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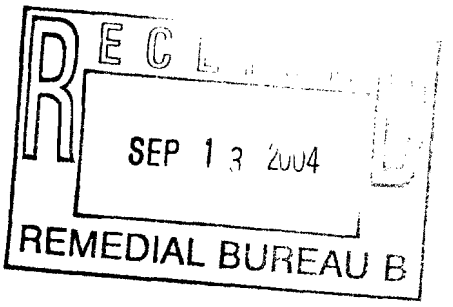

HYDROGEOLOGIC ASSESSMENT OF THE ALLIED WASTE BEDS IN THE SYRACUSE AREA

VOLUME 2 OF 2

Allied-Signal Inc.

Solvay, New York

May 1988

BLASLAND & BOUCK ENGINEERS, P.C.
BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

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BY

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FIELD METHODS

APPENDIX A - FIELD METHODS

This Appendix includes a discussion of field methods employed during the Hydrogeologic Assessment of the Allied Waste Beds. Field activities included a site reconnaissance; electrical resistivity and seismic refraction surveys; soil borings; monitoring well installations; well development; in-situ hydraulic conductivity analyses; ground-water quality sampling; stream flow measurements; and surface water quality sampling.

Detailed field methodologies employed during this assessment were included as part of the Blasland & Bouck Engineers, P.C., "Work Plan, Hydrogeologic Assessment of the Allied Waste Beds in the Syracuse Area", March 1987. Items not discussed in the Work Plan are discussed below, as well as a review of all methodologies employed during the actual assessment. Methodologies employed during the Site Reconnaissance were discussed previously in Volume 1, Section 4.2.

A.1 Resistivity Survey

An earth resistivity survey was initiated in the early part of the Waste Bed Investigation to determine its practicality for delineating the vertical and areal extent of brine plumes associated with Waste Beds 9-15. Because of the heterogeneity of the geologic and the hydrogeologic conditions adjacent to the waste beds, the resistivity survey proved to be less useful than originally anticipated. Resistivity is a very useful tool for defining the subsurface geology in areas where the geology is relatively uniform and the data evaluation is limited to no more than three or four rock units. During the analysis of the data, it became apparent that it was going to be difficult to isolate variations in resistivity due to high saline conditions and from variations due to the nature of the subsurface material. The usefulness of the resistivity became more apparent as the resistivity data was correlated with data from soil borings, monitoring wells and excavations around the waste bed. It became clear that in some areas very low resistivity values were correlated with high concentrations of total dissolved solids, but a linear relationship between resistivity and total dissolved solids or chloride concentrations could not be established.

A.1.1 General

A resistivity survey consists of passing an electrical current between two points (electrodes) through the earth and measuring the potential difference created as the current passes through the earth materials. The resistance of the material is calculated by using Ohm's Law, $R = V/I$; where: R = resistance; V = potential drop; and I = current induced. In general, the measured value from a resistivity survey is apparent resistivity. In shallow surveys where penetration of

the current is through a homogeneous material, the apparent resistivity would be equivalent to the actual resistivity. In most cases which involve penetration of saturated and unsaturated materials and layered earth materials, a series of computations or graphical analyses are necessary to change apparent resistivity to actual resistivity.

The resistivity of a material increases with an increase in properties such as porosity or sand and gravel content. The resistivity decreases with an increase in water content or salinity. Some typical values for some materials which may be encountered in this survey are listed below (from Telford, 1982).

Rock Type	Resistivity Range (Ohm-m)	Resistivity Range (Ohm-ft)
Alluvium and sands	10-800	3-244
Marls	3-70	.9-21
Clays	1-100	.3-30
Unconsolidated wet clay	20	6
Consolidated shales	20-2000	6-610
Natural waters	1-100	.3-30
Saline waters, 3 percent	.15	.05
Saline waters, 20 percent	.05	.015

A.1.2 Survey Methodology

The survey "array" or layout refers to the relative positions of the current and potential electrodes. There are several arrays which can be utilized for electrical resistivity surveys. The Wenner array was chosen as the most appropriate for the survey (Figure B-1).

The Wenner array uses uniformly spaced electrodes to measure apparent resistivity. The apparent resistivity using this array is calculated by the following formula (following Ohm's Law):

$$\rho_a = 2a \frac{V}{I}$$

Where: ρ_a = apparent resistivity; a = electrode spacing; V/I = the instrument reading.

The survey combined profiling and sounding methodologies. By obtaining resistivity measurements along a traverse using the same electrode spacing at several stations, a horizontal profile is created. This method can be used to delineate the lateral extent of a contaminant plume. When several electrode spacings ("a" spacings) are used at one station, a depth sounding is formed. This is because as the probe spacing increases, so does the depth of penetration of the electrical current. The sounding method can be used to delineate the vertical variation in subsurface materials including water quality variations.

Earth resistivity was measured along nine lines in the Waste Bed 9-15 area; the lines were numbered 1 through 9 and are shown on Figure 7. At most of the numbered lines several stations were established and for these stations an alphabetic designation was assigned. At each station, the resistivity was measured for four "a" spacing (20, 40, 80 and 160 feet). For example, at line 1 there were three stations (1a, 1b, and 1c) and at each station four resistivity measurements were made.

The raw and corrected data for each station is presented in Table B-1. The raw data (apparent resistivity) was recorded in a field notebook at the time the information was collected. The corrected data (corrected apparent resistivity) was computed in the office.

A.1.3 Data Reduction

The computer program used to reduce the resistivity data results in three values for resistivity. These values are apparent resistivity, fully corrected apparent resistivity and partially corrected apparent resistivity.

Apparent resistivity is the true earth resistivity of a material only when one is considering a homogeneous situation. Based upon the available soil boring, well and pit excavation data in the Waste Bed area, the subsurface materials are not homogeneous; therefore, some sort of correction factor is needed to evaluate the resistivity data. The computer program assumes a two-layer case for adjusting the apparent resistivity. The full correction value of resistivity is the better value to use in an evaluation when a high electrical resistance material is encountered at depth. When low resistance materials occur at depth a full correction of the data may overcompensate, so the partially corrected apparent resistivity value is the better approximation to use in this case. The partially corrected apparent resistivity values versus depth of penetration ("a" spacing) are plotted on log-log graphs and are included as Figures B-2 through B-10.

A.1.4 Survey Evaluation

Resistivity line 1 consisted of three stations oriented east-west and was located south of Waste Beds 14 and 15. Resistivity line 2 consisted of one station to the west of line 1. The resistivity values at Stations 1a and 2 are very similar to one another (Table B-1 and Figures B-2 and B-3). There was a sharp increase in resistivity between the 20 and 40 foot "a" spacings, and then a sharp decrease in resistivity was observed between the 40 and 80 foot "a" spacings. The increase in resistivity is due to the occurrence of sands and gravels or the occurrence of bedrock. Bedrock in this area is approximately 20 feet below the surface and is the Vernon Shale Formation. Although clays usually have low values of electrical resistance, shales or siltstones can

have very high resistivity values (Telford, 1982). The subsurface materials at Stations 1b and 1c may have been more weathered than at Stations 1a and 2 so there would not be as sharp of a contrast between the overburden or till and rock interface.

Resistivity line 3 consisted of two stations and is located on the west edge of Figure 7 in the Nine Mile Creek Valley. The stations were oriented north-south and this station was placed so as to obtain representative background readings for the Nine Mile Creek Valley. Stations 3a and 3b had apparent resistivity values which were very similar to one another (Table B-1 and Figure B-4). The subsurface materials in the valley at this location are not as well defined as other areas in the valley due to the lack of boring logs available for this location. The resistivity values at the 160 foot "a" spacing are slightly higher than observed at other resistivity lines, but the values are generally low, typical of a consolidated shale. The increase in resistivity between 40 and 80 foot "a" spacings may be due to granular overburden overlying till or bedrock. The occurrence of till overlying bedrock is uncertain here. The decrease between 80 and 160 foot "a" spacings could be due to natural salinity of the bedrock, but there is no direct evidence to support this theory. The lower resistivity values could also be due to a weathered bedrock surface.

Stations 4a and 4b were located perpendicular to one another to the west of Waste Bed 14. The resistivity values at the two stations were similar, there was decrease in resistivity between the 20 and 40 foot "a" spacings and then a general increase in resistivity with increasing depth (Table B-1 and Figure B-5). The resistivity values between 20 and 40 feet are relatively low, which is due to the mounding of ground

water in this area near Bed 14. The increasing resistivity with depth is due to the occurrence of bedrock.

Resistivity line 5 was located to the east of Waste Beds 12 and 15 and consisted of 6 stations. Stations 5c, 5d and 5f were oriented north-south, while Stations 5a, 5b and 5e were oriented east-west. Resistivity values for Stations 5a, 5c and 5d indicate the same resistivity trends; those being an increase in resistivity between the 20 and 40 "a" spacings, a decrease between the 40 and 80 "a" spacings, and an increase in resistivity between the 80 and 160 "a" spacings (Table B-1 and Figure B-6). Stations 5e and 5f show the same trends in resistivity values; those being a decrease in resistivity between the 20 and 40 "a" spacings, an increase between the 40 and 80 "a" spacings, and a decrease in resistivity between the 80 and 160 "a" spacings. The resistivity at Station 5b decreased in value with depth for all the "a" spacings measured. The resistivity values for all the stations were relatively low, and for the 160 foot "a" spacing the values were all similar. Soil borings which were placed nearby for the force main to Metro show that this area has highly variable subsurface conditions over relatively short distances. This is substantiated by the different trends in resistivity measured along line 5. In general, all the resistivity values are very low and this fact is likely due, in part, to the saline ground-water mounding from Waste Beds 12 and 15, and in part, due to saline ground water occurring in the Nine Mile Creek Valley.

Resistivity line 6 consisted of 1 station located in the bottom of a gravel excavation to the west of Waste Bed 13. The depth of the excavation was approximately 20 feet below the surrounding ground surface. All the resistivity values were relatively low (Table B-1 and

Figure B-7). The very low resistivity occurring at the 40 foot "a" spacing is due to the saline ground-water leaching from Waste Bed 13. There was a significant increase between the 40 and 80 foot "a" spacings and a large drop in resistivity between the 80 and 160 foot "a" spacings. The increase in resistivity between the 40 and 80 foot "a" spacings is likely due to sands and gravels overlying till and/or bedrock. The increase observed here is also due to the fact that the resistivity measured for the 20 foot "a" spacing is low in comparison because of the occurrence of the water table. The sharp decrease between the 80 and 160 foot "a" spacings could be due to either weathered bedrock or an increase in salinity.

Six stations were measured at resistivity line 7. An extra "a" spacing of 10 feet was measured at each of the stations. The decrease in resistivity values between the 10 and 20 foot "a" spacings is due to the presence of the water table (Table B-1 and Figure B-8). The increases in resistivity between the 20 and 80 foot "a" spacings is due to sands and gravels intermixed in the lacustrine sediments. The decrease in resistivity between the 80 and 160 foot "a" spacings may be due to the occurrence of weathered bedrock and the increase of salinity with depth.

Resistivity line 8 consisted of seven stations and was located north of Waste Beds 9 and 10. The values for resistivity were similar for all the stations with one exception (Table B-1 and Figure B-9). At Station 8b, the resistivity increased between the 40 and 80 foot "a" spacings, whereas the resistivity decreased for the other stations. The increase may have been due to the occurrence of more sands and gravels than occurred at the other stations. The resistivity values the between 80

and 160 foot "a" spacings were very low for all the stations. There are several wells near this resistivity line which were sampled, reflecting saline ground-water conditions. Therefore, the low resistivity values observed along line 8 appear to be due to the increasing salinity with increasing depth.

Three stations were measured along resistivity line 9. This line was located to the north of Waste Beds 12 and 13 and the Conrail tracks and was oriented parallel to the tracks and lies south of Nine Mile Creek. The resistivity values were generally low, but an increase in resistivity was observed the between 40 and 160 foot "a" spacings (Table B-1 and Figure B-10). Although ground water in the area is suspected to be naturally brackish, the low porosity of the bedrock in this area has caused a rise in resistivity with depth.

A.2 Boring and Well Installation Procedures

During October and November 1987, 19 borings were advanced at eight well cluster locations and monitoring wells were installed in 16 of the completed borings. Soil samples were obtained during the advancement of the deepest boring at each well cluster location and at one additional location where a well was not installed. Two other boreholes were not used for well installations due to difficulties encountered during drilling.

Eight well clusters were installed at various locations around the waste beds (Figure 8). In general, one deep well was screened in a permeable zone near the bedrock and a shallow well was screened in a permeable zone below the potentiometric surface. At Well Cluster 5, a third well was screened from 6.9 to 11.9 feet below grade in order to determine the quality of the perched water conditions at this location. One cluster consisted of a deep well

installed during this investigation (WB-6), and a second pre-existing 6-inch steel cased shallow well located in close proximity to WB-6.

A.2.1 Soil Sampling

Eighteen of the nineteen boreholes were completed with a truck-mounted Mobile 57 drill rig with 4-1/4 inch I.D. hollow-stem augers. One borehole (WB-2) was advanced with a truck-mounted TH60 Cyclone drill rig using air rotary techniques. Soil samples obtained while using the Mobile 57 drill rig were taken in accordance with ASTM D1586-84 for split barrel sampling. A 1-3/8 inch diameter, 2 foot long (internal dimensions) split-spoon sampler driven 24 inches with a 140 pound hammer dropped 30 inches was used throughout the sampling program. In general, the first borehole within a cluster was sampled continuously to the top of bedrock or to 100 feet, whichever was encountered first. Below 100 feet and above 100 feet, at the discretion of the on-site geologist, the sampling interval was changed to 5 foot intervals.

Upon removal of the sampler from the borehole, the soil samples were described by the supervising geologist. Soil sample descriptions were recorded in bound field books in indelible ink and included: soil moisture, color, type and texture, length of recovery, blow counts, drilling and sampling equipment, and miscellaneous observations. After describing the sample, a representative portion of the sample was stored in an 8 ounce glass jar provided by the driller.

Boring logs developed from the field notes are included in Appendix C. Table A-1 lists complete borehole and well installation details. The original field notes are maintained on file at the offices of Blasland & Bouck Engineers, P.C.

The boring advanced with the Cyclone drill rig at well cluster WB-2 was not sampled for soils above 95 feet. Samples obtained below 95 feet in this boring were cuttings and, as such, are not of the quality of split-spoon samples. The 0-95 foot interval had been sampled during the advancement of a hollow-stem auger boring (WB-2La) previously conducted at this cluster location, which failed to reach bedrock due to difficult drilling conditions. The log developed for boring WB-2L (Appendix C) is a composite log consisting of the soil information from the auger boring above 95 feet and the air rotary cuttings below that depth.

A.2.2 Rock Coring

At six separate drilling locations, the bedrock was cored with an NX core barrel which provides for the retrieval of a nominal 2-1/8 inch rock core. Five of the six cores were obtained from well clusters and the sixth was taken from boring WB-1La. The location of WB-1L had been a proposed well cluster location, but the boring was abandoned due to the relatively shallow bedrock and the relatively low permeability of the material overlying the bedrock encountered during drilling. At three of the eight well cluster locations, bedrock was not reached by the rig set up for coring, therefore, no cores were obtained from these clusters. Examination of air rotary cuttings and a change in drilling rate were used to determine depth to bedrock at WB-2L. Depth to

bedrock was not determined at the remaining two well cluster locations, WB-1 and WB-B.

Five foot core runs were performed at four of the five coring locations with core recovery varying between 2.8 and 4.5 feet. At the fifth location where a 3.8 foot core run was performed, recovery was 2.6 feet. A description of the rock core recovered and the rate of core cutting is provided on the subsurface logs in Appendix C.

A.2.3 Decontamination

Decontamination procedures for both drill rigs were similar. The rigs were decontaminated with high pressure hot water spray systems upon mobilization to the site and after each boring at a designated decontamination area. All downhole equipment, including augers, drill rods, tremie pipes, core barrels, auger plugs, split-spoon samplers, and associated drilling equipment including pipe wrenches, hand-held hammers and other equipment were decontaminated.

Split-spoon samplers were decontaminated prior to each use at the drilling location by washing with an Alconox detergent solution and thoroughly rinsing with tap water before the next sample.

A.2.4 Grain Size Analysis

Three to four soil samples from each of the eight well clusters were selected for grain size analysis. The samples selected from each cluster were either located within the screened interval or comprised of relatively impermeable material in comparison to the overlying and underlying deposits. The samples selected for analysis are listed in Table D-1.

Standard sieve analysis was conducted on all the selected samples except those which contained only a small proportion of material coarser than a No. 200 sieve size. Any sample with 20 percent or greater fines (No. 200 sieve size) had hydrometer analyses conducted on them in addition to the sieve analysis. Grain size analysis was performed in accordance with ASTM D422. The grain size curves are included in Appendix D.

A.2.5 Well Installations

Boreholes completed as described in the previous section were utilized for the installation of ground-water monitoring wells. Once the augers were advanced to the desired depth, a string of 2-inch I.D. flush-joint PVC 0.010-inch slot screen and riser were inserted into the borehole. In general, a grade zero sand pack was then installed by manually pouring sand into the annulus, filling the interval from below to above the well screen. In some locations, collapsed natural materials were used for the entire or a portion of the sand pack dependent on local geologic conditions (Table 25).

Bentonite pellets were poured into the annulus above the sand pack to provide a seal above the well screen pack. The bentonite pellets were hydrated by the water present in the borehole annulus. Grout comprised of approximately 95 percent Type II Portland cement and 5 percent bentonite powder (dry weight) mixed with approximately 6 gallons of water per bag of cement, was used to seal the annulus around the PVC riser to the surface. The grout was mixed into a slurry and added to the annulus using a tremie pipe, such that water in the annulus is displaced from the bottom upwards and a continuous grout

seal is insured. After the grout was emplaced, a 4.2-foot long, 4-inch I.D. steel surface casing with locking cap was installed around the PVC riser and secured with a padlock.

At all cluster well locations, the steel protective casing was installed such that the protective casing for the shallower well had a stick-up greater than the stick-up for the deeper well. This allowed immediate differentiation of wells within a cluster based on the casing stick-up height. After the grout in the annulus cured, sufficient grout was added to the annulus to compensate for settlement and a cement surface cap was placed around the protective pipe to encourage drainage away from the completed borehole. The complete well installation details are compiled in Table 25 and are shown on the subsurface logs in Appendix C.

A.3 Well Development, Ground-Water and In-Situe Hydraulic Conductivity Analyses

A.3.1 Well Development

The sixteen monitoring wells installed during the hydrogeologic investigation were developed during November 12-25, 1987 by Blasland & Bouck personnel. The wells were developed to remove fine grained soils from and around the well pack to promote a hydrologic interconnection between the aquifer and the well. Two methods of well development were used at the site: air-lift and bailing.

The air-lift method involved the use of a double coaxial tubing and foot valve setup powered by compressed air. The inner coaxial tube was a one-half inch diameter PVC hose, with slots cut into the bottom two

foot section which was inserted into the outer coaxial one-inch diameter PVC hose. A foot valve attached to the outer one-inch diameter hose allowed water to enter the annulus between the one-inch and one-half inch diameter hoses. The upper end of the one-half inch diameter hose was attached to a 60 cubic feet per minute air compressor which was used to force air down into the hose and out through the slots cut in the bottom. As a result, the air under pressure forced the water in the annulus between the two coaxial tubes up through the annulus to the surface. The foot valve prevented backflow of water or air into the well itself.

As the water was being pushed upwards, the tubing was raised and lowered inside of the well such that the foot valve acted like a surge block. In this manner, water is forced out into the formation, then pulled back into the well in an attempt to draw fine sediment from the sand pack into the well, where it could be pumped out. The deeper wells were generally developed by this method, as is shown in Table A-1.

Development by bailing involved removing water from the well using a two-inch diameter stainless steel bottom-loading bailer attached to a length of new polypropylene rope. The bailer was raised and lowered in a surging motion in an attempt to pull fine sediment out of the sand pack into the well bore, where it was removed by bailing. In general, the shallower wells were developed in this manner, as indicated in Table A-1.

All of the wells were initially very turbid due to suspended fines in the well. Each well was developed until there was no further noticeable decrease in the suspended load with continued development. If this

analytical sample was taken after the well recharged enough to obtain a sample. The deep wells were purged with a stainless steel top-loading bailer and a stainless steel bottom-loading bailer was used to purge the shallow wells. The last approximately one-half to one well volume of water was removed from the deep wells using the bottom-loading stainless steel bailer, which was subsequently used to obtain the analytical sample.

Two of the five pre-existing wells, DW-101 and MS-104.1, are located on property in the vicinity of the Crucible Steel, Inc., Solid Waste Management Facility near the State Fair parking area. These wells were evacuated, under Blasland & Bouck supervision, by an engineering firm which conducted the Part 366 Application for Crucible. Well MS-104.1 was evacuated and sampled using a dedicated bailer. Well DW-101 was sampled using a hand-operated pump. Blasland & Bouck personnel controlled the samples once the sample was removed from the well.

Three of the five previously existing wells, P-1, P-2 and Metro 1, were evacuated using a submersible pump. At least three well volumes were evacuated from each of the wells, then the pump was removed from the well.

All analytical samples were obtained from wells using a stainless steel bailer, except for wells MS-104.1 and DW-101, as discussed above. The analyses conducted for this investigation required that three one-pint plastic sample bottles be filled for each sample. Two bottles were prepared with acid, one each of nitric and sulfuric acid for sample preservation, and the third bottle contained no preservative. A one-half gallon plastic bottle was also supplied by the lab for each sample.

point was reached before removal of five well volumes, additional water was removed such that all wells had a minimum of five well volumes evacuated. In all but two cases, the wells failed to become relatively sediment-free. Fourteen of the sixteen wells installed and developed contained some proportion of gray-brown fines at the completion of the development process. A list of the well volumes removed, the methods used, and physical appearance of the water at the completion of development is included in Table A-1.

After development of each well, the equipment used for the development was decontaminated prior to developing the next well. Decontamination entailed flushing the coaxial tubing and foot valve set up thoroughly with tap water, both inside and out. Decontamination of the bailer was accomplished by the same methods as described in Section A.3.2 under Ground-Water Sampling. New polypropylene rope was used for each well which was bailed.

A.3.2 Ground-Water Sampling

Ground-water sampling was conducted from December 9-21, 1987 by Blasland & Bouck personnel. All sixteen of the wells installed as part of Blasland & Bouck's hydrogeologic investigation were sampled, in addition to five previously existing wells.

The wells installed during the course of this study were evacuated and sampled with a decontaminated stainless steel bailer attached to a new length of polypropylene rope. With the exception of Well WB-BL, a minimum of three well volumes were evacuated from the well prior to obtaining a sample for analysis. During purging of WB-BL, the well bailed dry after removing approximately two well volumes. The

Samples were obtained by carefully lowering the bailer into the well and then pouring the sample directly into the one-half gallon bottle and the unpreserved pint bottle. The sample in the one-half gallon bottom was filtered prior to acidification.

Sample filtration was performed with a Masterflex peristaltic pump which pushed the sample through a 0.45 micron filter. Filters manufactured by Gelman Sciences (Product No. 12123, 0.45 micron filter) and QED Environmental Systems, Inc. (Product No. FF8000) were used during this investigation dependent on availability of the filters. A new filter was used for each sample, and filtration was accomplished by pumping the sample from the one-half gallon plastic bottle through silicone tubing, through the filter and directly into the sample bottle. The silicone tubing was decontaminated prior to each filtration by thoroughly rinsing the outside of the tubing with tap water, then pumping approximately one-half gallon of tap water through the tubing, followed by a thorough rinse with distilled water and pumping approximately 1 quart of distilled water through the tubing. All sample bottles were then placed in a cooler with ice to maintain a cool temperature. The samples were delivered to the analytical laboratory on a daily basis at the completion of the field day. Chain-of-custody procedures were followed for all samples collected and are included in Appendix F.

Sampling equipment used to evacuate and sample each of the monitoring wells was decontaminated between sampling events. The bailers were washed with an Alconox/water detergent solution, rinsed with tap water, then distilled water, sprayed with methanol, and then rinsed again with distilled water. A new length of polypropylene rope

was used for each well. The submersible pump, hose, and power cords used for three wells were rinsed with tap water and the pump was inserted into a five foot long 4-inch I.D. PVC container, and at least twenty gallons of tap water was pumped through the pump.

Specific conductance, pH and temperature were all monitored on-site. After the laboratory bottles were filled, a bailer-full of ground water was poured into a clean glass or plastic container and each of the parameters were measured. The probes and thermometer used to measure these parameters were cleaned with distilled water after each use.

A.3.3 In-Situ Hydraulic Conductivity Analyses

In-situ hydraulic conductivity tests were performed on seven wells during December 1987. The tests were performed by the "slug test" method, whereby a "slug" of sufficient volume is rapidly placed into or removed from the well causing a pertabation in the static water level. Based on the slug's volume, it is possible to determine the theoretical maximum water level change in the well due to the insertion or removal of the slug. The recovery to the static level is monitored. The type and rate of recovery is indicative of the hydraulic conductivity of the screened interval of the tested well.

Slug tests were performed on Wells WB-2U, 4L, 5M, 5L, 6, BU and BL. The results of the tests are given in Table 15. These tests were performed using a length of 1-1/4 inch PVC pipe filled with cement. Three lengths, one 5 feet long and the other two 2.5 feet long, all which had dips and rings on either end, were utilized as the slugs. Depending on the anticipated hydraulic characteristics of the screened

interval, an appropriate combination of slug lengths could be utilized for each well, varying from 2.5 to 10 feet in 2.5 foot intervals. The volume of the slugs were calculated by measuring the slug's cross-sectional area and multiplying by the length.

During the conduct of the slug tests, the static water level was measured prior to placing the slug in the wells. The slug was rapidly placed in the well and successive water level measurements made at preselected time intervals until complete recovery occurred. In the wells tested for this Assessment, this usually occurred within a matter of minutes. If the recovery was too fast to record, the slug was removed and another slug added to a maximum of 10 feet. This procedure was then repeated. Once the water level stabilized to the static water level with the appropriate length of slug in the well, the slug was rapidly removed. Again, the recovery of the water level to the static level was monitored at preselected intervals. Most wells recovered very quickly, with three recovering within 20-25 seconds and one recovering within approximately 45 minutes.

The type and rate of the water level recovery after slug removal was used to determine a value of the screened interval horizontal hydraulic conductivity. This was done using a computer program by Weyer and Horwood-Brown that uses Hvorselv's formulae. The determined values of hydraulic conductivity are given in Table 15.

A.4 Surface Water Sampling and Stream Flow Measurements

A.4.1 Surface Water Sampling

Surface water sampling was conducted during the period of December 3-8, 1987 with two additional samples taken on December 22, 1987. The sampling locations are shown in Figure 27.

All samples were taken using a 1 liter Nalgene beaker decontaminated as outlined below. The beaker was attached to a telescoping aluminum pole, where necessary, and lowered into the surface water body with the opening facing upstream, where flow was evident. The sample was poured directly into the sample bottles provided by the laboratory from the Nalgene beaker. The samples bottles provided by the laboratory were described in Section A.3.2 (Ground-Water Sampling), except that no one-half gallon bottle was used because the surface water samples were not filtered. The samples were then placed in a cooler with ice to maintain an even, cool temperature.

After filling the sample bottles, another beaker-full of sample was taken to obtain measurements of pH, conductance and temperature. These measurements were made directly in the sampling beaker.

The Nalgene beaker was decontaminated prior to each use by scrubbing the beaker with an Alconox/tap water solution, thoroughly rinsing the beaker with tap water followed by a distilled water rinse, with methanol spray and a final distilled water rinse.

All information pertaining to sample color, turbidity, stream flow, and sampling location, in addition to sampling time and other observations, were recorded in a bound field book with indelible ink. Chain-of-custody procedures were followed. They are included in

Appendix F. At several locations, stream flow measurements were made using a flow meter as described in the following section.

A.4.2 Stream Flow Measurements

Stream flow measurements were taken by Blasland & Bouck Engineers, P.C. personnel on December 3 and 4, 1987 and March 11, 1988. Stream flow measurements, obtained by direct field measurement and through information gathered by the US Geological Survey at stream gaging stations, were utilized to determine the relative contribution of major tributaries to Onondaga Lake. The flow data, combined with chemical analytical results, allow for determination of chemical loading to the lake. Stream flow measurements were also obtained for selected minor tributaries to the lake, on tributaries to Nine Mile Creek, and at an upstream location of Nine Mile Creek in order to determine flow and chemical loading at these locations.

The methodology used to measure stream flow is reviewed in detail in Linsley, et. al, 1982. In summary, this method involves dividing the total width of the stream into vertical sections such that no section contained more than ten percent of the overall stream flow. Flow velocity measurements were then obtained in each vertical section at two-tenths and eight-tenths depth below the surface. The average of these two measurements has been shown to approximate the average velocity for the section. In shallow water, a single measurement at six-tenths depth was taken, which under these conditions, closely approximates the mean flow velocity.

Velocity measurements were made using a Marsh-McBirney Model 201D Portable Velocity Meter. The meter sensor is connected to the meter by a 20-foot long insulated cable. The sensor was affixed to the end of a galvanized pipe with a metal clamp which enabled the operator to accurately place the sensor at the appropriated stream depth. The stream velocity, in feet/second, is displayed on the meter. This value was recorded in a bound field book in indelible ink, along with the width and depth of the section measured. Computation of the discharge in the vertical section is completed by averaging the flow velocities from the two depths and multiplying the resultant velocity by the vertical section depth and width to obtain discharge in cubic feet per second. The contributions from each respective vertical section were then totalled to obtain the total stream discharge.

TABLE A-1

SUMMARY OF WELL DEVELOPMENT RESULTS

Well No.	Development Method	Volumes Removed	Appearance of Water Before Development	Appearance of Water After Development
WB-1U	Bailed	6	Lt. brown, high turbidity	Lt. brown, high turbidity
WB-1L	Bailed & Air Lifted	5	Lt. brown, high turbidity	Lt. brown, high turbidity
WB-2U	Bailed	6	Brown, high turbidity	Lt. brown, medium turbidity
WB-2L	Air Lifted	5	Brown, high turbidity	Lt. brown, medium turbidity
WB-3U	Bailed & Air Lifted	30	Lt. gray to brown	Lt. brown, medium turbidity
WB-3L	Bailed & Air Lifted	5	Lt. gray to brown, high turbidity	Gray to brown, medium turbidity
WB-4U	Bailed & Air Lifted	10	Gray to brown, high turbidity	Lt. brown, medium turbidity
WB-4L	Air Lifted	8	Gray to dk. brown, high turbidity	Gray to brown, medium turbidity
WB-5U	Bailed	20	Dk. gray to black	Dk. gray to black
WB-5M	Bailed	5	Dk. to lt. brown	Dk. to lt. brown
WB-5L	Air Lifted	6	Lt. brown, medium turbidity	Lt. brown, medium turbidity
WB-6L	Bailed & Air Lifted	5	Clear	Lt. brown, medium turbidity
WB-7U	Bailed	5	Dk. brown, high turbidity	Brown, high turbidity
WB-7L	Bailed & Air Lifted	5	Gray to brown, high turbidity	Brown, high turbidity
WB-8U	Bailed	5	Clear	White, translucent
WB-8L	Air Lifted	5	Dk. brown	Lt. brown, medium turbidity

APPENDIX B

RESISTIVITY DATA

TABLE B-1

EARTH RESISTIVITY SURVEY DATA

ALLIED-SIGNAL INC.

