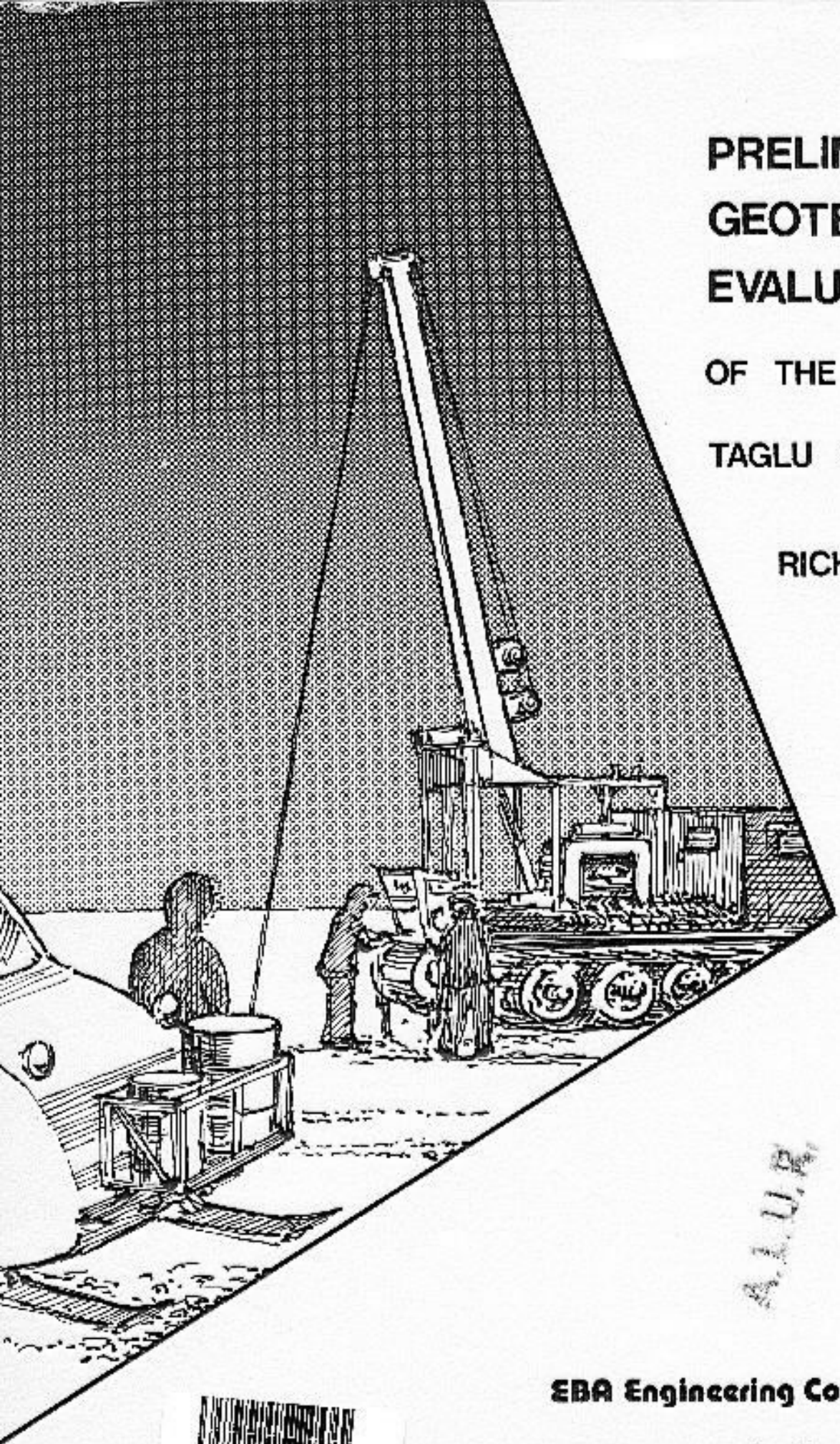

# PRELIMINARY GEOTECHNICAL EVALUATION

## OF THE

## TAGLU GAS PLANTSITE

## RICHARDS ISLAND
## N.W.T



EBA Engineering Consultants Ltd.

Arctic Geotechnical Group

129-90

A.L.U.R.

A.L.U.R.

# PRELIMINARY GEOTECHNICAL EVALUATION

# OF THE

# TAGLU GAS PLANT SITE

Submitted to:

IMPERIAL OIL LIMITED

OCTOBER, 1975

## ABSTRACT

This report presents the findings of a preliminary geotechnical site investigation for a proposed gas plant and associated roadways, airstrip and docksite. The development is to be located in the Taglu Block on Richards Island, N.W.T. where ice rich, perennially frozen, deltaic silt materials predominate.

An extensive drilling program was conducted in January, 1975. A track mounted Mobile B-61 drill utilizing a CRREL core barrel was the principal means of obtaining sub-surface data. Bulk density and water content tests were performed in a field laboratory and representative samples were returned to Edmonton for further laboratory testing.

The stratigraphy and ground ice conditions were determined in the area of the plant site, drilling pad, airstrip and roadways. The stratigraphy consists of non-plastic silt over very find sand while the excess ice contents in the surficial 20 feet average approximately 50 percent. Also the permafrost conditions and stratigraphy were investigated at two potential docksites.

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# LIST OF FIGURES

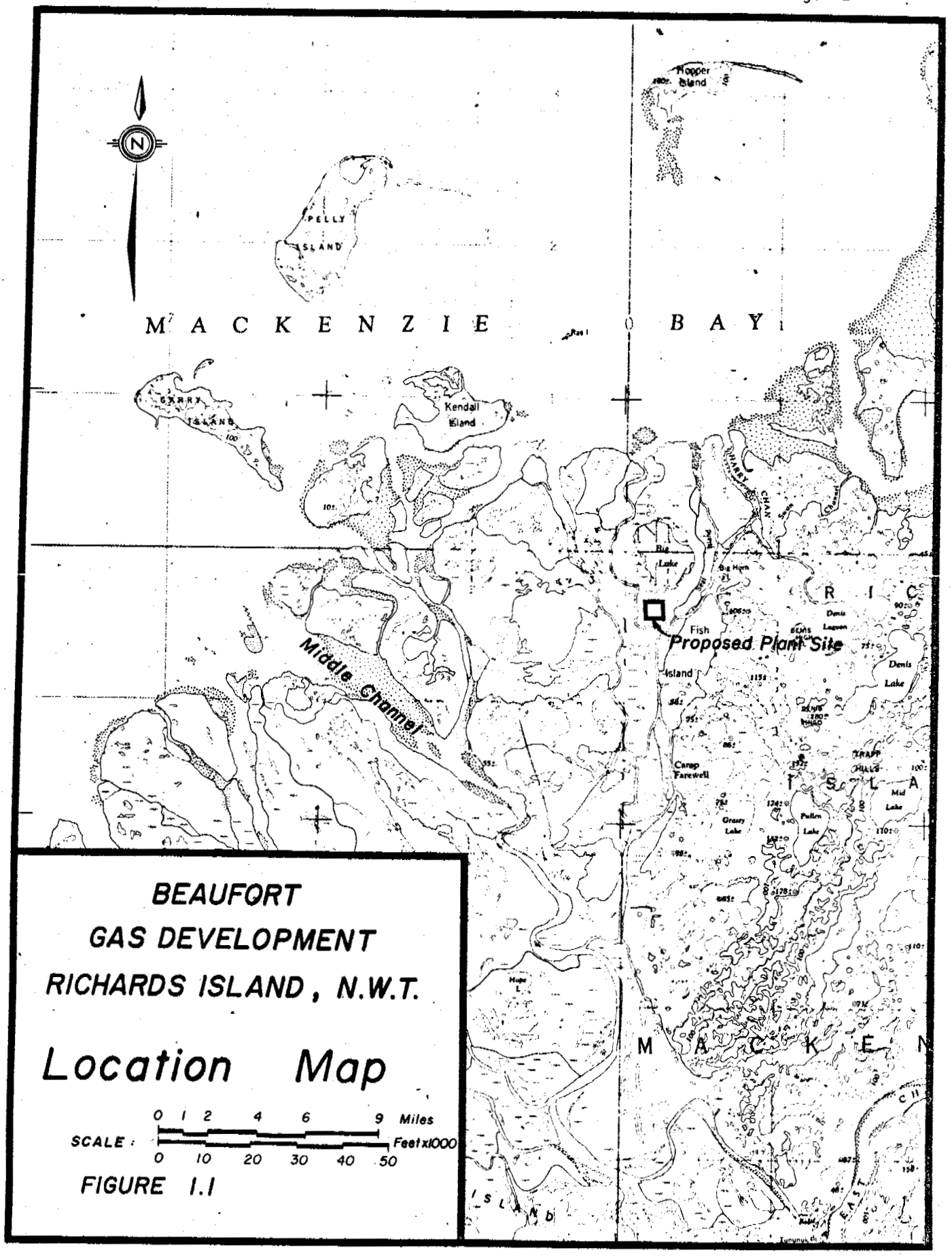
# 1. INTRODUCTION

## 1.1 General

In response to recent natural gas discoveries in the Mackenzie Delta, Imperial Oil Limited has undertaken the planning of a natural gas production and processing complex. This facility would be the first major industrial plant development on arctic terrain in Canada. In view of the engineering, environmental and logistical problems associated with working in arctic and sub-arctic regions, EBA Engineering Consultants Limited was retained to carry out an investigation program to collect geotechnical data relating to specific gas plant and ancilliary structure sites.

The site is located as shown in Figure 1.1, on the north portion of Richards Island in the Mackenzie River delta adjacent to the IOL Taglu D-43 gas well. The geotechnical investigation considered the area designated for the actual plantsite, an extensive pad to the north from which producing wells are to be drilled, an airstrip, a dock and connecting access roads. This report describes the drilling program undertaken and presents the data in a form suitable for the preliminary design of soil supported structures.

The information presented in this report was obtained from one part of an extensive drilling program carried out by EBA for Imperial Oil Limited. Other reports, presenting information complimentary to the Taglu gas plant development, are listed in References 5 through 8.




# BEAUFORT GAS DEVELOPMENT RICHARDS ISLAND, N.W.T.

## Location Map

FIGURE 1.1

## 1.2 Engineering Objectives

The scope of the investigation program was established by Imperial Oil Limited internal memorandum No. C-5295, dated October 15, 1974. The assignment was essentially one of site evaluation and field data collection with little emphasis on engineering analyses at this stage.

