.13 (	46.36)	3.93	141.29 (	463.55)	8.15
			99999.00 (	99999.00)	11.42



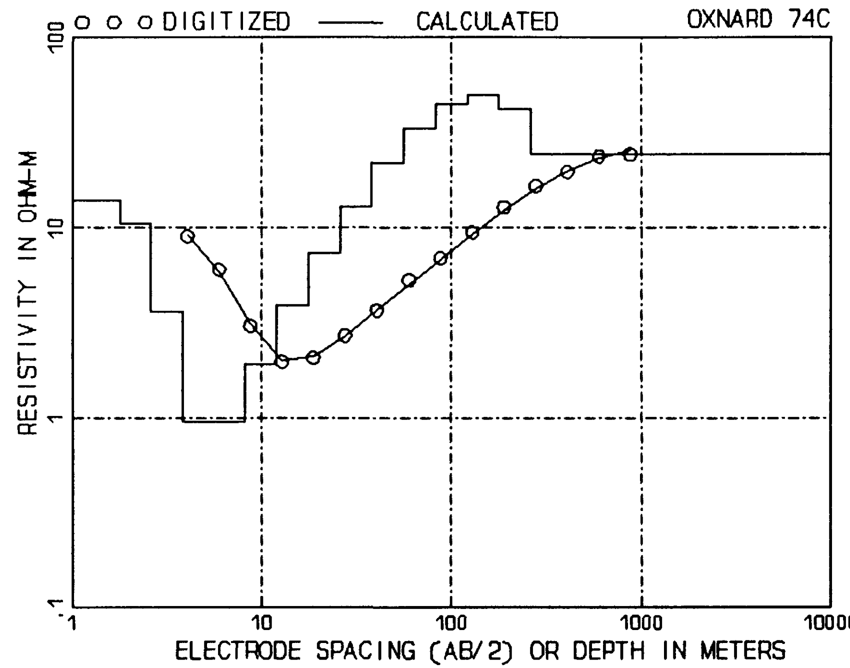
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.00	30.48 (	100.00)	8.80
4.27 (	14.00)	7.40	42.67 (	140.00)	9.80
6.10 (	20.00)	6.50	60.96 (	200.00)	9.70
9.14 (	30.00)	6.50	91.44 (	300.00)	9.80
12.19 (	40.00)	6.40	121.92 (	400.00)	10.50
18.29 (	60.00)	7.00	182.88 (	600.00)	10.60
24.38 (	80.00)	7.70	243.84 (	800.00)	11.50
30.48 (	100.00)	8.50	304.80 (	1000.00)	14.60



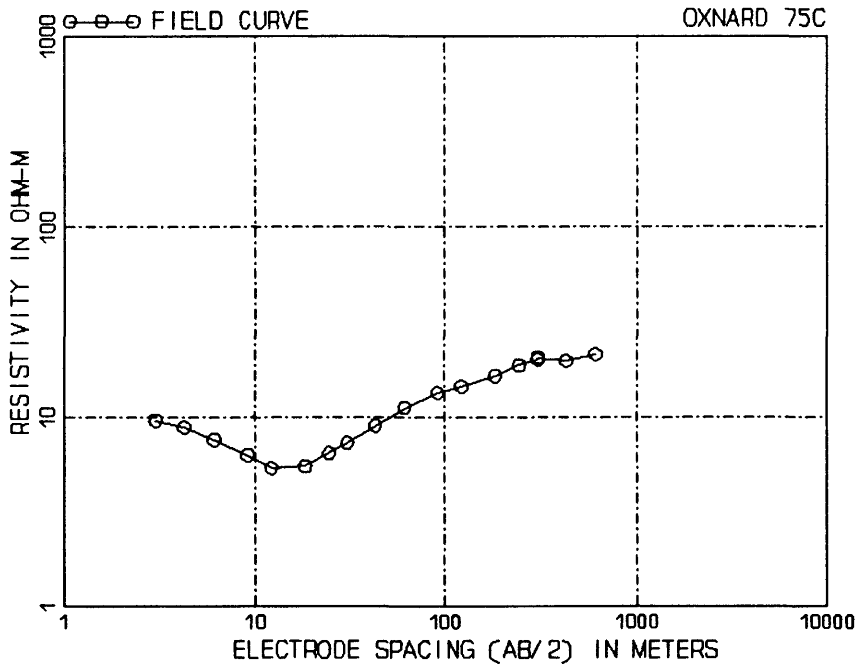
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.48 (	4.86)	11.88	14.81 (	48.60)	10.81
2.17 (	7.13)	6.78	21.74 (	71.34)	12.69
3.19 (	10.47)	5.21	31.91 (	104.71)	11.51
4.68 (	15.37)	5.04	46.84 (	153.69)	8.82
6.88 (	22.56)	5.55	68.76 (	225.58)	7.31
10.09 (	33.11)	7.58	100.92 (	331.11)	9.56
			99999.00 (	99999.00)	20.55



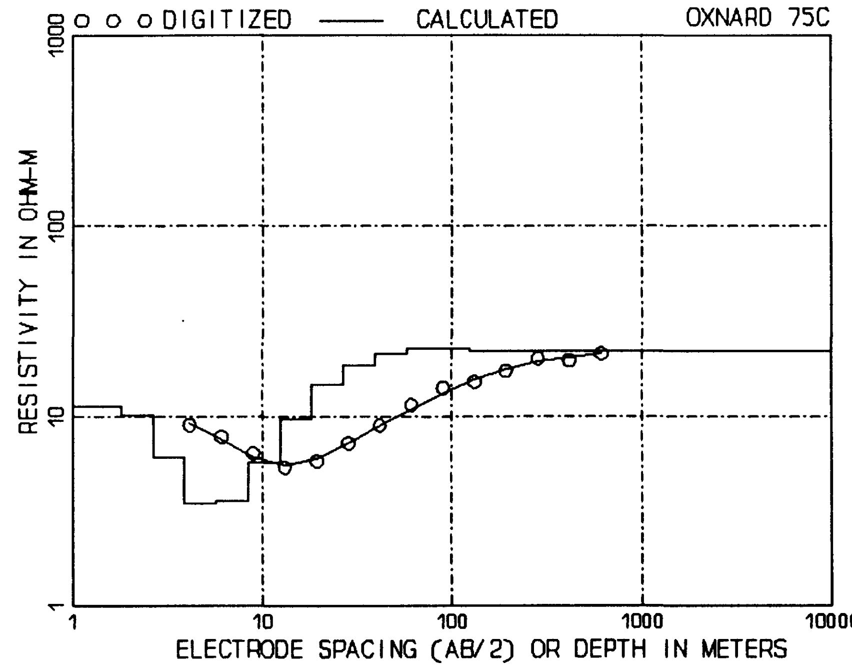
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	9.50	60.96	(200.00)	5.15
4.27	(14.00)	8.00	91.44	(300.00)	7.00
6.10	(20.00)	5.40	121.92	(400.00)	8.70
9.14	(30.00)	2.60	182.88	(600.00)	11.80
12.19	(40.00)	1.90	243.84	(800.00)	15.00
18.29	(60.00)	1.90	304.80	(1000.00)	16.50
24.38	(80.00)	2.33	426.72	(1400.00)	19.25
30.48	(100.00)	2.70	304.80	(1000.00)	17.50
30.48	(100.00)	2.75	426.72	(1400.00)	20.20
42.67	(140.00)	3.70	609.60	(2000.00)	23.60
			875.69	(2873.00)	24.20



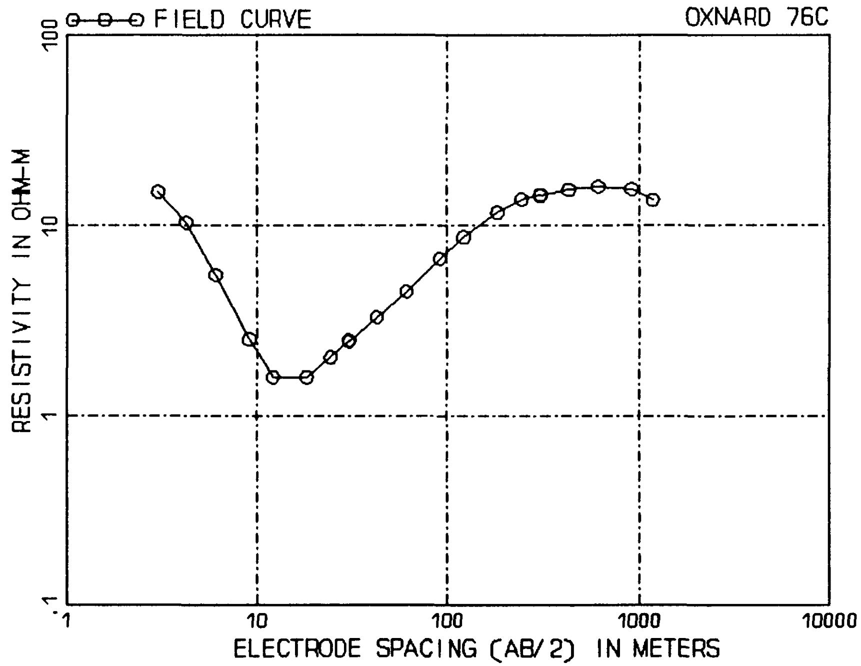
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.78	(5.83)	13.91	26.10	(85.61)	7.35
2.61	(8.56)	10.59	38.30	(125.67)	12.96
3.83	(12.57)	3.59	56.22	(184.45)	21.64
5.62	(18.45)	0.96	82.52	(270.74)	33.27
8.25	(27.07)	0.96	121.12	(397.39)	44.78
12.11	(39.74)	1.91	177.79	(583.29)	49.71
17.78	(58.33)	3.90	260.95	(856.15)	41.69
			99999.00	(99999.00)	24.38



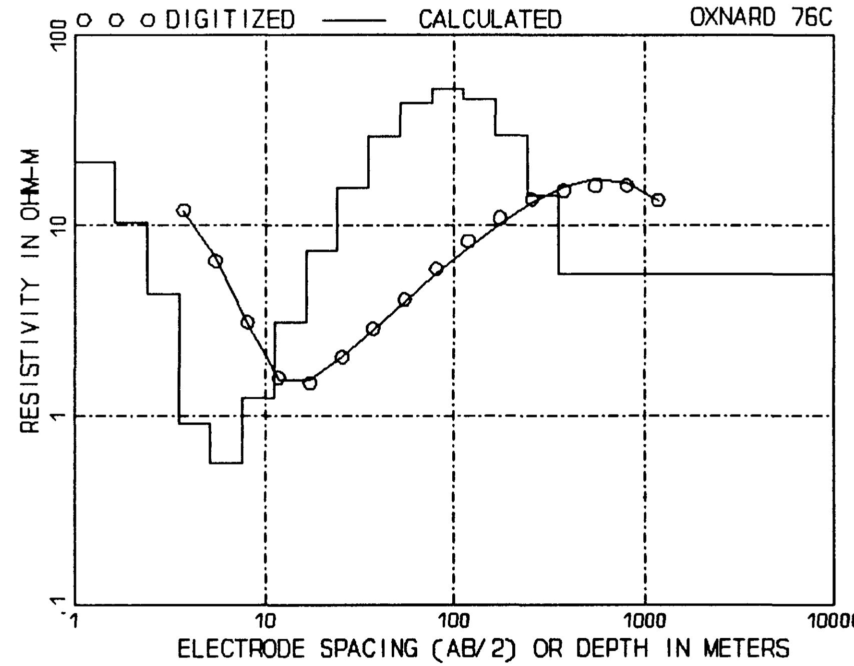
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	9.60	42.67	(140.00)	9.00
4.27	(14.00)	8.80	60.96	(200.00)	11.20
6.10	(20.00)	7.60	91.44	(300.00)	13.40
9.14	(30.00)	6.30	121.92	(400.00)	14.50
12.19	(40.00)	5.40	182.88	(600.00)	16.50
18.29	(60.00)	5.50	243.84	(800.00)	18.70
24.38	(80.00)	6.45	304.80	(1000.00)	20.00
30.48	(100.00)	7.30	304.80	(1000.00)	20.50
30.48	(100.00)	7.30	426.72	(1400.00)	19.70
			609.60	(2000.00)	21.30