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
1a	20	247	32	0.1	022	025	295	284	295
	40	045	33	0.1	045	017	779	1.7×10^7	11,493
	80	125	22	0.1	009	011	503	285	343
	160	257	17	0.01	061	075	684	1,249	948
1b	20	028	30	0.1	033	031	402	383	402
	40	018	30	0.1	018	017	440	503	478
	80	028	32	0.1	016	011	679	2,042	1,123
	160	061	34	0.1	008	007	754	885	833
1c	20	004	28	0.1	029	029	364	340	364
	40	071	30	0.1	016	017	415	507	470
	80	005	34	0.1	012	011	578	1,144	827
	160	047	38	0.1	007	008	754	1,227	993
2	20	040	32	0.1	020	020	251	229	251
	40	025	32	0.1	025	025	628	4.8×10^6	5,374
	80	055	32	0.1	013	012	628	628	628
	160	033	33	0.1	008	007	754	1,017	903
3a	20	032	22	0.01	140	140	176	158	176
	40	034	22	0.01	086	083	212	291	256
	80	132	24	0.01	044	045	224	240	235
	160	123	30	0.01	016	016	161	105	121
3b	20	042	34	0.1	017	017	214	194	214
	40	105	18	0.01	101	100	253	331	298
	80	047	23	0.01	056	055	279	323	307
	160	034	24	0.01	020	020	201	132	151

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
4a	20	007	28	0.01	037	035	45	53	45
	40	071	28	0.01	013	013	33	21	25
	80	004	29	0.01	011	011	55	328	107
	160	006	28	0.01	008	008	80	185	122
4b	20	045	28	0.01	032	032	40	43	40
	40	015	23	0.01	014	014	35	29	31
	80	125	20	0.001	085	085	43	59	52
	160	032	18	0.001	061	061	61	134	91
5a	20	059	22	0.001	141	141	18	13	18
	40	024	20	0.001	133	130	33	807	78
	80	008	34	0.001	070	070	35	39	37
	160	030	30	0.001	042	045	44	64	54
5b	20	022	24	0.01	082	082	103	118	103
	40	040	22	0.01	031	031	78	54	61
	80	085	28	0.001	116	116	58	40	45
	160	090	24	0.001	047	048	48	37	40
5c	20	005	24	0.01	011	011	14	12	14
	40	053	22	0.01	013	013	33	85,969	189
	80	053	26	0.01	007	006	33	33	33
	160	085	22	0.01	004	004	40	57	50
5d	20	020	30	0.01	023	023	29	25	29
	40	009	28	0.01	014	015	36	55	46
	80	018	28	0.01	007	008	38	39	39
	160	034	21	0.001	042	042	42	50	47
5e	20	047	24	0.01	054	054	68	74	68
	40	003	22	0.001	228	226	57	45	49
	80	028	20	0.01	014	014	70	101	87
	160	066	19	0.001	068	068	68	66	67

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
5f	20	026	24	0.01	081	081	102	122	102
	40	086	20	0.001	274	274	69	42	49
	80	044	24	0.001	144	144	72	78	76
	160	052	28	0.001	046	046	46	26	31
6	20	042	24	0.001	195	193	24	25	24
	40	014	24	0.001	027	027	7	1	1
	80	008	24	0.001	033	033	17	82,705	120
	160	010	30	0.001	012	012	12	8	9
7a	10	045	22	0.001	543	568	35	36	35
	20	017	30	0.001	262	262	33	30	31
	40	007	30	0.001	181	181	45	87	64
	80	128	28	0.001	113	113	57	84	71
	160	147	27	0.001	043	043	43	30	34
7b	10	025	30	0.01	084	084	53	59	53
	20	018	20	0.01	033	033	41	30	34
	40	251	26	0.01	019	019	48	60	55
	80	151	20	0.001	121	121	61	93	78
	160	252	24	0.001	056	056	56	50	52
7c	10	059	24	0.01	154	159	98	126	98
	20	115	32	0.001	458	433	56	26	34
	40	055	22	0.001	197	195	49	42	44
	80	027	22	0.001	117	117	59	79	70
	160	207	32	0.001	046	046	46	34	37
7d	10	158	24	0.01	126	126	79	93	79
	20	136	40	0.01	045	045	57	37	42
	40	104	36	0.01	030	030	75	130	102
	80	064	26	0.01	016	016	80	88	85
	160	218	22	0.001	063	063	63	46	51

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
7e	10	114	28	0.01	190	190	119	155	119
	20	004	20	0.01	035	035	44	7	15
	40	112	36	0.01	024	024	60	113	85
	80	148	22	0.001	174	174	87	199	132
	160	243	26	0.001	050	050	50	24	31
7f	10	045	36	0.01	110	112	70	98	70
	20	040	40	0.01	022	022	28	4	11
	40	030	24	0.001	191	191	48	372	98
	80	020	28	0.001	143	139	71	173	110
	160	126	26	0.001	062	062	62	53	55
8a	20	024	32	0.01	119	119	150	168	150
	40	150	38	0.01	048	048	121	90	100
	80	305	30	0.001	173	173	87	57	65
	160	174	32	0.001	028	028	28	4	7
8b	20	040	28	0.01	235	235	295	345	295
	40	148	27	0.01	085	085	214	141	161
	80	146	30	0.01	064	064	322	858	512
	160	158	20	0.001	028	028	28	2	0
8c	20	282	28	0.01	189	189	237	255	237
	40	007	40	0.01	082	082	206	171	181
	80	025	28	0.01	020	020	101	34	52
	160	028	22	0.001	023	023	23	3	1
8d	20	055	32	0.01	184	184	231	261	231
	40	073	32	0.01	072	072	181	132	146
	80	095	28	0.01	015	015	75	15	32
	160	036	24	0.001	014	014	14	1	0

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms) Forward	Resistance Reading (ohms) Reverse	Resistivity (ohm.ft) Apparent	Resistivity (ohm.ft) Full Correction	Resistivity (ohm.ft) Partial Correction
8e	20	038	30	0.01	126	126	158	166	158
	40	145	26	0.01	058	058	146	130	135
	80	237	24	0.001	139	139	70	23	36
	160	278	25	0.001	031	031	31	8	15
8f	20	041	24	0.01	119	119	150	152	150
	40	042	30	0.01	057	057	143	136	138
	80	090	28	0.001	151	151	76	31	43
	160	005	24	0.001	019	019	19	3	1
8g	20	120	22	0.01	103	103	129	131	129
	40	129	26	0.01	050	050	126	121	122
	80	041	22	0.001	125	125	63	23	34
	160	014	24	0.001	015	015	15	2	1
9a	20	066	40	0.01	013	013	16	22	16
	40	421	20	0.01	003	003	8	2	4
	80	082	20	0.001	017	017	9	10	10
	160	235	35	0.001	270	- - -	271	1.4×10^{29}	3.8×10^{24}
9b	20	004	32	0.01	010	010	13	17	13
	40	078	20	0.001	025	025	6	2	3
	80	142	24	0.001	016	016	8	13	10
	160	340	18	0.001	015	015	15	464	36
9c	20	098	34	0.01	008	008	10	10	10
	40	091	36	0.01	004	004	10	10	10
	80	001	28	0.001	016	016	8	6	7
	160	220	22	0.001	012	012	12	31	19

TABLE B-1

EARTH RESISTIVITY SURVEY DATA

ALLIED-SIGNAL INC.

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
1a	20	247	32	0.1	022	025	295	284	295
	40	045	33	0.1	045	017	779	1.7×10^7	11,493
	80	125	22	0.1	009	011	503	285	343
	160	257	17	0.01	061	075	684	1,249	948
1b	20	028	30	0.1	033	031	402	383	402
	40	018	30	0.1	018	017	440	503	478
	80	028	32	0.1	016	011	679	2,042	1,123
	160	061	34	0.1	008	007	754	885	833
1c	20	004	28	0.1	029	029	364	340	364
	40	071	30	0.1	016	017	415	507	470
	80	005	34	0.1	012	011	578	1,144	827
	160	047	38	0.1	007	008	754	1,227	993
2	20	040	32	0.1	020	020	251	229	251
	40	025	32	0.1	025	025	628	4.8×10^6	5,374
	80	055	32	0.1	013	012	628	628	628
	160	033	33	0.1	008	007	754	1,017	903
3a	20	032	22	0.01	140	140	176	158	176
	40	034	22	0.01	086	083	212	291	256
	80	132	24	0.01	044	045	224	240	235
	160	123	30	0.01	016	016	161	105	121
3b	20	042	34	0.1	017	017	214	194	214
	40	105	18	0.01	101	100	253	331	298
	80	047	23	0.01	056	055	279	323	307
	160	034	24	0.01	020	020	201	132	151

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
4a	20	007	28	0.01	037	035	45	53	45
	40	071	28	0.01	013	013	33	21	25
	80	004	29	0.01	011	011	55	328	107
	160	006	28	0.01	008	008	80	185	122
4b	20	045	28	0.01	032	032	40	43	40
	40	015	23	0.01	014	014	35	29	31
	80	125	20	0.001	085	085	43	59	52
	160	032	18	0.001	061	061	61	134	91
5a	20	059	22	0.001	141	141	18	13	18
	40	024	20	0.001	133	130	33	807	78
	80	008	34	0.001	070	070	35	39	37
	160	030	30	0.001	042	045	44	64	54
5b	20	022	24	0.01	082	082	103	118	103
	40	040	22	0.01	031	031	78	54	61
	80	085	28	0.001	116	116	58	40	45
	160	090	24	0.001	047	048	48	37	40
5c	20	005	24	0.01	011	011	14	12	14
	40	053	22	0.01	013	013	33	85,969	189
	80	053	26	0.01	007	006	33	33	33
	160	085	22	0.01	004	004	40	57	50
5d	20	020	30	0.01	023	023	29	25	29
	40	009	28	0.01	014	015	36	55	46
	80	018	28	0.01	007	008	38	39	39
	160	034	21	0.001	042	042	42	50	47
5e	20	047	24	0.01	054	054	68	74	68
	40	003	22	0.001	228	226	57	45	49
	80	028	20	0.01	014	014	70	101	87
	160	066	19	0.001	068	068	68	66	67

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
5f	20	026	24	0.01	081	081	102	122	102
	40	086	20	0.001	274	274	69	42	49
	80	044	24	0.001	144	144	72	78	76
	160	052	28	0.001	046	046	46	26	31
6	20	042	24	0.001	195	193	24	25	24
	40	014	24	0.001	027	027	7	1	1
	80	008	24	0.001	033	033	17	82,705	120
	160	010	30	0.001	012	012	12	8	9
7a	10	045	22	0.001	543	568	35	36	35
	20	017	30	0.001	262	262	33	30	31
	40	007	30	0.001	181	181	45	87	64
	80	128	28	0.001	113	113	57	84	71
	160	147	27	0.001	043	043	43	30	34
7b	10	025	30	0.01	084	084	53	59	53
	20	018	20	0.01	033	033	41	30	34
	40	251	26	0.01	019	019	48	60	55
	80	151	20	0.001	121	121	61	93	78
	160	252	24	0.001	056	056	56	50	52
7c	10	059	24	0.01	154	159	98	126	98
	20	115	32	0.001	458	433	56	26	34
	40	055	22	0.001	197	195	49	42	44
	80	027	22	0.001	117	117	59	79	70
	160	207	32	0.001	046	046	46	34	37
7d	10	158	24	0.01	126	126	79	93	79
	20	136	40	0.01	045	045	57	37	42
	40	104	36	0.01	030	030	75	130	102
	80	064	26	0.01	016	016	80	88	85
	160	218	22	0.001	063	063	63	46	51

TABLE B-1 (Cont'd.)

Station Number	"a" Spacing (feet)	Self Potential (millivolts)	Current (Volts)	Range (microamperes)	Resistance Reading (ohms)		Resistivity (ohm.ft)		
					Forward	Reverse	Apparent	Full Correction	Partial Correction
8e	20	038	30	0.01	126	126	158	166	158
	40	145	26	0.01	058	058	146	130	135
	80	237	24	0.001	139	139	70	23	36
	160	278	25	0.001	031	031	31	8	15
8f	20	041	24	0.01	119	119	150	152	150
	40	042	30	0.01	057	057	143	136	138
	80	090	28	0.001	151	151	76	31	43
	160	005	24	0.001	019	019	19	3	1
8g	20	120	22	0.01	103	103	129	131	129
	40	129	26	0.01	050	050	126	121	122
	80	041	22	0.001	125	125	63	23	34
	160	014	24	0.001	015	015	15	2	1
9a	20	066	40	0.01	013	013	16	22	16
	40	421	20	0.01	003	003	8	2	4
	80	082	20	0.001	017	017	9	10	10
	160	235	35	0.001	270	---	271	1.4×10^{29}	3.8×10^{24}
9b	20	004	32	0.01	010	010	13	17	13
	40	078	20	0.001	025	025	6	2	3
	80	142	24	0.001	016	016	8	13	10
	160	340	18	0.001	015	015	15	464	36
9c	20	098	34	0.01	008	008	10	10	10
	40	091	36	0.01	004	004	10	10	10
	80	001	28	0.001	016	016	8	6	7
	160	220	22	0.001	012	012	12	31	19

SUBSURFACE LOG WB-5U

(INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
				Note: WB-5U was installed in a borehole located within approximately 20 feet of WB-5L. The geology shown on this log represents what was encountered in WB-5L and no samples were taken for this boring.
				Black CINDERS. Brown to black CINDERS with variable amounts of gravel, sand and silt. - FILL - Wet at approximately 8.5 feet.
				Brown CLAY, trace silt. Bottom of boring 12.5'.

'ATION 386.1
D 10/23/87
'ETED 10/23/87
Y KLR, GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-5U

BLASLAND & BOUCK ENGINEERS, P.C.

WB-5M

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BOUCK
P.C.

SUBSURFACE LOG WB-5M (CONT'D.)

SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
						Dark gray coarse to fine gravelly coarse to fine SAND, little to trace silt and clay.
						Bottom of boring 63.0 feet.

RFACE ELEVATION 386.1
ATE STARTED 11/11/87
TE COMPLETED 11/11/87
ASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-5M

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-5L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	15	13			
		S-25	24	4			
50		S-26	11	2			
		S-27	8	29			
		S-28	15	37			Dark gray coarse to fine gravelly coarse to fine SAND, little to trace silt and clay.
55		S-29	19	26			
		S-30	24	19			
60		S-31	14	24			
		S-32	19	35			
		S-33	11	47			
65		S-34	13	85			
							Red SILT, little coarse to fine gravel, trace clay.
		S-35	14	54			Red and green coarse to medium SAND, trace fine gravel, silt.
70		S-36	12	109+			
		S-37	2	100+			Gray gravelly coarse to fine SAND little silt gradational to gray silty coarse to fine SAND, little fine gravel, slight stratification in some areas.
		S-38	2.5	62+			
75		S-39	12	91			
		S-40	18	62			
80		S-41	16	51			
85		S-42	18	49			
90		S-43	19	54			

SURFACE ELEVATION 386.0
DATE STARTED 10/19/87
DATE COMPLETED 10/22/87
CLASSIFIED BY KLR, GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 3
NO. WB-5L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-5L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-44	9.5	86			Gray brown to reddish brown to red silty fine SAND stratified, occasional lenses with medium to fine sand grading downward to:
100		S-45	13	146			
105		S-46	7	101			
							Red and green fine SAND, little silt, fine gravel, stratified.
110		S-47	9	78			
115							
		S-48	16	73			
120							
		S-49	9	130			Coarse to fine GRAVEL, little silt.
							Red SILT, little coarse to fine gravel, trace clay, TILL.
125							
		S-50	6	80+			
130							
		S-51	4	122+			
							Top of rock at 134.5.
135							Gray fissle SHALE.
		S-52	2.5	200+			
		core	2.6'	7 min			
				5.5 min			Interbedded dark and light gray horizontally bedded SHALE with numerous subhorizontal to subvertical thin (typically less than 1/16 inch thick) joints filled with gypsum.
140				7.5 min			
				6.5 min			
							Bottom of boring 141.0'.

SURFACE ELEVATION 386.0
DATE STARTED 10/19/87
DATE COMPLETED 10/22/87
CLASSIFIED BY KLR, CMT

PROJECT Allied-Signal Inc.
SHEET 3 OF 3
NO. WB-5L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-6

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	12	9			Topsoil over brick chips, cinders, coal chips. FILL.
		S-2	12	17			Brown to redbrown varved SILT and silty CLAY grading downward to:
5		S-3	18	10			
		S-4	20	8			
		S-5	12	12			
10		S-6	24	7			Varved fine SAND, little silt and clayey SILT grading downward to:
		S-7	18	12			
		S-8	18	9			
15		S-9	14	6			Gray to purple-brown silty fine SAND, laminated.
		S-10		9			
20		S-11	NR	7			
		S-12	12	9			
25		S-13	12	7			
		S-14	18	13			
		S-15	18	13			
30		S-16	18	10			
		S-17	24	25			
35		S-18	5	8			
		S-19	18	8			
		S-20	24	9			
40		S-21	18	7			
		S-22	12	13			
		S-23	18	8			

SURFACE ELEVATION 381.8
DATE STARTED 10/27/87
DATE COMPLETED 10/29/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 3
NO. WB-6

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-6L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	18	50			Gray-brown coarse to fine gravelly coarse to fine SAND, little silt, slight to moderate stratification.
		S-25	12	44			
50		S-26	12	68			
		S-27	18	28			
		S-28	14	19			
55							
		S-29	12	19			
60		S-30	18	15			Gray coarse to fine SAND, little silt, fine gravel, grading downward to:
		S-31	19	19			
		S-32	18	18			
65		S-33	12	21			
		S-34	14	15			
70		S-35	7	14			Gray silty medium to fine SAND, little gravel.
75		S-36	17	34			Red silty coarse to fine SAND, little coarse to fine gravel.
80		S-37	17	76			Red coarse to fine SAND, little silt. Top of rock at 83.0'.
85		S-38	4	73+			Black to gray weathered SHALE with 2-inch thick, subhorizontal joint filled with green, red, gray, yellow, coarse to fine sand in matrix of clay.
90		S-39	2	100+			Green weathered SHALE.
		core	2.8'	8 min			Green soft weathered SHALE with numerous subhorizontal to subvertical joints filled with gypsum.
				6 min			
				1.1 min			

SURFACE ELEVATION 381.8
DATE STARTED 10/27/87
DATE COMPLETED 10/29/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 3
NO. WB-6

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-6L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
				9 min 7 min			Gray shale with frequent subhorizontal to subvertical joint fillings of gypsum.
100							Bottom of boring 96.7 feet.

SURFACE ELEVATION 381.8
DATE STARTED 10/27/87
DATE COMPLETED 10/29/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 3 OF 3
NO. WB-6

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-7La

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	10	9			Black silty CINDERS, little coarse to fine sand, FILL.
		S-2	1	3			
5		S-3	12	9			
		S-4	6	10			
		S-5	10	9			Red to brown CLAY, moist. Occasional lenses of black organic silt.
10		S-6	13	17			
		S-7	11	55			Red to red-brown silty CLAY to clay with little silt. Laminated occasionally with fine silty sand partings.
15		S-8	24	21			
		S-9	24	37			
		S-10	19	6			Brown CLAY interbedded with silty fine sand.
20		S-11	24	5			Brown varved silty fine SAND interbedded with brown CLAY grading downward to:
		S-12	12	10			
		S-13	6	5			
25		S-14	18	4			
		S-15	12	3			
30		S-16	12	5			
		S-17	18	6			Brown silty fine SAND, grading downward to:
		S-18	12	3			
35		S-19	18	10			
		S-20	NR	5			
40		S-21	13	11			Brown to gray-brown fine SAND, little silt.
		S-22	12	9			
		S-23	12	12			

SURFACE ELEVATION 377.5±
DATE STARTED 11/2/87
DATE COMPLETED 11/6/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 3
NO. WB-7La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-7La (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	8	16			
50		S-25	11	15			
		S-26	8	27			Brown coarse to fine SAND, little fine gravel, trace silt.
		S-27	18	5			
55		S-28	24	6			Brown to red-brown interbedded silty CLAY, silty coarse to fine SAND and fine silty SAND.
		S-29	16	26			
60		S-30	6	10			Gray coarse to fine sandy GRAVEL, little silt to gray fine gravelly coarse to fine SAND, trace silt, occasional silt lense.
		S-31	18	16			
65		S-32	18	15			
		S-33	22	80			
		S-34	14	99			Red silty coarse to fine SAND, little clay, fine gravel, TILL.
70		S-35	18	115			
		S-36	18	91			Gray-brown gravelly coarse to fine SAND, little silt.
75		S-37	12	106			
		S-38	3	50+			
		S-39	6	57+			Red silty coarse to fine SAND, little fine gravel, TILL.
80		S-40	3	50+			
85		S-41	6	65+			
90		S-42	6	71+			

SURFACE ELEVATION 377.5±
DATE STARTED 11/2/87
DATE COMPLETED
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 3
NO. WB-7La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-7La (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-43	4	100+			
100		S-44	6	118+			Top of rock at 103 feet.
105		S-45					Green fissile weathered SHALE.
		core	3.85'	11 min			Red gradational downward to green very weathered to moderately weathered SHALE some subhorizontal to subvertical joints, joint surfaces are occasionally stained with iron oxide.
				5 min			
110				7 min			
				7 min			
				10 min			
							Bottom of boring 112.4 feet.

SURFACE ELEVATION 377.5±
DATE STARTED 11/2/87
DATE COMPLETED
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 3 OF 3
NO. WB-7L a

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-7U

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-7U was installed in a borehole located within approximately 20 feet of WB-7La. The geology shown on this log represents what was encountered in WB-7La and no samples were taken for this boring.
0							Black silty CINDERS, little coarse to fine sand, FILL.
5							
							Red to brown CLAY, moist. Occasional lenses of black organic silt.
10							
							Red to red-brown silty CLAY to clay with little silt. Laminated occasionally with fine silty sand partings.
15							
							Brown CLAY interbedded with silty fine sand.
20							Brown silty fine SAND interbedded with brown CLAY - VARVES grading downward to:
25							
30							Brown silty fine SAND, grading downward to:
35							
40							Brown to gray-brown fine SAND, little silt.
45							

SURFACE ELEVATION 377.5
DATE STARTED 11/10/87
DATE COMPLETED 11/10/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-7U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-7U (CONT'D.)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
45							
50							Brown coarse to fine SAND, little fine gravel, trace silt.
55							Bottom of boring 53.3'.

SURFACE ELEVATION 377.5
DATE STARTED 11/10/87
DATE COMPLETED 11/10/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-7U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-7L

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-7L was installed in a borehole located within approximately 20 feet of WB-7La. The geology shown on this log represents what was encountered in WB-7La. No samples were taken for this boring.
0							Black silty CINDERS, little coarse to fine sand, FILL.
5							
10							Red to brown CLAY, moist. Occasional lenses of black organic silt.
15							Red to red-brown silty CLAY to clay with little silt. Laminated occasionally with fine silty sand partings.
20							Brown CLAY interbedded with silty fine sand.
25							Brown varved silty fine SAND interbedded with brown CLAY grading downward to:
30							
35							Brown silty fine SAND, grading downward to:
40							Brown to gray-brown fine SAND, little silt.

SURFACE ELEVATION 377.5
DATE STARTED 11/6/87
DATE COMPLETED 11/9/87
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-7L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-7L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
50							
							Brown coarse to fine SAND, little fine gravel, trace silt.
55							Brown to red-brown interbedded silty CLAY, silty coarse to fine SAND and fine silty SAND.
60							Gray coarse to fine sandy GRAVEL, little silt to gray fine gravelly coarse to fine SAND, trace silt, occasional silt lense.
65							
							Red silty coarse to fine SAND, little clay, fine gravel, TILL.
70							
							Gray-brown gravelly coarse to fine SAND, little silt.
75							
							Red silty coarse to fine SAND, little fine gravel, TILL.
80							Bottom of boring 79 feet.
85							
90							

SURFACE ELEVATION 377.5

DATE STARTED 11/6/87

DATE COMPLETED 11/9/87

CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.

SHEET 2 OF 2

NO. WB-7L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-BU

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-BU was installed in a borehole located within approximately 20 feet of WB-BL. The geology shown on this log represents what was encountered in WB-BL and no samples were taken for this boring.
							Road bed gravel.
							White SOLVAY WASTE occasional dark lenses.
							Bottom of boring 24.3 feet.

SURFACE ELEVATION 382.3
DATE STARTED Nov. 20, 1987
DATE COMPLETED Nov. 20, 1987
CLASSIFIED BY KLR

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-BU

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-BL

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0							Road bed gravel.
5		S-1	15	1			White SOLVAY WASTE occasional dark lenses.
10		S-2	21	2			
15		S-3	24	1			
20		S-4	24	1			
25		S-5	24	1			
		S-6	24	1			Green MARL with shells.
30		S-7	24	1			
		S-8	24	1			
		S-8a					
35		S-9	24	9			Dark gray SILT, little dark gray and black fine sand.
		S-10	24	27			
		S-10a					
		S-11	12	19			
40		S-12	18	5			
		S-13	24	16			
		S-14	24	14			

SURFACE ELEVATION 382.2
DATE STARTED 11/18/87
DATE COMPLETED 11/19/87
CLASSIFIED BY KLR

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-BL

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-BL (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-15	24	11			Dark gray SILT occasional thin clay lenses, one fine sand lens.
		S-16	15	5			
50		S-17	16	WOR			Dark gray fine sandy CLAY, little silt, occasional fine sand lens.
		S-18	18	2			
55		S-19	24	2			Fine to medium SAND little clay. Dark gray CLAY.
		S-20	24	3			
		S-21	24	WOH			Dark gray varved CLAY and SILT gradational to:
60		S-22	24	2			
		S-23	24	3			
65		S-24	24	3			
		S-25	24	2			Brown varved CLAY, little silt.
		S-26	24	2			
70		S-27	18	2			
		S-28	24	2			
75		S-29	18	2			
		S-30	24	3			
		S-31	12	20			
80		S-32	18	28			Red medium to fine sandy CLAY, little gravel. TILL.
		S-33	12	54+			
85							Bottom of boring 85.4 feet.

SURFACE ELEVATION 382.2
DATE STARTED 11/18/87
DATE COMPLETED 11/19/87
CLASSIFIED BY KLR

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-BL

BLASLAND & BOUCK ENGINEERS, P.C.

APPENDIX D

GRAIN SIZE ANALYSIS

GRAIN SIZE ANALYSIS SAMPLES[1]

Well	Sample Number(s)	Analysis[2]	Report Number
WB-1L	S2	P,H	1
	S12, S13	S,H	2
	S19b, S20	S,H	3
	S22, S23	S	20
WB-2L	S19	S,H	4
	S31, S32	S,H	5
	S35, S36	S	21
WB-3L	S11	P,H	6
	S19	S,H	7
	S33	P,H	8
WB-4L	S17, S18	S,H	9
	S26, S27	S,H	10
	S40	S,H	11
WB-5L	S5	S	22
	S10	P,H	12
	S30, S31	S	23
	S48	P,H	13
WB-6L	S2	P,H	14
	S27	S,H	15
	S36	S	24
WB-7L	S26	S	25
	S34	S,H	16
	S36, S37	S	26
WB-8L	S4	P,H	17
	S20	P,H	18
	S32	S,H	19

[1] Refer to following page for the depth intervals of the samples and a summary of the grain size distribution.