Scope of the assignment included but was not limited to the following:

a) An interpretation of site conditions from aerial photographs and surficial geology maps.

b) Organization of a field drilling program including the selection of drilling, sampling and field laboratory testing equipment.

c) Direction of all technical aspects of the field program including day by day review of the data and assessment of drilling progress.

d) Data synthesis and report with broad engineering recommendations necessary to adequately define site conditions in areas designated for construction.

## 1.3 Authorization and Personnel

The investigation program was initiated by Service Order No. 13S608194 issued by Imperial Oil Limited dated December, 1974. The field work was carried out as one part of an extensive winter drilling program undertaken by Imperial Oil Limited, Field Services Department, Edmonton for

which EBA was commissioned to proved technical and engineering support. Logistics of all aspects of the field operation were directed by Imperial Oil Limited Field Services Department in Edmonton (Mr. C.R. Kippen) whereas technical laison and direction were provided by Imperial Oil's Beaufort Gas Project, Calgary (Mr. J.C. McDougall and Mr. L. Keeling).

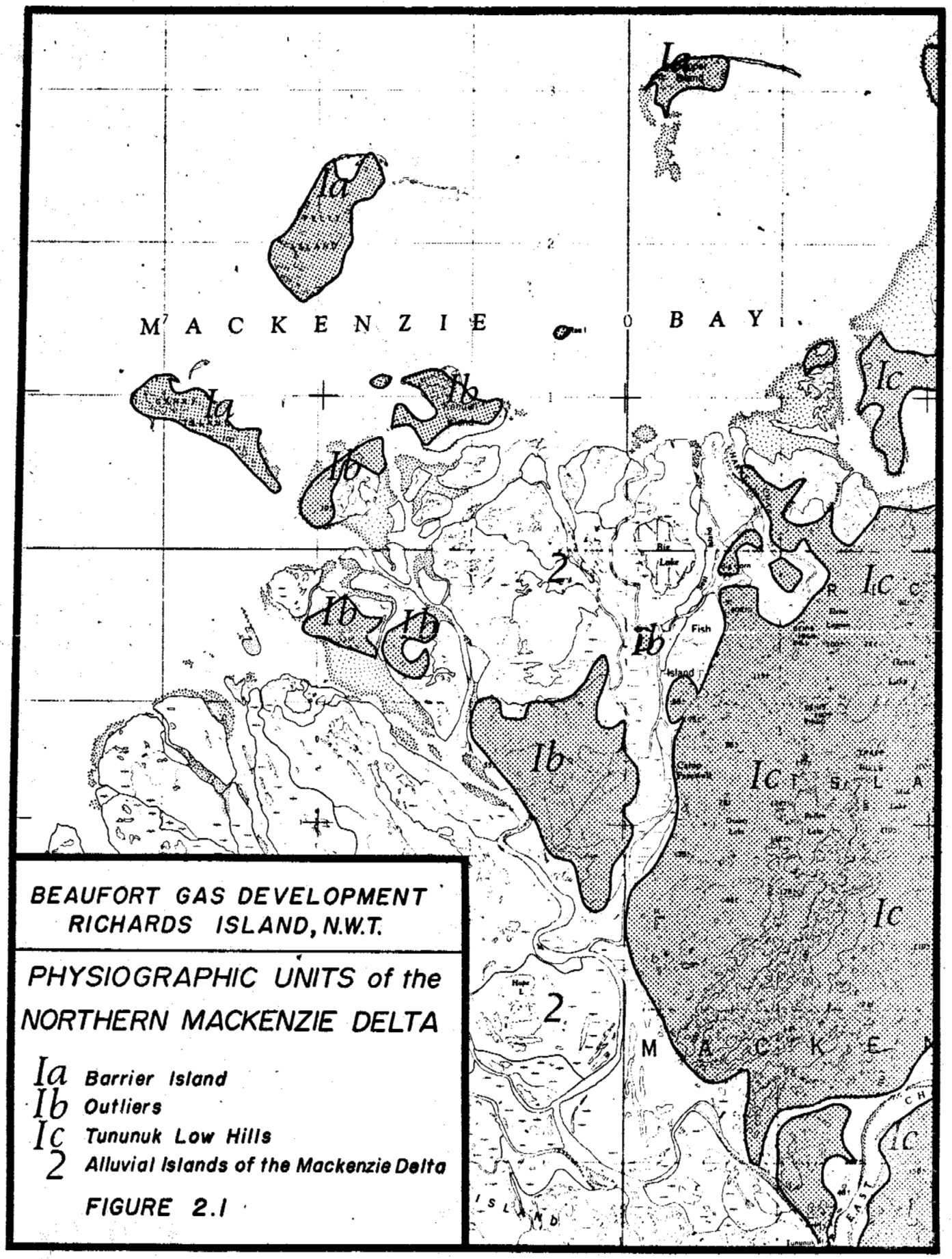
## II GEOLOGIC SETTING

### 2.1 Regional Physiography

The Taglu plantsite is located at the northern end of the Mackenzie Delta approximately nine miles from Mackenzie Bay. The plantsite is situated on recent delta alluvium which is continuously frozen except beneath lakes and river channels.

Figure 2.1 shows the major physiographic units of the northern delta. These units correspond to the older Pleistocene soils and to the Recent (geologic sense) soils. Within the map area, shown on Figure 2.1, the Pleistoncene deposits have been divided into three sub units which are; Area 1a, the barrier islands (Garry, Pelly, Rae, and Hooper), Area 1b, the residual highs or outliers of former islands now buried in the delta alluvia, and Area 1c, the Richards Isand part of the Tununuk Low Hills (Mackay, 1963).

The outliers are eroded, detached portions of the Richards Island. These may be sub-deltaicly continuous with Richards Island or may have been completely separated by glacial meltwater and Mackenzie River channels. The delta has grown to engross these outliers which were probably separate islands, in much the same way that Kendall Island is presently being surrounded. The extent of the outliers under the delta




**BEAUFORT GAS DEVELOPMENT**
**RICHARDS ISLAND, N.W.T.**

## PHYSIOGRAPHIC UNITS of the NORTHERN MACKENZIE DELTA

- *Ia* Barrier Island
- *Ib* Outliers
- *Ic* Tununuk Low Hills
- *2* Alluvial Islands of the Mackenzie Delta

FIGURE 2.1

cannot be predicted. However, they are probably continous under the delta alluvium to the north and possibly to the south where channel erosion would have been less severe.

In appearance the outliers are generally flat, "with a predominant altitude of about 50 feet" (Mackay, 1963). The altitude of the barrier islands ranges between 100 and 200 feet above sea level except for tiny Rae Island at about 50 feet. Rae Island is rapidly eroding away and will probably be removed below sea level before the delta grows out to it.

The western side of Richards Island, which is in the Tununuk low hills region, ranges in altitude between 40 and 125 feet. The relief is irregular, with broad drained flats and drowned valleys.

The second physiographic unit is the delta of the Mackenzie River. There are three physiographic sub-regions of the delta and the area of interest is the low "alluvial islands" region (Mackay, 1963). Mackay reports that "flood waters rise at least 8.5 feet above low water level, thus inundating all the alluvial islands". Flood waters of this extent probably only occur at break up. In general the highest altitude in this region excluding pingos is less than six feet above sea level. Most of the land within a ten mile coastal fringe is less than four feet in altitude. Levees in the study area, where they exist, are about five feet above late summer low-water levels (Mackay 1963, Fig.57). "However, levee development is virtually absent in areas less than four feet above sea level". (Mackay, 1963).

The extent of channel shifting within the study area is a major concern. The area has undergone much channel shifting as the delta formed. However, the channels generally are not rapidly meandering in the normal sense. Mackay indicates that most channels wander rather than meander[1]. This indicates a movement of a significant length of channel rather than a continuous sweeping back and forth of the channel within a confined valley. The existance of large tundra polygons such as are found in the Taglu plant site area are indications that no major channel shifting has occurred there "for hundreds (?) (sic) of years" (Mackay, 1963).

Most of the lakes in this region are floodplain lakes which occupy shallow depressions rimmed by higher land along the channels. Some of these lakes have been breached by a migration of a channel. Floodplain lakes receive their recharge during highwater at breakup or times of storm surges. The number of floodings (several per year in low areas), migration of channels, and thermokarst action of deeper lakes combine to keep the lacustrine regime of the delta in an active state.

## 2.2 Regional Geology

The Mackenzie Delta occupies a subsiding structural trough in the underlying bedrock. This trough has allowed a thick accumulation of deltaic sediments. The region of interest was probably offshore of the delta at the beginning of the Pleistocene. The sediments which were being deposited were probably pro-delta clay and some silt with moderate organic contents.

During the Pleistocene, the area was exposed by the drop in sea level and over-ridden by continental glaciation. Glacial erosion probably removed much of the exposed pre-galcial delta sediments. Glacial till

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[1] Meander Plain as used on Figure A-2 would be more correctly called Channel floodplain. However, this would be confused with the alluvial (delta) floodplain. Therefore, this name was changed for the sake of clarity.

was deposited over much of the present Richards Island and out past Garry, Pelly and Hooper Islands. Sub-marine till deposites have been encountered as far as 14 miles northwest of Pelly Island (EBA, 1974). As the glacier retreated, outwash channels spread out over the exposed till plain. Much of the till was removed by erosion and some of it was buried under outwash sands and gravel (mainly sand in the Taglu area).

At the end of the Pleistocene in this area, approximately 12,000 to 13,000 years ago, the sea may have flooded the delta before isostatic rebound lifted the land above sea level and exposed it to erosion. Eventually the rate of rebound slowed, the rise in sea level continued and the land was slowly flooded until sea level reached its present position.

The Mackenzie River system was certainly active throughout deglaciation. As soon as it was free of ice, it carried a substantial meltwater discharge which cut into and possibly through the ancestral Richards Island causing the outliers of Pleistocene material. As the flow subsided, and sea level rose, the post-glacial Mackenzie River continued to build a delta over the old delta, and around the outliers. The growth of the delta continues today and will eventually surround and engulf Kendall Island and the barrier islands as it has the other outliers.

## III TAGLU PLANTSITE AND DRILLING PAD

### 3.1 General

This section discusses the site conditions in the areas of the gas plant, the drilling pad, and ancillary structures such as the airstrip, roads and dock. The appropriate locations of the drilling pad, gas

plant and airstrip areas are shown in Figure A-1 while the roadway, and docksites are shown in Figure A-3.

## 3.2 Drilling and Labortory Program

Exploration drilling at the Taglu plant site commenced in early January as the first stage of the overall field program. The drill rig and sampling procedure are described in detail in Appendix B. Sixty one, continuously cored, boreholes were advanced in this area to depths ranging from 20 to 50 feet. Bulk density and moisture content of numerous soil samples were determined in a field laboratory and select representative samples from each borehole were returned to the EBA Edmonton laboratory for further testing. The borehole locations are shown in Figure A-3, the borehole logs are presented in Appendices D.2 through D.5 and the grain size curves are present in Appendices E.1 through E.4.