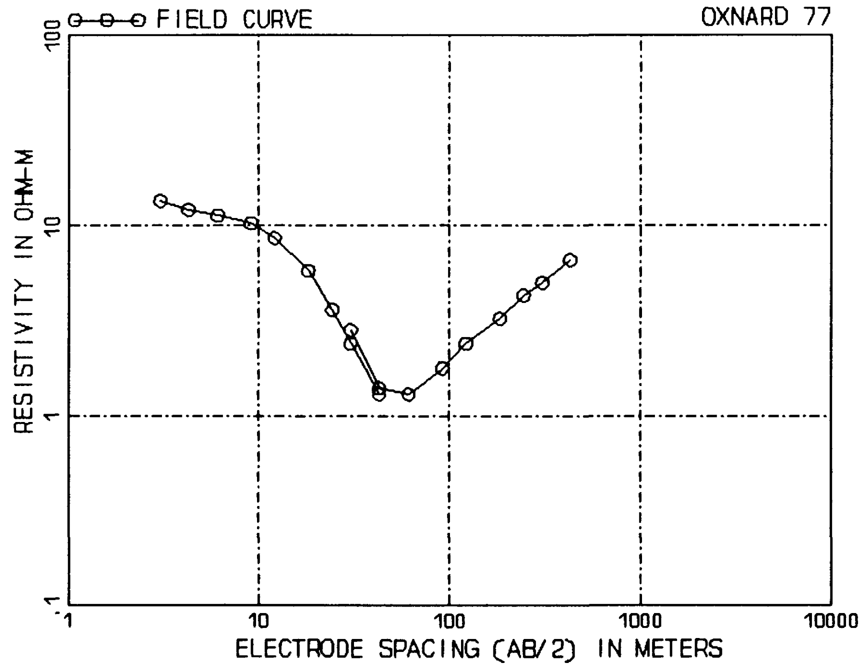
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	11.28	26.66	(87.48)	14.60
2.67	(8.75)	10.12	39.14	(128.40)	18.68
3.91	(12.84)	6.09	57.45	(188.47)	21.24
5.74	(18.85)	3.50	84.32	(276.64)	22.76
8.43	(27.66)	3.59	123.76	(406.05)	22.85
12.38	(40.60)	5.71	181.66	(595.99)	21.95
18.17	(59.60)	9.66	99999.00	(99999.00)	21.88



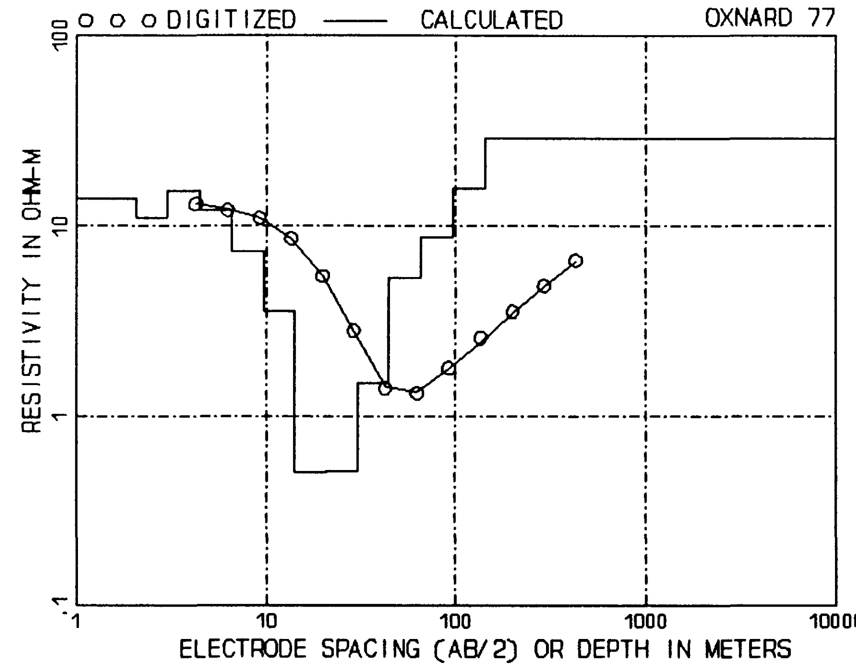
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	15.00	60.96 (	200.00)	4.50
4.27 (	14.00)	10.40	91.44 (	300.00)	6.70
6.10 (	20.00)	5.50	121.92 (	400.00)	8.70
9.14 (	30.00)	2.52	182.88 (	600.00)	11.70
12.19 (	40.00)	1.60	243.84 (	800.00)	13.70
18.29 (	60.00)	1.60	304.80 (	1000.00)	14.50
24.38 (	80.00)	2.03	304.80 (	1000.00)	14.30
30.48 (	100.00)	2.50	426.72 (	1400.00)	15.40
30.48 (	100.00)	2.45	609.60 (	2000.00)	16.00
42.67 (	140.00)	3.30	914.40 (	3000.00)	15.50
			1180.49 (	3873.00)	13.60



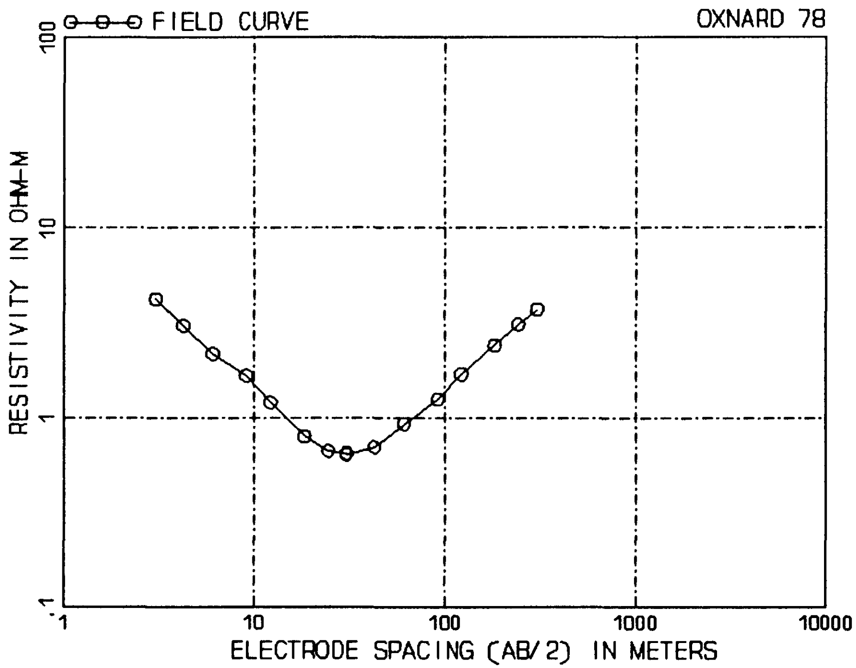
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.63 (	5.36)	21.35	35.18 (	115.41)	15.76
2.40 (	7.86)	10.30	51.63 (	169.41)	29.15
3.52 (	11.54)	4.37	75.79 (	248.65)	43.99
5.16 (	16.94)	0.91	111.24 (	364.97)	51.64
7.58 (	24.87)	0.56	163.28 (	535.71)	45.64
11.12 (	36.50)	1.24	239.67 (	786.31)	29.90
16.33 (	53.57)	3.07	351.78 (	1154.14)	14.45
23.97 (	78.63)	7.32	99999.00 (	99999.00)	5.56

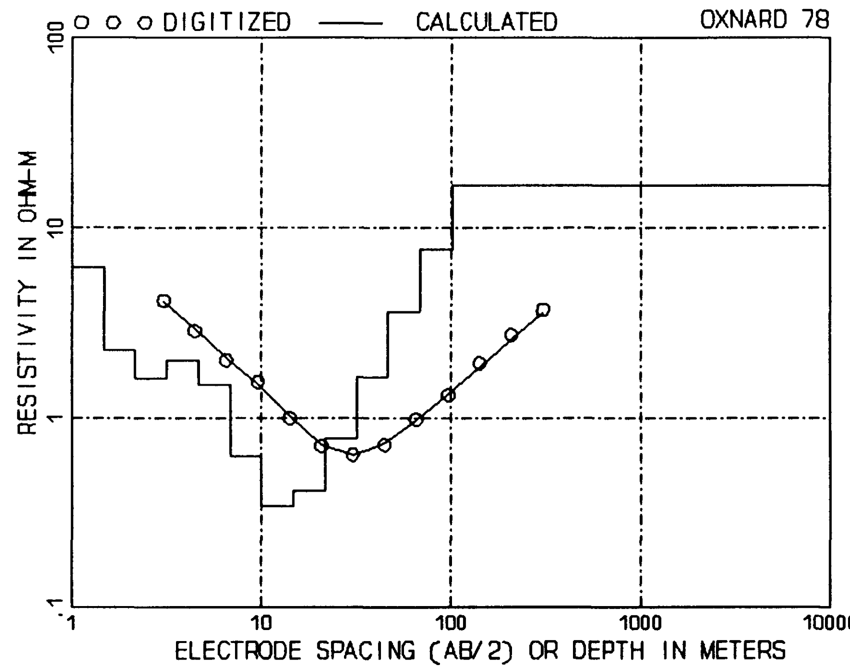


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	13.50	30.48 (	100.00)	2.82
4.27 (	14.00)	12.10	42.67 (	140.00)	1.40
6.10 (	20.00)	11.30	60.96 (	200.00)	1.30
9.14 (	30.00)	10.30	91.44 (	300.00)	1.78
12.19 (	40.00)	8.60	121.92 (	400.00)	2.40
18.29 (	60.00)	5.80	182.88 (	600.00)	3.25
24.38 (	80.00)	3.60	243.84 (	800.00)	4.30
30.48 (	100.00)	2.40	304.80 (	1000.00)	5.00
42.67 (	140.00)	1.30	426.72 (	1400.00)	6.60



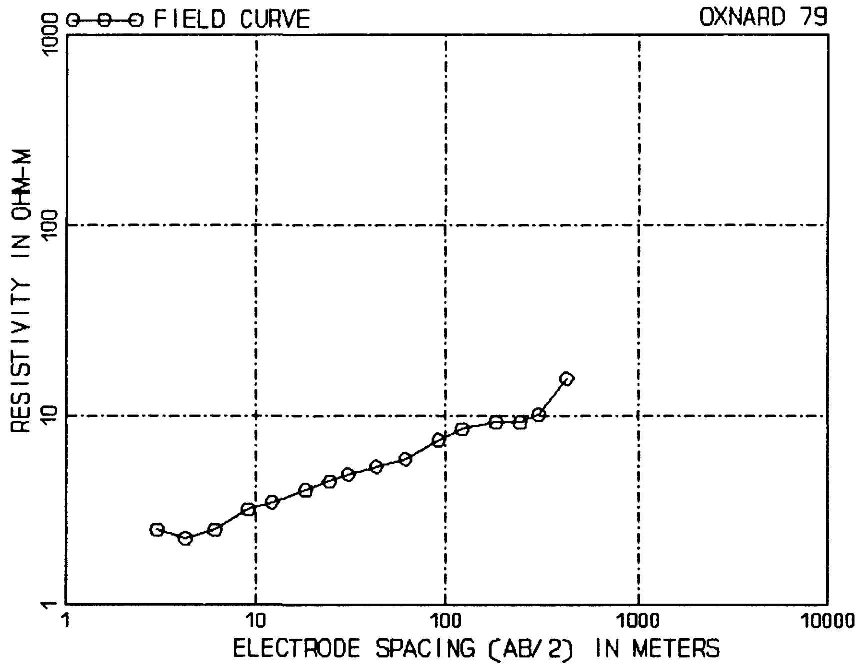
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.07 (	6.80)	13.83	20.74 (	68.04)	0.50
3.04 (	9.99)	11.04	30.44 (	99.87)	0.52
4.47 (	14.66)	15.21	44.68 (	146.59)	1.49
6.56 (	21.52)	12.13	65.58 (	215.16)	5.29
9.63 (	31.58)	7.33	96.26 (	315.81)	8.73
14.13 (	46.36)	3.53	141.29 (	463.55)	15.67
			99999.00 (	99999.00)	28.65