[2] S: Sieve Analysis
P: Prewash
H: Hydrometer Analysis

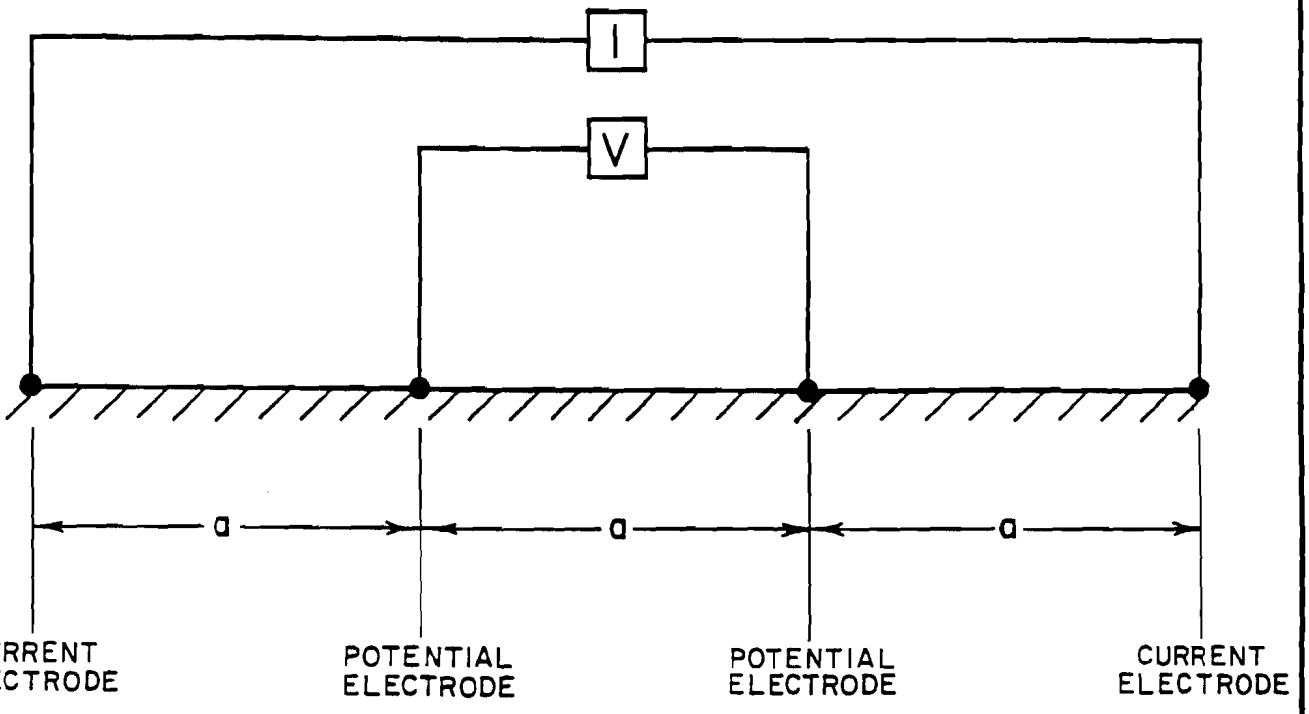
Project Title Laboratory Testing File #131.02 #2

Sieve Analysis ASTM D-422

Well Boring #	Sample #	Depth in Feet	Sieve Size - Percent Passing Sieve													
			2"	1"	3/4"	½"	3/8"	#4	#10	#30	#40	#60	#100	#200		
1L(1)	S-2	5-7	--	--	--	--	--	--	--	--	100	--	--	99.3		
1L	S-12&S-13	37-39 40-42	100	85.3	85.3	83.6	81.5	70.0	50.8	36.3	33.9	30.6	28.4	25.8		
1L	S-19B&S-20	61-62 64-66	--	100	82.6	81.0	77.9	68.3	57.5	45.8	43.2	37.7	33.9	29.8		
1L	S-22&S-23	68-69.5 70-72	100	81.5	69.2	59.8	50.9	41.5	32.8	21.9	20.0	16.9	15.0	13.2		
2L	S-19	40-42	--	100	90.6	85.9	84.9	75.4	50.7	31.3	28.3	24.3	22.0	19.8		
2L	S-31&S-32	68-69.8 70-71.5	100	87.2	81.4	72.9	64.6	52.3	41.5	30.6	28.2	25.2	23.5	21.7		
2L	S-35&S-36	85-86.5 90-91.5	100	92.8	70.5	61.7	55.4	43.7	32.6	22.6	20.6	17.9	16.5	15.2		
3L(1)	S-11	20-22	--	--	--	--	--	--	--	--	100	--	--	98.5		
3L	S-19	36-38	--	--	100	92.3	85.1	75.6	59.7	36.6	31.1	25.2	22.5	19.8		
3L(1)	S-33	68-70	--	--	--	--	--	--	--	--	100	--	--	76.0		
4L	S-17&S-18	32-34 34-36	--	100	89.0	85.6	77.1	59.8	47.2	37.7	35.8	33.3	32.1	31.1		
4L	S-26&S-27	50-52 52-54	100	89.9	85.6	76.0	71.2	60.0	48.8	37.2	35.1	32.4	30.9	29.4		
4L	S-40	90-92	--	--	100	94.2	85.2	63.8	48.4	34.0	31.1	27.3	25.6	23.9		
5L	S-5	8-10	--	100	90.5	78.0	71.2	60.9	47.3	30.9	27.4	22.1	18.3	14.8		
5L(i)	S-10	18-20	--	--	--	--	--	100	--	--	98.9	--	--	98.3		
5L	S-30&S-31	58-60 60-62	100	89.9	84.4	70.2	61.9	50.3	38.2	23.0	20.2	16.9	15.3	13.9		
5L(1)	S-48	116-118	--	--	--	--	100	--	--	--	81.9	--	--	35.1		

Remarks: (1) Partial Sieve Analysis, used in calculations for hydrometer analysis

Prewashed ASTM C-117
Yes X No ____
Performed By W.H.T.&J.G.