## 3.3 Site Conditions

The site conditions are summarized in the cross sections present in Figure A-3. The gas plant, drilling pad, airstrip and roadway areas are all similar. Very generally, the stratigraphy consists of peat overlying silt and occasionally sand.

The surficial geology of the Taglu plant site, as interpreted from the aereal photographs is shown in Figure A-2. As could be expected, flood

plain deposits dominate and the traces of old channels have been buried or modified by flooding.

The vegetation is typical tundra consisting of mosses and grasses growing in small hummocks. Willow shrubs were present along the river banks. The peat layer, typically 2 to 3 feet thick, consists of medium brown, very fibrous, organic material containing many roots and twigs. Topograhically the site is very flat.

The silt strata consists of uniform, medium brown silt which changes to dark grey at depth. The clay content was typically less than 10 percent while the sand content varied from nil to 35 percent. The silt often graded into a very fine silty sand strata below a depth of approximately 40 feet.

The field estimated excess ice content is also shown on the cross sections in Figure A-3. The visual estimate of the ice content has been categorized into divisions with approximately a 20 percent range in ice content. Many areas of higher or lower ice content which were too small to map are delineated in the borehole logs.

The ice form was typically random in the peat and very ice rich silt while the ice in the less ice rich silt was of the stratified form (Vs). Below approximately 20 feet the visible excess ice content was nil. Generally, the ice content increased towards the north of the site. This is especially evident in cross sections 2 and 5. As the area is characterized by extensive ice wedge polygon development (Figure A-2), the massive ground ice observed in several boreholes is probably a vertical ice wedge with limited horizontal dimension rather than an extensive tabular body of ground ice.

The moisture content and bulk density as related to depth in Figures 3.1 and 3.2, were statistically examined for the surficial units categorized in Figure A-2,. Data from boreholes drilled along a potential Taglu-Niglintgak gathering line are also included in Figures 3.1, 3.2 and 3.3. It is apparent that there is no significant distinction of the water content or bulk density for various surficial units below a depth of approximately 5 feet. A plot of moisture content versus bulk density is shown in Figure 3.3. Deviations from theoretical volumetric relationship shown reflect the variation of frozen cores from a fully saturated condition.

Permanent ground temperature measurement installations in the form of thermistor strings were provided by the Imperial Oil Limited, Production Reserach and Technical Services Laboratory. Ground Temperature measurements were obtained from the locations, indicated in Figure A-3, on April 15, April 25, and May 13, 1975. The temperature profiles are presented in Appendix C. The temperature appears to have reached a small, constant gradient at depth of approximately 30 to 40 feet below which it is probably unaffected by seasonal surface temperature changes. The average temperature at 40 feet was found to be 20 degrees Farenheit.

Because of the season, no determination of the depth of the active layer could be made, however, a previous drilling progam (Elmer W. Brooker and Associates Ltd., 1972), was conducted at IOL Talug G-33 in the fall of 1972 when the active layer was at a maximum depth. Approximately 18 inches of thaw was observed on the tundra sections and 36 inches of thaw up to 150 feet from the river bank.