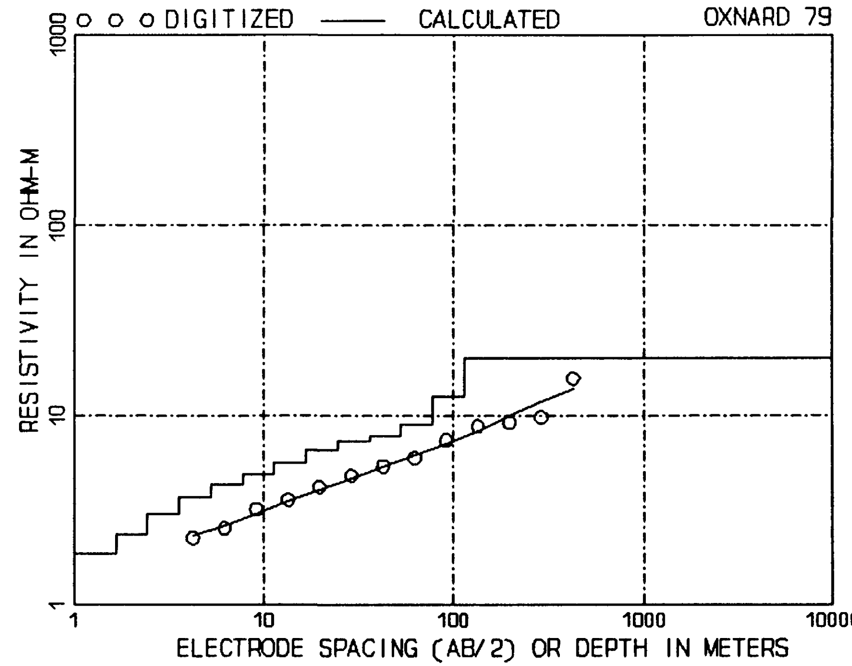


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	4.20	30.48	(100.00)	0.64
4.27	(14.00)	3.05	42.67	(140.00)	0.70
6.10	(20.00)	2.17	60.96	(200.00)	0.93
9.14	(30.00)	1.66	91.44	(300.00)	1.25
12.19	(40.00)	1.20	121.92	(400.00)	1.70
18.29	(60.00)	0.80	182.88	(600.00)	2.40
24.38	(80.00)	0.67	243.84	(800.00)	3.10
30.48	(100.00)	0.65	304.80	(1000.00)	3.70

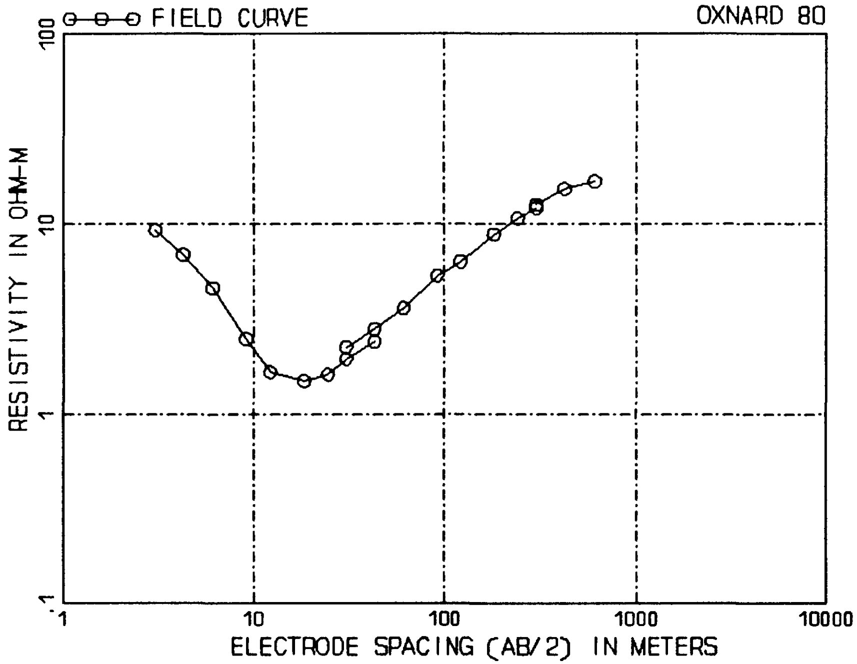
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.48	(4.86)	6.22	14.81	(48.60)	0.34
2.17	(7.13)	2.28	21.74	(71.34)	0.41
3.19	(10.47)	1.61	31.91	(104.71)	0.78
4.68	(15.37)	2.00	46.84	(153.69)	1.65
6.88	(22.56)	1.50	68.76	(225.58)	3.60
10.09	(33.11)	0.62	100.92	(331.11)	7.74
			99999.00	(99999.00)	16.81



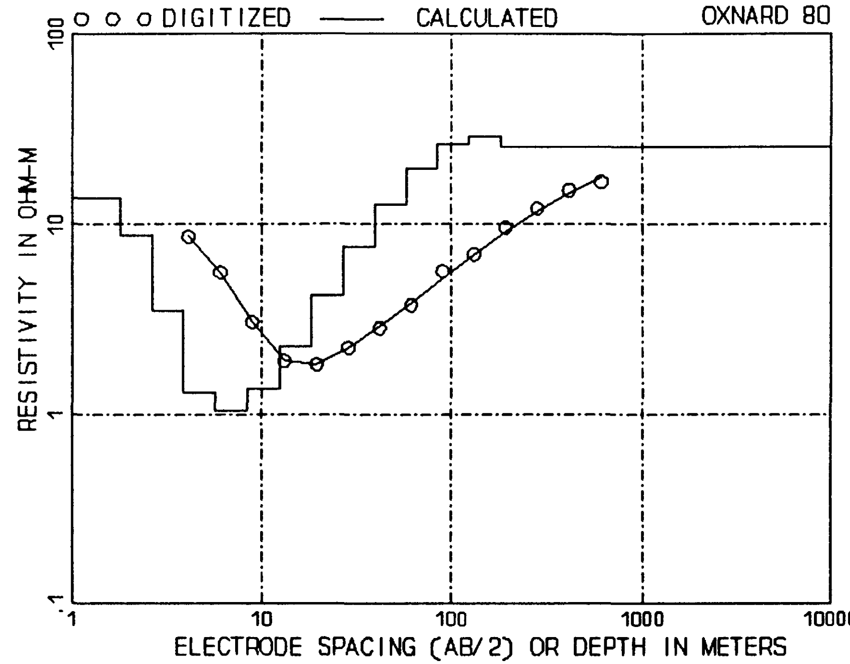
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	2.50	30.48	(100.00)	4.90
4.27	(14.00)	2.25	42.67	(140.00)	5.40
6.10	(20.00)	2.50	60.96	(200.00)	5.90
9.14	(30.00)	3.20	91.44	(300.00)	7.40
12.19	(40.00)	3.50	121.92	(400.00)	8.50
18.29	(60.00)	4.05	182.88	(600.00)	9.20
24.38	(80.00)	4.50	243.84	(800.00)	9.20
30.48	(100.00)	4.90	304.80	(1000.00)	10.10
			425.50	(1396.00)	15.70



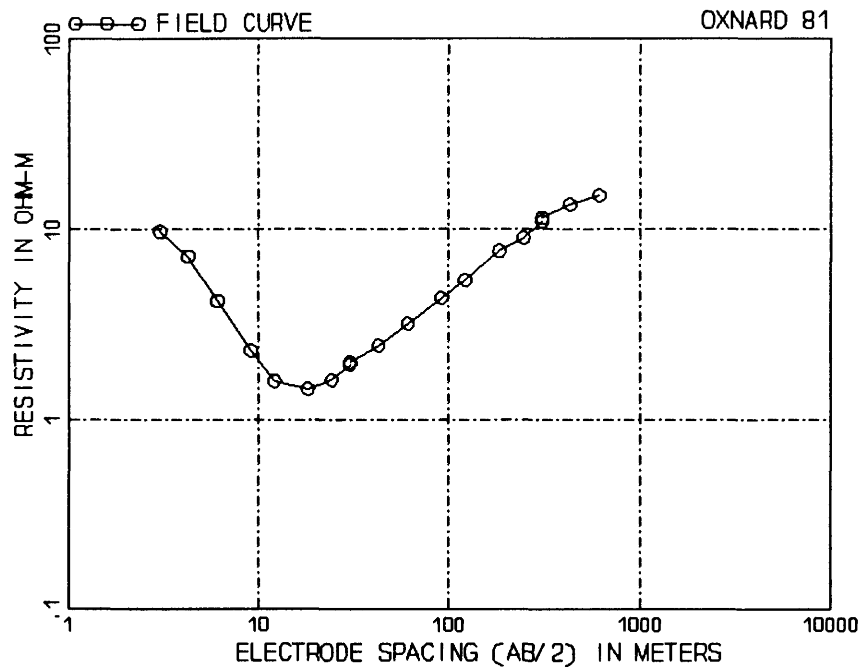
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.68	(5.50)	1.87	16.75	(54.95)	5.63
2.46	(8.07)	2.37	24.59	(80.66)	6.54
3.61	(11.84)	3.01	36.09	(118.40)	7.29
5.30	(17.38)	3.68	52.97	(173.78)	7.74
7.77	(25.51)	4.31	77.75	(255.08)	8.93
11.41	(37.44)	4.91	114.12	(374.40)	12.57
			99999.00	(99999.00)	20.20



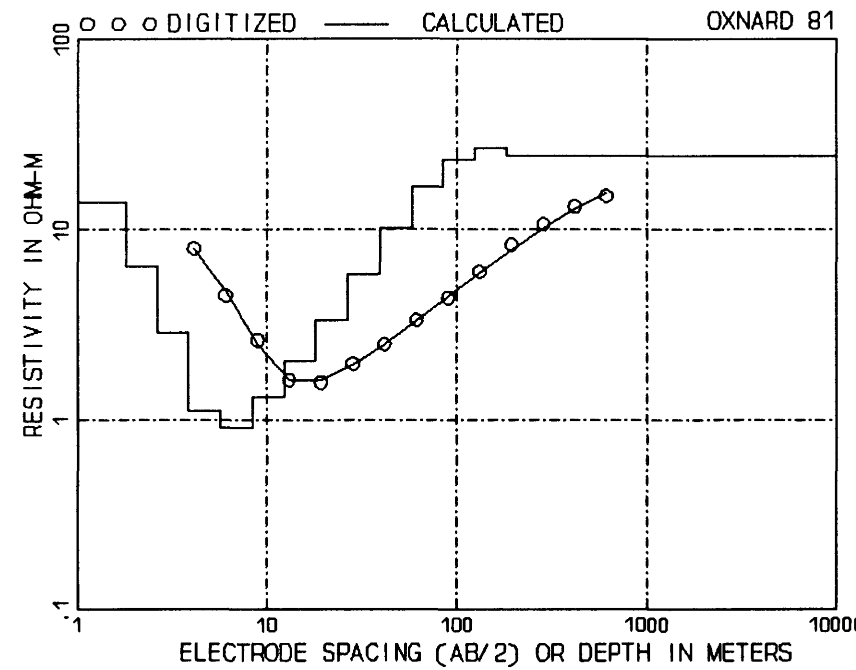
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.30	42.67 (	140.00)	2.80
4.27 (	14.00)	6.90	60.96 (	200.00)	3.60
6.10 (	20.00)	4.60	91.44 (	300.00)	5.35
9.14 (	30.00)	2.48	121.92 (	400.00)	6.35
12.19 (	40.00)	1.66	182.88 (	600.00)	8.80
18.29 (	60.00)	1.50	243.84 (	800.00)	10.70
24.38 (	80.00)	1.62	304.80 (	1000.00)	12.10
30.48 (	100.00)	1.95	304.80 (	1000.00)	12.60
42.67 (	140.00)	2.40	426.72 (	1400.00)	15.30
30.48 (	100.00)	2.25	609.60 (	2000.00)	16.70



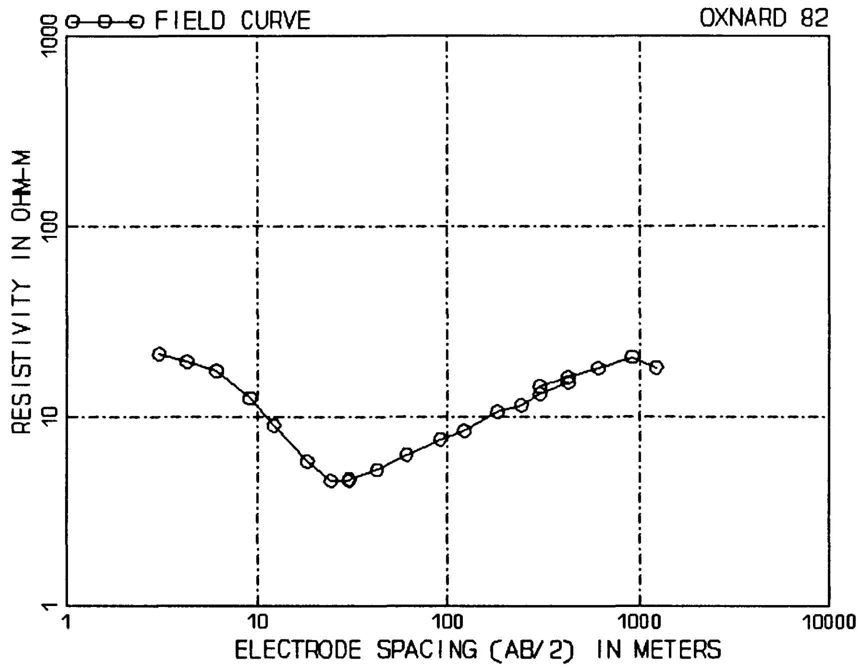
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.82 (	5.96)	13.76	26.66 (	87.48)	4.24
2.67 (	8.75)	8.69	39.14 (	128.40)	7.63
3.91 (	12.84)	3.48	57.45 (	188.47)	12.76
5.74 (	18.85)	1.31	84.32 (	276.64)	19.60
8.43 (	27.66)	1.04	123.76 (	406.05)	26.32
12.38 (	40.60)	1.36	181.66 (	595.99)	29.04
18.17 (	59.60)	2.27	99999.00 (	99999.00)	25.59