WENNER ELECTRODE CONFIGURATION

FIGURE B-2

PARTIALLY CORRECTED APPARENT RESISTIVITY

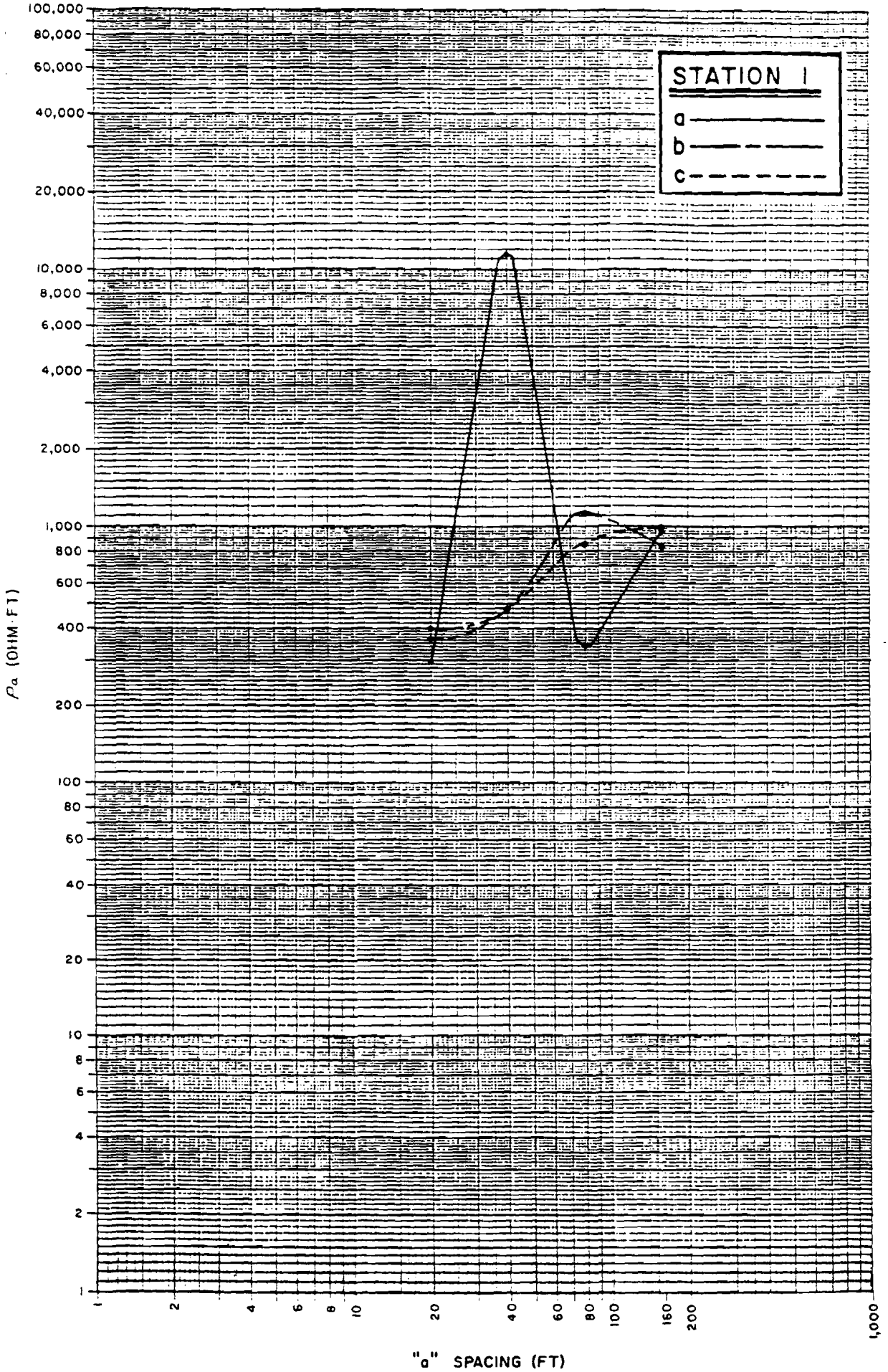


FIGURE B-3

PARTIALLY CORRECTED APPARENT RESISTIVITY

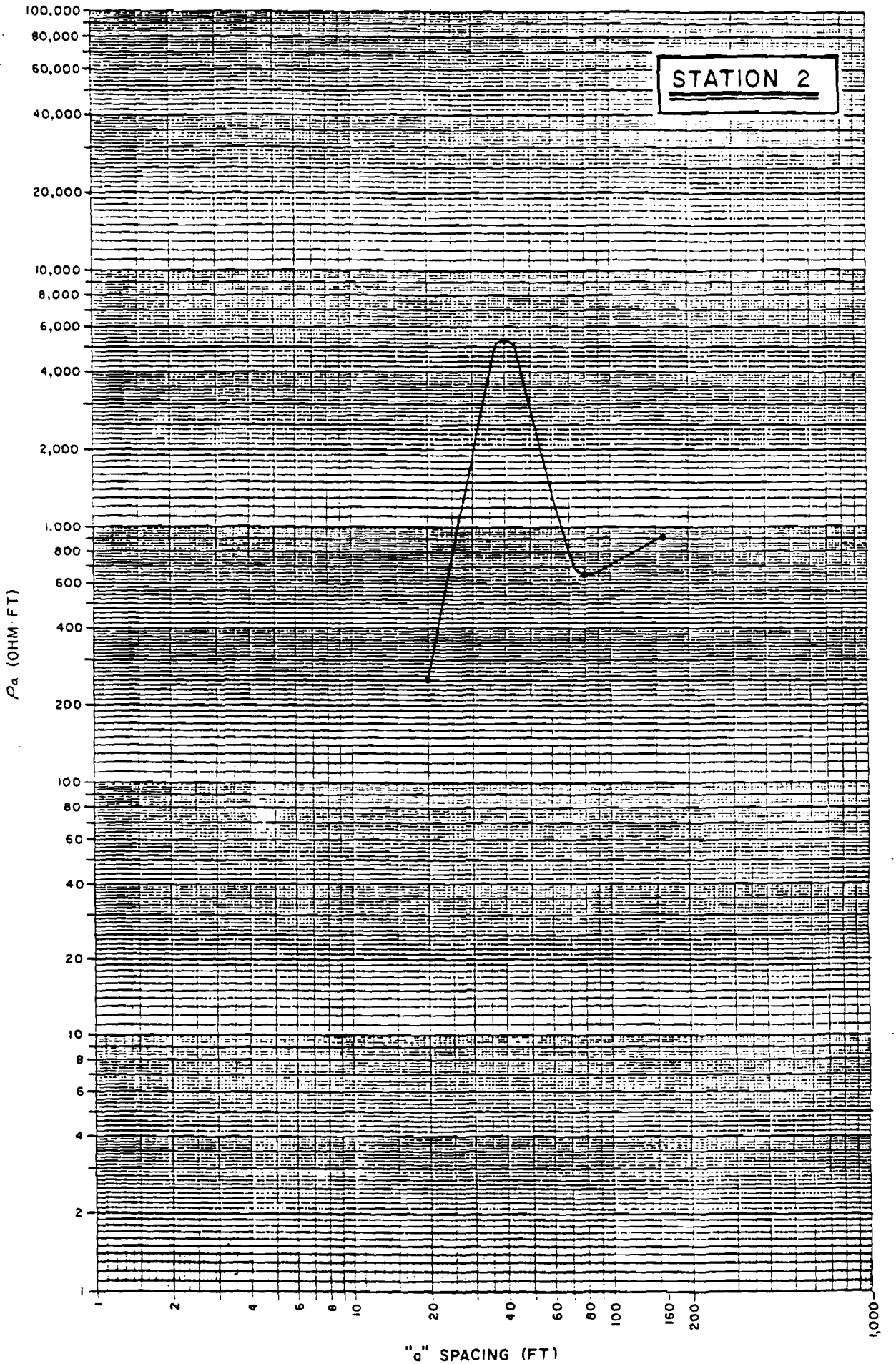


FIGURE B-4

PARTIALLY CORRECTED APPARENT RESISTIVITY

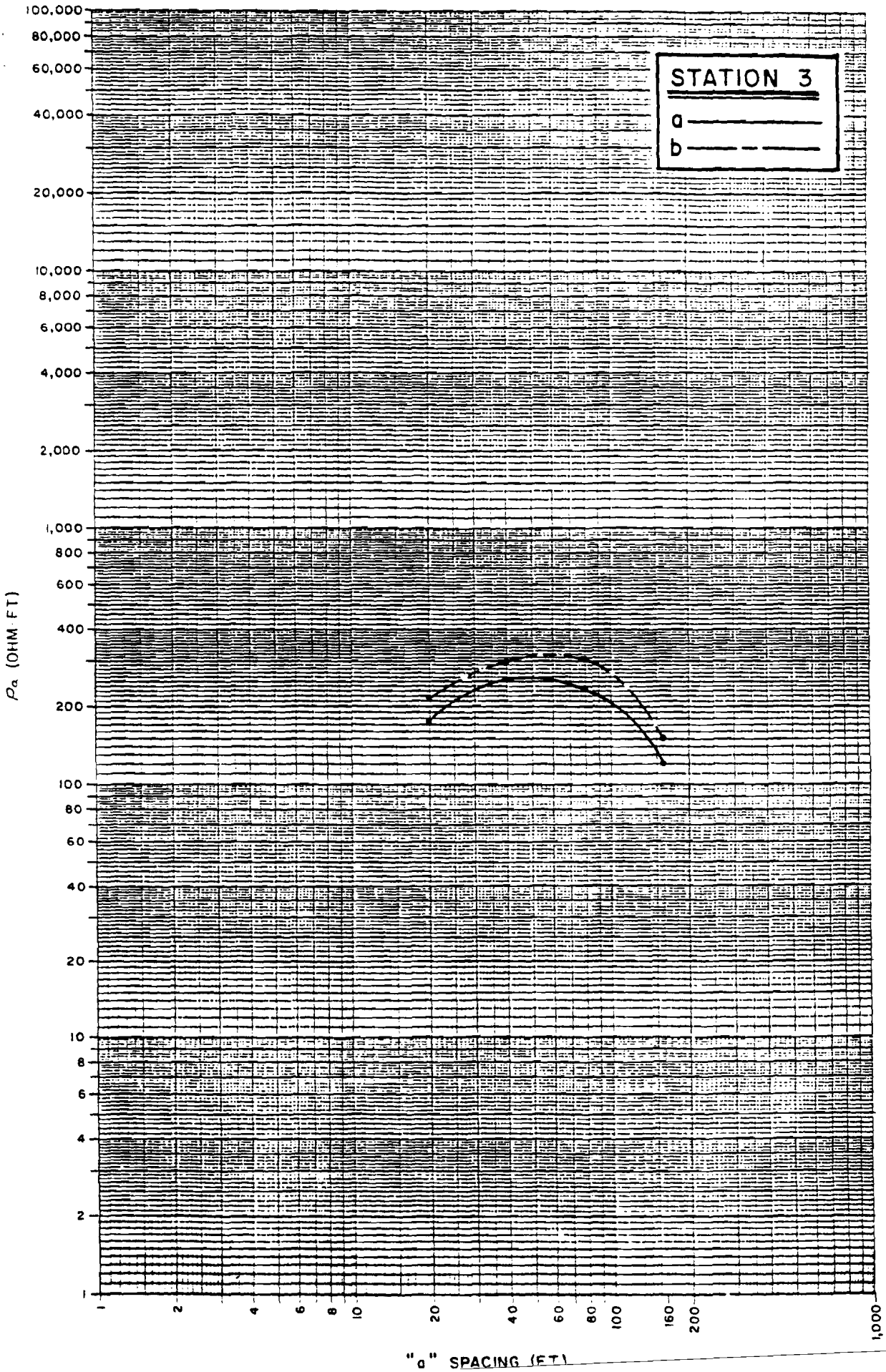


FIGURE B-5

PARTIALLY CORRECTED APPARENT RESISTIVITY

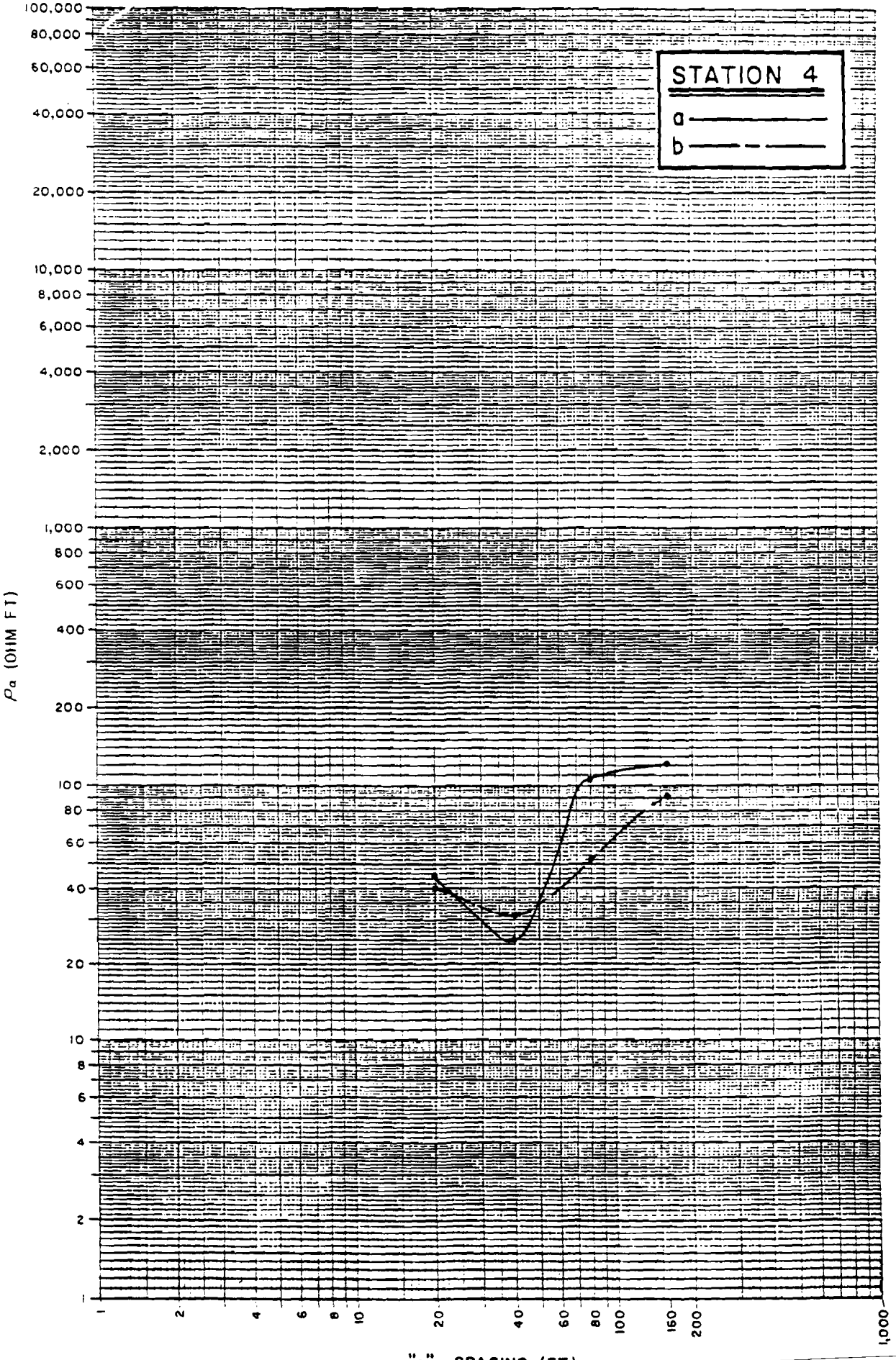


FIGURE B-6

PARTIALLY CORRECTED APPARENT RESISTIVITY

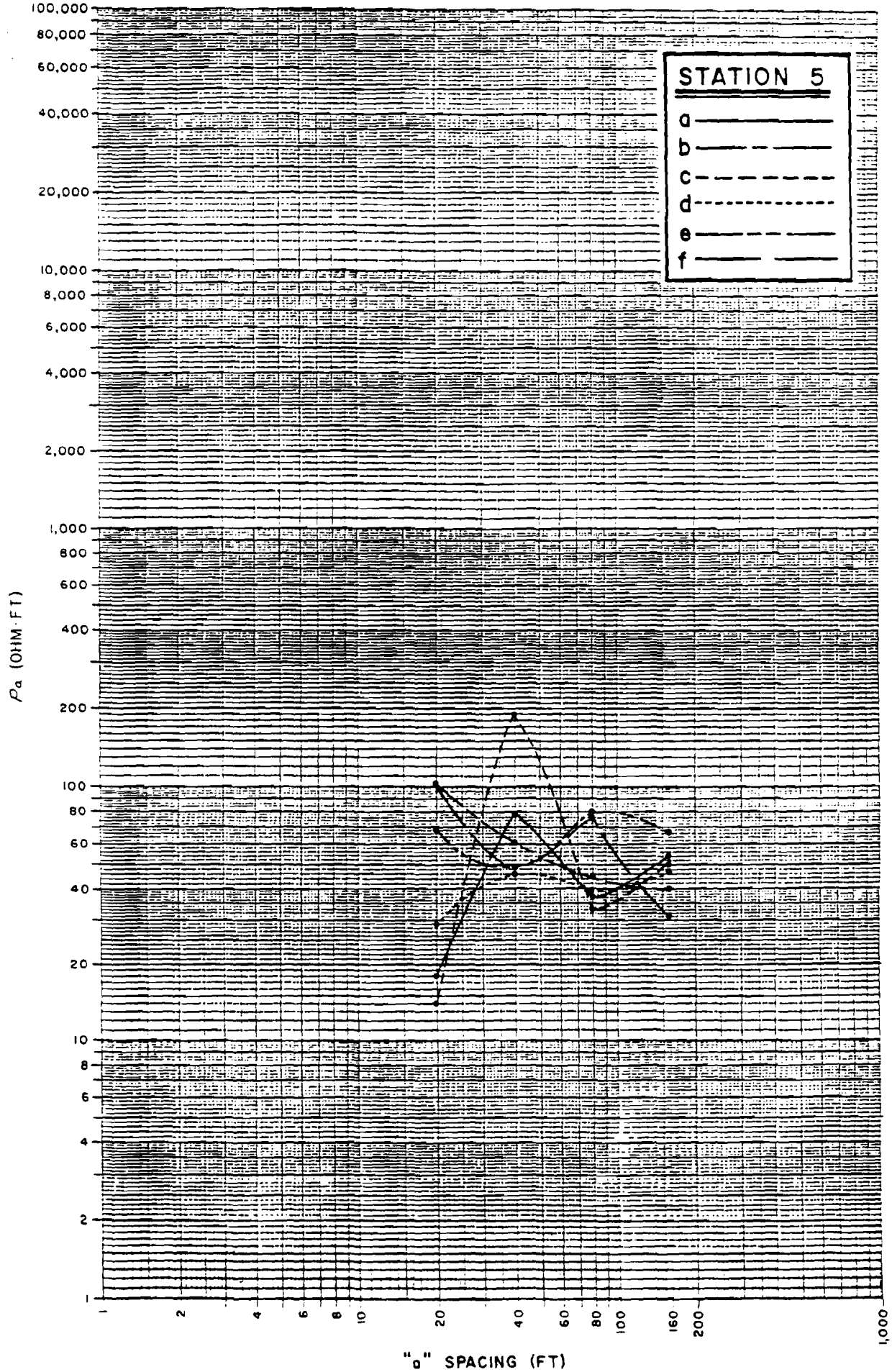


FIGURE B-7

PARTIALLY CORRECTED APPARENT RESISTIVITY

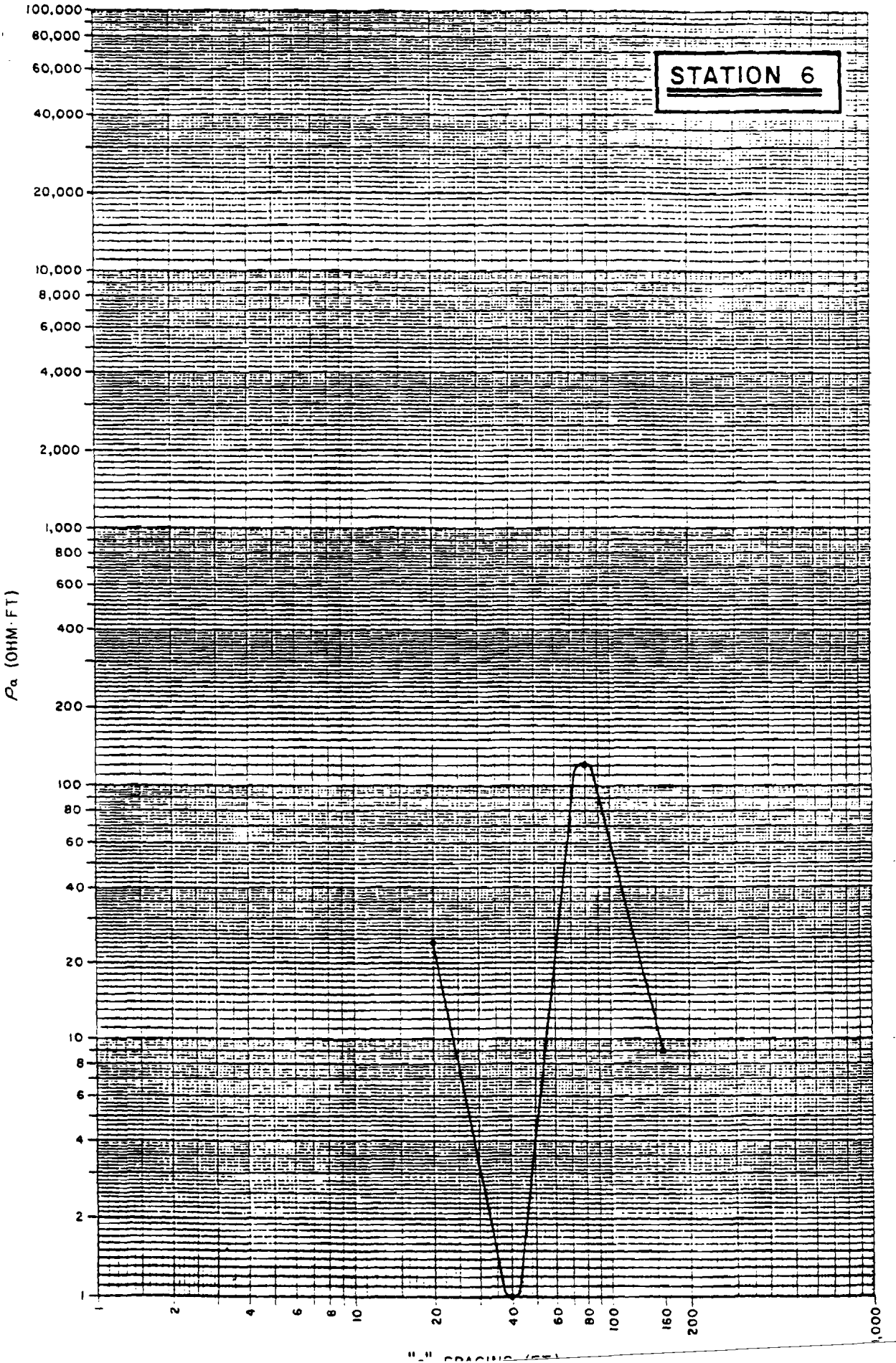


FIGURE B-8

PARTIALLY CORRECTED APPARENT RESISTIVITY

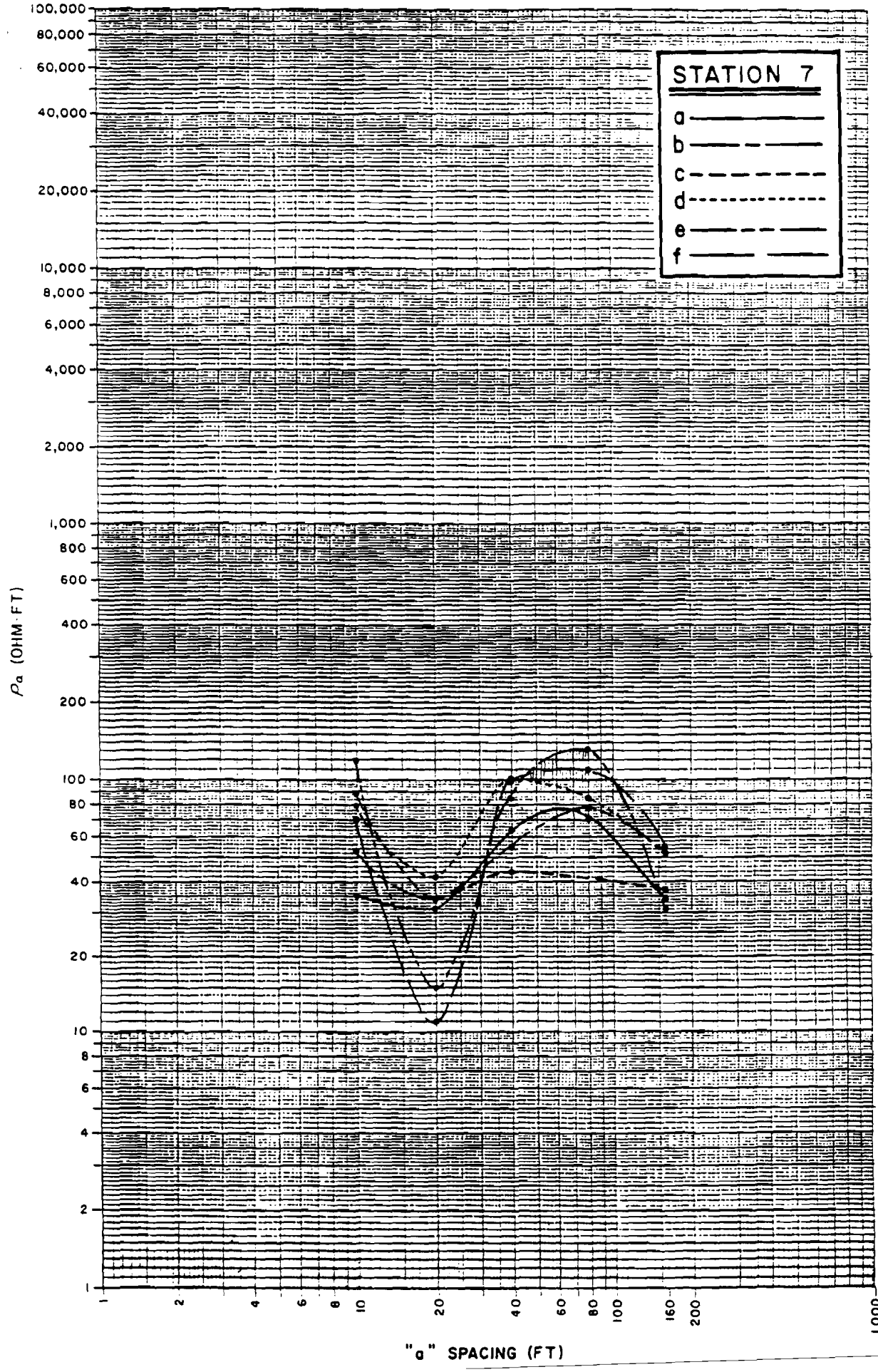


FIGURE B-9

PARTIALLY CORRECTED APPARENT RESISTIVITY

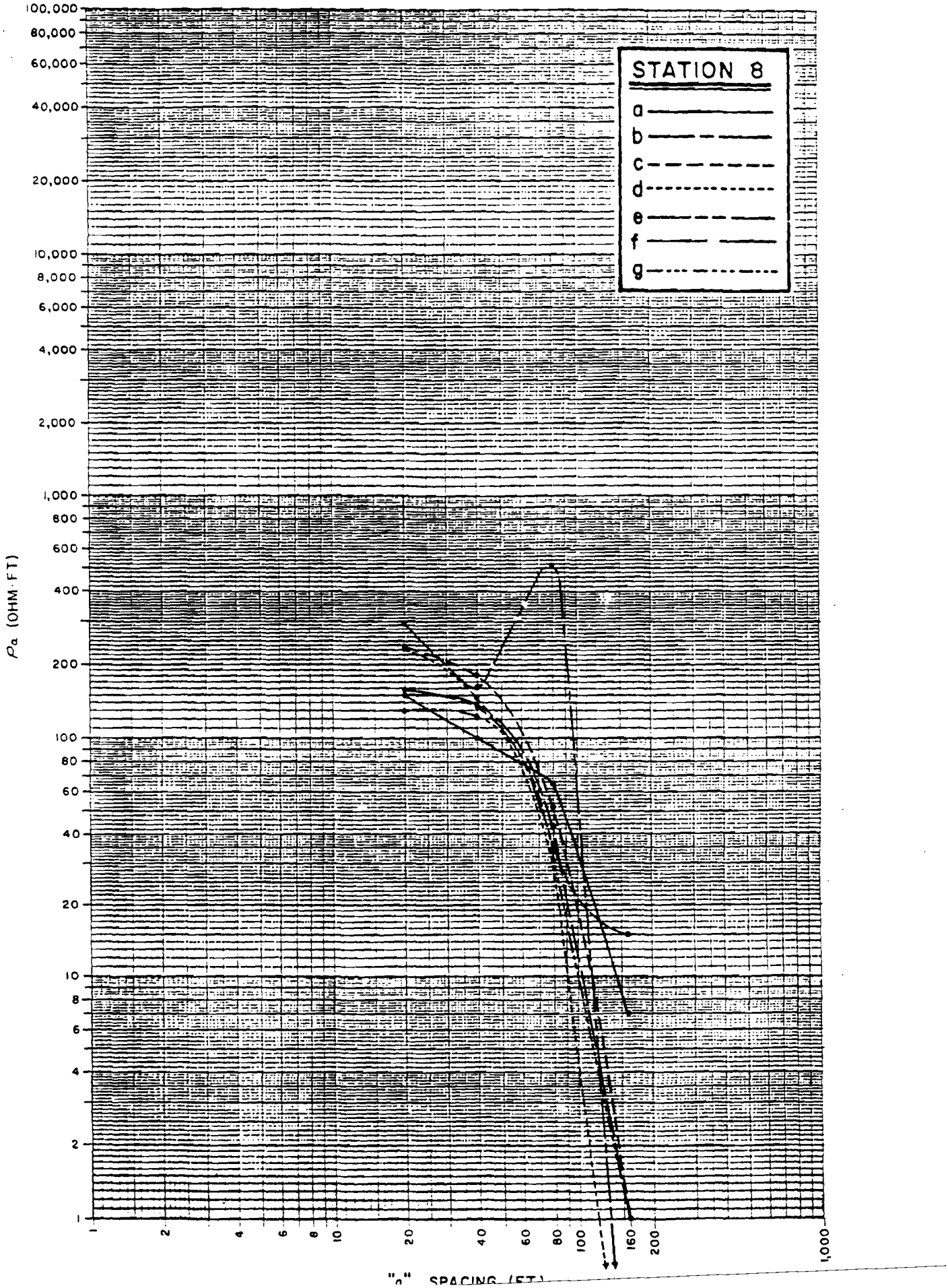
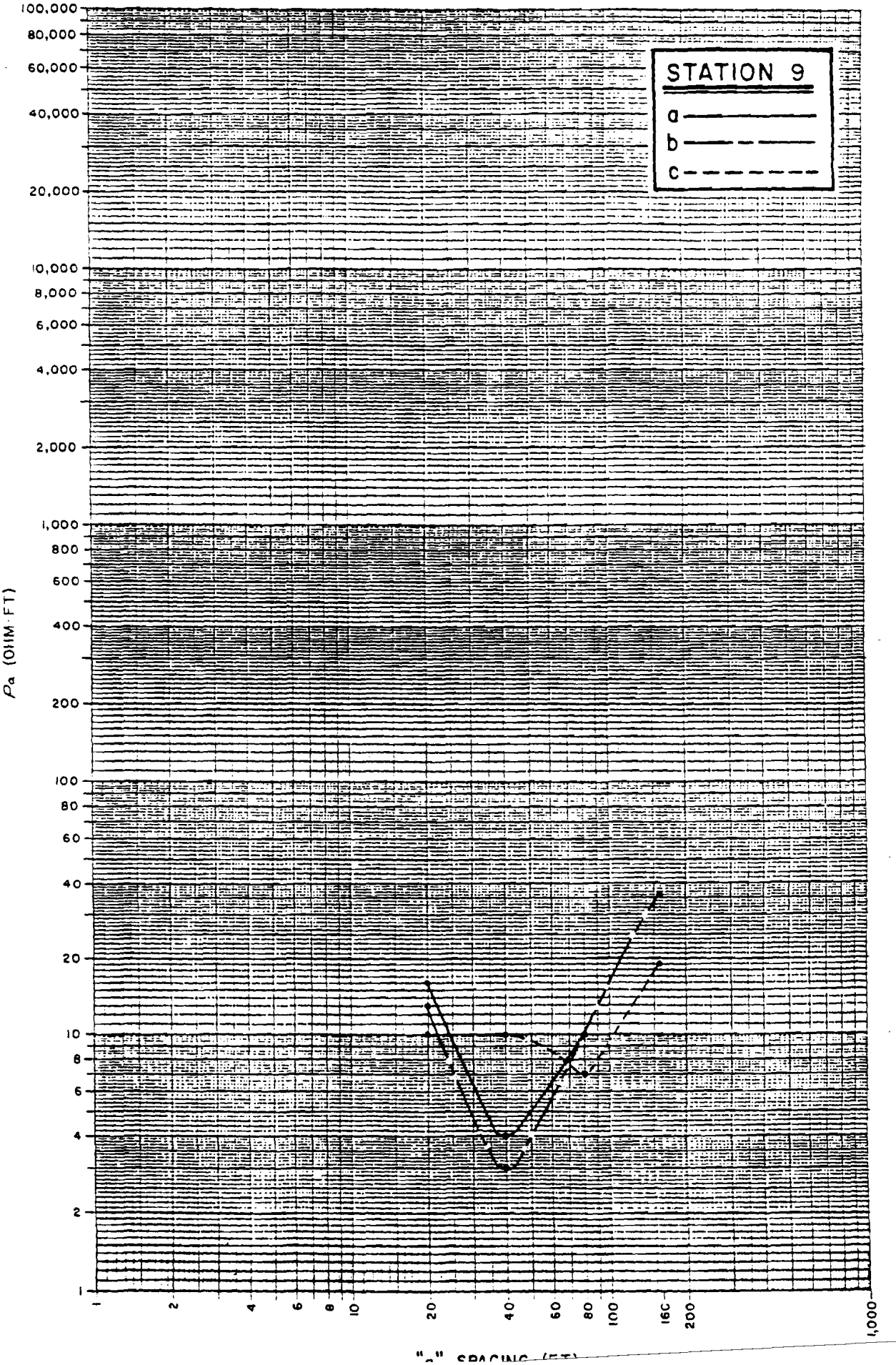


FIGURE B-10

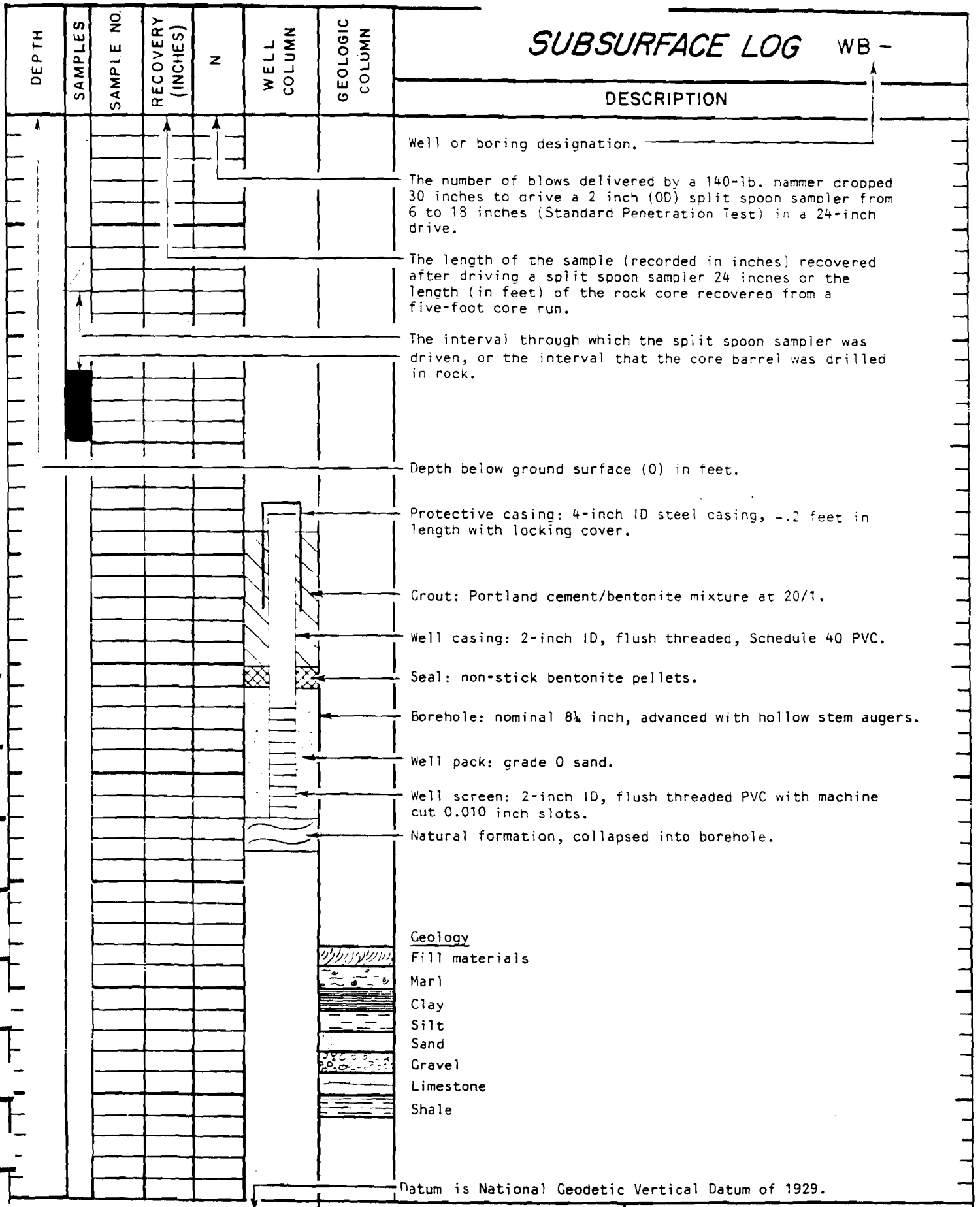
PARTIALLY CORRECTED APPARENT RESISTIVITY



APPENDIX C

SUBSURFACE LOGS

SUBSURFACE LOG WB -



SURFACE ELEVATION _____

DATE STARTED _____

DATE COMPLETED _____

CLASSIFIED BY _____

PROJECT Allied-Signal Inc.

SHEET ___ OF ___

NO. _____

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-1La

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	12	12			Two-inch brown TOPSOIL, wet. Brown to reddish brown mottled CLAY.
		S-2	10	18			
5		S-3	24	7			Brown to red-brown to purplish varved silty fine SAND and CLAY, wet.
		S-4	18	8			
		S-5	10	2			
10		S-6	24	3			
		S-7	22	19			
		S-8	23	21			
15		S-9	20	29			
		S-10	12	6			Brown silty fine SAND to SILT, laminated, wet.
20		S-11	12	5			
		S-12	22	4			Brown to purplish brown varved SILT and CLAY occasional lense of silty fine sand, wet.
25		S-13	24	14			
		S-14	18	20			Brown silty fine SAND occasional silt and clay laminations.
		S-15	20	6			
30		S-16	24	7			
		S-17	12	10			
35		S-18	NR	5			
		S-19	14	12			
		S-20	6	12			
40		S-21	12	10			
		S-22	18	17			
		S-23	11	12			

SURFACE ELEVATION 404.3
DATE STARTED 10/30/87
DATE COMPLETED 10/30/87
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-1La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-1La (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	22	30			
		S-25	18	51			Yellow silty coarse to fine SAND, little fine gravel. Top of rock at 50.0 ft.
50		S-26	NR	50+			Upper three feet of core: dark gray fine grained LIMESTONE with subhorizontal to subvertical joints at 0.1, 0.7, 1.5 and 2.2 feet from top of core. Joints open from 0.1-0.2 feet, filled with a calcium carbonate cemented fine gravelly coarse to fine sand. Lower 1.2 feet of core red, soft, weathered SHALE with numerous subhorizontal breaks.
		core	4.2'	5 min			
				5 min			
				7 min			
55				6 min			
				5.5min			Bottom of boring 55.6'.

SURFACE ELEVATION 404.3
DATE STARTED 10/30/87
DATE COMPLETED 10/30/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-1La

PLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-1U

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-1U was installed in a borehole located within approximately 20 feet of WB-1L. The geology shown on this log represents what was encountered in WB-1L and no samples were taken for this boring.
0							Red-brown silty CLAY, mottled, slight laminations, moist.
5							Red-brown CLAY interbedded with brown fine sandy SILT, laminations 2 - 3 inches thick, moist, varves.
10							Light brown silty fine SAND, dry.
							Pushed gray brown siltstone COBBLE.
15							Light brown fine SAND, trace medium sand and silt, laminated, moist gradational to brown silty fine SAND with lenses of silty CLAY, laminated, moist to damp.
20							
25							Reddish brown fine SAND, trace medium to coarse sand, silt, wet.
30							Brown fine SAND interbedded with silt-clay layers, varves.
35							Very difficult augering 34.8 - 36.9. Dark gray ROCK CHIPS in matrix of silty fine sand.
							Brown and gray silty coarse to fine GRAVEL, little coarse to fine sand, wet. Gravel subangular.
40							Brown silty coarse SAND, little fine gravel.
							Bottom of boring 40.5'.

SURFACE ELEVATION 404.1
DATE STARTED 11/17/87
DATE COMPLETED 11/17/87
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-1U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-1L

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	DESCRIPTION
0		S1	12	10	Red-brown silty CLAY, mottled, slight laminations, moist.
5		S2	24	6	Red-brown CLAY interbedded with brown fine sandy SILT, varves 2 - 3 inches thick, moist.
10		S3	12	49	Light brown silty fine SAND, dry.
		S4	1/2	82	Pushed gray brown siltstone COBBLE.
15		S5	24	48	Light brown fine SAND, trace medium sand and silt, laminated, moist gradational to brown silty fine SAND with lenses of silty CLAY, laminated, moist to damp.
		S6	18	48	
		S7	17	31	
20		S8	24	23	
25		S9	21	27	Reddish brown fine SAND, trace medium to coarse sand, silt, wet.
30		S10	19	27	Brown fine SAND interbedded with silt-clay layers, varves.
35		S11	2	60/0.3	Very difficult augering 34.8 - 36.9. Dark gray ROCK CHIPS in matrix of silty fine sand.
		S12	24	78	Brown and gray silty coarse to fine GRAVEL, little coarse to fine sand, wet. Gravel subangular.
40		S13	10	80	Brown silty coarse SAND, little fine gravel, one 1-inch lense of red silty coarse to fine sand, till-like material.
45		S14	12	81	Brown silty coarse to fine SAND, wet, faintly laminated.

SURFACE ELEVATION 403.9
DATE STARTED 11/12/87
DATE COMPLETED 11/16/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-1L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-1L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
45							
		S15	10	18			
50		S16	12	38			
		S17		27			
55							
		S18	18	88			
60		S19	19	76			Gray brown coarse to fine SAND, little fine gravel, silt. One 1-inch enclusion of red till in bottom 2-inch of sample.
							Red coarse to fine sandy SILT.
65		S20	24	29			TILL Gray to reddish brown coarse to fine sandy SILT.
		S21	24	48			Reddish brown silty coarse to fine GRAVEL.
		S22	18	83			
70		S23	24	80			
							Gray brown silty coarse to fine SAND, little fine gravel.
75		S24	6	75/.5			
							Boulder? at 78' - very difficult augering.
		S25	14	100/0.7			Dark red-purple silty coarse to fine SAND, little fine gravel. TILL
80		S26	1	50/.1			Gray broken coarse gravel.
		S27	4	110/0.5			Red SILT, little coarse to fine sand, TILL.
							Bottom of boring 82.8 '. Unable to advance boring to bedrock due to adverse drilling conditions.

SURFACE ELEVATION 403.9
DATE STARTED 11/12/87
DATE COMPLETED 11/16/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-1L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-2La

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	10.5	9			Black to brown organic silt and clay. TOPSOIL. Red to brown silty CLAY.
		S-2	15	23			
5		S-3	14	7			Brown to red brown, fine SAND, little silt, trace clay, moist.
		S-4	12	6			
		S-5	11	4			
10		S-6	4	71			Gray to brown sandy coarse to fine GRAVEL, little silt, dry, occasional sand lenses.
		S-7	12	38			
		S-8	10	42			
15		S-9	7	38			
		S-10	18	38			
20		S-11	10	35			
		S-12	11	28			
		S-13	9	15			
25		S-14	7	14			Wet at 26'±.
		S-15	8	22			
30		S-16	12	15			
		S-17	17	19			
35		S-18	4	24			
40		S-19	18	31			Gray coarse SAND, little medium to fine sand, trace silt and clay.

SURFACE ELEVATION 400.5±
DATE STARTED 10/8/87
DATE COMPLETED 10/9/87
CLASSIFIED BY SPS

PROJECT Allied-Signal Inc.
SHEET 1 OF 3
NO. WB-2La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-2La (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-20	24	71			
							Red-brown sandy SILT, trace fine gravel.
		S-21	20	67			Red-brown to gray coarse to fine sandy GRAVEL, little to trace silt and clay.
50		S-22	14	89			
		S-23	20	38			
55		S-24	10	39			
		S-25	13	74			Gray coarse SAND, little fine sand, silt.
		S-26	18	38			
60		S-27	15	30			Dark red to dark gray, sandy coarse to fine GRAVEL, little to trace silt and clay.
		S-28	24	100			
65		S-29	17	80			
		S-30	9	50+			
		S-31	12	100			
70		S-32	13	212+			Occasional lenses of TILL-like gray to greenish clayey SILT, little coarse to fine sand and coarse to fine gravel from 69-74 feet.
75		S-33	18	185			
80		S-34	18	118			
85		S-35	15	99			
90		S-36	14	106			

SURFACE ELEVATION 400.5±

DATE STARTED 10/8/87

DATE COMPLETED

CLASSIFIED BY SPS

PROJECT Allied-Signal Inc.

SHEET 2 OF 3

NO. WB-2La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-2La (CONT'D)

DEPTH	SAMPLES	SAMPLE NO	RECOVERY (FEET)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
95		S-37	NR	66+			No recovery.

Bottom of boring 95.5 ft.
Unable to advance boring to bedrock due to adverse drilling conditions.

SURFACE ELEVATION 400.5±
DATE STARTED 10/8/87
DATE COMPLETED
CLASSIFIED BY SPS

PROJECT Allied-Signal Inc.
SHEET 3 OF 3
NO. WB-2La

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-2U

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-2U was installed in a borenole located within approximately 20 feet of WB-2La. The geology shown on this log represents what was encountered in WB-2La and no samples were taken for this boring.
0							Black to brown organic silt and clay. TOPSOIL. Red to brown silty CLAY.
5							Brown to red brown, fine SAND, little silt, trace clay, moist.
10							Gray to brown sandy coarse to fine GRAVEL, little silt, dry, occasional sand lenses.
15							
20							
25							Wet at 26'±.
30							
35							
40							Gray coarse SAND, little medium to fine sand, trace silt and clay.
45							Bottom of Boring 45.0'.

SURFACE ELEVATION 400.4
DATE STARTED 10/9 /87
DATE COMPLETED 10/12/87
CLASSIFIED BY SPS

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-2U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-2L

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: Borehole for WB-2L is a nominal 6-1/2 inches advanced with an air rotary rig using the Odex System. No samples taken above 97 ft. Samples taken below 97 ft. were cuttings. Geology above 97 feet is from 2La.
0							Black to brown organic silt and clay. TOPSOIL. Red to brown silty CLAY.
5							Brown to red brown, fine SAND, little silt, trace clay, moist.
10							Gray to brown sandy coarse to fine GRAVEL, little silt, dry, occasional sand lenses.
15							
20							
25							Wet at 26'±.
30							
35							
40							Gray coarse SAND, little medium to fine sand, trace silt and clay.
45							

SURFACE ELEVATION 400.7
DATE STARTED 11/23/87
DATE COMPLETED 11/25/87
CLASSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 3
NO. WB-21

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-2L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
45							
							Red-brown sandy SILT, trace fine gravel.
							Red-brown to gray coarse to fine sandy GRAVEL, little to trace silt and clay.
50							
55							
							Gray coarse SAND, little fine sand, silt.
60							Dark red to dark gray, sandy coarse to fine GRAVEL, little to trace silt and clay.
65							
70							Occasional lenses of TILL-like gray to greenish clayey SILT, little coarse to fine sand and coarse to fine gravel from 69-74 feet.
75							
80							
85							
90							6-inch steel casing installed during advancement of boring using the Odex System. Casing pulled back to 92 feet at completion of boring.
95							

RFACE ELEVATION 400.7
DATE STARTED 11/22/87
E COMPLETED 11/25/87
SSIFIED BY GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 3
NO. WB-2L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-2L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
95							
		NA	NA	NA			Gray GRAVEL, little silt, drilling became harder at 97'.
100							
		NA	NA	NA			
105							Red fine sandy SILT and CLAY. TILL
		NA	NA	NA			Top of rock at 108 ft.
							Green to gray weathered to unweathered SHALE.
110							
							Bottom of boring 111.6'.
115							

SURFACE ELEVATION 400.7
DATE STARTED 11/23/87
DATE COMPLETED 11/25/87
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 3 OF 3
NO. WB-2L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-3U

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-3U was installed in a borehole located within approximately 20 feet of WB-3L. The geology shown on this log represents what was encountered in WB-3L and no samples were taken for this boring.
0							Brown organic silty fine sand, TOPSOIL. Light brown silty CLAY.
5							Light brown silty fine SAND, laminated with fine sandy SILT.
10							
15							
20							Brown sandy CLAY, moist.
25							Coarse to fine GRAVEL in silty CLAY matrix.
30							Brown to purplish fine sandy SILT, little to trace gravel, moist.
35							Brown medium to fine SAND, little silt, moist.
40							Brown, reddish brown and gray fine gravelly, coarse to fine SAND, little silt, wet with minor amounts of coarse gravel and clay.
							Bottom of boring 45.0'.

SURFACE ELEVATION 401.7
DATE STARTED 10/26/87
DATE COMPLETED 10/26/87
CLASSIFIED BY CMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-3U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-3L

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	10	4			Brown organic silty fine sand, TOPSOIL. Light brown silty CLAY.
		S-2	14	10			
5		S-3	24	9			
		S-4	12	13			Light brown silty fine SAND, laminated with fine sandy SILT.
		S-5	6	9			
10		S-6	8	12			
		S-7		14			
15		S-8	11	18			
		S-9	12	19			
		S-10	12	15			
20		S-11	15.5	7			Brown sandy CLAY, moist.
		S-12	17	76			Coarse to fine GRAVEL in silty CLAY matrix.
25		S-13	18	81			
		S-14	NR	25+			
		S-15	14	53			Brown to purplish fine sandy SILT, little to trace gravel, moist.
30		S-16	17	28			
		S-17	24	45			
		S-18	24	87			Brown medium to fine SAND, little silt, moist.
35		S-19	18	95			Brown, reddish brown and gray fine gravelly, coarse to fine SAND, little silt, wet with minor amounts of coarse gravel and clay.
		S-20	10	100+			
40		S-21	11	100+			
		S-22	14	79			
		S-23	24	51			

IRFACE ELEVATION 401.5
DATE STARTED 10/5/87
TE COMPLETED 10/7/87
ASSIFIED BY KLR, CMT

PROJECT Allied-Signal Inc.
SHEET 1 OF 2
NO. WB-3L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-3L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY INCHES	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	24	54			
		S-25	24	54			
50		S-26	14	33			
		S-27	24	120			
		S-28	17	55			
55		S-29	15	88			Purplish brown fine SAND, little silt.
		S-30		66			
60		S-31	24	68			
		S-32	24	118			
65		S-33	22	120			
70		S-34	24	69			
75		S-35	8	125+			Gray brown fine to medium SAND, trace silt. Gray-purple sandy SILT, trace gravel, clay. Top of rock at 77.5'.
		S-36	NR	50+			
80		core	3.6'	8 min			Light gray soft weathered shale, with numerous subhorizontal joints, open joint at 79.7-79.8 filled with clay and rock fragments.
				7 min			Very soft zone, recovered gray clay.
				2 min			Dark gray unweathered shale with numerous subhorizontal joint fillings of gypsum, numerous subhorizontal drilling breaks.
				8 min			
85				8 min			Bottom of boring 84.6'.
90							

SURFACE ELEVATION 401.5
DATE STARTED 10/5/87
DATE COMPLETED 10/7/87
CLASSIFIED BY KLR/GMT

PROJECT Allied-Signal Inc.
SHEET 2 OF 2
NO. WB-3L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-4U

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
							Note: WB-4U was installed in a borehole located within approximately 20 feet of WB-4L. The geology shown on this log represents what was encountered in WB-4L and no samples were taken for this boring.
0							Light gray fine gravelly coarse to fine SAND, little silt, damp to dry.
5							
10							Light gray to brown with flecks of green and red clayey SILT, little sand, fine gravel.
15							
20							
25							
30							
35							
40							Bottom of boring 39.0'.

SURFACE ELEVATION 396.2
DATE STARTED 10/16/87
DATE COMPLETED 10/16/87
CLASSIFIED BY KLR

PROJECT Allied-Signal Inc.
SHEET 1 OF 1
NO. WB-4U

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG WB-4L

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
0		S-1	14	49			Light gray fine gravelly coarse to fine SAND, little silt, damp to dry.
		S-2	3	50+			
5		S-3	8	38			
		S-4	10	24			
		S-5	10	33			
10		S-6	12	31			Light gray to brown with flecks of green and red clayey SILT, little sand, fine gravel.
		S-7	10	38			
15		S-8	5	30			
		S-9	NR	20			
		S-10	8	12			
20		S-11	8	12			
		S-12	10	13			
		S-13	17	17			
25		S-14	15	25			
		S-15	11	16			
30		S-16	15	21			
		S-17	15	20			
		S-18	17	23			
35		S-19	16	32			
		S-20	15	27			
40		S-21	19	41			Gray coarse to fine gravelly coarse SAND, little green and red clay, trace silt.
		S-22	15	33			
		S-23	21	27			

SURFACE ELEVATION 396.4
DATE STARTED 10/12/87
DATE COMPLETED 10/15/87
CLASSIFIED BY SPS, KLR

PROJECT Allied-Signal Inc.
SHEET 1 OF 3
NO. WB-4L

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-4L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-24	14	29			
		S-25	12	21			Brown to gray, with red and green flecks gravelly CLAY, little coarse sand, silt, wet.
50		S-26	8	23			
		S-27	11	106			
55		S-28	NR	50+			
		S-29	NR				
		S-30	NR	75+			
60		S-31	12	66+			Dark gray gravelly coarse SAND, trace silt, clay.
65		S-32	20	97			Brown to gray, with red and green flecks, gravelly CLAY, little coarse sand, trace silt.
		S-33	15	83+			Red and green medium to coarse SAND, little clay, trace silt, fine gravel, wet.
70		S-34	NR	50+			
75		S-35	12	63+			Brown-gray gravelly coarse to medium SAND, little clay.
		S-36	6	100+			
80		S-37	6	96+			
85		S-38	4.8	100+			
		S-39	9	50+			
90		S-40	18	62			
		S-41	11	115			
		S-42	15	61			

SURFACE ELEVATION 396.4

DATE STARTED 10/12/87

DATE COMPLETED 10/15/87

CLASSIFIED BY SPS, KLR

PROJECT Allied-Signal Inc.

SHEET 2 OF 3

NO. WB-41

BLASLAND & BOUCK ENGINEERS, P.C.

SUBSURFACE LOG

WB-4L (CONT'D)

DEPTH	SAMPLES	SAMPLE NO.	RECOVERY (INCHES)	N	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTION
		S-43	13	130			
100		S-44	10	37+			Red CLAY, little gravel, sand, trace silt, TILL.
105		S-45	7	50+			
110		S-46	7.5	50+			Top of rock at 113.5'.
115		S-47	4.2	100+			Green weathered SHALE.
		core	4.5'	6 min			115.8'-116.8' green SHALE weathered to silty clay with numerous platey shale fragments.
				6 min			116.8'-117.6' dark gray SHALE, relatively unweathered with occasional subhorizontal joints filled with gypsum up to ½-inch thick.
				7.5 min			
120				9 min			117.6'-118.8' light gray SHALE with several thin stringers of gypsum, one broken zone with gypsum filled voids.
				9 min			118.8'-120.6' green SHALE weathered and unweathered zones, numerous subhorizontal joints or breaks along bedding plane.
							Bottom of boring 120.6'.

URFACE ELEVATION 396.4

ATE STARTED 10/12/87

DATE COMPLETED 10/15/87

LASSIFIED BY SPS, KLR

PROJECT Allied-Signal Inc.

SHEET 3 OF 3

NO. WB-4L

BLASLAND & BOUCK ENGINEERS, P.C.