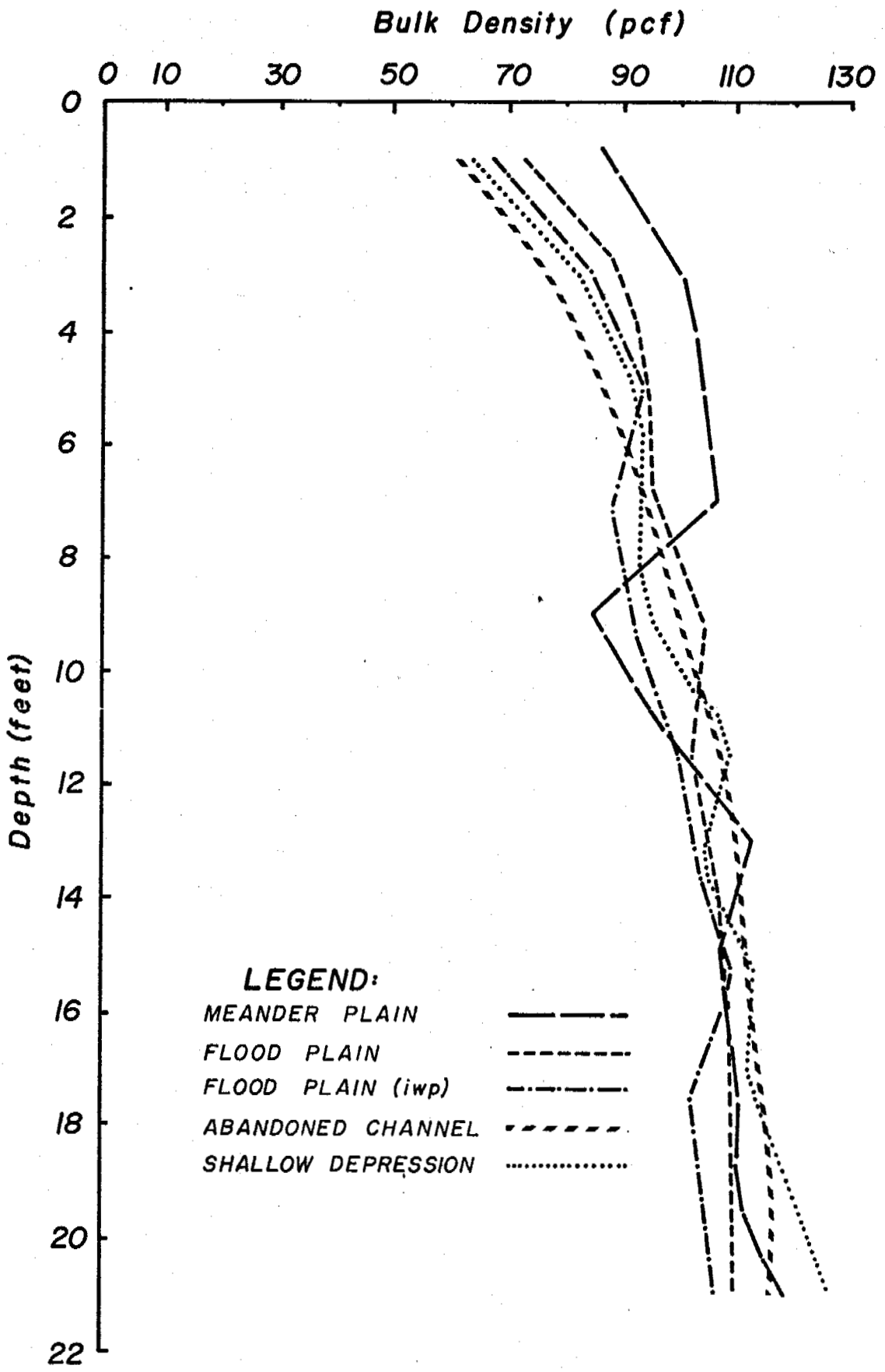


FIGURE 3.1 Bulk Density versus Depth Relationship

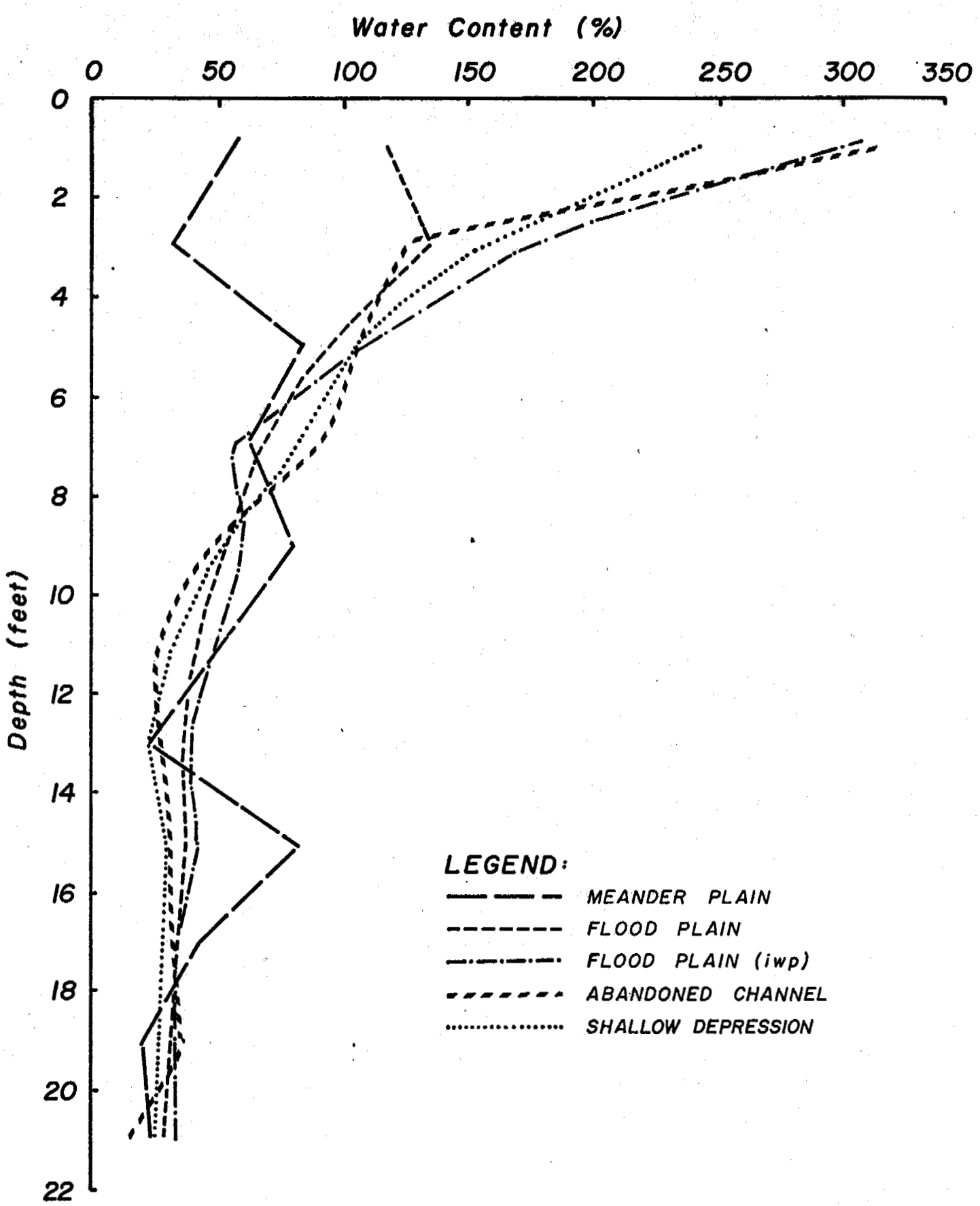


FIGURE 3.2 Water Content Depth Relationship

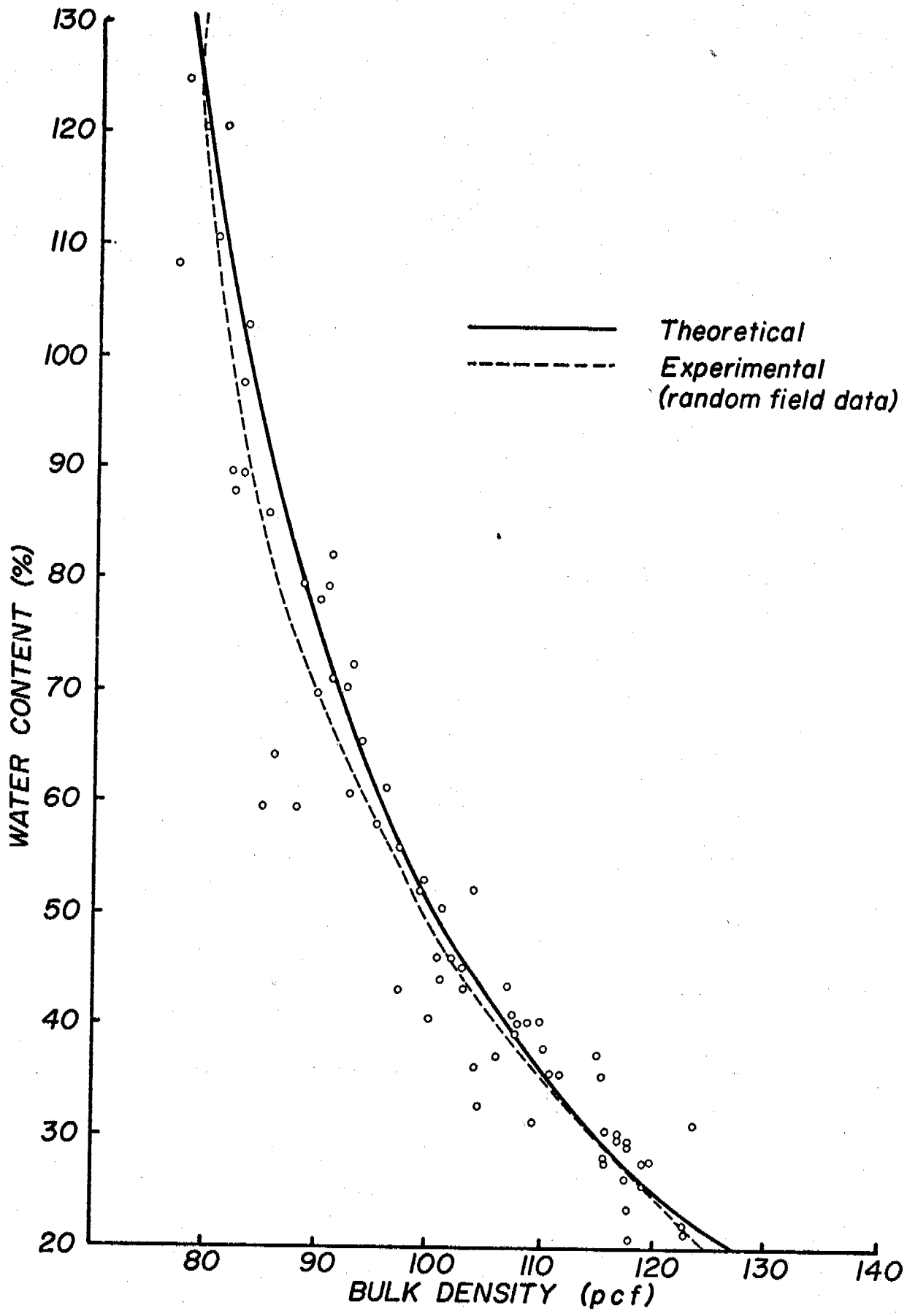


FIGURE 3.3 WATER CONTENT vs BULK DENSITY

# IV. DOCKSITES

## 4.1 General

Two prospective docksites, denoted as Docksite 1 and Docksite 2 in Figure A-3, were investigated. It was decided early in the drilling program that from a logistics stand point, Docksite 2 was more favourable site and therfore it was more intensely drilled. One continuous core borehole was drilled on the bank at Docksite 2 plus two hollow stem auger holes and 3 dynamic cone penetrometer tests[1] were advanced from the ice, whereas only one hollow stem auger hole was drilled at Docksite 1. The borehole locations are shown on the cross sections presented in Figures 3.4 and 3.5.

## 4.2 Site Conditions

At Dockstie 2 approximately 20 feet of dark grey silt overlying 5 feet of dark grey silty sand and silt was encountered.