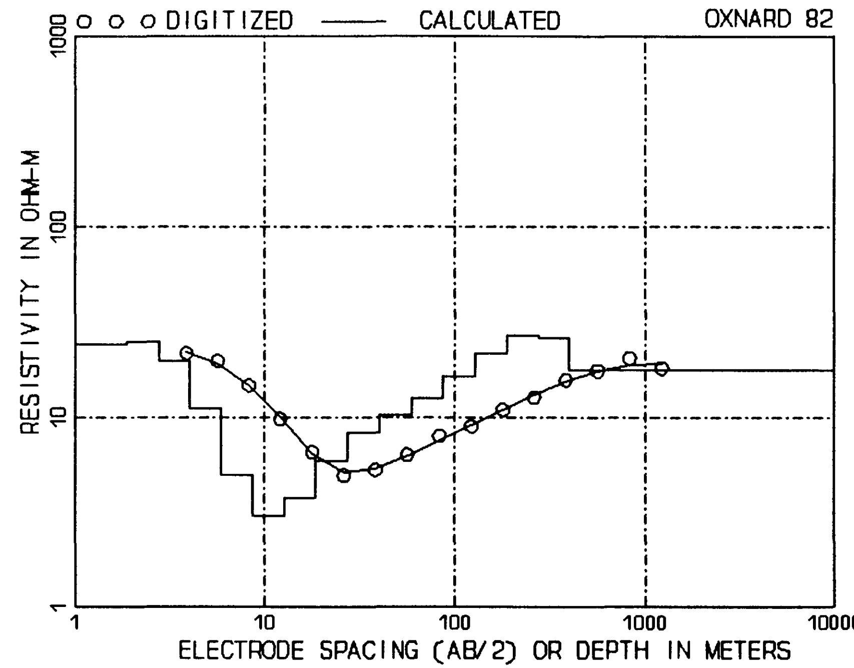
AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	9.70	42.67 (	140.00)	2.45
4.27 (	14.00)	7.20	60.96 (	200.00)	3.20
6.10 (	20.00)	4.20	91.44 (	300.00)	4.36
9.14 (	30.00)	2.30	121.92 (	400.00)	5.40
12.19 (	40.00)	1.60	182.88 (	600.00)	7.70
18.29 (	60.00)	1.45	243.84 (	800.00)	9.00
24.38 (	80.00)	1.62	304.80 (	1000.00)	11.00
30.48 (	100.00)	1.95	304.80 (	1000.00)	11.50
30.48 (	100.00)	2.00	426.72 (	1400.00)	13.50
			609.60 (	2000.00)	15.00



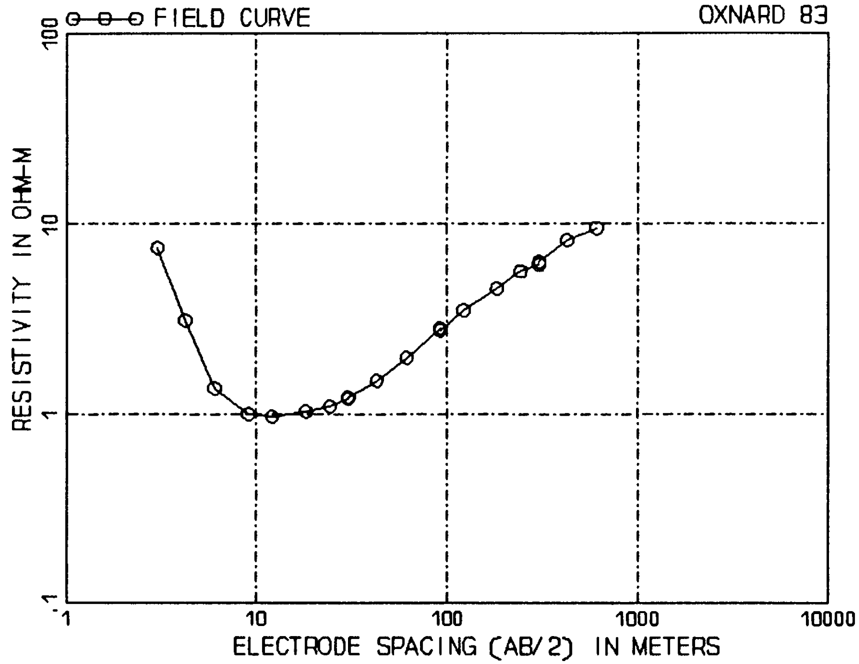
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.82 (	5.96)	13.88	26.66 (	87.48)	3.33
2.67 (	8.75)	6.45	39.14 (	128.40)	5.80
3.91 (	12.84)	2.88	57.45 (	188.47)	10.26
5.74 (	18.85)	1.11	84.32 (	276.64)	16.76
8.43 (	27.66)	0.91	123.76 (	406.05)	23.37
12.38 (	40.60)	1.32	181.66 (	595.99)	26.58
18.17 (	59.60)	2.05	99999.00 (	99999.00)	24.39



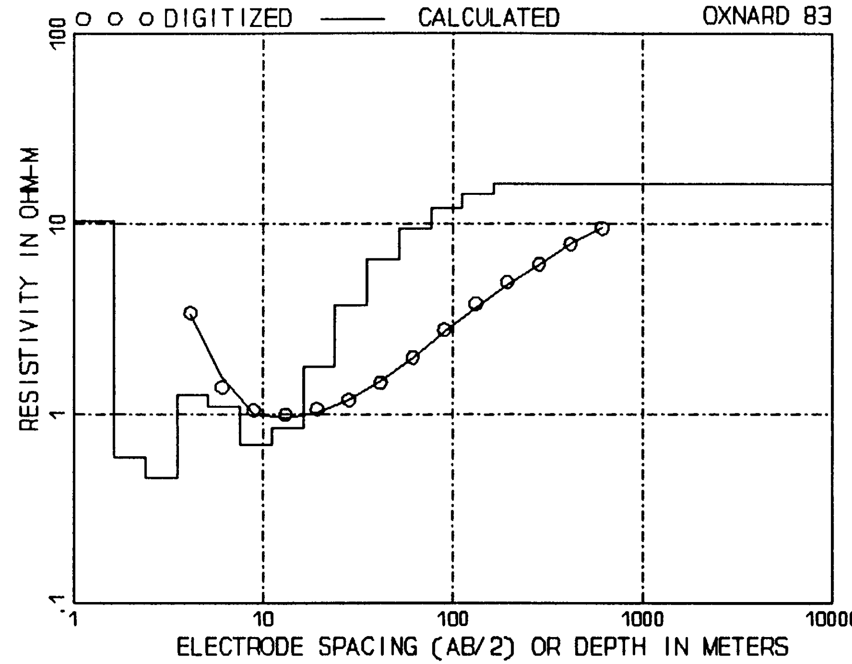
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	21.40	91.44	(300.00)	7.60
4.27	(14.00)	19.50	121.92	(400.00)	8.40
6.10	(20.00)	17.40	182.88	(600.00)	10.60
9.14	(30.00)	12.50	243.84	(800.00)	11.50
12.19	(40.00)	9.00	304.80	(1000.00)	13.20
18.29	(60.00)	5.80	426.72	(1400.00)	15.20
24.38	(80.00)	4.60	304.80	(1000.00)	14.40
30.48	(100.00)	4.60	426.72	(1400.00)	16.20
30.48	(100.00)	4.70	609.60	(2000.00)	18.00
42.67	(140.00)	5.25	914.40	(3000.00)	20.50
60.96	(200.00)	6.30	1219.20	(4000.00)	18.10



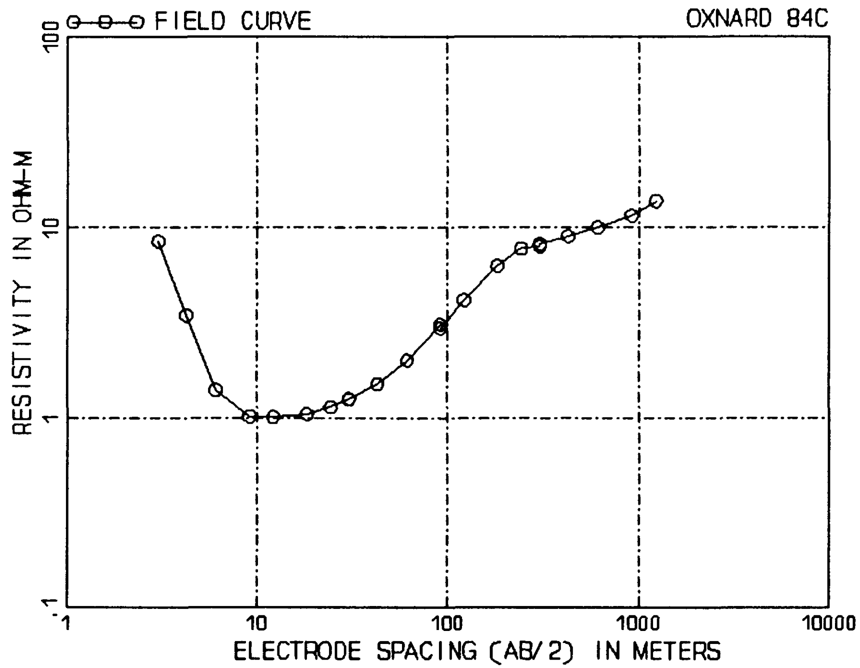
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.87	(6.15)	24.07	40.37	(132.44)	8.23
2.75	(9.02)	24.83	59.25	(194.40)	10.30
4.04	(13.24)	19.66	86.97	(285.34)	12.67
5.93	(19.44)	11.15	127.66	(418.82)	16.28
8.70	(28.53)	4.95	187.37	(614.75)	21.63
12.77	(41.88)	3.02	275.03	(902.33)	26.81
18.74	(61.47)	3.79	403.69	(1324.43)	26.19
27.50	(90.23)	5.91	99999.00	(99999.00)	17.58



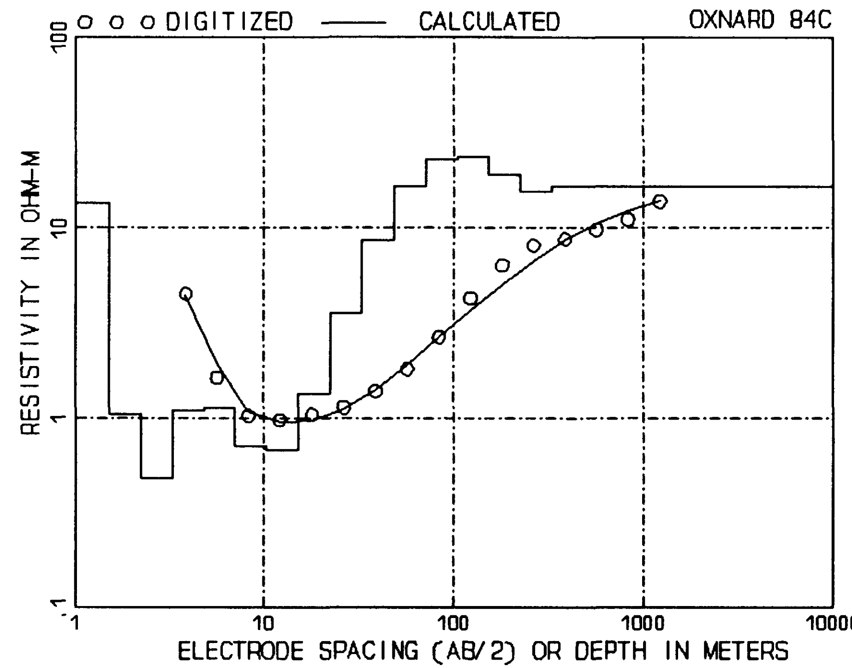
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	7.50	60.96	(200.00)	1.98
4.27	(14.00)	3.10	91.44	(300.00)	2.83
6.10	(20.00)	1.36	91.44	(300.00)	2.75
9.14	(30.00)	1.00	121.92	(400.00)	3.50
12.19	(40.00)	0.97	182.88	(600.00)	4.55
18.29	(60.00)	1.03	243.84	(800.00)	5.63
24.38	(80.00)	1.10	304.80	(1000.00)	6.10
30.48	(100.00)	1.20	304.80	(1000.00)	6.30
30.48	(100.00)	1.22	426.72	(1400.00)	8.20
42.67	(140.00)	1.50	609.60	(2000.00)	9.50