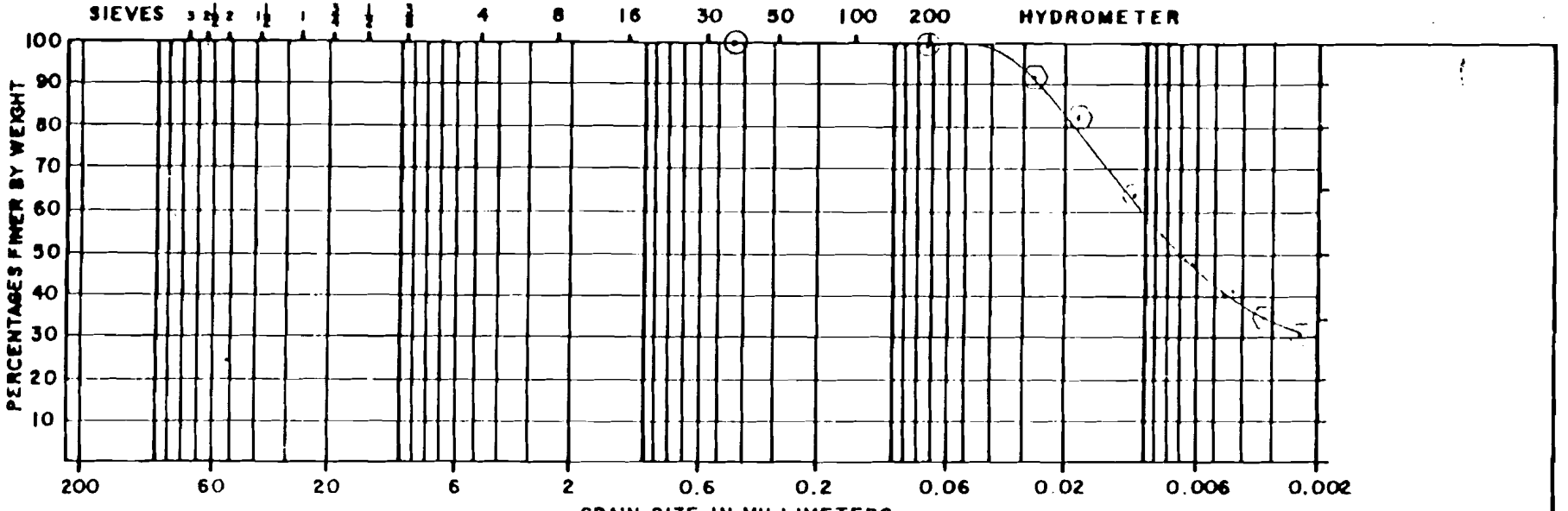
Sieve Analysis ASTM D-422

Well Boring #	Sample #	Depth in Feet	Sieve Size - Percent Passing Sieve													
			2"	1"	3/4"	½"	3/8"	#4	#10	#30	#40	#60	#100	#200		
6L(1)	S-2	--	--	--	--	--	--	--	--	100.	99.8	--	--	98.9		
6L	S-27	52-54	--	--	100	88.6	84.8	78.1	61.5	38.7	30.6	23.9	21.4	19.3		
6L	S-36	75-77	--	--	100	90.9	84.2	73.9	65.4	52.9	45.7	30.9	24.2	18.6		
7L	S-26	52-54	--	--	--	100	92.4	74.9	54.8	34.1	28.6	23.0	20.3	17.9		
7L	S-34	68-69.5	--	--	100	98.5	95.3	88.3	80.8	72.1	68.9	60.2	50.2	37.5		
7L	S-36&S-37	72-73.5 74-76	--	100	94.4	89.0	84.1	66.0	48.8	30.1	24.5	19.1	16.9	14.9		
BL(1)	S-4	20-22	--	--	--	--	--	100	--	--	92.2	--	--	88.6		
BL(1)	S-20	56-58	--	--	--	--	--	100	--	--	99.6	--	--	98.6		
BL	S-32	80-82	--	100	96.1	96.1	92.5	88.8	83.5	73.5	66.8	49.3	38.9	30.8		

Remarks: (1) Partial Sieve Analysis, used in calculations for hydrometer analysis

Prewashed ASTM C-117
Yes X No
Performed By VJT&JG

GRAIN SIZE ANALYSIS



BOULDERS COBBLES	GRAVEL C	GRAVEL M	GRAVEL F	SAND C	SAND M	SAND F	SILT - CLAY SOIL

228	76.2	25.4	9.52	2.0	0.59	0.25	0.074 MM.	OPENING
9 In.	3 in.	1 in.	3/8 in.	Nos. 10	30	60	200	SIEVE

L-88008
Laboratory Testing

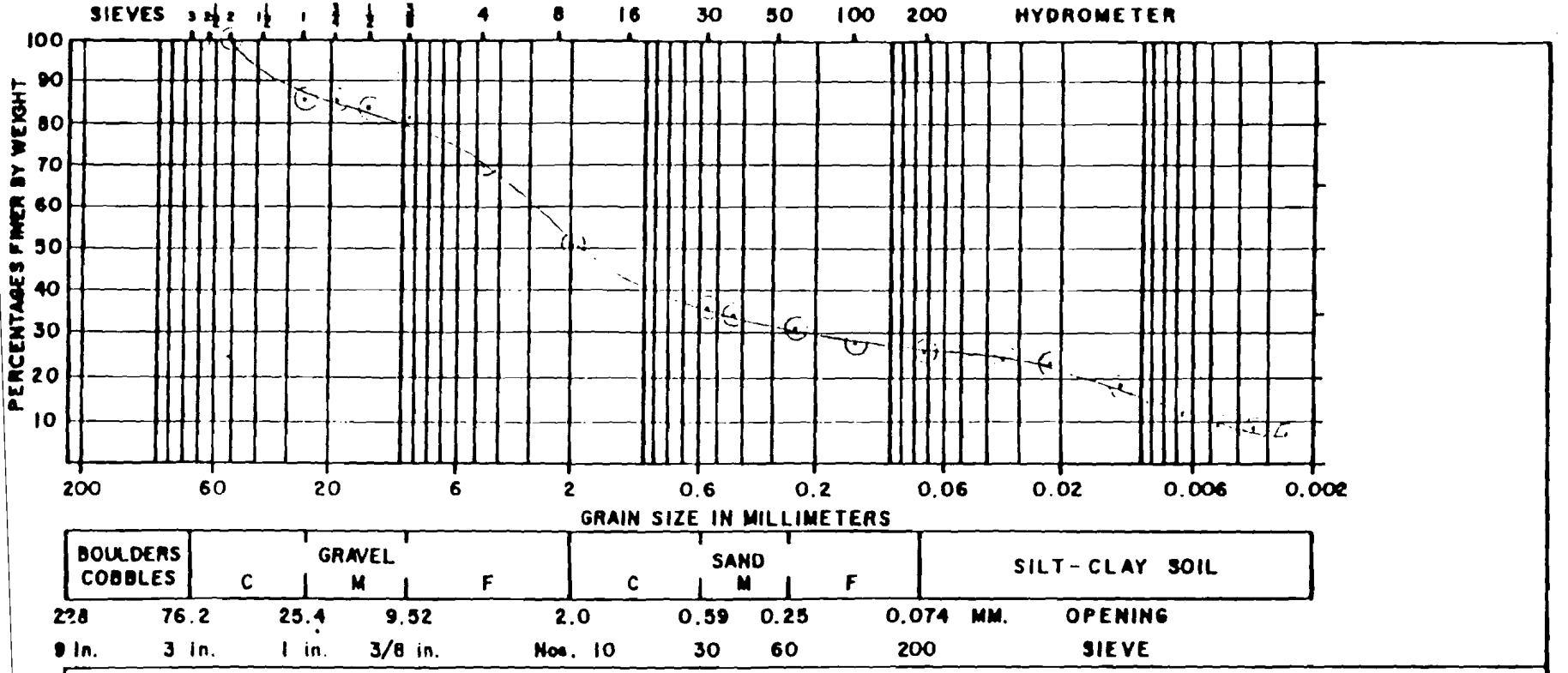
Well-Boring Nº : 1L
Sample Nº : S-2
Depth : 5'-7'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008
REPORT NO 1

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

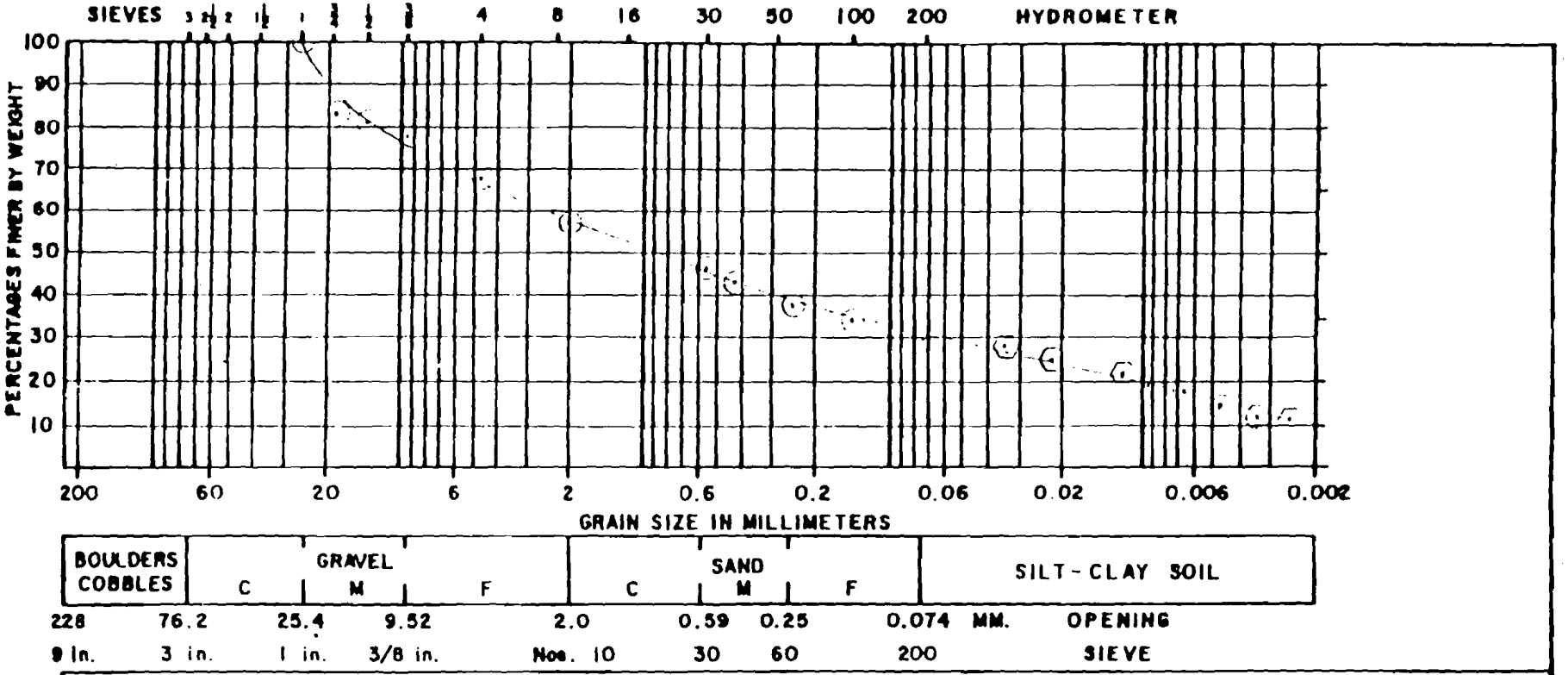
Well-Boring Nº : 1L
Sample Nº : S-12 + S-13
Depth : 37'-39' 40'-42'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

pamatt wolff inc
FIS ER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315-437 1429

JOB NO L-88008
REPORT NO. 2

GRAIN SIZE ANALYSIS



L-88008

Laboratory Testing

Well-Boring Nº : 1L

Sample Nº : S-19B + S-20

Depth : 61'-62' 64'-66'

- Sieve Analysis
- Hydrometer Analysis

parratt wolff inc

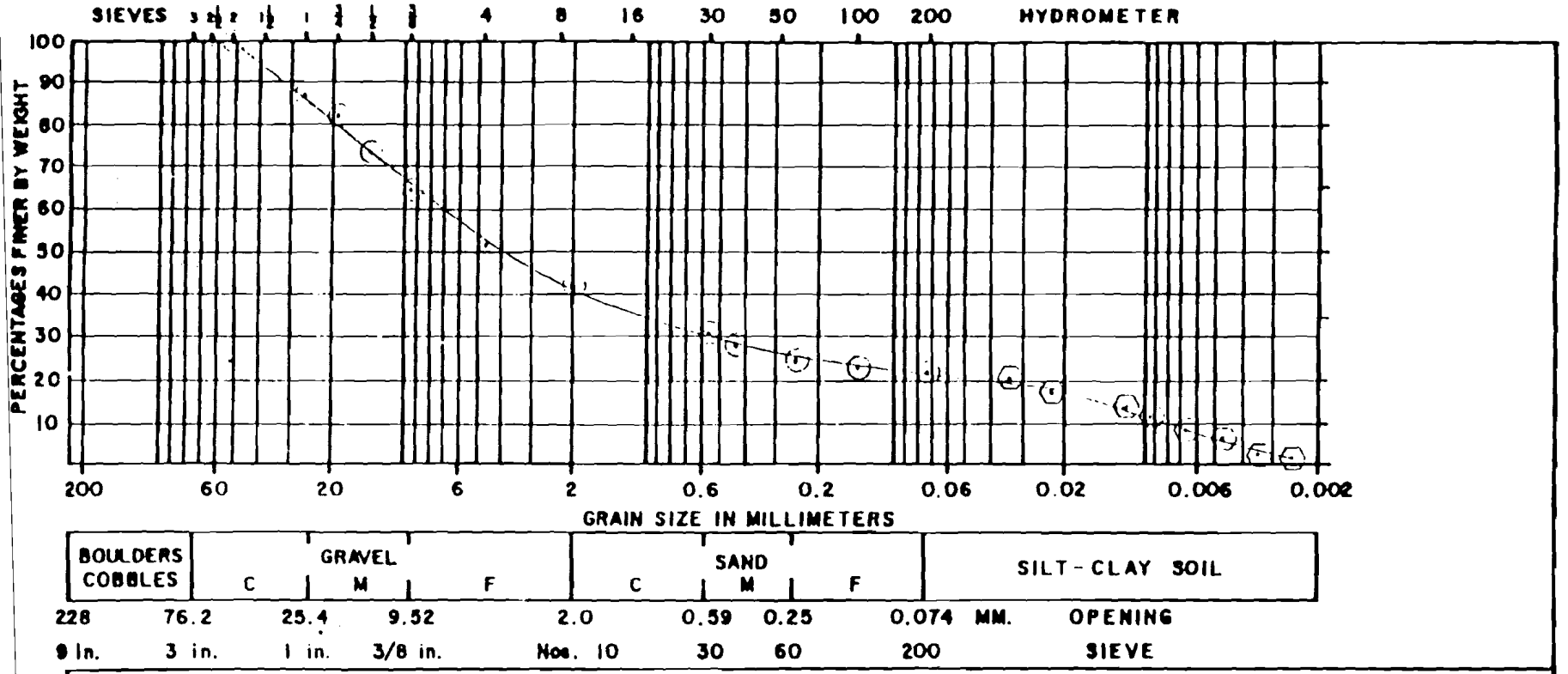
FISHER RD EAST SYRACUSE N Y 13057

TELEPHONE AREA CODE 315/437 1429

JOB NO L-88008

REPORT NO 3

GRAIN SIZE ANALYSIS



L-88008

Laboratory Testing

Well-Boring Nº : 2L

Sample Nº : S-31 + S-32

Depth : 68'-69.8' 70'-71.5'

⊙ Sieve Analysis

⊙ Hydrometer Analysis

parratt wolff inc

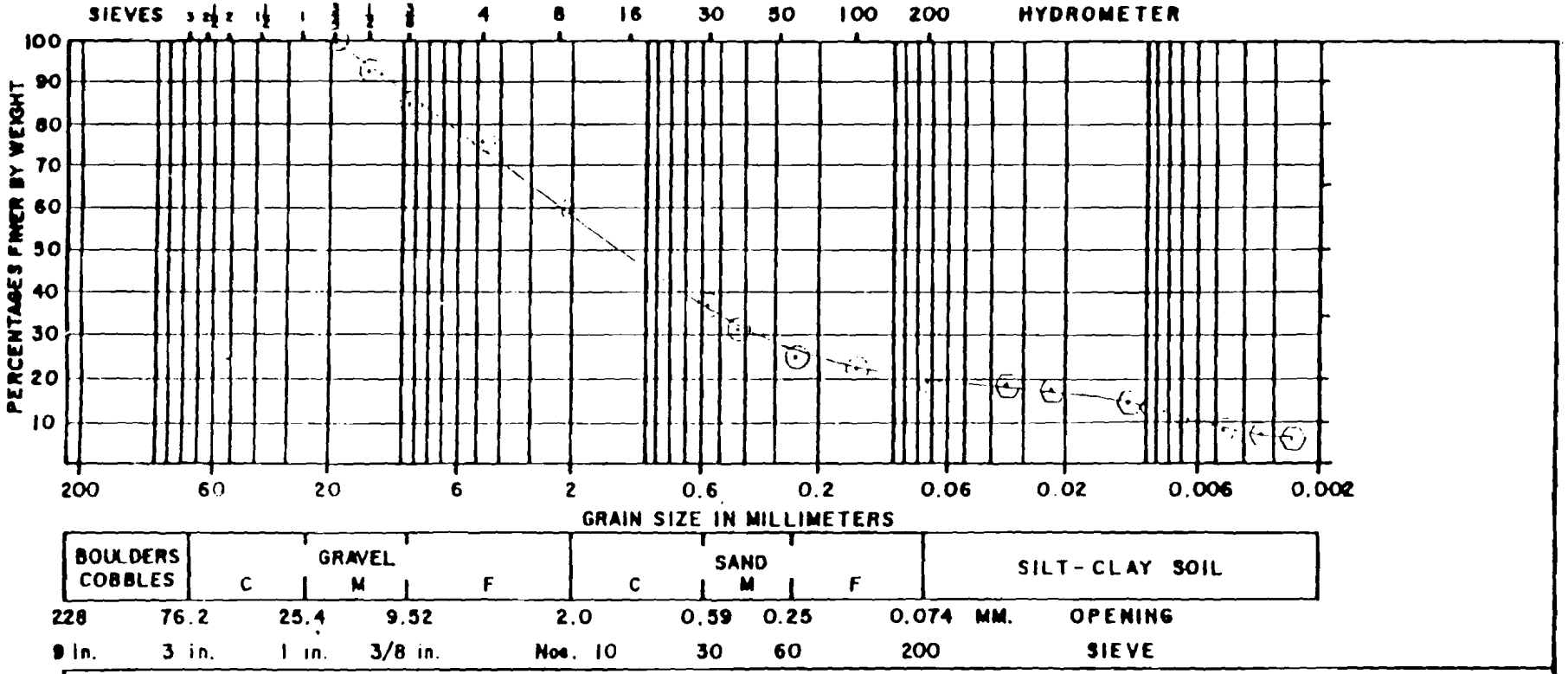
115 ERIE BLVD EAST SYRACUSE N Y 13057

TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008

REPORT NO. 5

GRAIN SIZE ANALYSIS



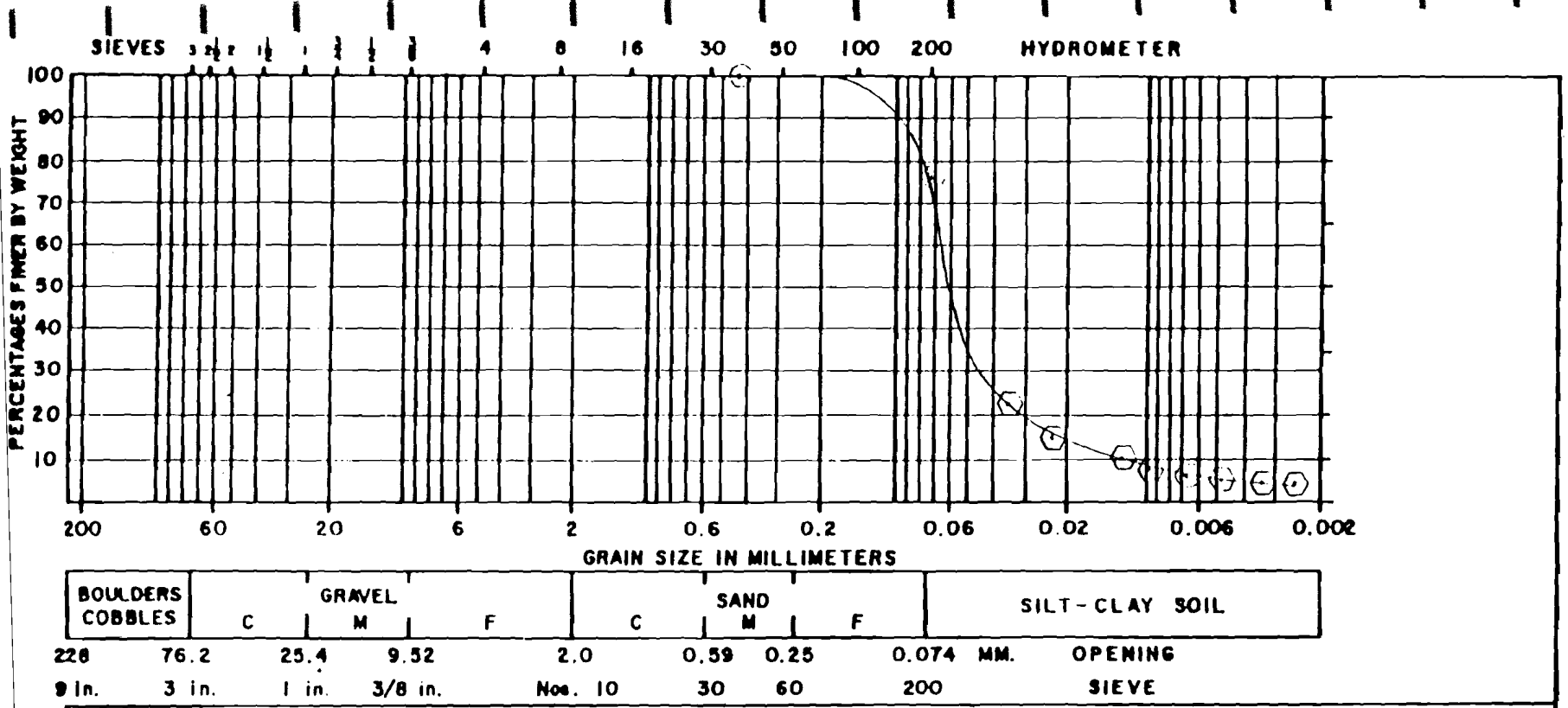
L-88008
Laboratory Testing

Well-Boring Nº : 3L
Sample Nº : S-19
Depth : 36'-38'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO. L-88008
REPORT NO. 1



L-88008
Laboratory Testing

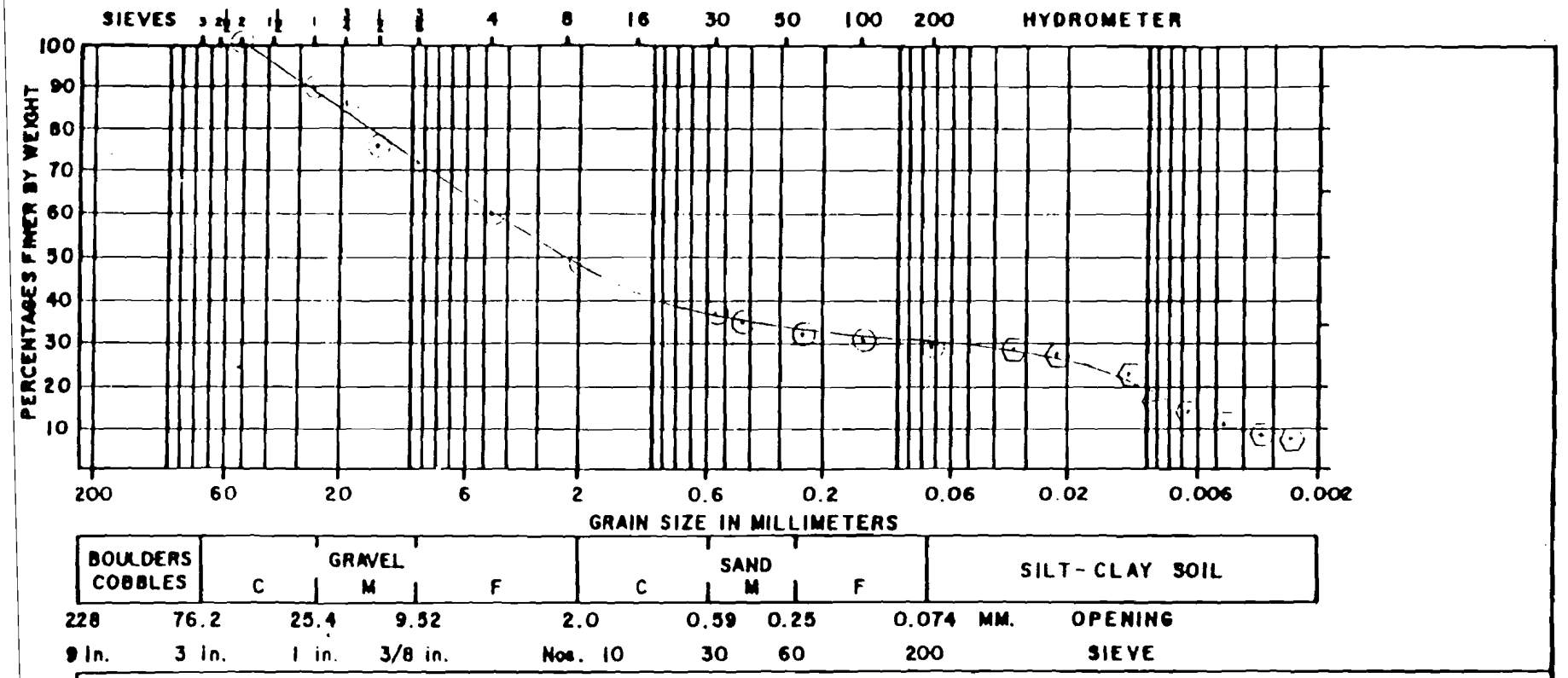
Well-Boring Nº : 3L
Sample Nº : S-33
Depth : 68'-70'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
115 ERIE BLVD EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315-437-1429

JOB NO. L-88008
REPORT NO. 8

GRAIN SIZE ANALYSIS



L-88008

Laboratory Testing

Well-Boring Nº : 4L

Sample Nº : S-26 + S-27

Depth : 50'-52' 52'-54'

⊙ Sieve Analysis

· Hydrometer Analysis

parratt wolff inc

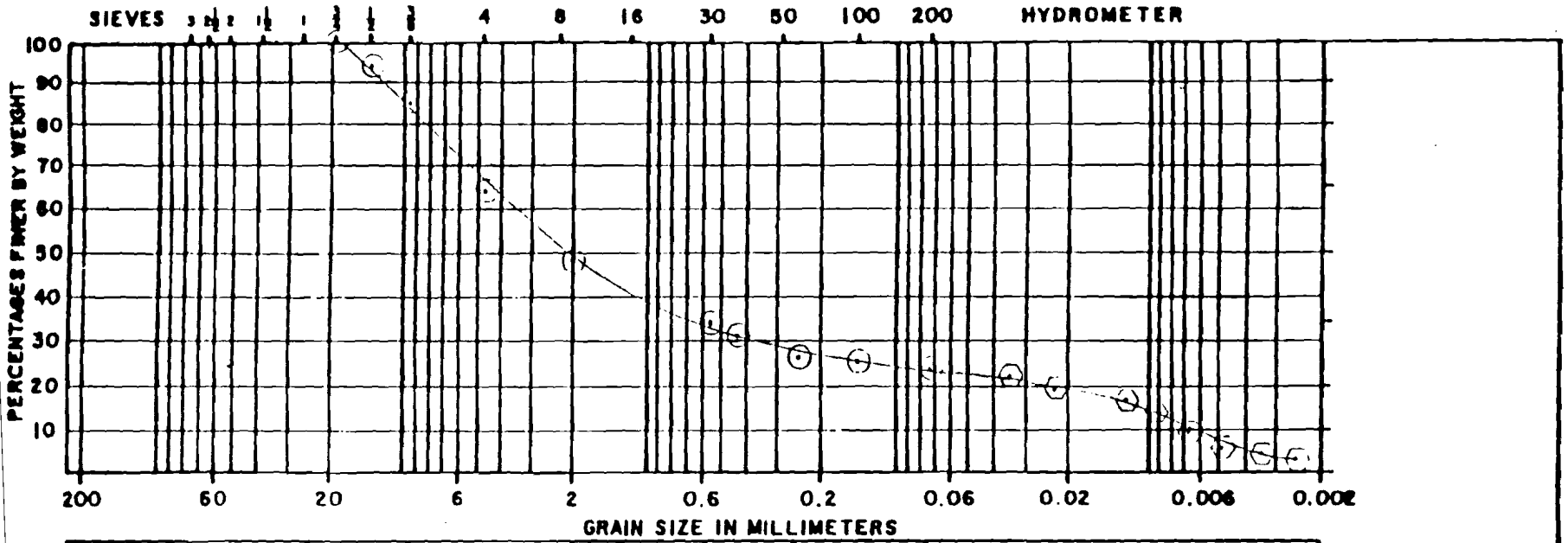
215 ERIE BLVD EAST SYRACUSE N Y 13057

TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008

REPORT NO 10

GRAIN SIZE ANALYSIS



parratt wolff inc
FISHER RD. EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315 437 1429