A crude assessment of the probable depth of frequent scour in the river bed was obtained from the density profiles. It was assumed that the material which was frequently eroded and redeposited has a much lower density than the more permanent river bed material. After inspecting all of the density profiles from the docksites and from river crossing investigations performed in the area during the same winter, the depth of frequently scoured material was arbitrarily defined as having a dynamic cone penetration resistance less than 5 blows per foot. This is referred to simply as the scour depth in the Figures. Approximately 10 feet of potential scour was observed at Docksite 2.

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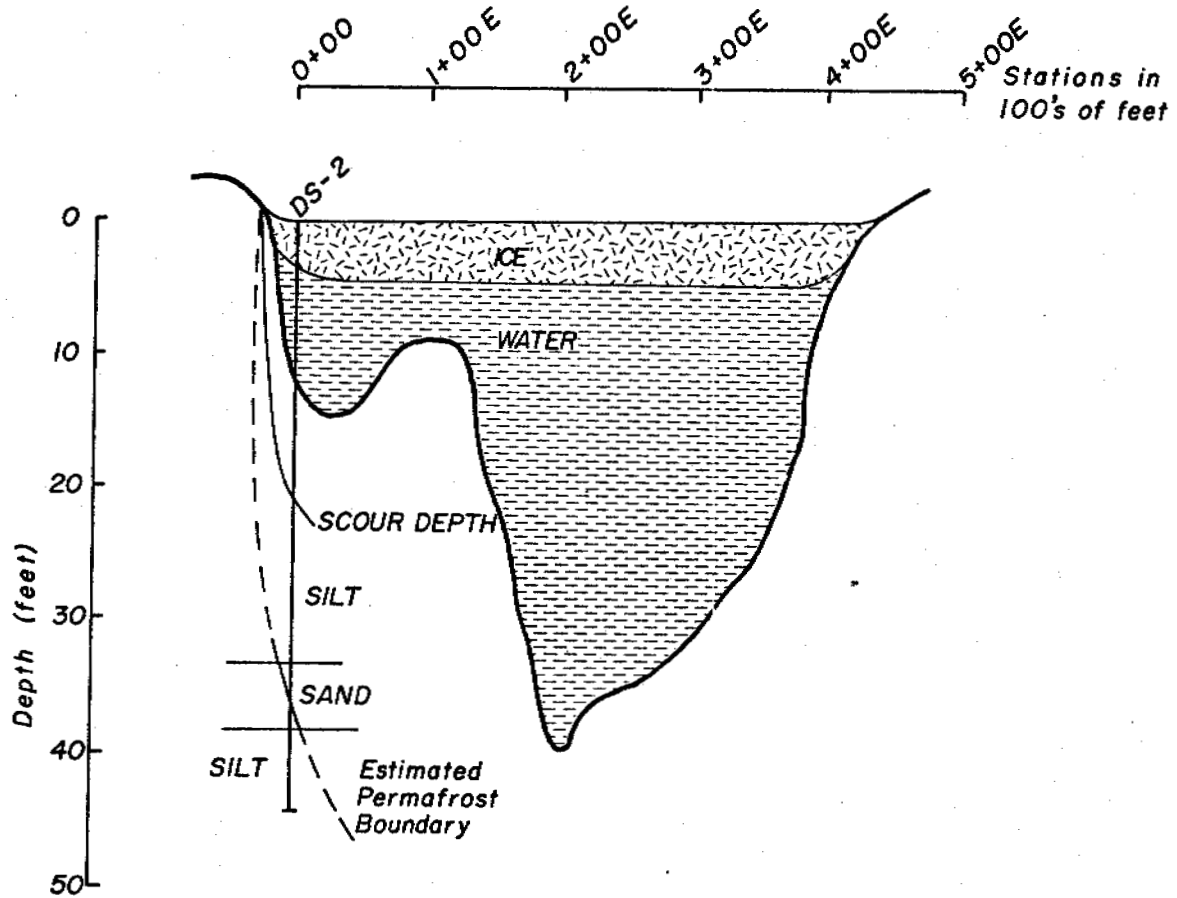
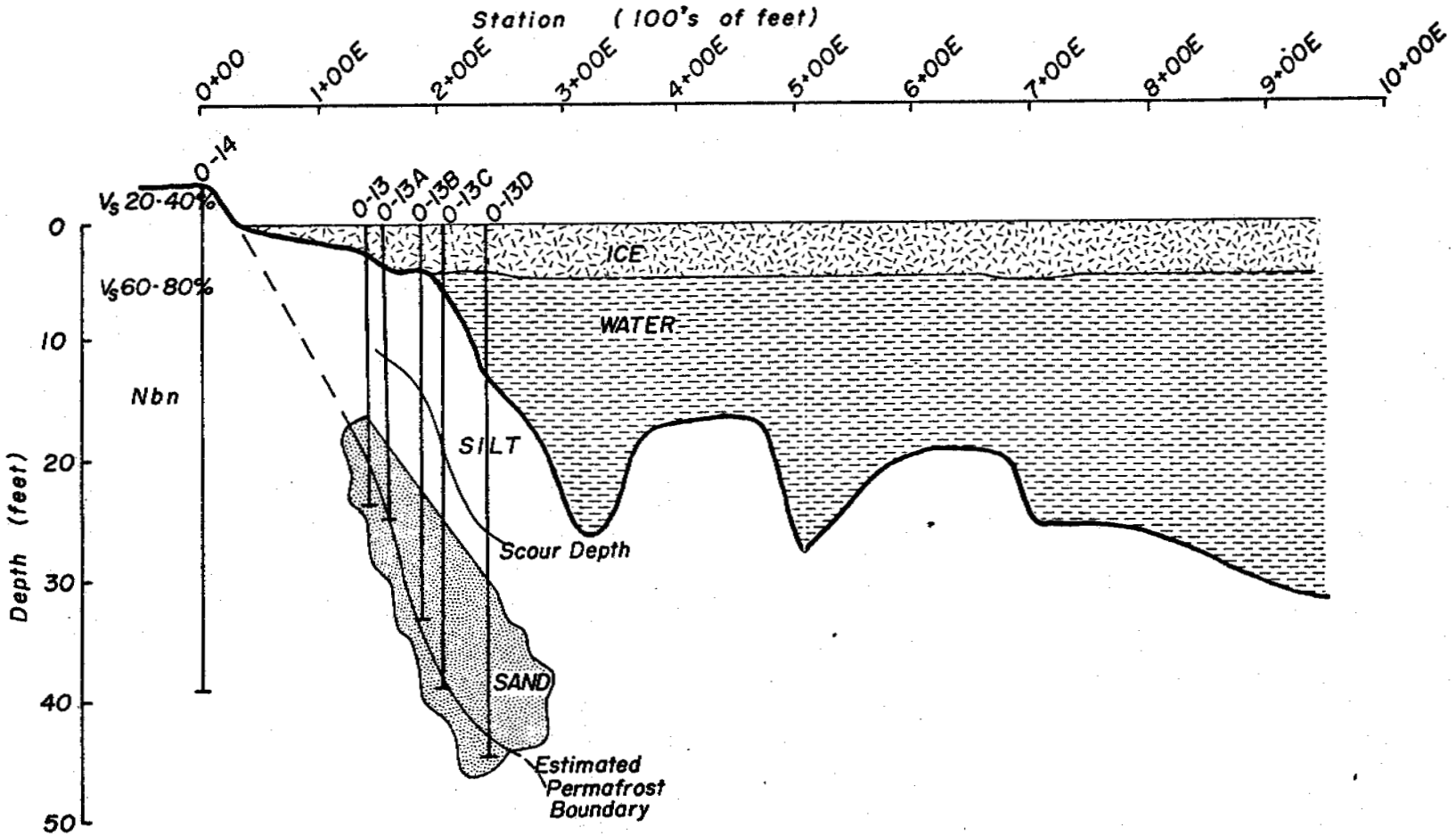
[1] The dynamic cone penetrometer test consists of recording the number of blows it takes a 140 pound hammer falling 30 inches to advance a $60^{o}$, 2 inch diameter cone a distance of one foot.