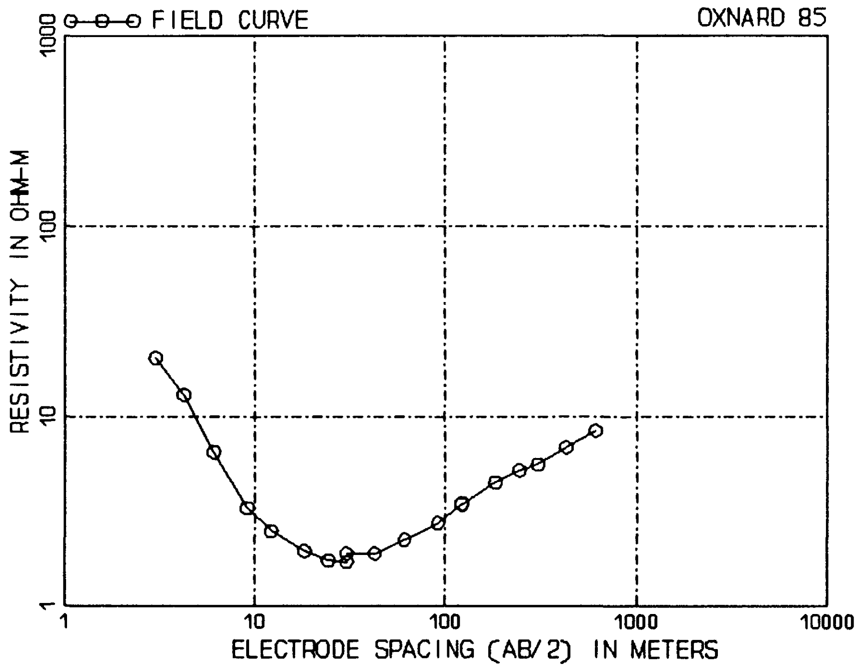
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.63	(5.36)	10.31	24.00	(78.73)	1.77
2.40	(7.87)	0.59	35.22	(115.56)	3.74
3.52	(11.56)	0.46	51.70	(169.62)	6.50
5.17	(16.96)	1.25	75.89	(248.97)	9.41
7.59	(24.90)	1.09	111.39	(365.44)	12.10
11.14	(36.54)	0.69	163.49	(536.39)	14.43
16.35	(53.64)	0.85	99999.00	(99999.00)	16.15

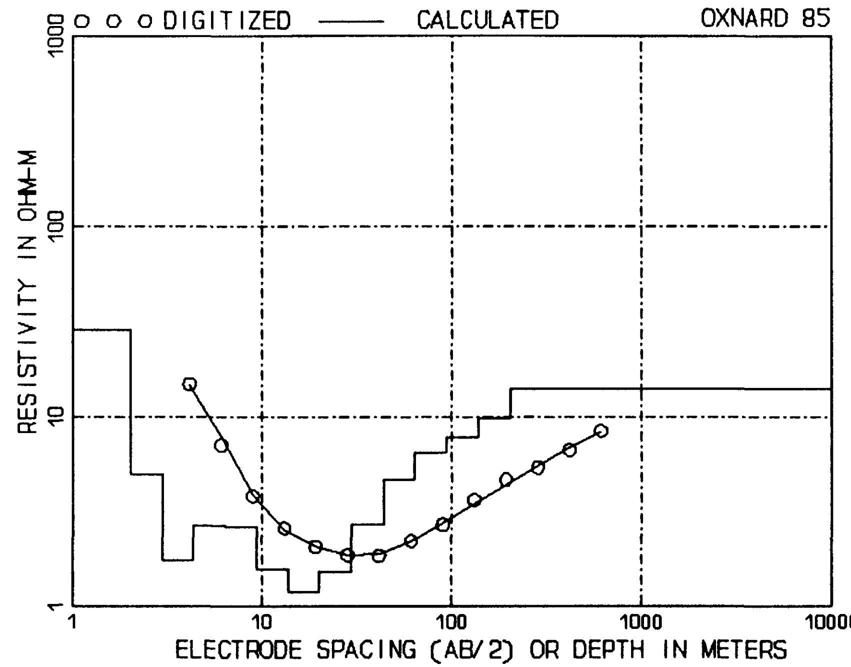


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.50	91.44	(300.00)	3.10
4.27	(14.00)	3.45	91.44	(300.00)	2.95
6.10	(20.00)	1.40	121.92	(400.00)	4.15
9.14	(30.00)	1.02	182.88	(600.00)	6.30
12.19	(40.00)	1.01	243.84	(800.00)	7.80
18.29	(60.00)	1.05	304.80	(1000.00)	8.00
24.38	(80.00)	1.14	304.80	(1000.00)	8.20
30.48	(100.00)	1.26	426.72	(1400.00)	9.00
30.48	(100.00)	1.25	609.60	(2000.00)	10.00
42.67	(140.00)	1.51	914.40	(3000.00)	11.60
60.96	(200.00)	2.00	1219.20	(4000.00)	13.80



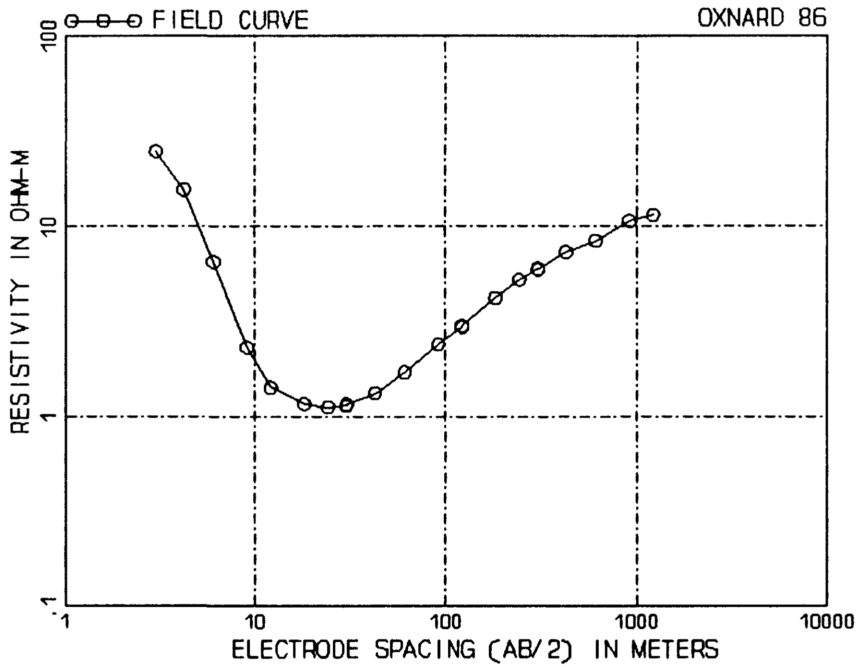
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.52	(4.98)	13.54	32.70	(107.28)	3.54
2.23	(7.31)	1.05	48.00	(157.46)	8.60
3.27	(10.73)	0.49	70.45	(231.13)	16.38
4.80	(15.75)	1.09	103.40	(339.25)	22.97
7.04	(23.11)	1.12	151.77	(497.95)	23.43
10.34	(33.92)	0.71	222.77	(730.88)	19.02
15.18	(49.79)	0.68	326.99	(1072.79)	15.52
22.28	(73.09)	1.34	99999.00	(99999.00)	16.60



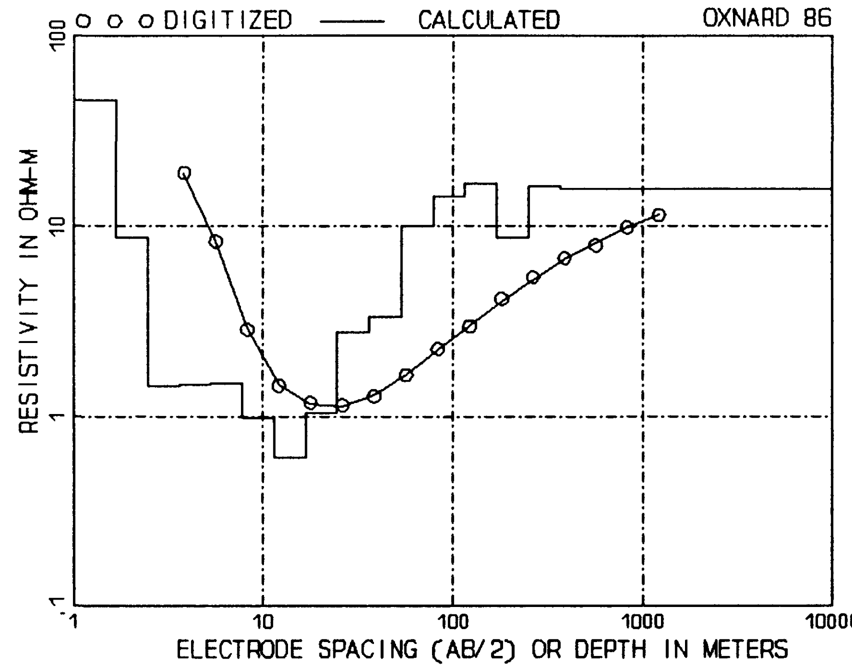


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	20.30	60.96	(200.00)	2.25
4.27	(14.00)	13.00	91.44	(300.00)	2.75
6.10	(20.00)	6.50	121.92	(400.00)	3.50
9.14	(30.00)	3.30	121.92	(400.00)	3.45
12.19	(40.00)	2.50	182.88	(600.00)	4.50
18.29	(60.00)	1.96	243.84	(800.00)	5.20
24.38	(80.00)	1.75	304.80	(1000.00)	5.60
30.48	(100.00)	1.72	304.80	(1000.00)	5.60
30.48	(100.00)	1.90	426.72	(1400.00)	6.90
42.67	(140.00)	1.90	609.60	(2000.00)	8.40

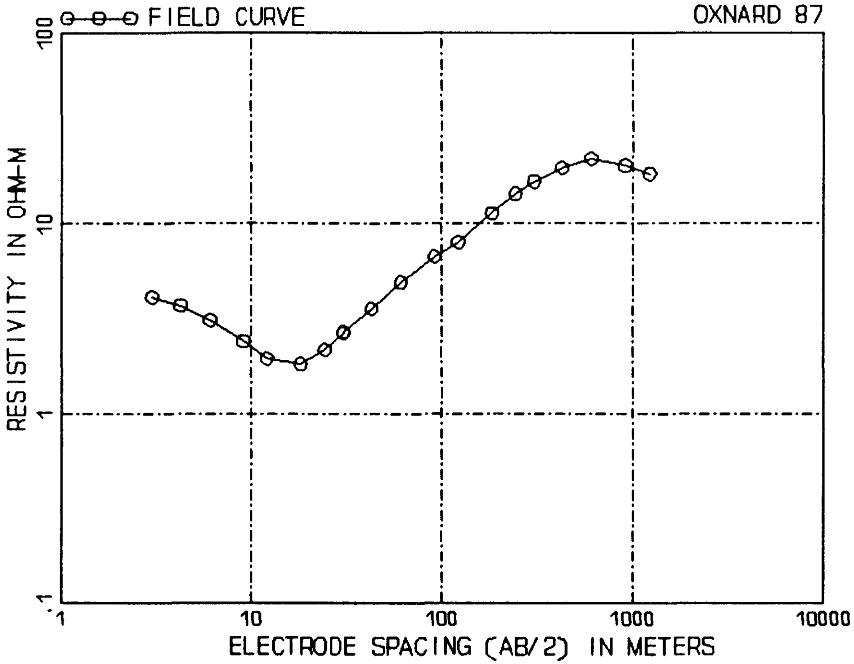
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
2.02	(6.62)	28.74	29.63	(97.20)	1.54
2.96	(9.72)	5.00	43.49	(142.67)	2.73
4.35	(14.27)	1.76	63.83	(209.41)	4.66
6.38	(20.94)	2.67	93.69	(307.37)	6.42
9.37	(30.74)	2.65	137.51	(451.16)	7.78
13.75	(45.12)	1.57	201.84	(662.22)	9.86
20.18	(66.22)	1.19	99999.00	(99999.00)	14.08