L-88008

Laboratory Testing

Well-Boring Nº : 4L

Sample Nº : S-40

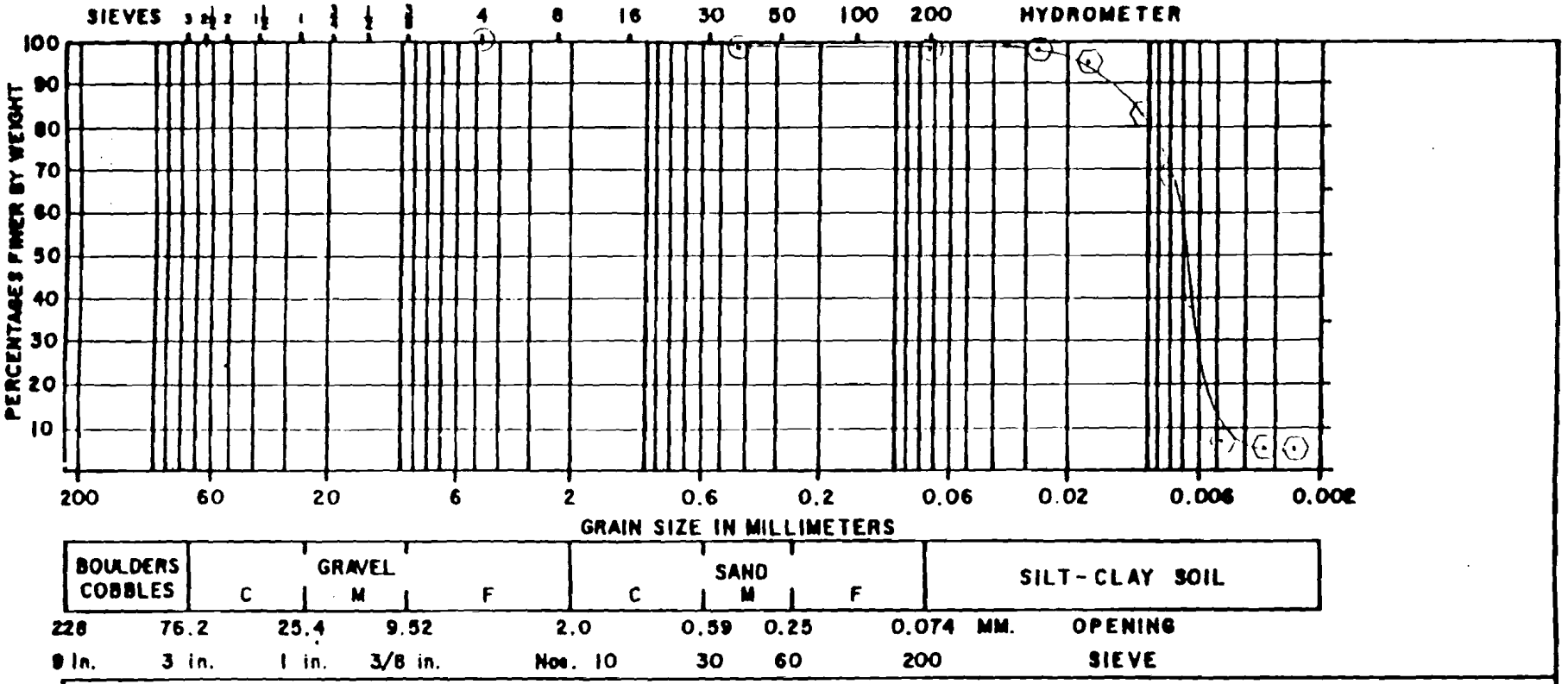
Depth : 90'-92'

- Sieve Analysis
- Hydrometer Analysis

JOB NO. L-88008

REPORT NO. 1

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

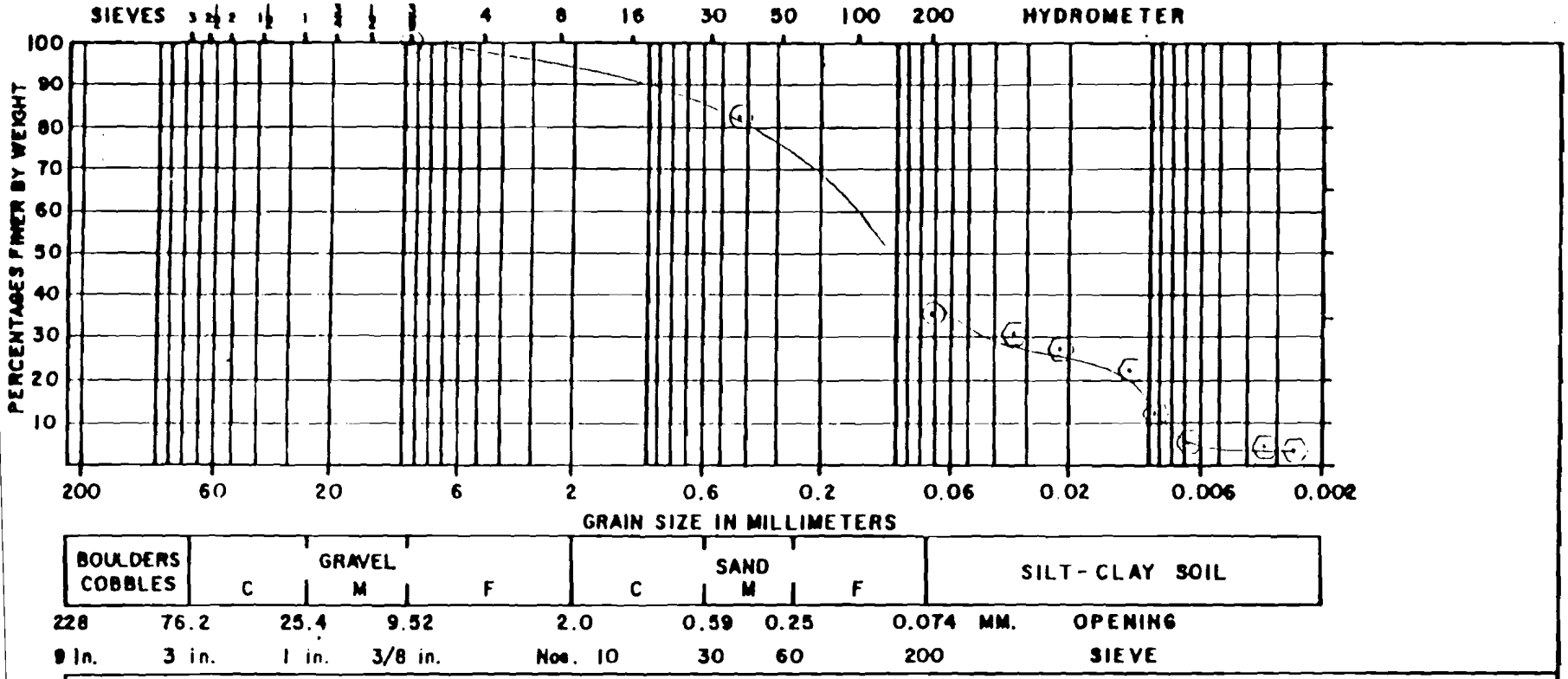
Well-Boring Nº : 5L
Sample Nº : S-10
Depth : 18'-20'

- Sieve Analysis
- Hydrometer Analysis

parratt wolff inc
115 ERIE BLVD. EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

JOB NO. L-88008
REPORT NO. 12

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

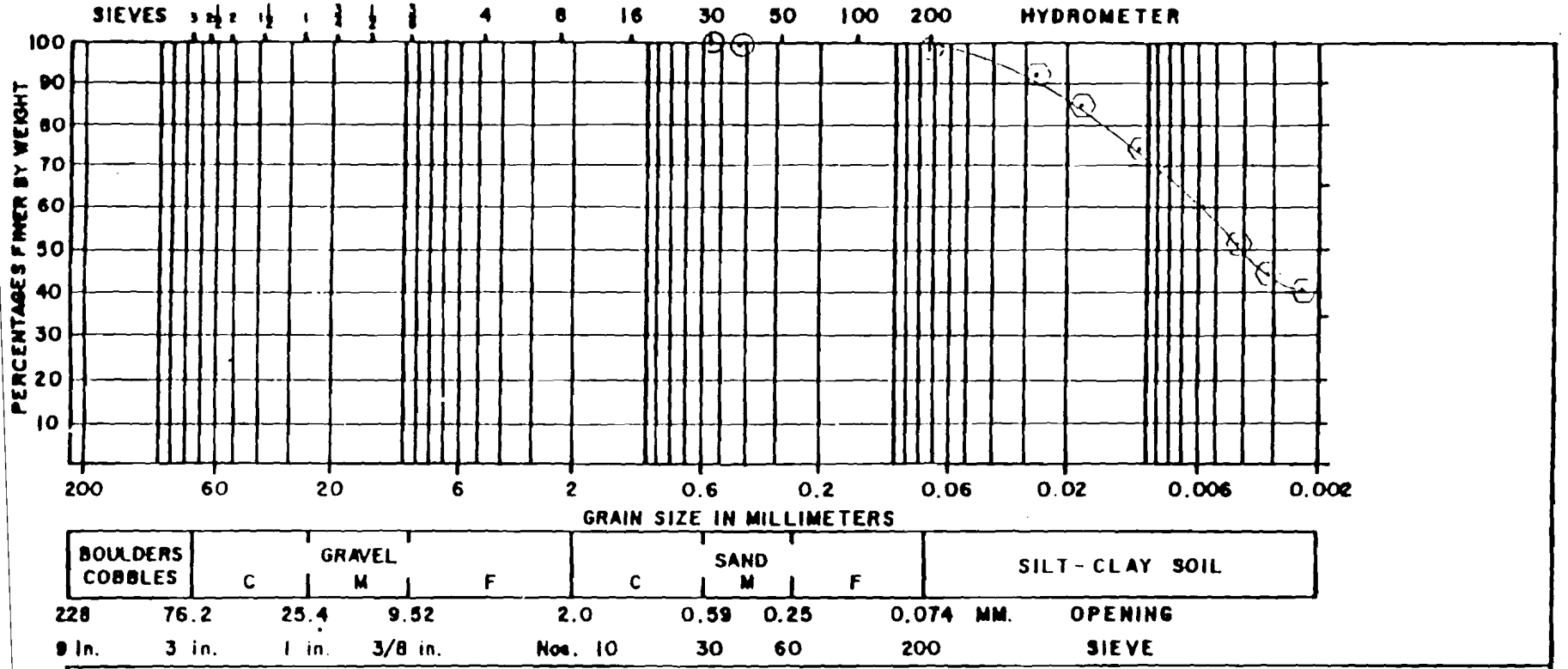
Well-Boring Nº : 5L
Sample Nº : S-48
Depth : 116'-118'

- Sieve Analysis
- Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008
REPORT NO 13

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

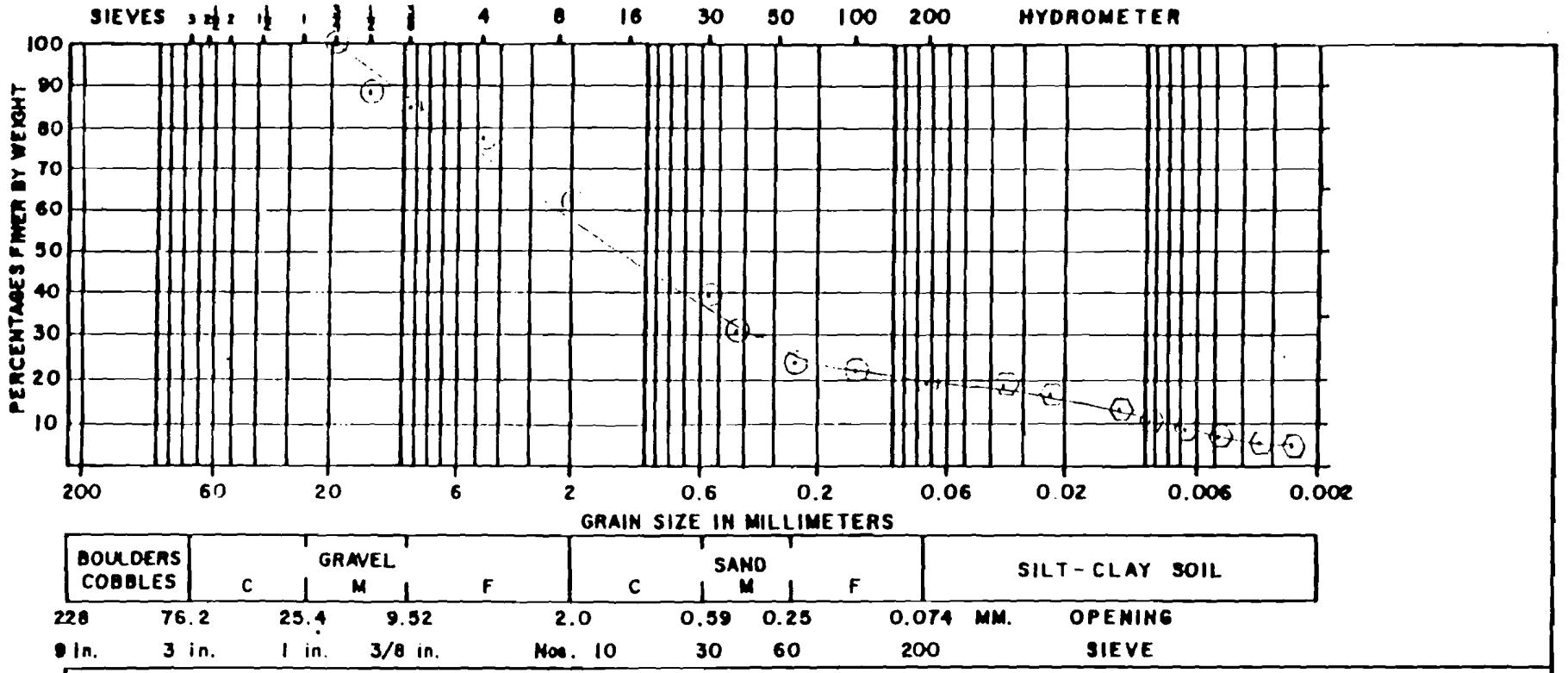
Well-Boring Nº : 6L
Sample Nº : S-2
Depth : —

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
515 ERIE BLVD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315-437-1429

JOB NO L-88008
REPORT NO 14

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

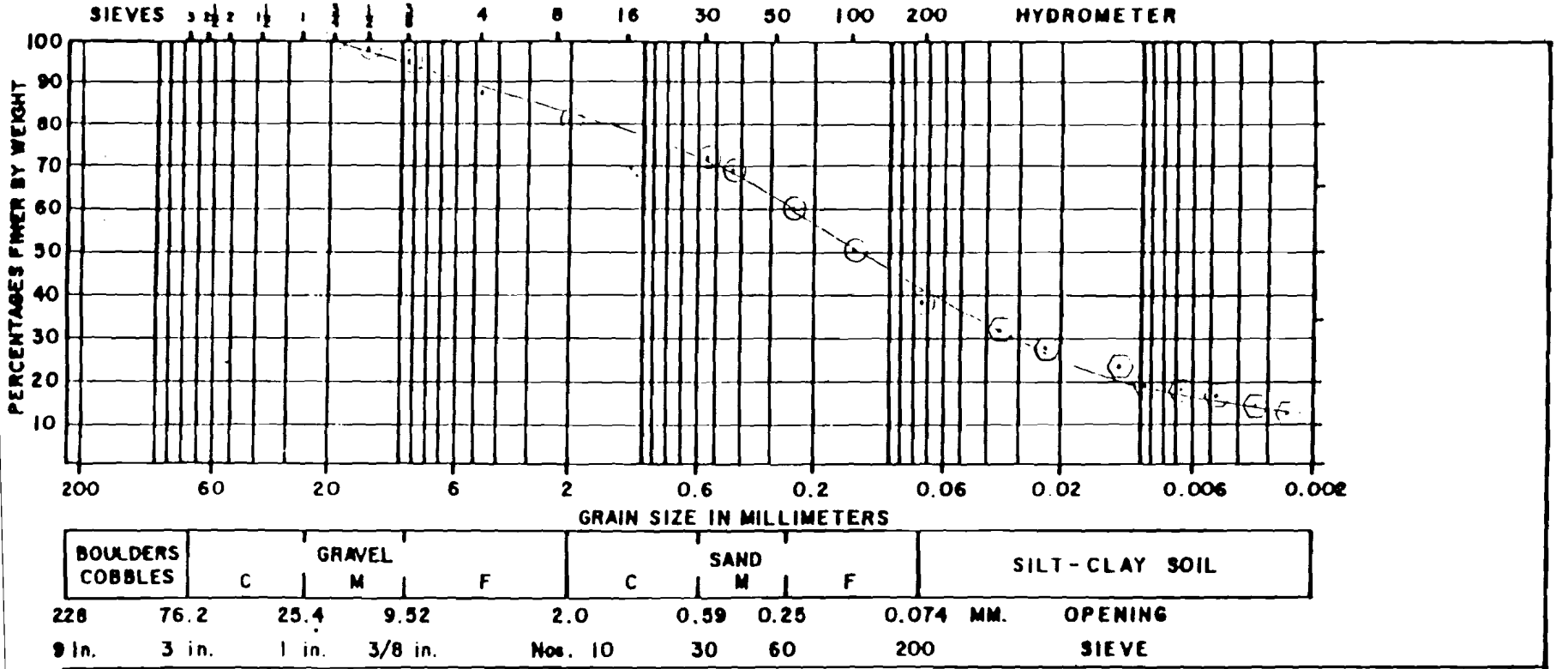
Well-Boring Nº : 6L
Sample Nº : S-27
Depth : 52'-54'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008
REPORT NO. 15

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

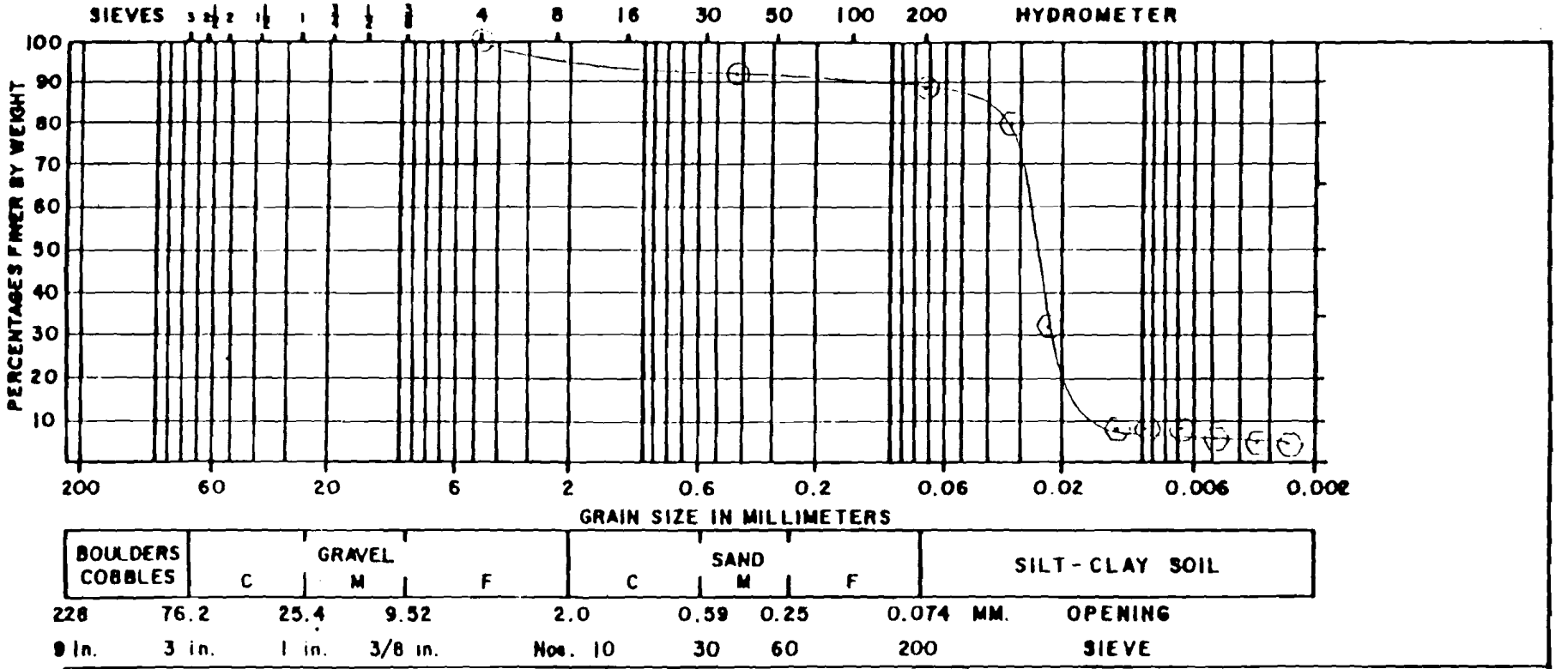
Well-Boring Nº : 7L
Sample Nº : S-34
Depth : 68'-69.5'

- Sieve Analysis
- Hydrometer Analysis

permatt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO. L-88008
REPORT NO. 16

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

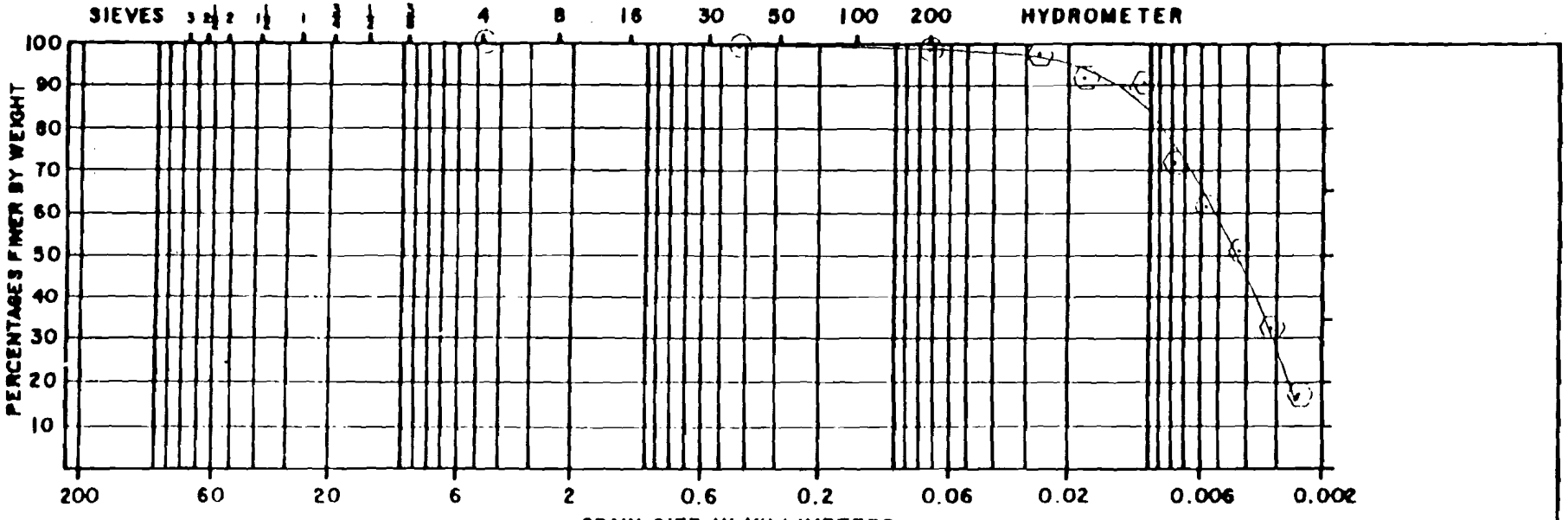
Well-Boring Nº : BL
Sample Nº : S-4
Depth : 20'-22'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

pamatt wolfe inc
515 ERIE BLVD EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315-437-1429

JOB NO. L-88008
REPORT NO. 17

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

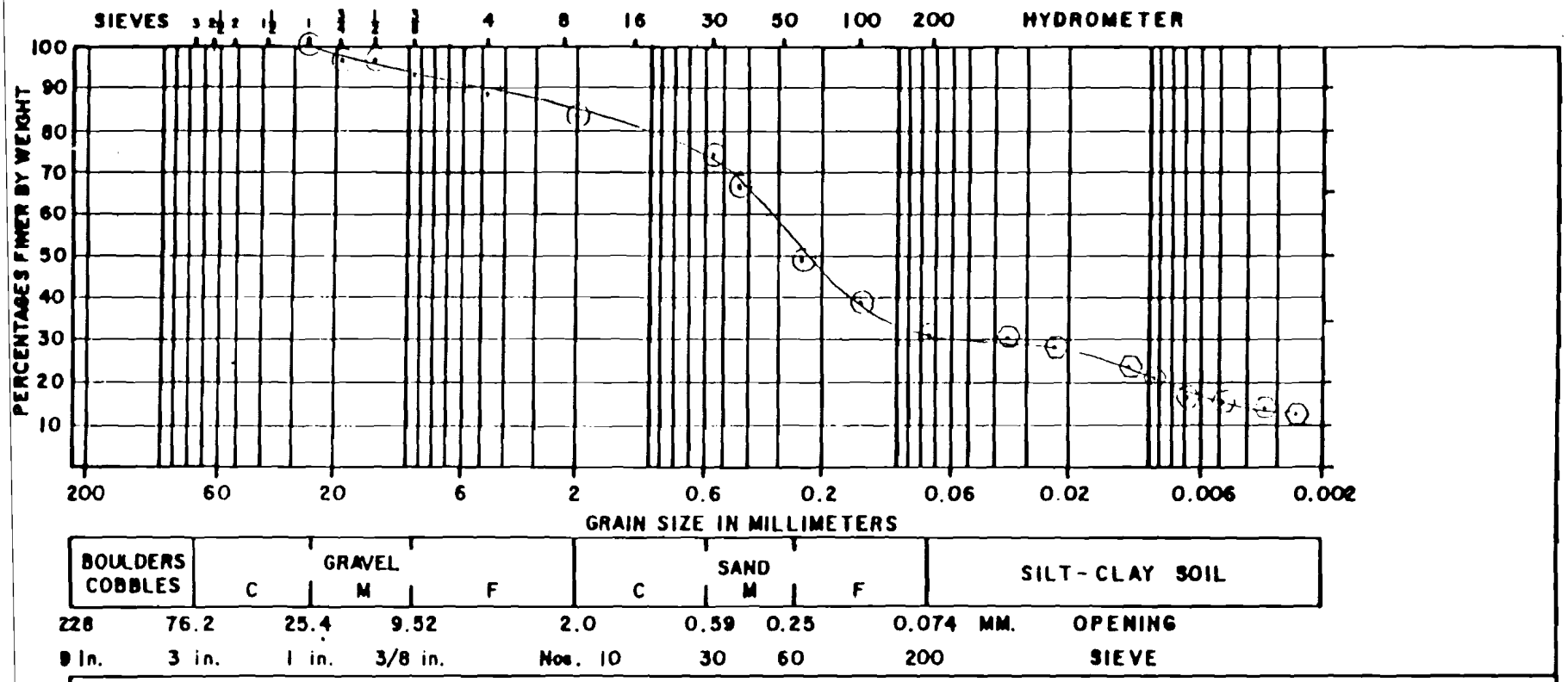
Well-Boring Nº : BL
Sample Nº : S-20
Depth : 56'-58'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315-437-1429

JOB NO L-88008
REPORT NO 18

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

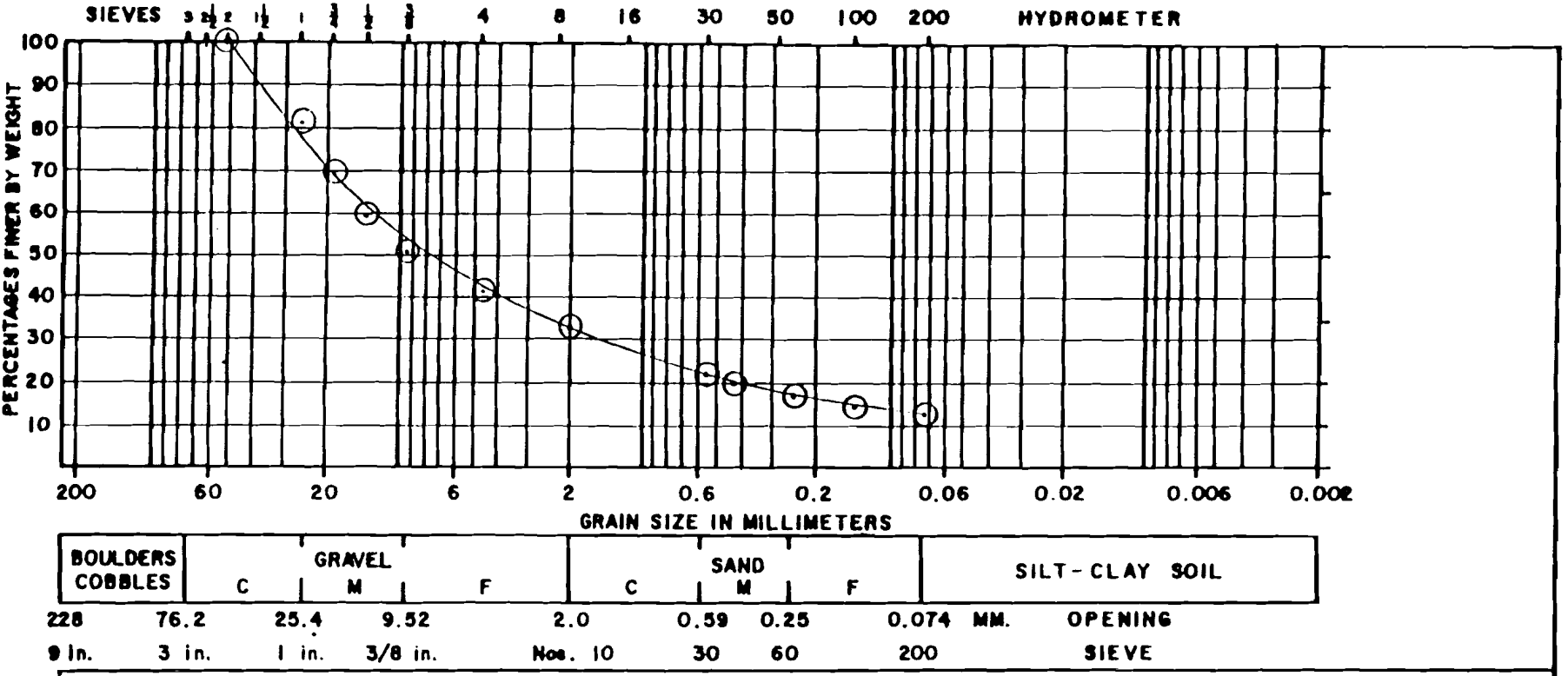
Well-Boring Nº : BL
Sample Nº : S-32
Depth : 80'-82'

⊙ Sieve Analysis
⊙ Hydrometer Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315-437 1429