NOTE: For location see FIGURE A-3

FIGURE 3.4 DOCKSITE I CROSS SECTION




NOTE: For location see FIGURE A-3

FIGURE 3-5 DOCKSITE 2 CROSS SECTION

The most critical characteristic of the site is the manner in which the permafrost extends beneath the river. The skewness of the permafrost regime beneath the river, which is indicative of lateral migration of the river (Smith, 1973), is not surprising since the site is on the erosional bank of a sharp river bend.

Similar subsurface conditions were encountered at Docksite I. The permafrost table appears to be steeper at this location which is as expected as the location is further around the bend where the rate of bank erosion is not as rapid. The steeper permafrost table may, for a given depth of pile, allow a sheet pile structure to be constructured closer to the shore.

## V. SUMMARY

This report prevents the geotechnical data obtained from a preliminary investigation for the proposed Taglu Gas Plant on Richards Island N.W.T. The development consist of the gas plant, an adjacent drilling pad, airstrip, roadways and a docksite. It is belived that sufficient data is presented herin to proceed with the definitive design, although further drilling at specific sites and particular laboratory testing may be required prior to finalization of the design.

The plant site and drilling pad area wre investigated quite extensively. The stratigraphy consisted of silt with an intermittant fine sand strata encountered at approximately 35 feet. The ground ice conditions were locally very variable but generally appeared to increase towards the north east. A typical borehole consisted of excess ice in the range of 20 to 90% to depth of approxoimately 30 feet where material with no excess ice was encountered.

Respectfully submitted,

EBA Engineering Consultants Ltd.

David D. Kent, P. Eng.

D.W. Hayley, P. Eng.

DDK/tmf

# LIST OF REFERENCES

1. Elmer W. Brooker and Associates Ltd., 1972, Drilling at Taglu G-33, October, 1972. Report submitted by Elmer W. Brooker and Associates to Imperial Oil Ltd.

2. EBA, 1974, Beaufort Sea Drilling Program, Winter, 1974. Report submitted by EBA Engineering Consultants Ltd. to Imperial Oil Limited.

3. Mackay, J.R., 1963, The Mackenzie Delta Area, N.W.T. Geological Survey of Canada, Miscellaneous Report 23.

4. Smith, M.W. and C.T. Hwang, 1973, Thermal Disturbance due to Channel shifting, Mackenzie Delta, N.W.T. Canada, North American Contribution to the Second International Permafrost Conference, Yakutsk, U.S.S.R.

5. EBA, 1975a, Preliminary Geotechnical Evaluation Beaufort Gas Development, Richards Island, N.W.T. Report submitted, by EBA Engineering Consultants Ltd. to Imperial Oil Limited.

6. EBA, 1975b, Preliminary Geotechnical Evaluation, Big Horn Point Borrow Area. Report submitted by EBA Engineering Consultants Ltd. to Imperial Oil Limited.

## LIST OF REFERENCES (cont'd)

7. EBA 1975c, Ya-Ya Granular Resources Study - 1975. Report submitted by EBA Engineering Consultants Limited to the Arctic Petroleum Operators Association.

8. EBA, 1975d, Beaufort Sea Drilling Program, Winter 1975 Report submitted by EBA Engineering Consultants Ltd., to Imperial Oil limited (In preparation).


| | | | |
|---|---|---|---|
| DWN BY RAH | EBA Engineering Consultants Ltd. | BEAUFORT GAS DEVELOPMENT | FIGURE : A - 1 |
| DATE DWN JULY '75 | | LOCATION PLAN | SHT No |
| SCALE 1:50,000 | | | |
| JOB No E-965-1 | | | |


| | | |
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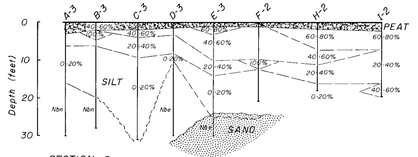
| DWN BY R A H | EBA Engineering Consultants Ltd. | BEAUFORT GAS DEVELOPMENT |
| DATE DWN. JULY '75 | | SURFICIAL GEOLOGY AND TERRAIN ANALYSIS |
| SCALE 1:50,000 | | FIGURE A - 2 |
| JOB No E-965-1 | | SHT No |

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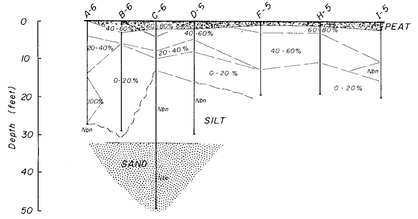


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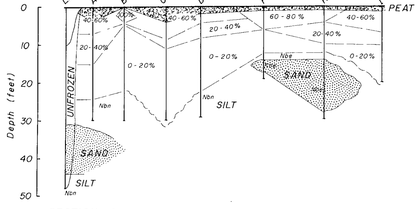


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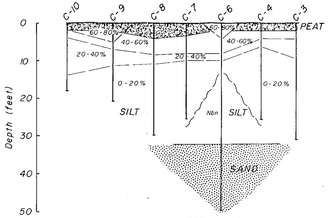
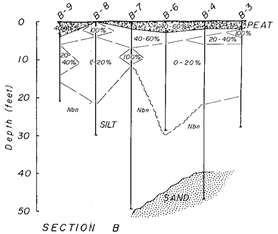
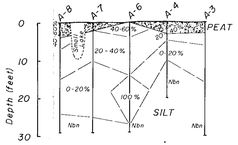


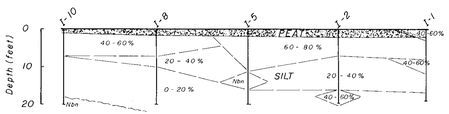

PLANT SITE SECTION C



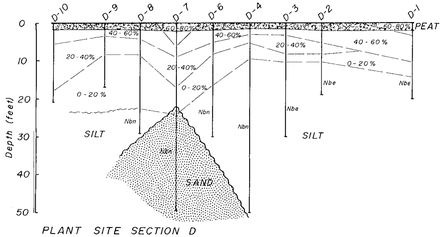

SECTION B



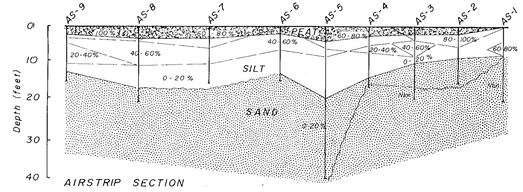

PLANT SITE SECTION A



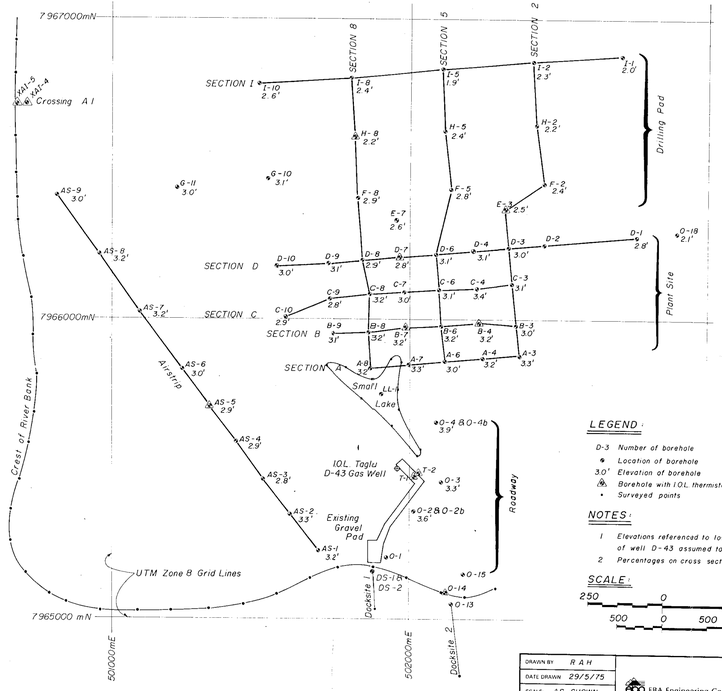

DRILLING PAD SECTION I




PLANT SITE SECTION D




AIRSTRIP SECTION





**LEGEND**

- D-3 Number of borehole
- Location of borehole
- 3.0' Elevation of borehole
- Borehole with IOL thermistor strings installed
- Surveyed points

**NOTES**

1. Elevations referenced to lower casing flange of well D-43 assumed to be 610 feet
2. Percentages on cross sections refer to visible ice

**SCALE**

250 0 250 500 750 Meters

500 0 500 1000 2000 Feet

| | |
|---|---|
| DRAWN BY | R A H |
| DATE DRAWN | 29/5/75 |
| SCALE | AS SHOWN |
| JOB No | E-965 |

EBA Engineering Consultants Ltd.