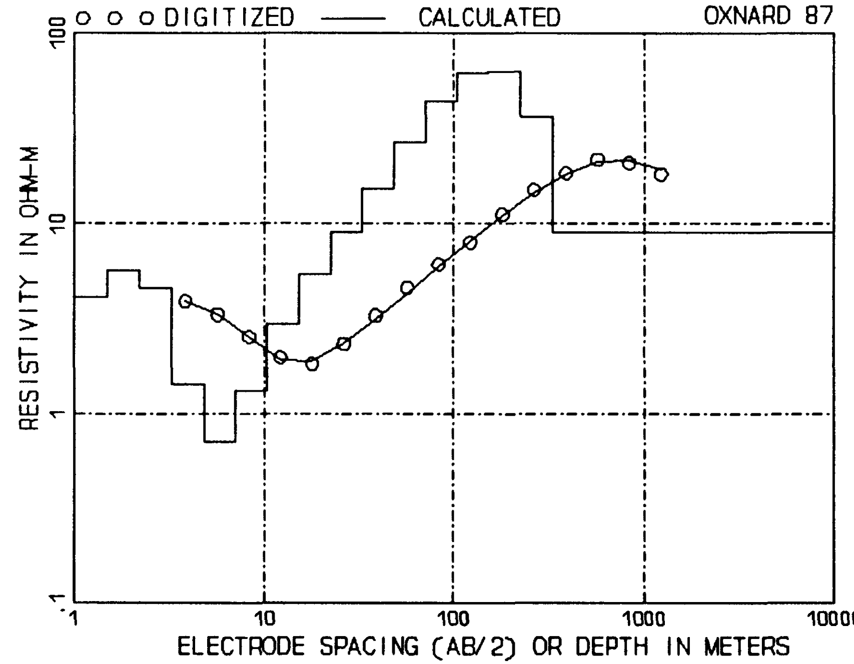
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	24.70	91.44	(300.00)	2.40
4.27	(14.00)	15.60	121.92	(400.00)	2.95
6.10	(20.00)	6.50	121.92	(400.00)	3.00
9.14	(30.00)	2.30	182.88	(600.00)	4.20
12.19	(40.00)	1.42	243.84	(800.00)	5.25
18.29	(60.00)	1.17	304.80	(1000.00)	6.00
24.38	(80.00)	1.12	304.80	(1000.00)	5.95
30.48	(100.00)	1.14	426.72	(1400.00)	7.35
30.48	(100.00)	1.16	609.60	(2000.00)	8.40
42.67	(140.00)	1.33	914.40	(3000.00)	10.70
60.96	(200.00)	1.71	1219.20	(4000.00)	11.50



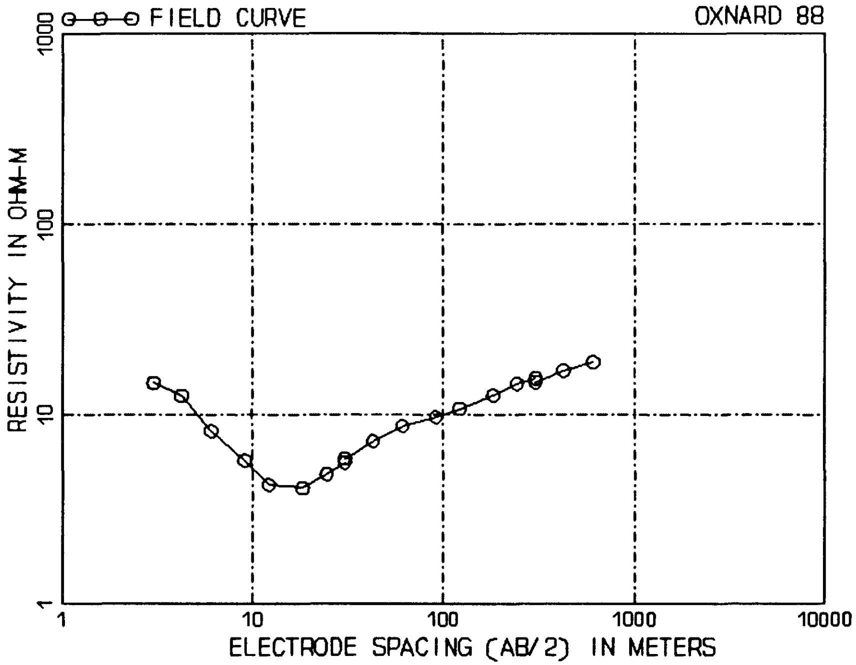
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.69	(5.53)	45.81	36.33	(119.20)	2.78
2.48	(8.12)	8.70	53.33	(174.96)	3.36
3.63	(11.92)	1.45	78.27	(256.81)	10.03
5.33	(17.50)	1.47	114.89	(376.94)	14.24
7.83	(25.68)	1.49	168.64	(553.27)	16.71
11.49	(37.69)	0.98	247.53	(812.09)	8.75
16.86	(55.33)	0.60	363.32	(1191.99)	16.17
24.75	(81.21)	1.04	99999.00	(99999.00)	15.88

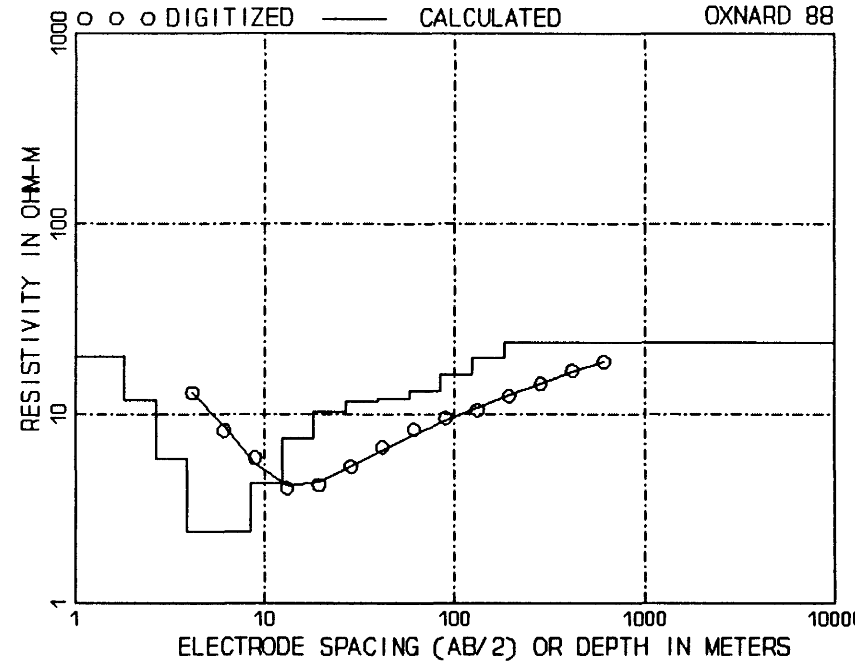


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	4.10	60.96 (	200.00)	4.90
4.27 (	14.00)	3.70	91.44 (	300.00)	6.70
6.10 (	20.00)	3.10	121.92 (	400.00)	8.00
9.14 (	30.00)	2.40	182.88 (	600.00)	11.30
12.19 (	40.00)	1.95	243.84 (	800.00)	14.30
18.29 (	60.00)	1.82	304.80 (	1000.00)	16.60
24.38 (	80.00)	2.17	304.80 (	1000.00)	16.60
30.48 (	100.00)	2.65	426.72 (	1400.00)	19.60
30.48 (	100.00)	2.68	609.60 (	2000.00)	21.80
42.67 (	140.00)	3.55	914.40 (	3000.00)	20.10
			1219.20 (	4000.00)	18.20



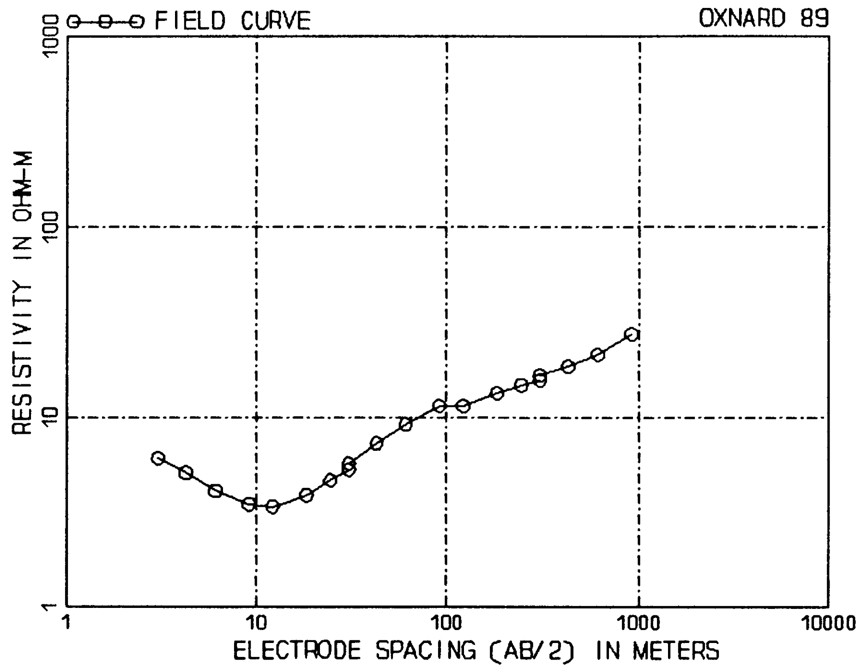
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.52 (	4.98)	4.08	32.70 (	107.28)	9.03
2.23 (	7.31)	5.71	48.00 (	157.46)	15.32
3.27 (	10.73)	4.55	70.45 (	231.13)	26.59
4.80 (	15.75)	1.44	103.40 (	339.25)	43.74
7.04 (	23.11)	0.72	151.77 (	497.95)	61.21
10.34 (	33.92)	1.31	222.77 (	730.88)	62.39
15.18 (	49.79)	2.94	326.99 (	1072.79)	36.56
22.28 (	73.09)	5.41	99999.00 (	99999.00)	8.97



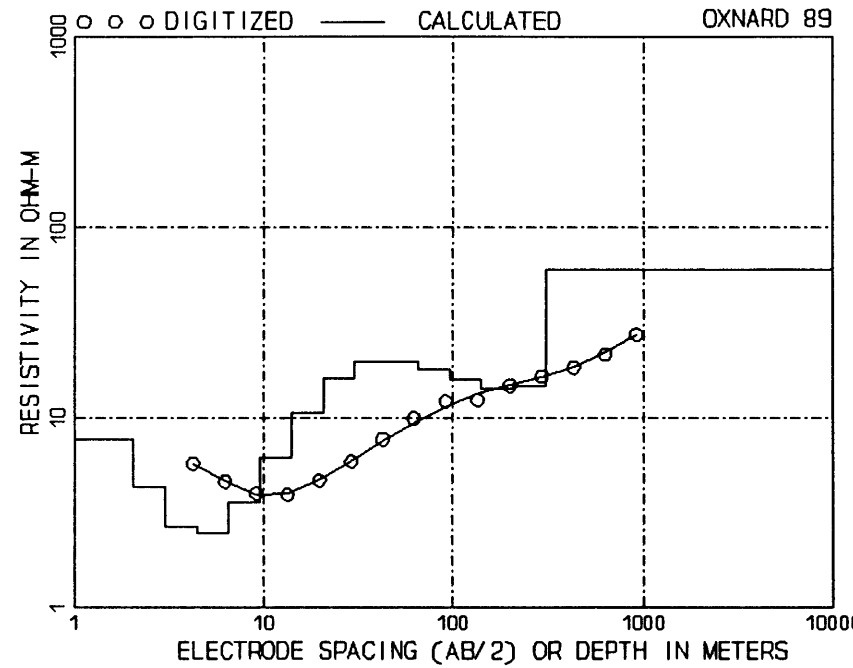


AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	14.60	42.67	(140.00)	7.20
4.27	(14.00)	12.50	60.96	(200.00)	8.70
6.10	(20.00)	8.20	91.44	(300.00)	9.70
9.14	(30.00)	5.70	121.92	(400.00)	10.70
12.19	(40.00)	4.27	182.88	(600.00)	12.60
18.29	(60.00)	4.10	243.84	(800.00)	14.50
24.38	(80.00)	4.85	304.80	(1000.00)	15.50
30.48	(100.00)	5.58	304.80	(1000.00)	14.80
30.48	(100.00)	5.85	426.72	(1400.00)	17.00
			609.60	(2000.00)	18.80