JOB NO L-88008
REPORT NO 19

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

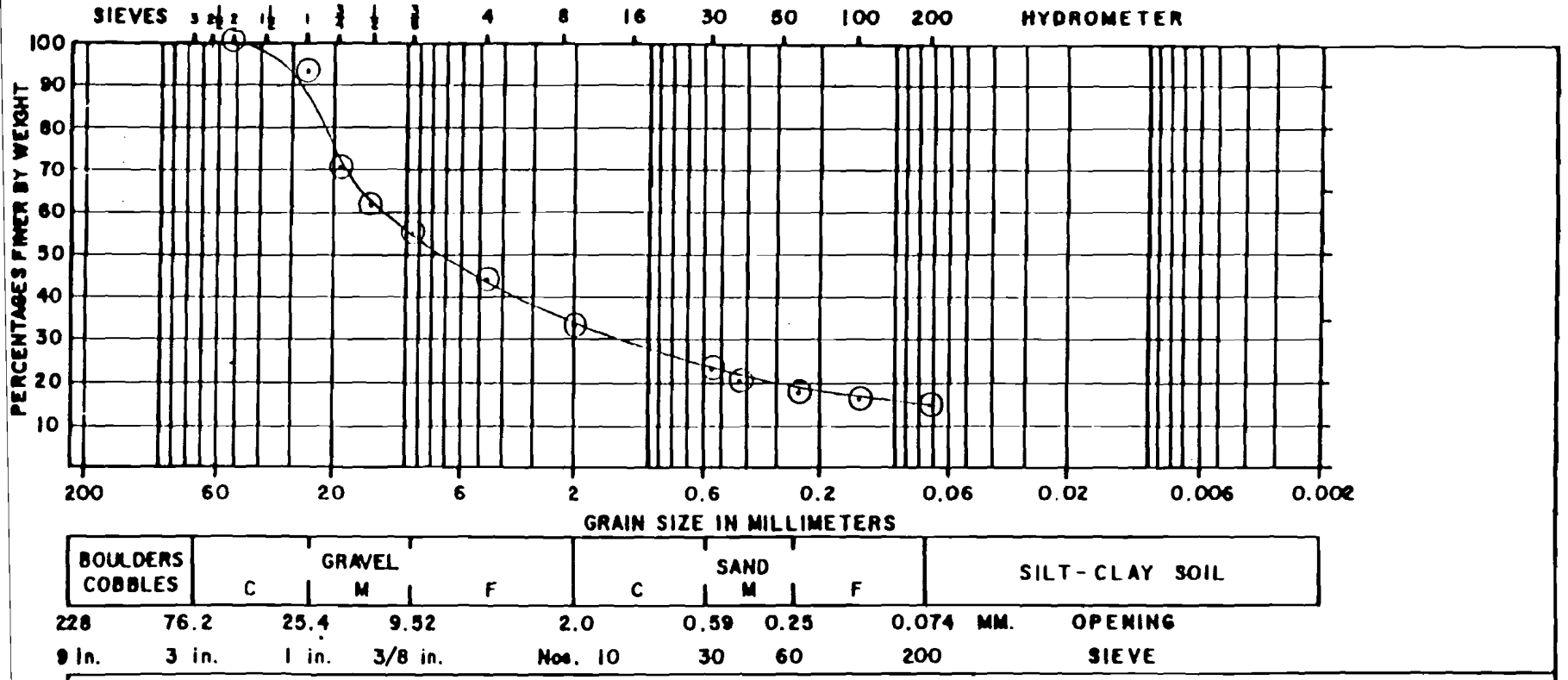
⊙ Sieve Analysis

Well-Boring Nº: 1L
Sample Nº: S-22 + S-23
Depth: 68'-69.5' - 70'-72'

parratt wolff inc
FIFTH ER RD. EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315/437-1428

JOB NO L-88008
REPORT NO 20

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

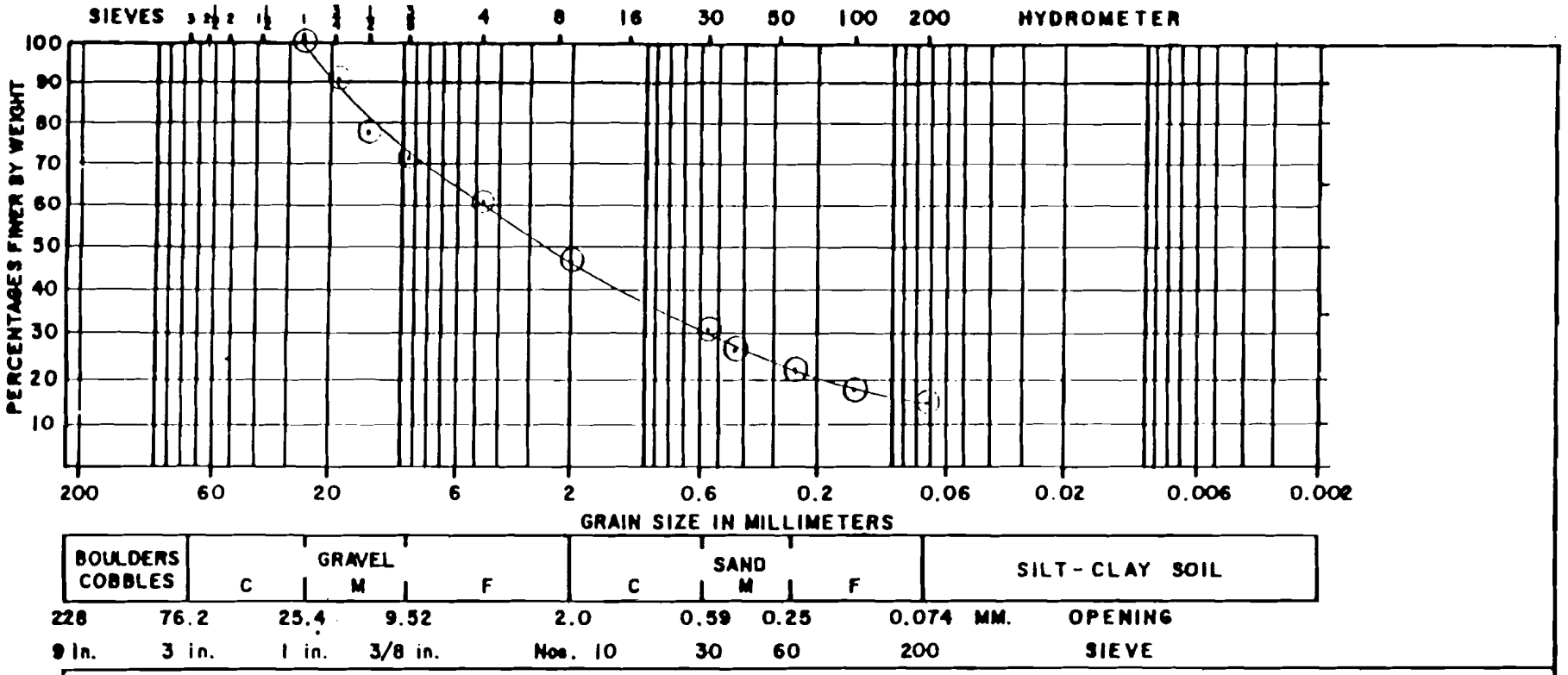
⊙ Sieve Analysis

Well-Boring Nº: 2L
Sample Nº: S-35 + S-36
Depth: 85'-86.5' - 90'-91.5'

parratt wolff inc
FULLER RD EAST SYRACUSE N Y 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008
REPORT NO. 2L

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

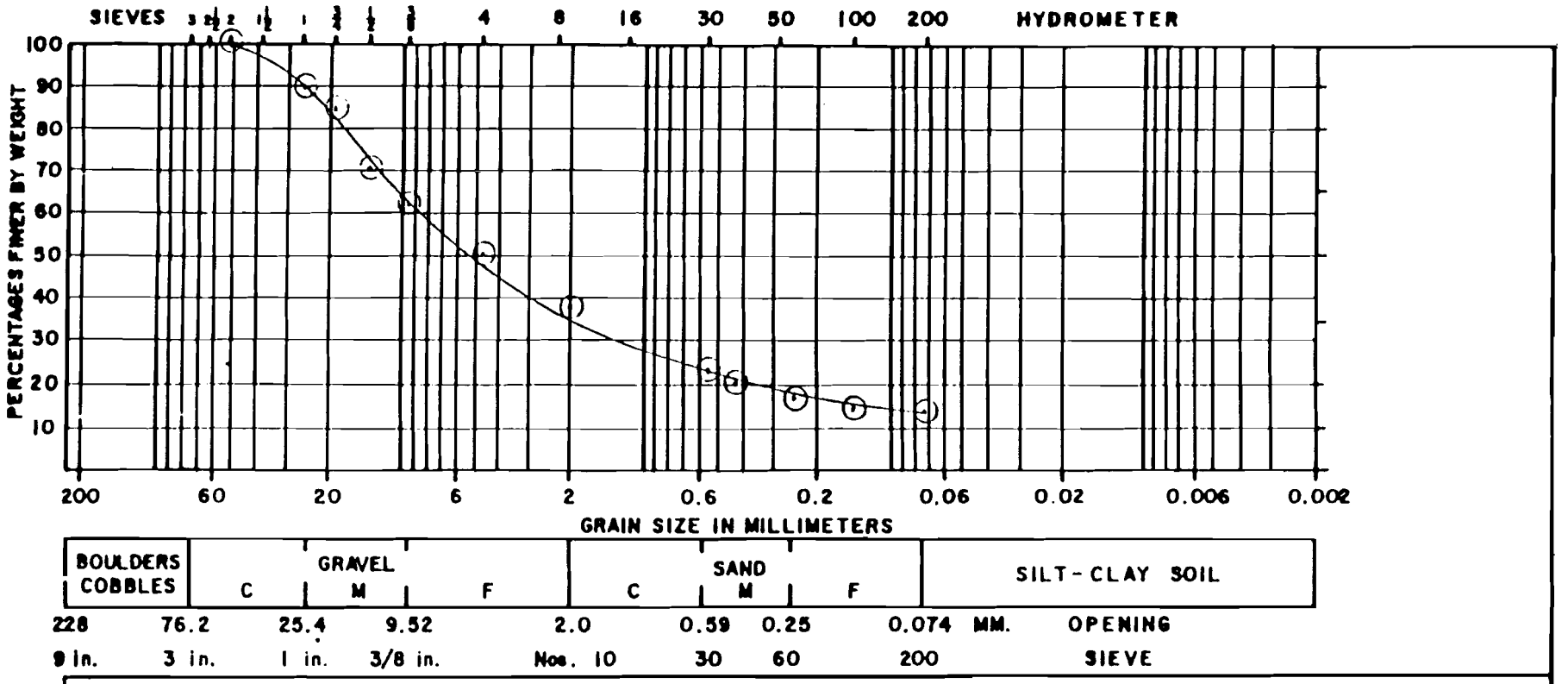
⊙ Sieve Analysis

Well-Boring Nº : 5L
Sample Nº : S-5
Depth : 8'-10'

parratt wolff inc
157 ERIE BLVD EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315/437-2711

JOB NO L-88008
REPORT NO 22

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

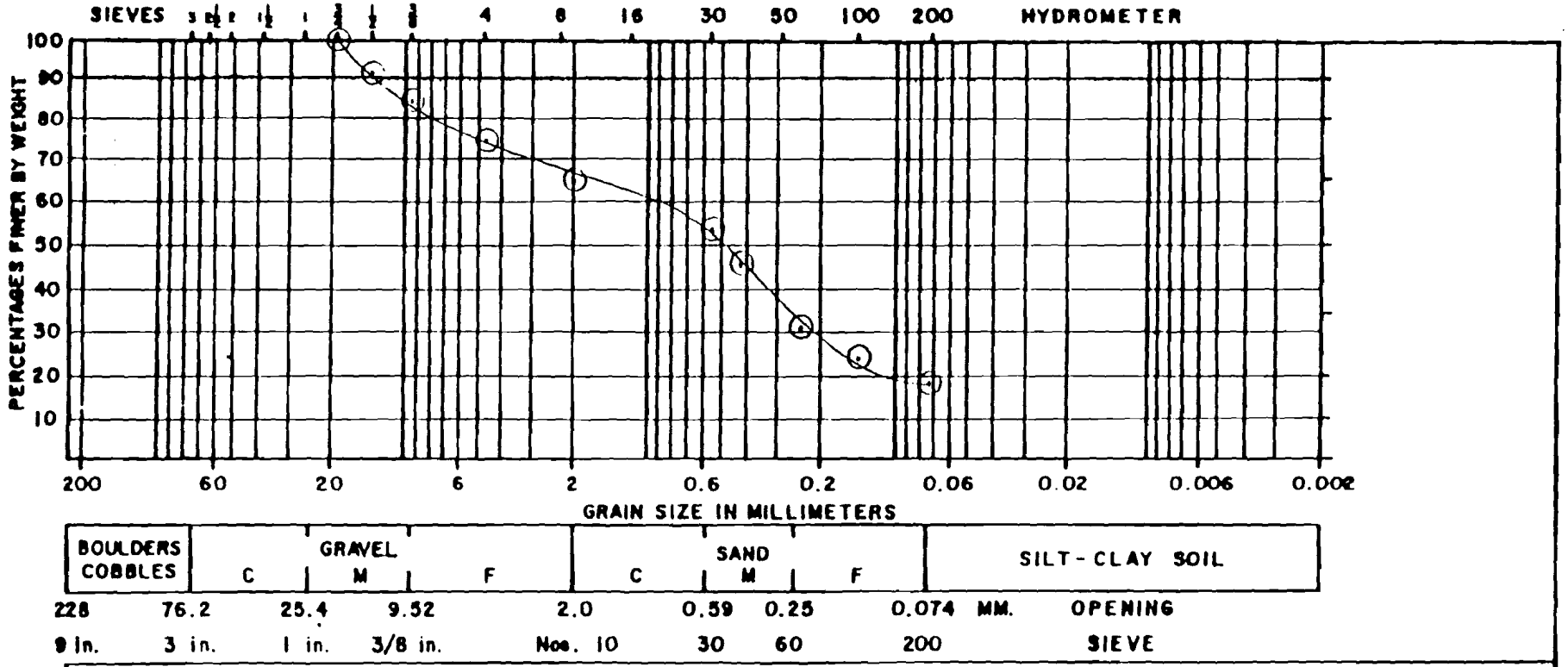
⊙ Sieve Analysis

Well-Boring Nº : 5L
Sample Nº : S-30 + S-31
Depth : 58'-60' - 60'-62'

parratt wolff inc
FIVE EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

JOB NO L-88008
REPORT NO 23

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

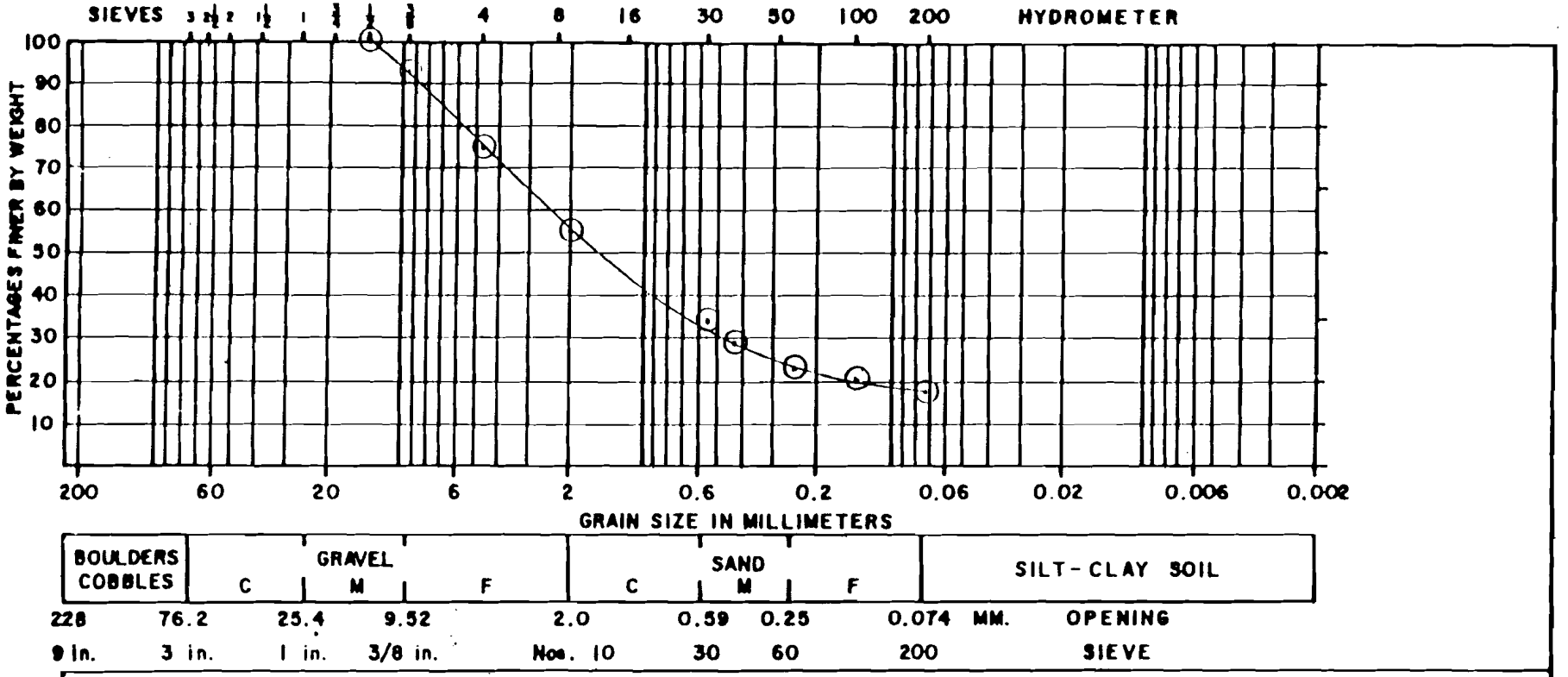
⊙ Sieve Analysis

Well-Boring Nº: 6L
Sample Nº: S-36
Depth: 75'-77'

parratt wolff inc
FAYETTEVILLE NEW YORK 13066
TELEPHONE AREA CODE 315 637 1429

JOB NO L-88008
REPORT NO 24

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

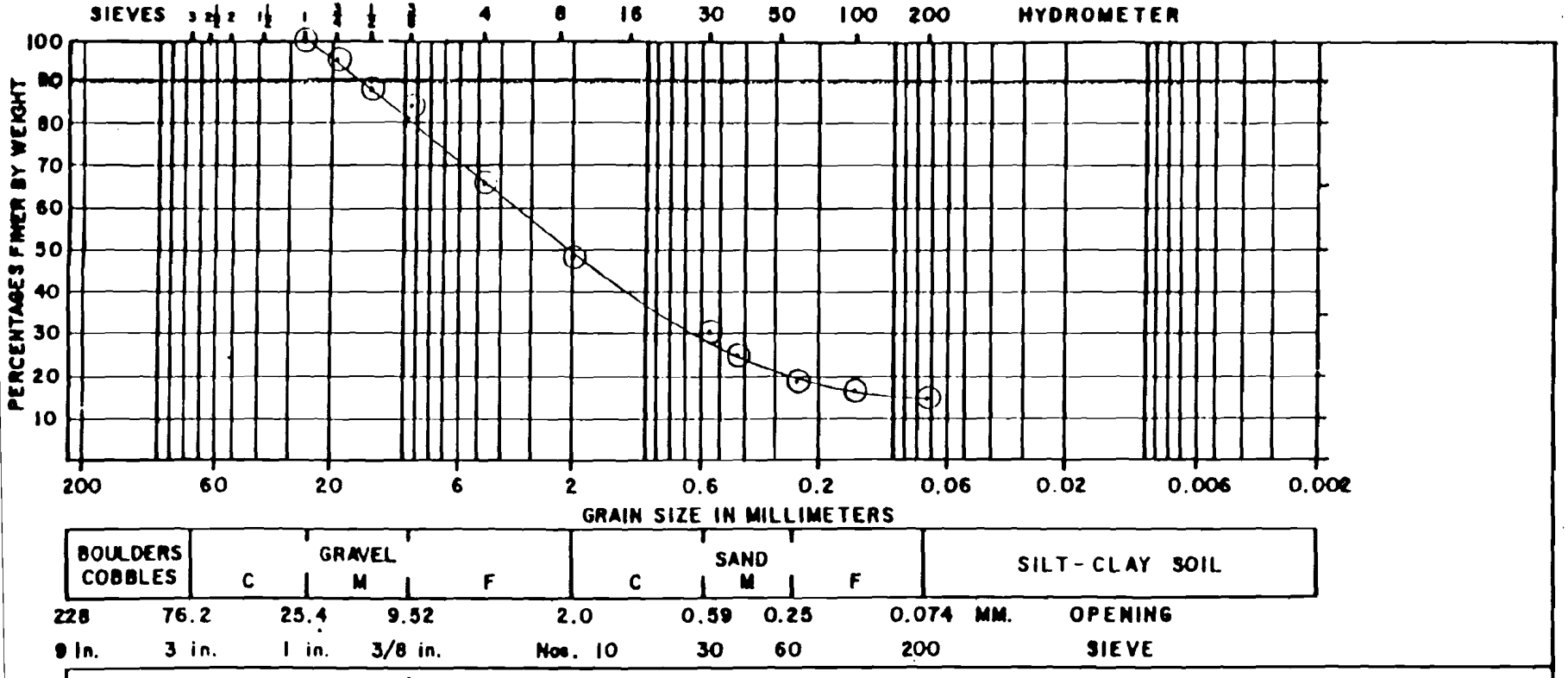
⊙ Sieve Analysis

Well-Boring Nº : 7L
Sample Nº : S-26
Depth : 52'-54'

parratt wolff inc
FAYETTEVILLE NEW YORK EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

JOB NO L-88008
REPORT NO. 25

GRAIN SIZE ANALYSIS



L-88008
Laboratory Testing

Well-Boring Nº: 7L
Sample Nº: S-36 + S-37
Depth: 72'-73.5'-74'-76'

⊙ Sieve Analysis

parratt wolff inc
FISHER RD EAST SYRACUSE N.Y. 13057
TELEPHONE AREA CODE 315 437 1429

JOB NO L-88008
REPORT NO 26

APPENDIX E

SEISMIC REFRACTION INVESTIGATION

DR. JOHN F. KICK

Geophysical & Geological Consulting

Box 6, Dunstable, Mass. 01827
(617) 649-6650

SEISMIC REFRACTION INVESTIGATION FOR A HYDROGEOLOGIC ASSESSMENT OF THE ALLIED WASTE BEDS IN THE SYRACUSE AREA

prepared for

Blasland & Bouck Engineers, P.C.
5793 Widewaters Parkway Box 66
Syracuse, New York 13214

SEISMIC REFRACTION INVESTIGATION FOR A HYDROGEOLOGIC ASSESSMENT OF THE ALLIED WASTE BEDS IN THE SYRACUSE AREA

Introduction

A seismic refraction investigation was completed on properties containing the Allied Waste Beds in an area west of Syracuse, New York by John Kick, geophysicist.

The purpose of the work was to determine depth to bedrock and other detectable interfaces, and the nature of subsurface materials. The information is needed to support a hydrogeologic assessment of the Allied Waste Beds being conducted by Blasland & Bouck Engineers, P.C. of Syracuse, New York.

Seismic Field Work

Eleven seismic lines (17 shot points) covering 4335 linear feet of traverse were completed October 21, 22, and 23, 1987. Locations of lines and shot points are shown on the map of Figure 1. Each line is included between two shot points. As shown on the map, the traverse was broken at several places because of obstacles such as an active railroad, marshes, and streams.

The map of Figure 1 is based on an enlarged (scale approx. 1" = 1000') version of a portion of the Camillus and Syracuse West quadrangle topographic map, provided by Mr. George Thomas, geologist for Blasland & Bouck Engineers, P.C. Mr. Thomas also directed the investigation, as well as furnishing useful information and providing considerable support.

A S.I.E. Model RS-4, 12 channel seismic system was used to obtain the data. Each seismic line is made up of a string of 12 detectors (geophones) planted in the ground along a straight line. The geophones are used to detect a seismic wave generated by the use of small explosive charges placed in holes at each end of the line (at shot points). The outputs of the 12 geophones are fed to a seismograph, which records the signals on film. The arrival times are read from the film and plotted on time-distance graphs

for analysis and interpretation. All lines were reversed, and all were tied where possible. Supplemental shots were placed as needed.

Data Interpretation

Data interpretation was accomplished by use of the critical distance method which is based on the analysis of graphs of travel time versus distance in combination with formulae based on refraction theory. Every opportunity was utilized to integrate geological knowledge of the site and thus increase the accuracy of the results.

Accuracy - In general, experience shows that the computed seismic depths at shot points are within ten percent of the true depths. Accuracy between shot points, or for depths less than 15 feet, or for unusual, unforeseen ground conditions may be somewhat less.

Results

The interpreted results are presented in the form of profile cross sections on Figures 1 and 2, and in the written discussion below. The profiles show overburden (soils) and bedrock seismic velocities, and the position of the bedrock surface as related to the surface of the ground.

Seismic Velocities - Seismic waves travel at different velocities in different materials. When interpreted with due care these velocities can provide useful information on soil and rock characteristics. Below are listed correlations of material types with seismic velocities encountered on this project.

Velocity (ft/sec)	Interpretation
1500 - 2000	Thin surficial layers of unsaturated sand, gravel, or fill - often too thin to be accurately recorded.
3200 - 3400	Unsaturated material, usually more compact and/or fine grained than the above.
4500 - 5300	Commonly saturated sands and gravels, but can also include fine grained sands, silts, clays, or various admixtures of these as well as some types of till.

Seismic Velocities (cont.)

Velocity (ft/sec)	Interpretation
5900 - 7000	Compact till materials.
9800 - 13400	Bedrock - paleozoic sedimentary rock, most likely shale. Degree of weathering and/or fracturing generally increases as velocity decreases.

Discussion of Profiles

SP (shot points) 1 - 4 - Extends from near Rte. 695 to a drain channel south of the Conrail right of way. Calculated depths to bedrock range from 34 feet near SP 1 to over 65 feet near SP 3. The degree of upward slope of the rock surface from SP 2 - 1 is greater than shown, because the ground surface slopes upward to the south at this location.

SP 5 - 6 - An isolated (untied) line between the railroad and a zone of marsh. Calculated bedrock depths range from 66 to 78 feet, sloping downward to the north.

SP 7 - 8 - Extends from the north side of the above mentioned marsh to the southern shoreline of Nine Mile Creek. Interpreted bedrock depths vary from 84 feet near SP 7, to 91 feet near SP 8.

SP 9 - 13 - Mostly along a dirt access road (Brewery Road). SP 9 is on the southern shore of Nine Mile Creek, but the geophone spread begins on the north shore and extends northward, leaving an 80 foot water covered space. Calculated depths to rock range to slightly over 100 feet at 2 localities, but could be somewhat more or less depending on the thickness of the intermediate till layer, and the accuracy of the slope calculations.

SP 14 - 16 - Extends from a marshy tract of land on the south, to higher ground on the northerly end. Bedrock depths range from 82 feet near SP 14 to less than 50 feet as SP 16 is approached. The bedrock slopes upward to the north to a greater degree than shown because the ground surface also slopes upward.

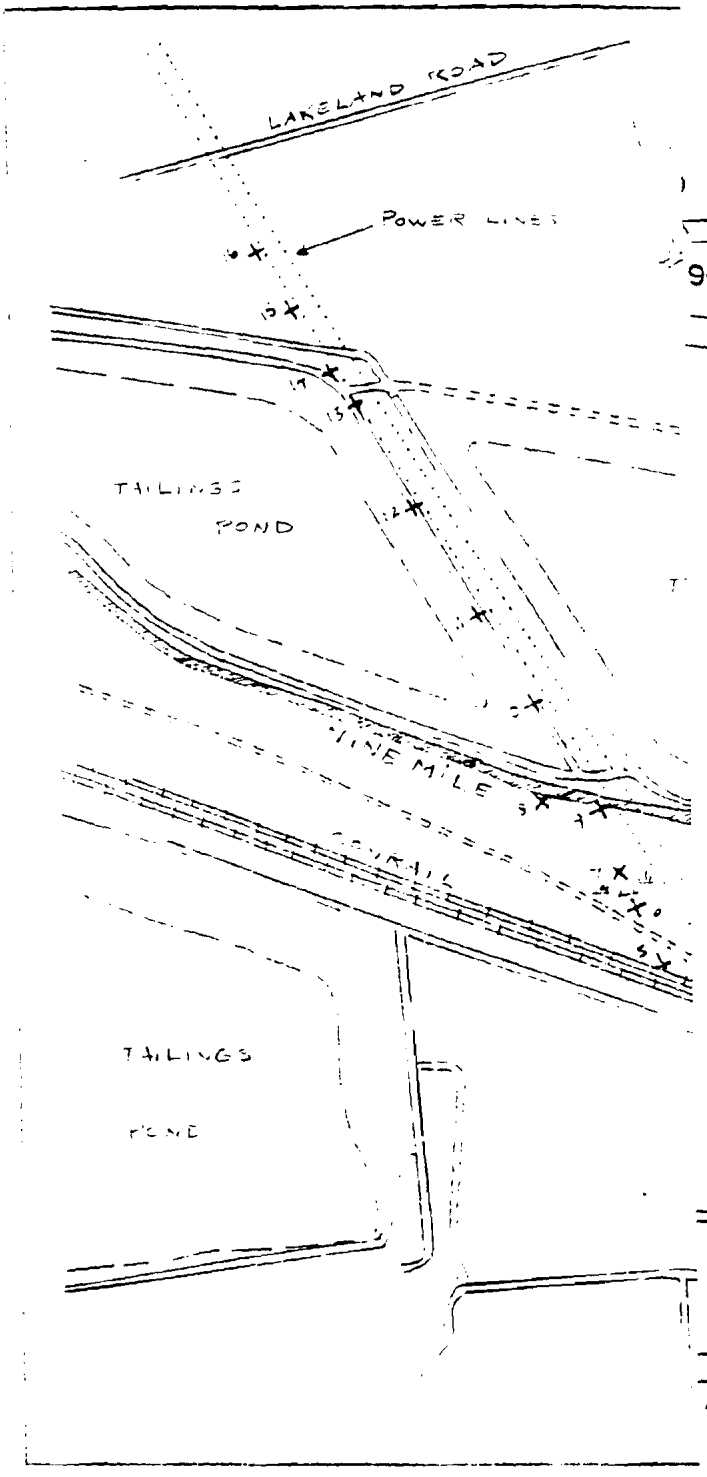
General Comment - Except on the northern and southern ends, much of the survey traversed areas of fill.

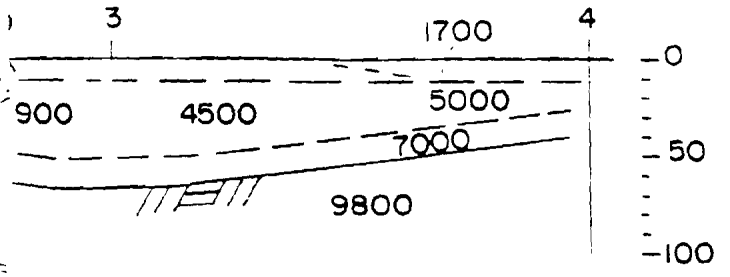
Discussion

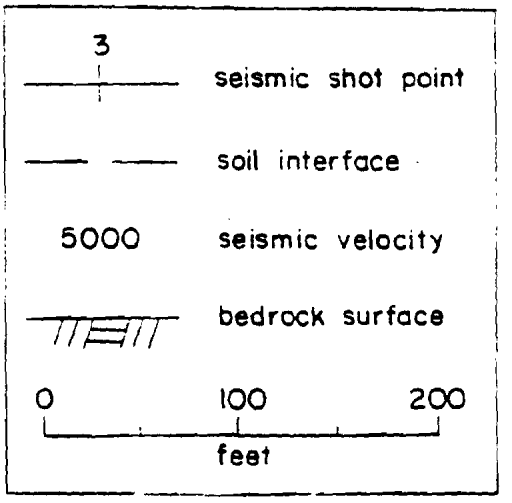
A source of error common with seismic refraction work is that relatively thin intermediate layers with intermediate velocities may not be recorded. Omission of such layers from calculations results in computed depths to bedrock that are somewhat less than the actual depths.