TAGLU GAS PLANT AREA
BOREHOLE LOCATIONS
STRATIGRAPHIC SECTIONS

FIGURE A-3

SHEET No

# APPENDIX B
# SITE INVESTIGATION DETAILS

## B.1 INTRODUCTION

This appendix describes the site investigation in detail. The drilling program, field equipment and field laboratory testing are described. The results are presented and discussed elsewhere in the report.

## B.2 DRILLING PROGRAM

The drilling program was designed to collect preliminary data of a classification nature consistent with the objectives presented in Section 1. Soil type, ice type and quantity, frozen bulk density, water content and grain size data was obtained. The borehole locations are presented in Figure A-3 and the borehole logs presented in Appendix D. Further laboratory testing data is presented in Appendix E.

The boreholes in the plantsite and drilling pad areas were laid out on a grid system within the areas specified by Imperial Oil Limited. The grid spacing was 400 feet in the plantsite area and 1000 feet in the less critical drilling pad area. Two potential docksites, an airstrip and the roadways were also investigated.

## B.3 FIELD WORK

Mobilization for the field program began on January 8 and the drilling program began on January 14, 1975. Drilling at the Taglu plantsite was completed on February 26, 1975.

Survey services were provided by Canadian Engineering Surveys Ltd. of Edmonton. The borehole locations were laid out by various means including transit and chain and reference to physical features. After drilling the borehole location was determined using the electronic "Mini Ranger System" manufactured by Motorola. This system measures the distance, with an accuracy of approximately one meter, from the mobile master unit to each of two known transponder locations. The location of the master unit could then be determined by triangualation.

The drill rig, contracted from Mobile Augers and Research Ltd., Edmonton, was manufactured specifically for arctic soil testing operations. The rig is essentially a Mobile B-61 drill rig mounted on a tracked carrier. The rig is especially adapted for arctic operation in that both the drill is designed to be transported by a Lockheed Hercules aircraft.

The rig was accompanied in the field by a heated coreshack and a D6 caterpillar tractor. At the drill site the coreshack was placed immediately behind and in a line with the drill rig. Wings attached to the coreshack were then folded back on the drill so as to provide shelter from the wind. Electric flood lights powered by a generator were installed on the coreshack to permit operation in darkness. A four wheel drive truck was used for transportation between camp and rig.

All of the on land boreholes were advanced with a six inch modified CRREL core barrel which provided a 4" diameter continuous core. Extruding the core from the core barrel required some heating of the barrel; however, the maximum depth of disturbance on the core was 1/4 inch. In high ice content material the core tended to crumble inside the core barrel but this problem was alleviated as drilling progressed with improved techniques and cutting tooth design. The core was scraped to remove the disturbed material and then logged for ice content and soil type. A core sample was obtained if possible every two or three feet for field laboratory testing. All the core from a few selected boreholes was shipped to Imperial Oil Limited, Production Research and Technical Services Laboratory in Calgary for thermal conductivity tests.

Hollow stem auger or solid flight augers were used in the unfrozen sediments beneath rivers and lakes.

A field laboratory stationed at the camp was equipped to perform frozen bulk density, moisture content, sieve analyses and Atterberg limits. The frozen bulk density tests were performed by squaring the end of a frozen core with a masonary saw. The core cross section was sufficiently uniform that no further trimming was necessary. A 220V electric was used for drying the samples. A representative dried sample from each hole was returned to the EBA Edmonton laboratory for further testing.

The camp and logistic support was provided by the Field Services Department of Imperial Oil Limited. The camp was composed of train of sleigh mounted trailer units consisting of an electric power unit, kitchen and washroom unit, two or three sleeper units and the field laboratory.

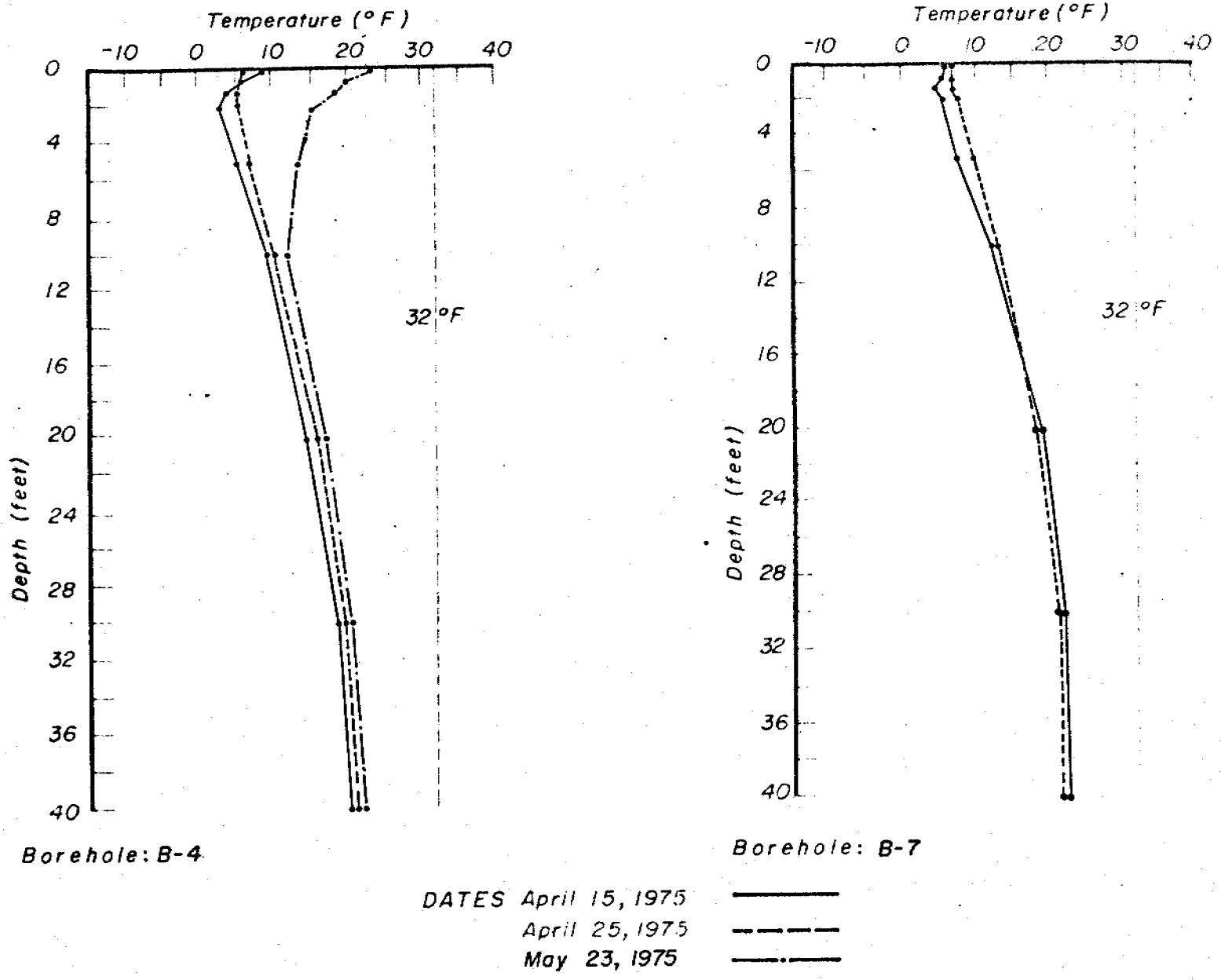
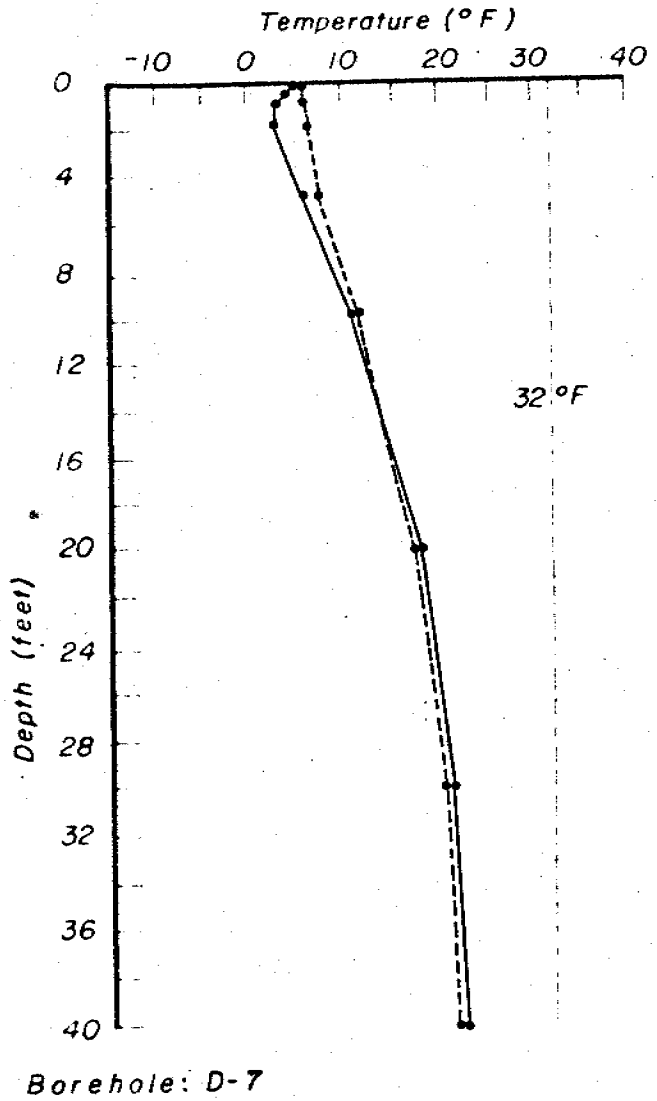
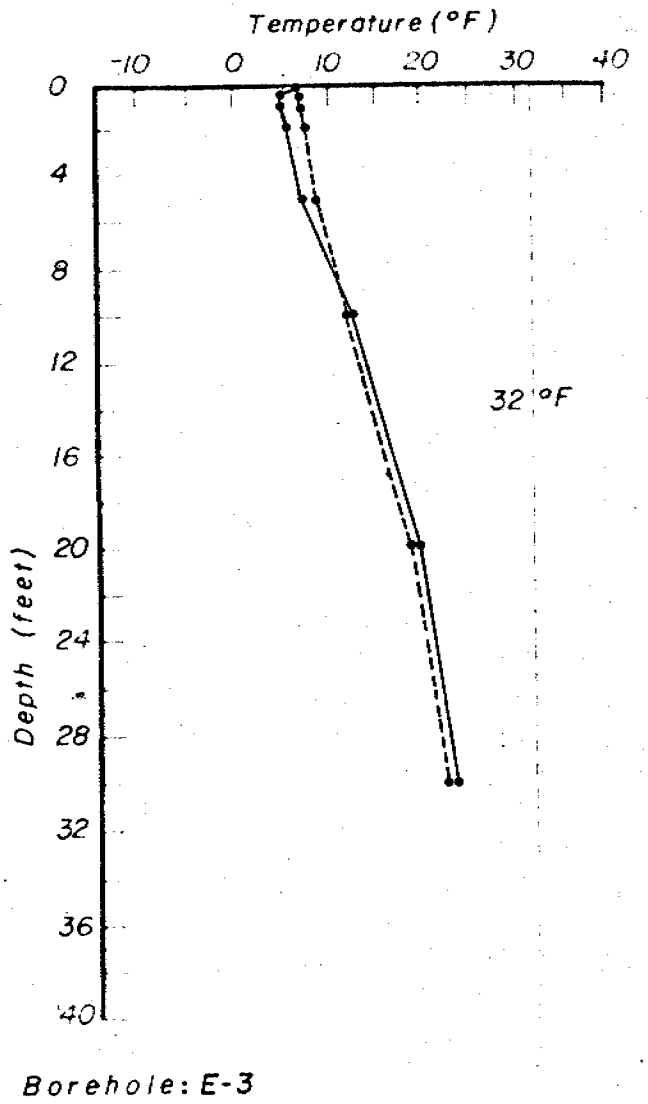