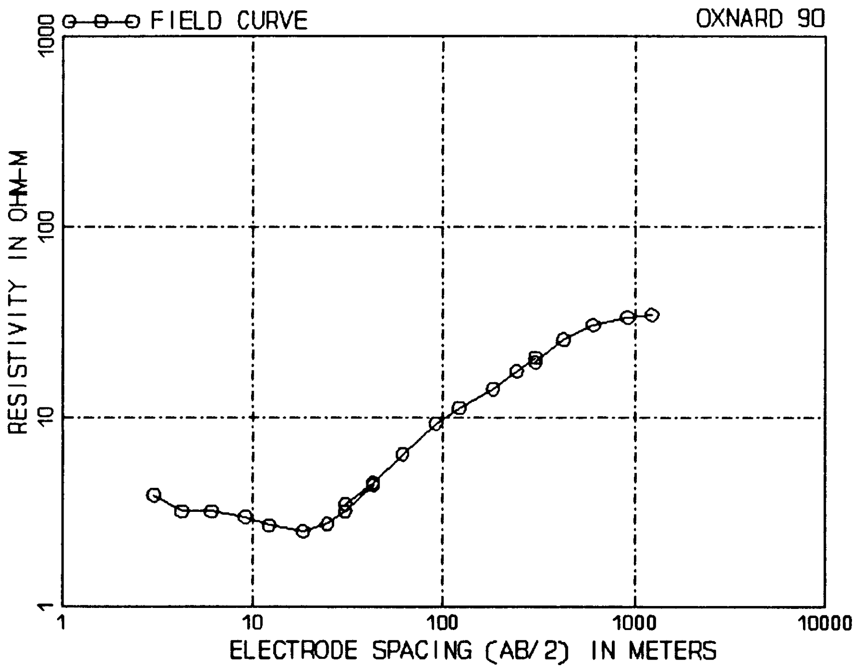
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.82	(5.96)	20.16	26.66	(87.48)	10.35
2.67	(8.75)	11.90	39.14	(128.40)	11.64
3.91	(12.84)	5.80	57.45	(188.47)	12.06
5.74	(18.85)	2.42	84.32	(276.64)	13.28
8.43	(27.66)	2.39	123.76	(406.05)	16.05
12.38	(40.60)	4.32	181.66	(595.99)	19.88
18.17	(59.60)	7.47	99999.00	(99999.00)	23.61

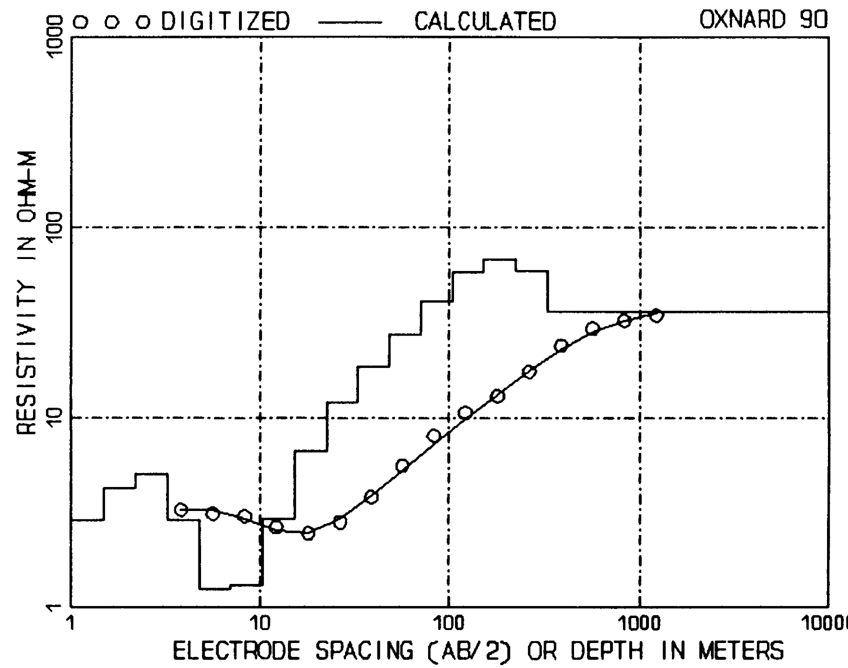


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	6.10	60.96 (	200.00)	9.20
4.27 (	14.00)	5.10	91.44 (	300.00)	11.50
6.10 (	20.00)	4.10	121.92 (	400.00)	11.50
9.14 (	30.00)	3.50	182.88 (	600.00)	13.40
12.19 (	40.00)	3.40	243.84 (	800.00)	14.80
18.29 (	60.00)	3.90	304.80 (	1000.00)	15.70
24.38 (	80.00)	4.66	304.80 (	1000.00)	16.70
30.48 (	100.00)	5.30	426.72 (	1400.00)	18.50
30.48 (	100.00)	5.70	609.60 (	2000.00)	21.30
42.67 (	140.00)	7.30	914.40 (	3000.00)	27.30



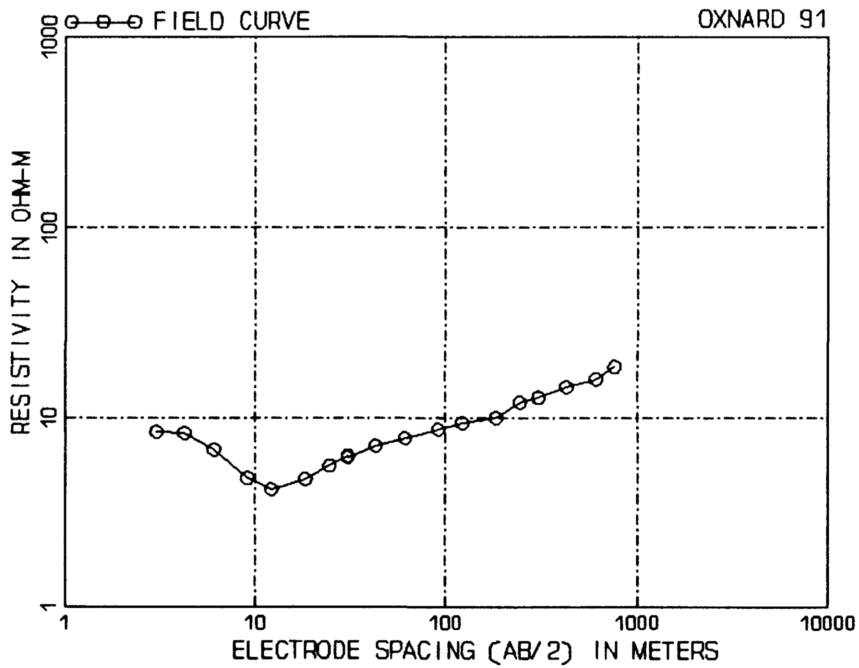
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
2.06 (	6.77)	7.65	30.28 (	99.33)	16.16
3.03 (	9.93)	4.34	44.44 (	145.80)	19.72
4.44 (	14.58)	2.66	65.23 (	214.01)	19.89
6.52 (	21.40)	2.48	95.74 (	314.12)	18.07
9.57 (	31.41)	3.57	140.53 (	461.06)	15.87
14.05 (	46.11)	6.18	206.27 (	676.74)	14.31
20.63 (	67.67)	10.70	302.77 (	993.32)	14.73
			99999.00 (	99999.00)	60.00



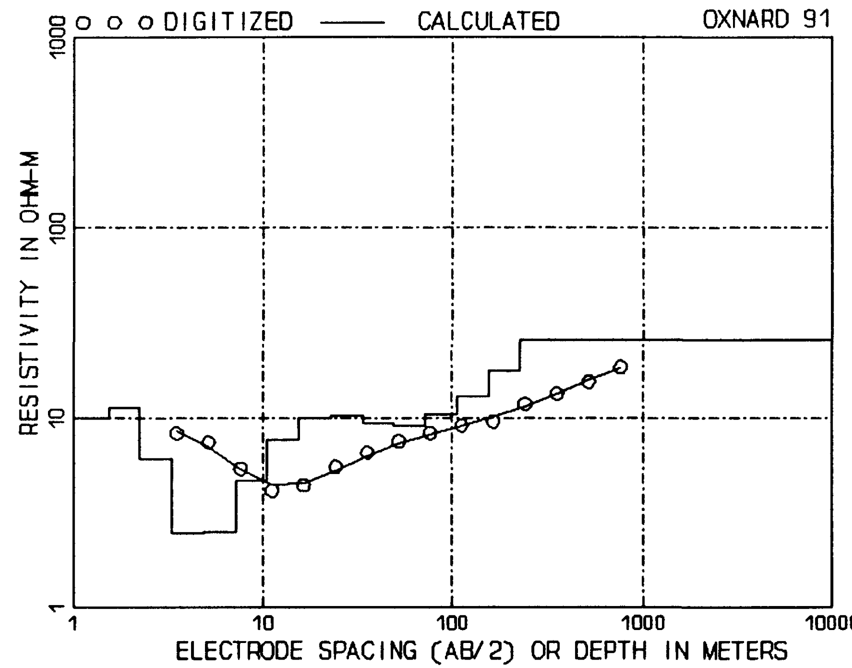


AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	3.90	60.96 (	200.00)	6.40
4.27 (	14.00)	3.20	91.44 (	300.00)	9.30
6.10 (	20.00)	3.20	121.92 (	400.00)	11.20
9.14 (	30.00)	3.00	182.88 (	600.00)	14.10
12.19 (	40.00)	2.70	243.84 (	800.00)	17.50
18.29 (	60.00)	2.52	304.80 (	1000.00)	20.50
24.38 (	80.00)	2.75	304.80 (	1000.00)	19.50
30.48 (	100.00)	3.20	426.72 (	1400.00)	25.60
42.67 (	140.00)	4.40	609.60 (	2000.00)	30.60
30.48 (	100.00)	3.50	914.40 (	3000.00)	33.50
42.67 (	140.00)	4.55	1219.20 (	4000.00)	34.50

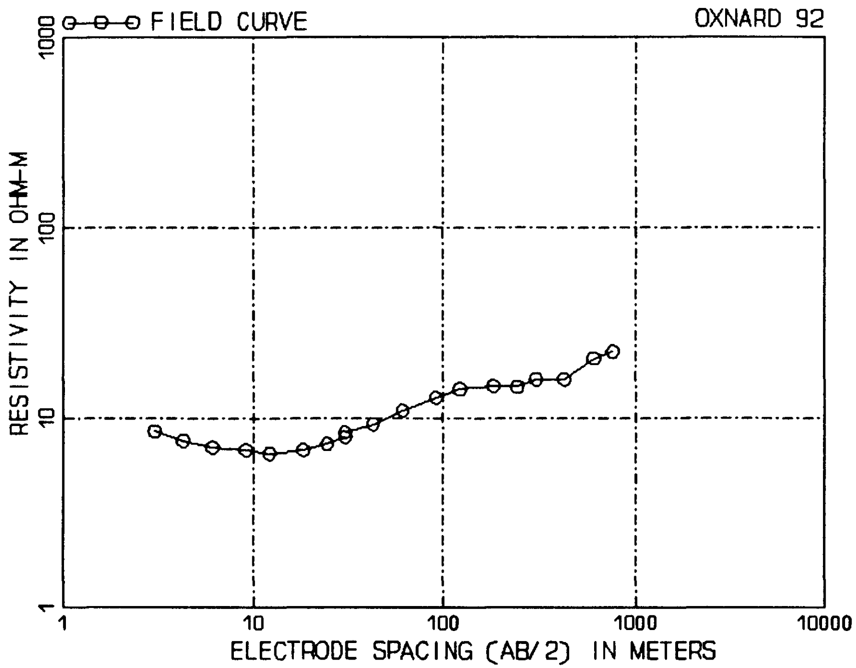
DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.52 (	4.98)	2.90	32.70 (	107.28)	12.07
2.23 (	7.31)	4.29	48.00 (	157.46)	18.57
3.27 (	10.73)	5.03	70.45 (	231.13)	27.30
4.80 (	15.75)	2.91	103.40 (	339.25)	40.89
7.04 (	23.11)	1.24	151.77 (	497.95)	58.23
10.34 (	33.92)	1.30	222.77 (	730.88)	68.50
15.18 (	49.79)	2.93	326.99 (	1072.79)	59.43
22.28 (	73.09)	6.64	99999.00 (	99999.00)	36.39



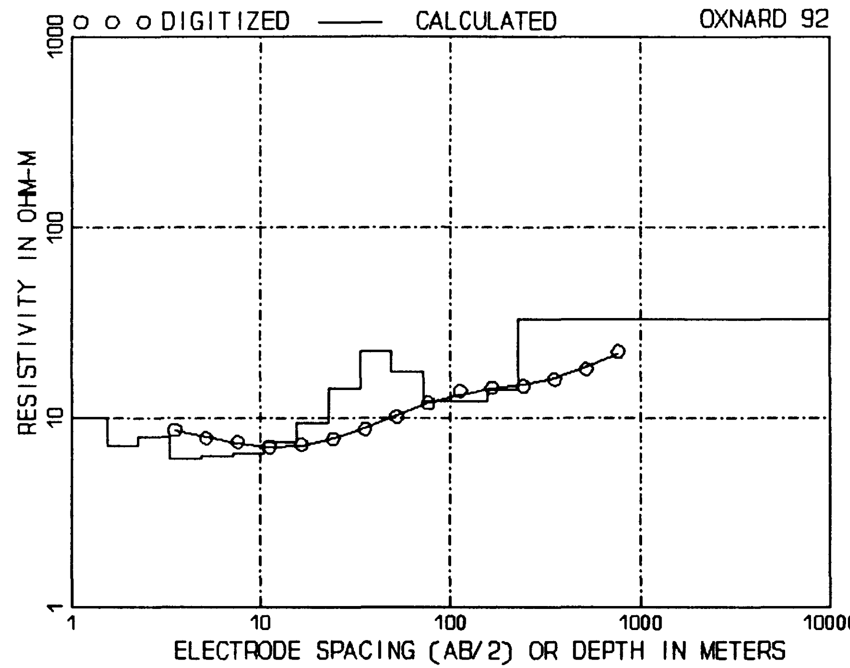
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.40	60.96	(200.00)	7.80
4.27	(14.00)	8.30	91.44	(300.00)	8.70
6.10	(20.00)	6.80	121.92	(400.00)	9.40
9.14	(30.00)	4.80	182.88	(600.00)	10.00
12.19	(40.00)	4.20	243.84	(800.00)	12.00
18.29	(60.00)	4.75	304.80	(1000.00)	12.80
24.38	(80.00)	5.60	304.80	(1000.00)	12.70
30.48	(100.00)	6.30	426.72	(1400.00)	14.50
30.48	(100.00)	6.20	609.60	(2000.00)	16.00
42.67	(140.00)	7.10	762.00	(2500.00)	18.50