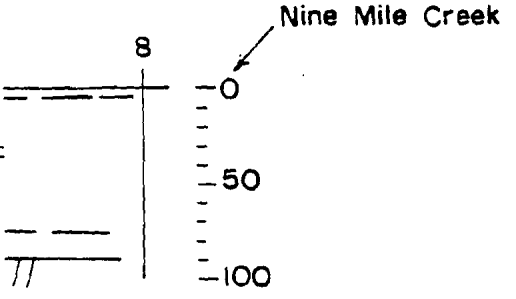
In the case of this project, an intermediate layer with till velocity (5900 - 7000 ft/sec) was recorded in a few places, but on most lines no evidence for such a layer was seen. In order to increase the accuracy of the depth to rock calculations, a layer of till of constant (15 feet) thickness, with estimated velocity of 7000 ft/sec was added into the final calculations. The computations were made using a computer program which deals with such "hidden layer" problems. The 15 foot estimated thickness was taken from drilling and geologic observations. Where till is greater in thickness than 15 feet the calculated depths will be too shallow. Where till is thin or missing, the calculated depth is slightly greater than the actual.

In places where some evidence exists for an intermediary till layer, the depth to till and bedrock is indicated by a symbol shown in the legend on Figure 2.









⊥ seismic shot point

1 inch = approx. 1000 feet.

Map based on U.S.G.S. Syracuse West Q

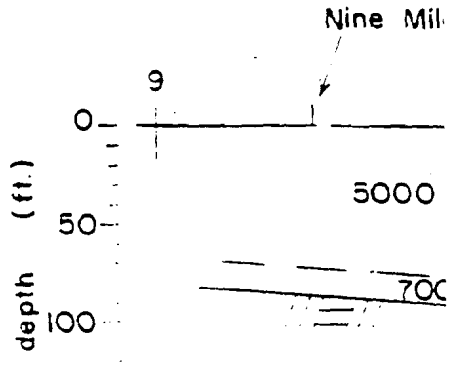
All locations are approximate.

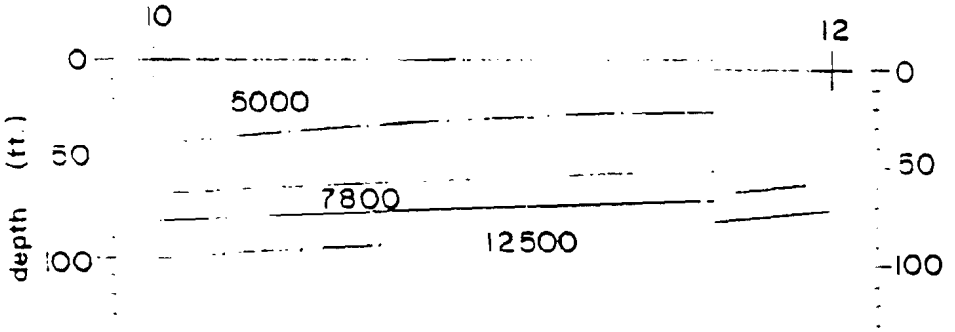
L

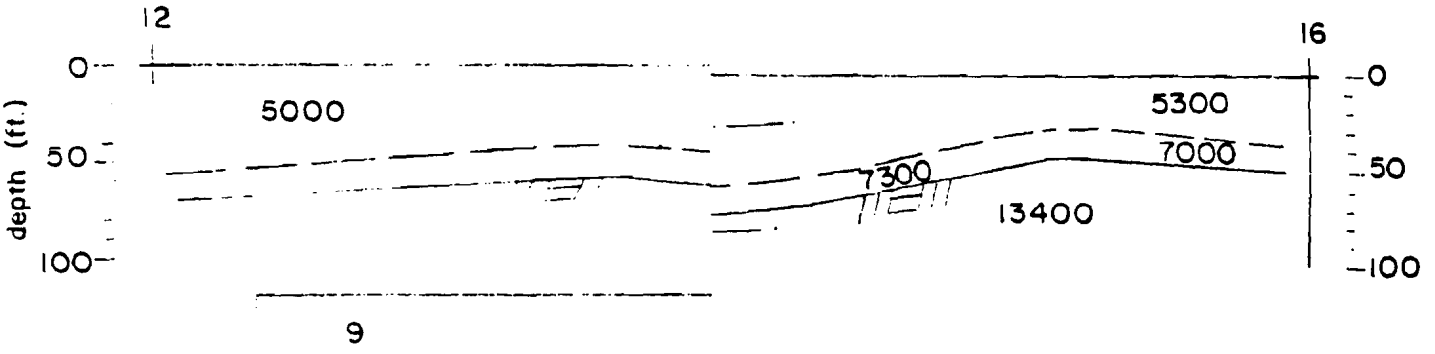
S

PROFILES

by: J. F. Kick
Geophysicist
October 1987







9

seismic shot poin

soil interface

5000 seismic velocity

bedrock surface

interfaces for m
thickness at place
where recorded.

0 100 200
feet

ROFILES

by: J. F. Kick
Geophysicist
October 1987

APPENDIX F

ANALYTICAL RESULTS

OBG LABORATORIES, INC.

Laboratory Report

CLIENT BLASLAND & BOUCK ENGINEERS, P.C. JOB NO. 2887.013.517

DESCRIPTION Allied

DATE COLLECTED 12-17-87 DATE REC'D. 12-17-87 DATE ANALYZED

Description	WB-Bu	WB-BL	WB-6
Sample #	G3978	G3979	D3980
SPECIFIC CONDUCTIVITY	6600.	13000.	80000.
PH, LABORATORY	12.4	7.2	6.4
CALCIUM	1200.	315.	19000.
CHLORIDE	1300.	7200.	56000.
FLUORIDE	0.69	0.57	0.14
IRON	0.06	0.62	39.
MAGNESIUM	<0.05	56.	120.
NITRITE NITRATE NITROGEN	1.4	<0.01	<0.01
POTASSIUM	21.	36.	280.
SODIUM	200.	1100.	9500.
STRONTIUM	6.2	32.	42.
SULFATE	66.	630.	49.
TOTAL DISSOLVED SOLIDS	3500.	11000.	87000.
HYDROXIDE ALKALINITY	1200.	<1.	<1.
CARBONATE ALKALINITY	400.	<1.	<1.
BICARBONATE ALAKLANITY	<1.	280.	54.

Methodology: Federal Register — 40 CFR. Part 136. October 26, 1984

Units: mg/l (ppm) unless otherwise noted

Comments:

Authorized: D. R. Brandon

OBG Laboratories, Inc

OBG LABORATORIES, INC.

Laboratory Report

CLIENT BLASLAND & BOUCK ENGINEER, P.C. JOB NO. 2887.013.517

DESCRIPTION Allied

DATE COLLECTED 12-18-87 DATE REC'D. 12-18-87 DATE ANALYZED

Description	Metro 1
Sample #	G3999
PH, LABORATORY	7.6
SPECIFIC CONDUCTIVITY	990.
CALCIUM	140.
CHLORIDE	130.
FLUORIDE	1.1
IRON	0.15
MAGNESIUM	28.
NITRITE NITRATE NITROGEN	0.16
POTASSIUM	12.
SODIUM	74.
STRONTIUM	0.88
SULFATE	260.
TOTAL DISSOLVED SOLIDS	830.
HYDROXIDE ALKALINITY	<1.
CARBONATE ALKALINITY	<1.
BICARBONATE ALKALINITY	220.

Methodology: Federal Register — 40 CFR. Part 136. October 26. 1984

Units: mg/l (ppm) unless otherwise noted

Comments:

Authorized: D.A. Brandon

OBG Laboratories, Inc.

CEG LABORATORIES, INC.

Laboratory Report

CLIENT BLASLAND & BOUCK ENGINEERS, P.C. JOB NO. 2887.013.517

DESCRIPTION Allied

DATE COLLECTED 12-21-87 DATE REC'D. 12-21-87 DATE ANALYZED

Description	P-1	P-2
Sample #	G4032	G4033
PH, LABORATORY	5.1	7.0
SPECIFIC CONDUCTIVITY	41000.	2700.
CALCIUM	8400.	660.
CHLORIDE	22000.	900.
FLUORIDE	<0.1	0.14
IRON	330.	6.0
MAGNESIUM	91.	71.
NITRITE NITRATE NITROGEN	<0.01	<0.01
POTSSSIUM	25.	11.
SODIUM	5000.	170.
STRONTIUM	23.	12.
SULFATE	64.	960.
TOTAL DISSOLVED SOLIDS	39000.	2900.
HYDROXIDE ALKALINITY	<1.	<1.
CARBONATE ALKALINITY	<1.	<1.
BICARBONATE ALKALINITY	32.	210.

thodology: Federal Register — 40 CFR. Part 136. October 26. 1984

Units: mg/l (ppm) unless otherwise noted

Comments:

Authorized: D.M. Brandon

G Laboratories, Inc.

DEG LABORATORIES, INC.

RECEIVED
JAN 18 1988
Blasland, Bouck Engineers P.C.
Syracuse II

Laboratory Report

CLIENT BLASLAND & BOUCK ENGINEERS, P.C. JOB NO. 2887.013.517

DESCRIPTION Allied

DATE COLLECTED 12-14-87 DATE REC'D. 12-14-87 DATE ANALYZED

Description	WB-2u	WB-2L	WB-4u	WB-4L	DW-101	104.1MS
Sample #	G3803	G3804	G3805	G3806	G3807	G3808
ALKALINITY AS						
HYDROXIDE ALKALINITY	<1.	<1.	<1.	<1.	<1.	<1.
CARBONATE ALKALINITY	<1.	<1.	<1.	<1.	<1.	360.
BICARBONATE ALKALINITY	60.	70.	60.	50.	120.	20.
PH, LABORATORY	8.3	6.4	8.0	6.6	6.6	9.9
CALCIUM	68.	19000.	3300.	15000.	23000.	23000.
CHLORIDE	350.	51000.	11000.	43000.	59000.	51000.
FLUORIDE	0.16	<0.10	0.12	<0.10	<0.10	0.25
IRON	<0.05	8.3	0.18	22.	130.	1.3
MAGNESIUM	11.	690.	220.	1000.	250.	2.0
NITRITE NITRATE NITROGEN	1.7	<0.01	<0.01	<0.01	<0.01	<0.01
POTASSIUM	12.	180.	82.	250.	250.	150.
SODIUM	120.	8800.	2300.	10000.	15000.	12000.
STRONTIUM	1.5	35.	13.	41.	150.	110.
SULFATE	190.	440.	130.	150.	6.	39.
TOTAL DISSOLVED SOLIDS	890.	93000.	17000.	76000.	101000.	83000.
SPECIFIC CONDUCTIVITY	1200.	79000.	19000.	68000.	89000.	84000.

Methodology: Federal Register — 40 CFR. Part 136. October 26, 1984

Units: mg/l (ppm) unless otherwise noted

Comments:

Authorized: D.A. Brent

DEG Laboratories, Inc.

OBG LABORATORIES, INC.

Laboratory Report

CLIENT BLASLAND & BOUCK ENGINEERS, P.C. JOB NO. 2887.013.517

DESCRIPTION Hydrogeo, Assessment Allied Waste Beds
Syracuse, NY

DATE COLLECTED 12-9-87 DATE REC'D. 12-9-87 DATE ANALYZED

Description	WB-3U	WB-3L	WB-1U	WB-1L
Sample #	G3576	G3577	D3578	G3579
SPECIFIC CONDUCTIVITY	1000.	8000.	530.	960.
PH, LABORATORY	7.4	6.5	7.4	7.2
CALCIUM	150.	1000.	110.	270.
CHLORIDE	500.	9000.	7.	45.
FLUORIDE	0.15	<0.1	0.25	0.25
IRON	<0.05	29.	<0.05	0.87
MAGNESIUM	76.	500.	53.	57.
NITRITE NITRATE NITROGEN	<0.01	<0.01	<0.01	<0.01
POTASSIUM	2.0	48.	5.4	2.9
SODIUM	110.	8300.	13.	24.
STRONTIUM	1.6	0.64	0.49	2.9
SULFATE	59.	590.	98.	560.
TOTAL DISSOLVED SOLIDS	1500.	65000.	800.	1300.
HYDROXIDE ALKALINITY	<1.	<1.	<1.	<1.
CARBONATE ALKALINITY	<1.	<1.	<1.	<1.
BICARBONATE ALKALINITY	210.	290.	370.	250.

Methodology: Federal Register — 40 CFR. Part 136. October 26. 1984

Units: mg/l (ppm) unless otherwise noted

Comments:

Authorized: D.A. Brandon

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeo. Assess. Allied Waste Bds
B & B CONTACT G.M. Thomas

LABORATORY OBG Labs
ADDRESS Syracuse NY
CONTACT Rick Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	ANALYSES see List IN Remarks						NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
SW-1	G3272	3 Dec 87	0930	—	water											3	
SW-2	G3273		0955	—												3	
SW-3	G3274		1045	—												3	
SW-4	G3275		1230	—												3	
SW-5	G3276		1310	—												3	
SW-6	G3277		1525	—												3	
SW-7	G3278		1355	—												3	

I. SAMPLED AND RELINQUISHED BY
SIGN G.M. Thomas
PRINT George Thomas
FIRM B+B
DATE 3 Dec 87 TIME 1500

I. RECEIVED BY
SIGN Lori Pellizzari
PRINT Lori Pellizzari
FIRM OBG
DATE 12/3/87 TIME 1500

II. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

II. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

III. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

III. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☐ N/A
IF YES EXPLAIN IN REMARKS

LIQUID	VOA VIAL		
	GLASS BOTTLE		
	PLASTIC BOTTLE	X	X X
	PRESERVATIVE	A1	C2 A
	CONTAINER VOLUME	Pint	Pint Pint
SOLID	VOA VIAL		
	GLASS JAR		
	PLASTIC JAR		
	PRESERVATIVE		
	CONTAINER VOLUME		

NOTE: SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C_1 - ACIDIFIED WITH H_2SO_4 C_2 - Nitric acid
D - NaOH, E - Na THIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)
All samples to be analyzed for:
Alkalinity as: Hydroxide
Carbonate
Bicarbonate
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS
Conductance
pH

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 1310Z.06
PROJECT Hydrogeo. Assessment Allied Waste Beds
B & B CONTACT G.M. Thomas

LABORATORY OBG Labs
ADDRESS Syracuse NY
CONTACT Steve Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	see list in remarks					NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
SW-8	G3334	4Dec87	0820	—	Water											
SW-9	G3335		0840	—												
SW-10	G3336		0915	—												
SW-11	G3337		1010	—												
SW-12	G3338		1115	—												
SW-13	G3339		1220	—												
SW-14	G3340	↓	1035	—	↓											

I. SAMPLED AND RELINQUISHED BY
SIGN G.M. Thomas
PRINT G.M. Thomas
FIRM B&B
DATE 4Dec87 TIME 1355

I. RECEIVED BY
SIGN K.J. Kukliński
PRINT K.J. Kukliński
FIRM OBG LABS
DATE 12/4/87 TIME 1335

II. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

II. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

III. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

III. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

LIQUID	VOA VIAL												
	GLASS BOTTLE												
	PLASTIC BOTTLE					X	X	X					
	PRESERVATIVE					A	A, C,	A, C2					
	CONTAINER VOLUME					2½x	2½x	2½x					
SOLID	VOA VIAL												
	GLASS JAR												
	PLASTIC JAR												
	PRESERVATIVE												
	CONTAINER VOLUME												

NOTE SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C1 - ACIDIFIED WITH H_2SO_4 C2 - acidified w/ nitric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)

All samples to be analyzed for:

Alkalinity as: Hydroxide
Carbonate
Bicarbonate

Conductance
pH

Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeologic Assessment Addendum Tech. Spec. #4
B & B CONTACT Gail Thomas

LABORATORY OEA Labs
ADDRESS Syracuse, NY
CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	SO4	Nitrate/NO2				NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
SW-15	G3445	7 Dec 87	1055	—	Water					X	X	X			3	
SW-16	G3446	7 Dec 87	1230	—	Water					X	X	X			3	
SW-17	G3447	7 Dec 87	1320	—	water					X	X	X			3	
SW-18	G3448	7 Dec 87	1425	—	water					X	X	X			3	

ANALYSES

LIQUID	VOA VIAL										
	GLASS BOTTLE										
	PLASTIC BOTTLE				X	X	X				
	PRESERVATIVE				A	A C_1	A C_2				
	CONTAINER VOLUME				1 pint	1 pint	1 pint				
SOLID	VOA VIAL										
	GLASS JAR										
	PLASTIC JAR										
	PRESERVATIVE										
	CONTAINER VOLUME										

I. SAMPLED AND RELINQUISHED BY
SIGN G. Thomas
PRINT Gail Thomas
FIRM B&B
DATE 7 Dec 87 TIME 1520

I. RECEIVED BY
SIGN Vicki Lizzara
PRINT Lori Pellegrini
FIRM OEA LABS 1520
DATE 12/7/87 TIME ~~1520~~

II. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

II. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

III. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

III. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

NOTE SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C_1 - ACIDIFIED WITH H_2SO_4 + Sulfuric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)
All samples were analyzed for:
Alkalinity as Hydroxide
Carbonate
Bicarbonate
Conductance
pH
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeologic Assessment Allied Waste Beds, Syr. NY
B & B CONTACT G.M. Thomas

LABORATORY OBG Labs
ADDRESS Syracuse NY
CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	see	remarks					NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
SW-19	G3475	8 Dec 87	0755	—	water					x	x	x				3	
SW-20	G3476	↓	0840	—	↓					x	x	x				3	
SW-21	G3477	↓	1015	—	↓					x	x	x				3	
SW-22	G3478	↓	1100	—	↓					x	x	x				3	
SW-23	G3479	↓	1150	—	↓					x	x	x				3	
SW-24	G3480	↓	1220	—	↓					x	x	x				3	
SW-25	G3481	↓	1300	—	↓					x	x	x				3	

I. SAMPLED AND RELINQUISHED BY	I. RECEIVED BY
SIGN G.M. Thomas	SIGN Lori Pellizzari
PRINT G.M. Thomas	PRINT Lori Pellizzari
FIRM B&B	FIRM OBG/HBS
DATE 8 Dec 87 TIME 1355	DATE 12/8/87 TIME 1355
II. RELINQUISHED BY	**II. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME
III. RELINQUISHED BY	**III. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME
IV. RELINQUISHED BY	**IV. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME

		VOA	BNA	METALS	PEST/PCB	see	remarks				
LIQUID	VOA VIAL										
	GLASS BOTTLE										
	PLASTIC BOTTLE					x	x	x			
	PRESERVATIVE					A	A C1	A C2			
	CONTAINER VOLUME					pint	pint	pint			
SOLID	VOA VIAL										
	GLASS JAR										
	PLASTIC JAR										
	PRESERVATIVE										
	CONTAINER VOLUME										

NOTE: SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)

All samples to be analyzed for:
Alkalinity as: Hydroxide
Carbonate
Bicarbonate
conductance
pH
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☐ N/A
IF YES EXPLAIN IN REMARKS

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED, C₁ - ACIDIFIED WITH H_2SO_4, C₂ acidified w/ nitric
D - NaOH, E - NaTHIOSULFATE, F - OTHER

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeo. Assessment Allied Waste Bldg. Syr. NY.
B & B CONTACT G.M. Thomas

LABORATORY OBG Labs Inc
ADDRESS Syr., NY.
CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	Sulfate	Chloride	TDS				NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
VB-3U	G3576	9 Dec 87	1010 0950	—	Water					X	X	X				3	
VB-3L	G3577	9 Dec 87	1030	—	water					X	X	X				3	
VB-1U	G3578	9 Dec 87	1235	—	Water					X	X	X				3	
VB-1L	G3579	9 Dec 87	1315	—	Water					X	X	X				3	

SAMPLED AND RELINQUISHED BY
SIGN G.M. Thomas
PRINT G.M. Thomas
FIRM B&B
DATE 9 Dec 87 TIME 1420

I. RECEIVED BY
SIGN Lori Pellizzari
PRINT Lori Pellizzari
FIRM OBG LABS
DATE 12/9/87 TIME 1430

RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

II. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

III. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

	LIQUID	SOLID
VOA VIAL		
GLASS BOTTLE		
PLASTIC BOTTLE	X X X	
PRESERVATIVE	A A A C_1 C_2	
CONTAINER VOLUME	Pint Pint Pint	
VOA VIAL		
GLASS JAR		
PLASTIC JAR		
PRESERVATIVE		
CONTAINER VOLUME		

NOTE SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C_1 - ACIDIFIED WITH H_2SO_4 - C_2 - Acidified w/ nitric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)
All samples to be analyzed for:
Alkalinity as Hydroxide
Carbonate
Bicarbonate
conductance
pH
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeologic Assessment, Allied Waste Beds Syr.
B & B CONTACT C.M. Thomas

LABORATORY OBG labs
ADDRESS Syracuse NY
CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	Sel	[illegible]					NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
WB-2U		14 Dec 87	1055							X	X	X				3	
WB-2L		14 Dec 87	1120							X	X	X				3	
WB-4U		14 Dec 87	1400							X	X	X				3	
WB-4L		14 Dec 87	1430							X	X	X				3	
DW-101		14 Dec 87	1515							X	X	X				3	
104.1MS		14 Dec 87	1532							X	X	X				3	

I. SAMPLED AND RELINQUISHED BY	I. RECEIVED BY
SIGN G.M. Thomas	SIGN KJ Kuklinski
PRINT C.M. Thomas	PRINT Kuklinski
FIRM B+B	FIRM OBG LABS
DATE 14 Dec 87 TIME 1628	DATE 12.14.87 TIME 1630
II. RELINQUISHED BY	**II. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME
III. RELINQUISHED BY	**III. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME
IV. RELINQUISHED BY	**IV. RECEIVED BY**
SIGN	SIGN
PRINT	PRINT
FIRM	FIRM
DATE TIME	DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

		VOA	BNA	METALS	PEST/PCB	Sel	[illegible]				
LIQUID	VOA VIAL										
	GLASS BOTTLE										
	PLASTIC BOTTLE					X	X	X			
	PRESERVATIVE					A	A, C_1	A, C_1			
	CONTAINER VOLUME					pint	pint	pint			
SOLID	VOA VIAL										
	GLASS JAR										
	PLASTIC JAR										
	PRESERVATIVE										
	CONTAINER VOLUME										

NOTE: SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED, C_1 - ACIDIFIED WITH H_2SO_4, Acidified with nitric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)

All samples to be analyzed for
Conductance as: Hydroxide
Carbonate
Bicarbonate
conductance
pH
Calcium
Chloride
Flouride
Iron
Magnesium
Nitrate
Potasium
Sodium
Strontium
Sulfate
TDS

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.02.06
PROJECT Hydrogeologic Assessment Allied Wire Bds Syr NY
B B B CONTACT G.M. Thomas

LABORATORY OBG Labs
ADDRESS Syr. NY
CONTACT Dave Hill

B B B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	Alkalinity	Conductance	pH	NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
WB-5U	G3941	16 Dec 87	1100	—	water					X	X	X	5	
WB-5M	G3942	16 Dec 87	1025	—	water					X	X	X	3	
WB-5L	G3943	16 Dec 87	1130	—	water					X	X	X	3	
WB-7U	G3944	16 Dec 87	1355	—	water					X	X	X	3	
WB-7L	G3945	16 Dec 87	1400	—	water					X	X	X	5	

I. SAMPLED AND RELINQUISHED BY	I. RECEIVED BY	
SIGN G. M. Thomas	SIGN K J Kuklinski	
PRINT G. M. Thomas	PRINT K J KUKLINSKI	
FIRM B&B	FIRM OBG LABS	
DATE 16 Dec 87 TIME 1543	DATE 12-16-87 TIME 1545	
II. RELINQUISHED BY	II. RECEIVED BY	
SIGN	SIGN	
PRINT	PRINT	
FIRM	FIRM	
DATE TIME	DATE TIME	
III. RELINQUISHED BY	III. RECEIVED BY	
SIGN	SIGN	
PRINT	PRINT	
FIRM	FIRM	
DATE TIME	DATE TIME	
IV. RELINQUISHED BY	IV. RECEIVED BY	
SIGN	SIGN	
PRINT	PRINT	
FIRM	FIRM	
DATE TIME	DATE TIME	

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

LIQUID	VOA VIAL			
	GLASS BOTTLE			
	PLASTIC BOTTLE	X	X	X
	PRESERVATIVE	A C	A, C	A, C
	CONTAINER VOLUME	Pint	Pint	Pint
SOLID	VOA VIAL			
	GLASS JAR			
	PLASTIC JAR			
	PRESERVATIVE			
	CONTAINER VOLUME			

NOTE SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C - ACIDIFIED WITH H_2SO_4, C_2 - acidified w/ nitric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)

All samples to be analyzed for:
Alkalinity as: carbonate
~~Conductance~~ bicarbonate
conductance hydroxide
pH
calcium
chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Specific Gravity
Sulfate
TDS

BLASLAND & BOUCK ENGINEERS, P.C.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

FILE NO. 131.06.06
PROJECT Hydrogeologic Assessment, Allied Waste Bed, Syr. [illegible]
B B B CONTACT George Thomas

LABORATORY OBG Labs
ADDRESS Syracuse NY
CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	VOA	BNA	METALS	PEST/PCB	[illegible]	[illegible]	[illegible]				NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
WB BL	G3978	17 Dec 87	1100	—	water					X	X	X				3	may contain organics - caution -
WB BL	G3979	17 Dec 87	1150	—	water					X	X	X				3	
WB-6	G3980	17 Dec	1455	—	water					X	X	X				3	

I. SAMPLED AND RELINQUISHED BY SIGN G.M. Thomas PRINT G. M. Thomas FIRM B+B DATE 17 Dec 87 TIME 1600	I. RECEIVED BY SIGN Lori Pellizzari PRINT Lori Pellizzari FIRM OBG LABS DATE Dec 17, 87 TIME 1600
II. RELINQUISHED BY SIGN PRINT FIRM DATE TIME	II. RECEIVED BY SIGN PRINT FIRM DATE TIME
III. RELINQUISHED BY SIGN PRINT FIRM DATE TIME	III. RECEIVED BY SIGN PRINT FIRM DATE TIME
IV. RELINQUISHED BY SIGN PRINT FIRM DATE TIME	IV. RECEIVED BY SIGN PRINT FIRM DATE TIME

LIQUID			
VOA VIAL			
GLASS BOTTLE			
PLASTIC BOTTLE	X	X	X
PRESERVATIVE	A	A, C	A, C
CONTAINER VOLUME	pint	pint	pint

SOLID
VOA VIAL
GLASS JAR
PLASTIC JAR
PRESERVATIVE
CONTAINER VOLUME

NOTE SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)

All samples to be analyzed for:
~~Alkalinity~~ ~~Conductance~~ as: hydroxide
carbonate
bicarbonate
Conductance
pH
Calcium
Chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
IF YES EXPLAIN IN REMARKS

PRESERVATION KEY: A- SAMPLE CHILLED, B - FILTERED,
C - ACIDIFIED WITH ~~H_2SO_4~~, ~~see~~ C_2 acidified w/ HNO_3
D - NaOH, E- NaTHIOSULFATE, F - OTHER nitric acid

PAGE 1 OF 1

NO. 1.1 26

PROJECT Hydrogeologic Assessment Mill Creek Landfill, Syr.

B & B CONTACT George Thomas

LABORATORY OBG Labs

ADDRESS Syracuse NY

CONTACT Dave Hill

B & B SAMPLE NO.	LABORATORY SAMPLE NO.	SAMPLING DATE	SAMPLING TIME	SAMPLE DEPTH	SAMPLE TYPE	ANALYSES: VOA	BNA	METALS	PEST/PCB	Sulfide Residual Cl						NO. OF CONTAINERS	COMMENTS (SPECIAL INSTRUCTIONS, CAUTIONS, ETC.)
Metro 1	G3999	18 Dec 87	1205	—	water					X	X	X					

I. SAMPLED AND RELINQUISHED BY
SIGN G. M. Thomas
PRINT G. M. Thomas
FIRM B+B
DATE 18 Dec 87 TIME 1247

I. RECEIVED BY
SIGN Lori Pellizzari
PRINT Lori Pellizzari
FIRM OBG Labs
DATE 12/18/87 TIME 1247

II. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

II. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

III. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

III. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RELINQUISHED BY
SIGN
PRINT
FIRM
DATE TIME

IV. RECEIVED BY
SIGN
PRINT
FIRM
DATE TIME

EVIDENCE SAMPLES TAMPERED WITH ☐ NO ☐ YES ☒ N/A
YES EXPLAIN IN REMARKS

LIQUID	VOA VIAL			
	GLASS BOTTLE			
	PLASTIC BOTTLE	X	X	X
	PRESERVATIVE	A	A, C1	A, C2
	CONTAINER VOLUME			
SOLID	VOA VIAL			
	GLASS JAR			
	PLASTIC JAR			
	PRESERVATIVE			
	CONTAINER VOLUME			

NOTE. SAMPLE BOTTLES SUPPLIED BY LAB, UNLESS INDICATED

PRESERVATION KEY: A - SAMPLE CHILLED, B - FILTERED,
C_1 - ACIDIFIED WITH H_2SO_4; C_2 Acidified w/ nitric acid
D - NaOH, E - NaTHIOSULFATE, F - OTHER.

REMARKS: (SAMPLE STORAGE, NONSTANDARD SAMPLE BOTTLES)
Sample to be analyzed for
Alkalinity as Hydroxide
Carbonate
bicarbonate
pH
conductance
calcium
chloride
Fluoride
Iron
Magnesium
Nitrate
Potassium
Sodium
Strontium
Sulfate
TDS

APPENDIX G - AERIAL PHOTOGRAPHS

The aerial photographs included with this Assessment were flown on March 28, 1981 for the Onondaga Planning Agency by Kucera & Associates, Inc., Mentor, Ohio. The scale of the photographs is approximately 1"=800'.