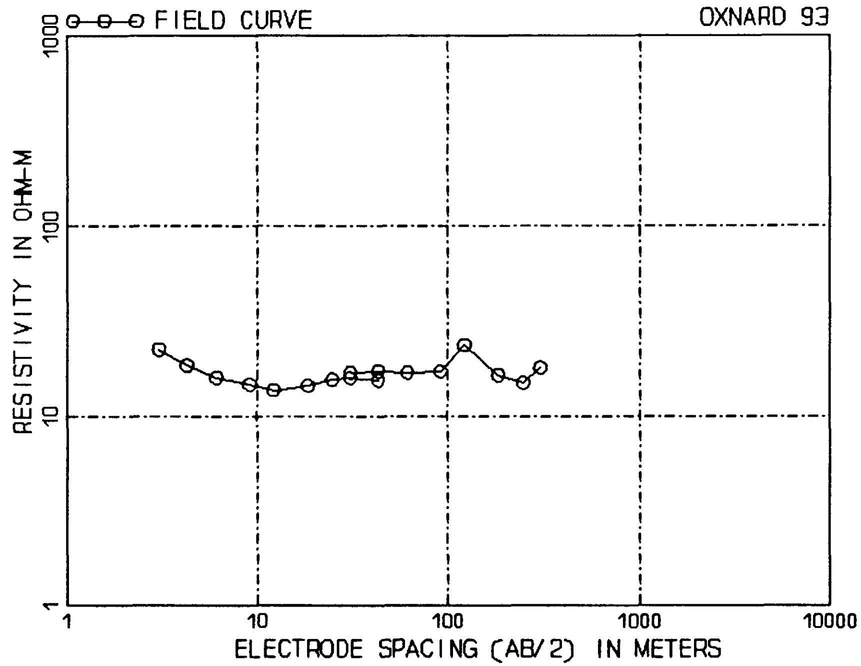
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.55	(5.08)	9.91	22.71	(74.50)	9.98
2.27	(7.45)	11.35	33.33	(109.35)	10.31
3.33	(10.93)	6.05	48.92	(160.50)	9.31
4.89	(16.05)	2.46	71.81	(235.59)	9.05
7.18	(23.56)	2.53	105.40	(345.79)	10.37
10.54	(34.58)	4.67	154.70	(507.56)	13.08
15.47	(50.76)	7.68	227.07	(744.99)	17.77
			99999.00	(99999.00)	25.59



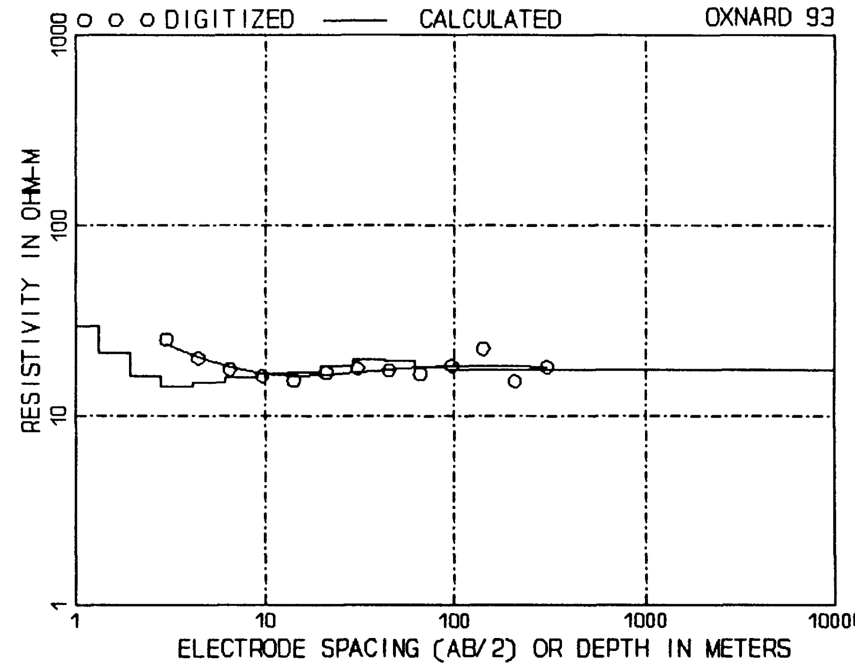
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	8.50	60.96	(200.00)	11.00
4.27	(14.00)	7.60	91.44	(300.00)	12.80
6.10	(20.00)	7.00	121.92	(400.00)	14.20
9.14	(30.00)	6.80	182.88	(600.00)	14.70
12.19	(40.00)	6.50	243.84	(800.00)	14.60
18.29	(60.00)	6.80	304.80	(1000.00)	16.00
24.38	(80.00)	7.30	304.80	(1000.00)	16.00
30.48	(100.00)	7.90	426.72	(1400.00)	16.00
30.48	(100.00)	8.40	609.60	(2000.00)	20.50
42.67	(140.00)	9.30	762.00	(2500.00)	22.30



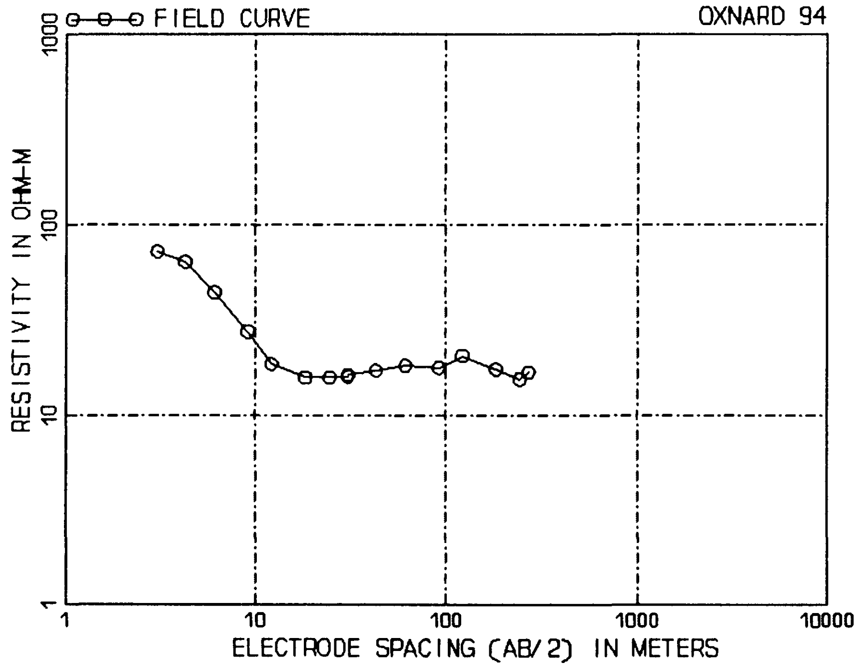
DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.55	(5.08)	9.97	22.71	(74.50)	9.43
2.27	(7.45)	7.13	33.33	(109.35)	14.25
3.33	(10.93)	7.87	48.92	(160.50)	22.23
4.89	(16.05)	6.08	71.81	(235.59)	17.34
7.18	(23.56)	6.25	105.40	(345.79)	12.12
10.54	(34.58)	6.44	154.70	(507.56)	12.19
15.47	(50.76)	7.40	227.07	(744.99)	13.98
			99999.00	(99999.00)	32.95



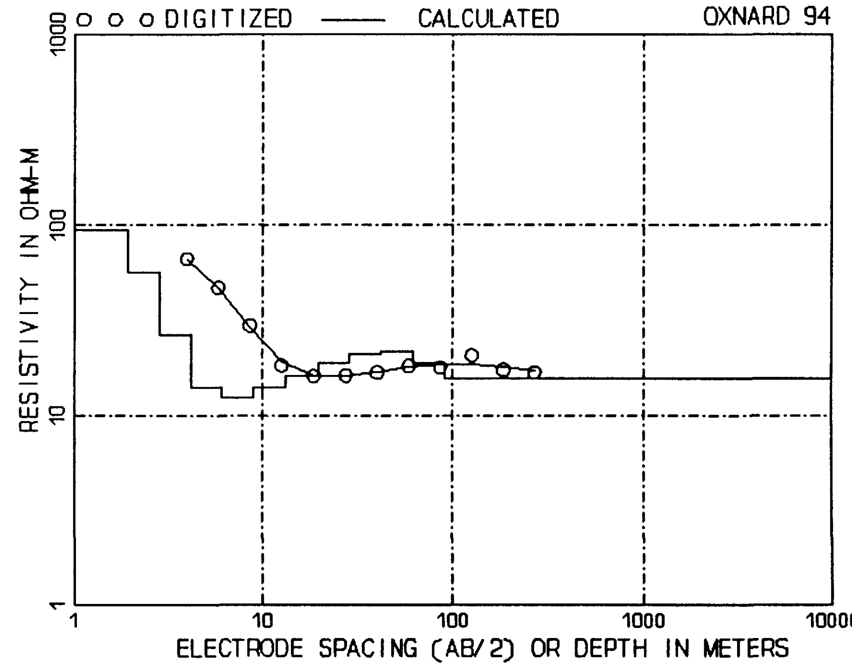
AB/2, m	(ft)	App. Res.	AB/2, m	(ft)	App. Res.
3.05	(10.00)	22.50	42.67	(140.00)	15.50
4.27	(14.00)	18.50	30.48	(100.00)	17.00
6.10	(20.00)	16.00	42.67	(140.00)	17.30
9.14	(30.00)	14.70	60.96	(200.00)	17.00
12.19	(40.00)	13.70	91.44	(300.00)	17.20
18.29	(60.00)	14.50	121.92	(400.00)	23.60
24.38	(80.00)	15.60	182.88	(600.00)	16.50
30.48	(100.00)	15.90	248.11	(814.00)	15.00
			304.80	(1000.00)	18.00



DEPTH, m	(ft)	RESIS.	DEPTH, m	(ft)	RESIS.
1.33	(4.37)	29.36	13.33	(43.74)	16.56
1.96	(6.42)	21.26	19.57	(64.20)	16.91
2.87	(9.42)	16.17	28.72	(94.23)	18.26
4.22	(13.83)	14.34	42.16	(138.32)	19.87
6.19	(20.30)	14.82	61.88	(203.02)	19.56
9.08	(29.80)	16.01	90.83	(298.00)	18.01
			99999.00	(99999.00)	17.45



AB/2, m (	ft)	App. Res.	AB/2, m (	ft)	App. Res.
3.05 (	10.00)	72.50	30.48 (	100.00)	16.30
4.27 (	14.00)	64.00	42.67 (	140.00)	17.20
6.10 (	20.00)	44.00	60.96 (	200.00)	18.20
9.14 (	30.00)	27.50	91.44 (	300.00)	17.80
12.19 (	40.00)	18.60	121.92 (	400.00)	20.50
18.29 (	60.00)	15.80	182.88 (	600.00)	17.50
24.38 (	80.00)	15.80	243.84 (	800.00)	15.50
30.48 (	100.00)	16.00	271.27 (	890.00)	16.80



DEPTH, m (	ft)	RESIS.	DEPTH, m (	ft)	RESIS.
1.94 (	6.35)	94.80	19.35 (	63.49)	16.26
2.84 (	9.32)	56.31	28.40 (	93.19)	18.71
4.17 (	13.68)	26.70	41.69 (	136.78)	21.10
6.12 (	20.08)	14.10	61.19 (	200.77)	21.52
8.98 (	29.47)	12.38	89.82 (	294.69)	18.94
13.18 (	43.25)	14.07	99999.00 (	99999.00)	15.57