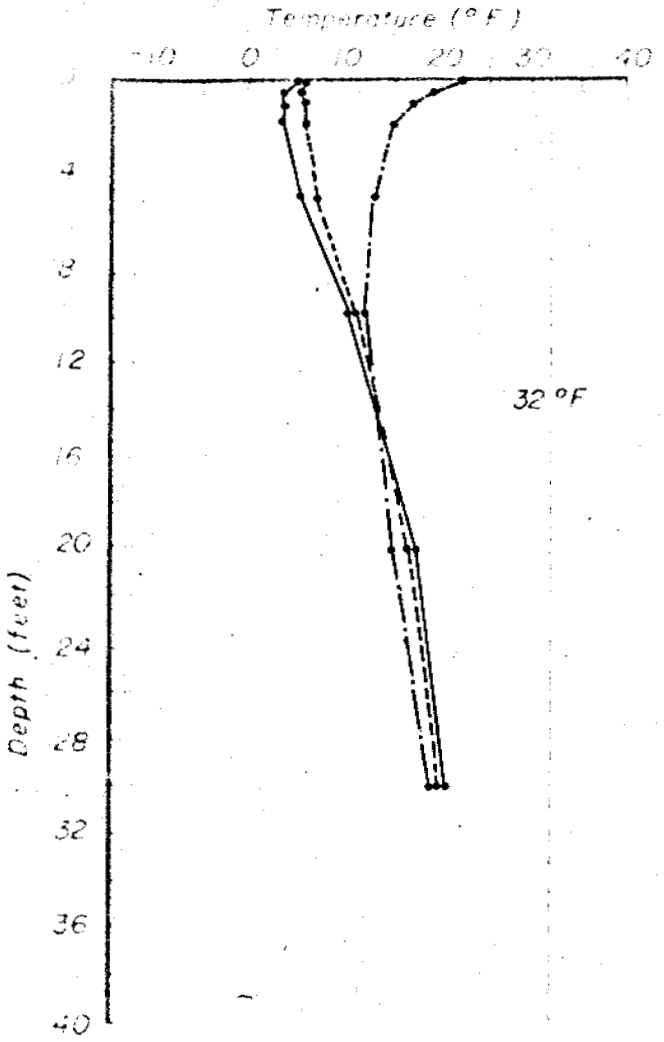

FIGURE: C.1 TEMPERATURE PROFILES



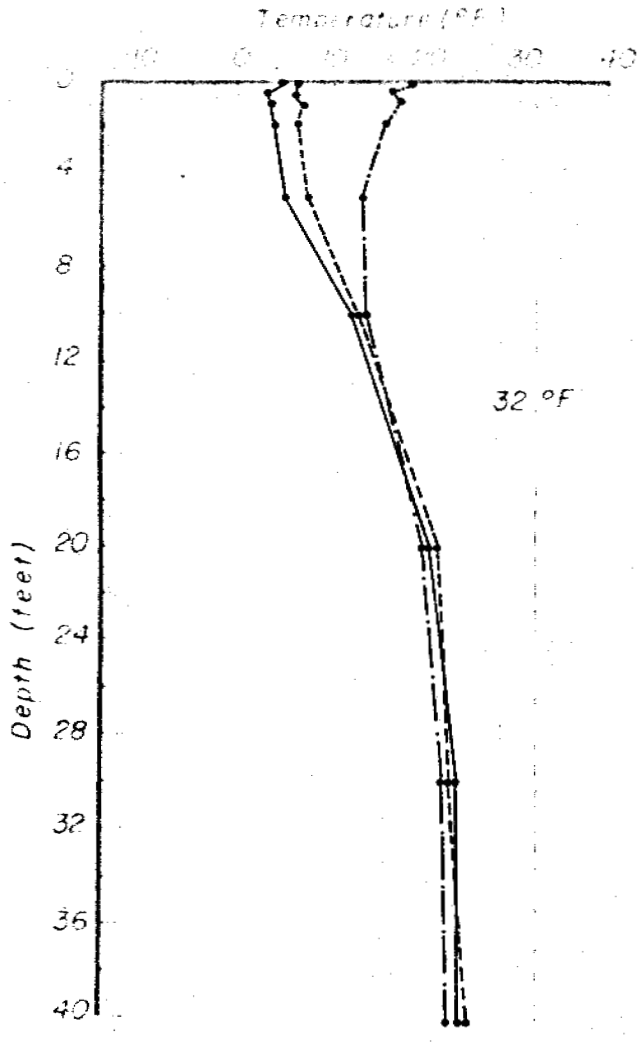




DATES April 15, 1975 ———
April 25, 1975 — — — —

FIGURE: C.2 TEMPERATURE PROFILES




Borehole: **H-8**




Borehole: **AS-5**

DATES April 15, 1975 ——————
April 25, 1975 – – – –
**May 23, 1975** ——·——

FIGURE: C.3 TEMPERATURE PROFILES

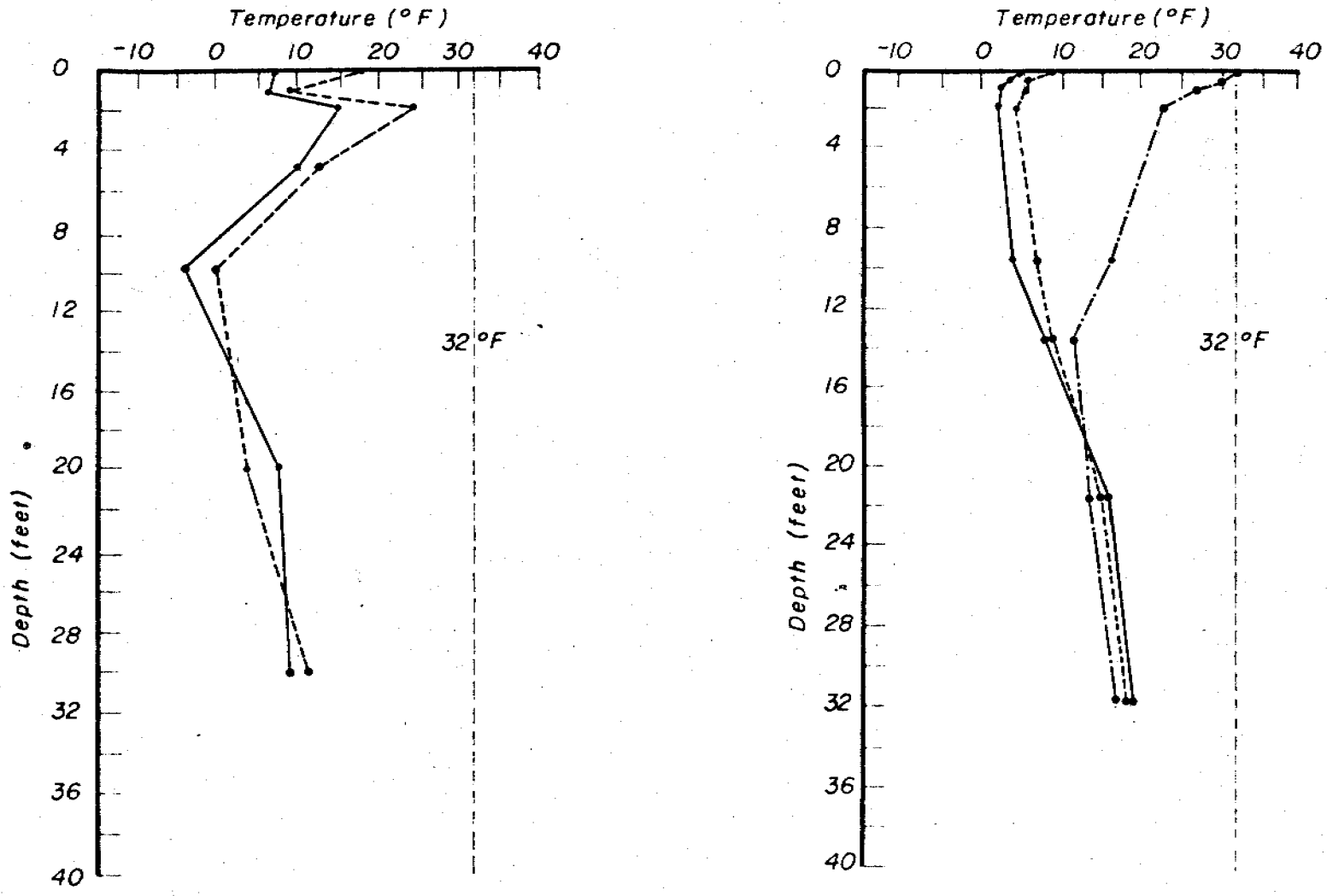



FIGURE: C.4 TEMPERATURE PROFILES

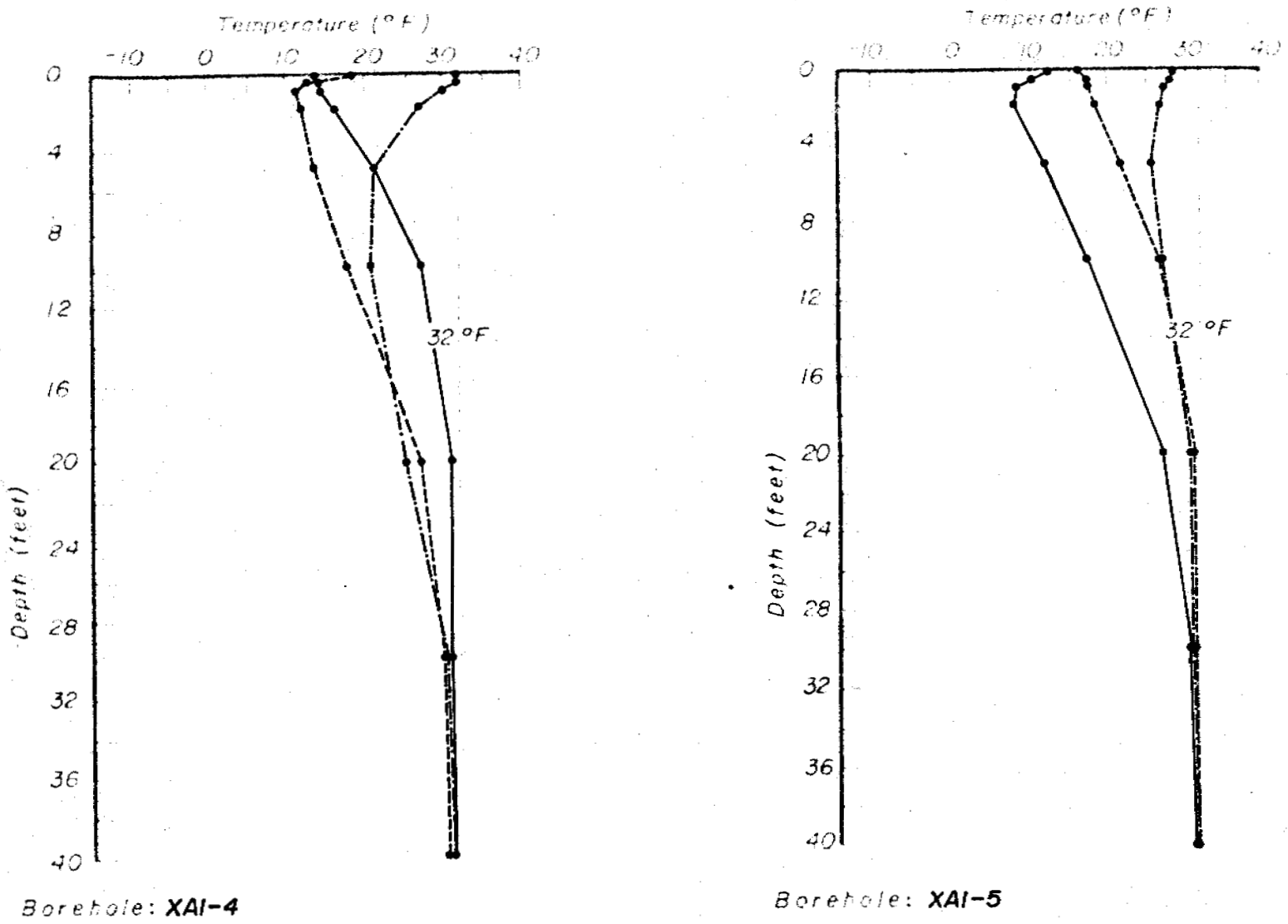
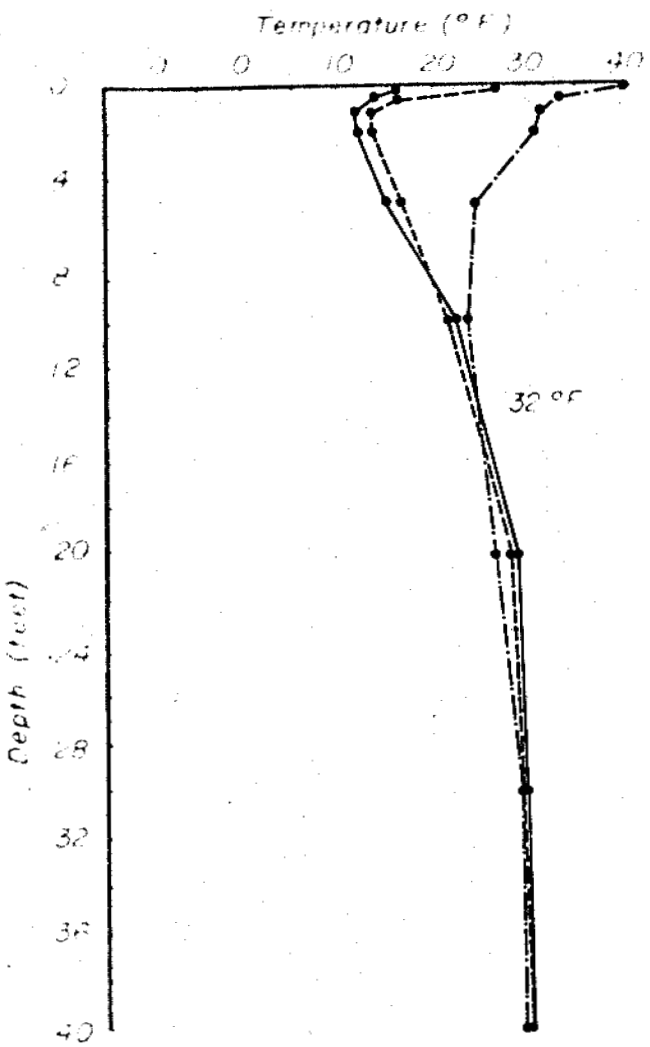
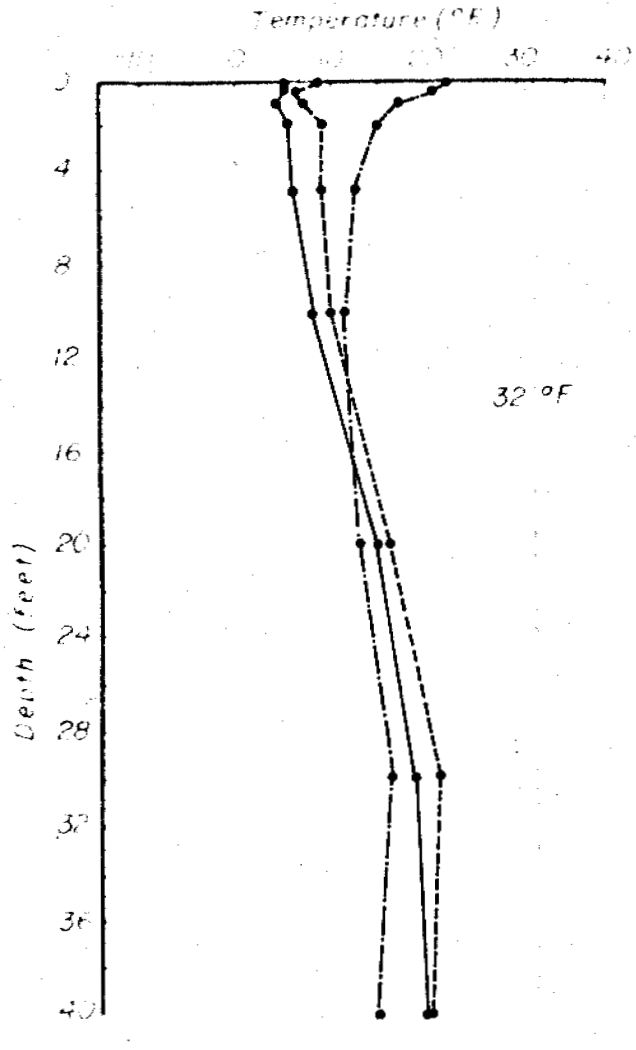



FIGURE: C.5 TEMPERATURE PROFILES




Borehole: 0-14.




Average of Boreholes

DATES April 15, 1975
April 25, 1975
May 23, 1975

FIGURE: C.6 TEMPERATURE PROFILES

## D.1 SOIL CLASSIFICATION AND DESCRIPTION

Permafrost is any earth material which exists at temperatures below $0^{\circ}$ C continuously for a number of years. Although very important from an engineering standpoint, the presence of ice is not a requisite for permafrost. In this report the National Research Council of Canada system for the field description of permafrost and soil has been adopted.

The soil phase and the ice phase of the permafrost are independently described. The reader is referred to the explanation of the symbols and forms used in logging boreholes given on Page D-3.

The soil was described with respect to color, grain size, gradation and structure. The color recorded was that of the insitu material. The grain size of the material was classified according to the unified soil classification system and structural properties such as stratification and cross bedding were noted.

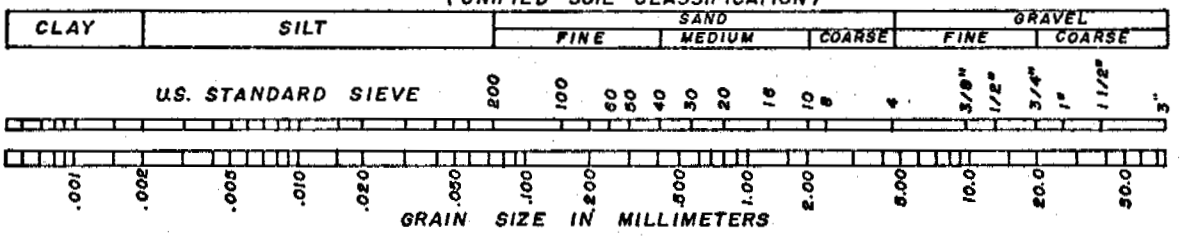
The ice description consists of three basic divisions: non visible ice, visible ice and visible ice greater than one inch thick (massive ice).

As the term non visible ice implies, ice crystals are not visible to the naked eye although a slight sheen may be evident. This category is subdivided into friable material (NF) which crumbles easily, well bonded material with no excess ice (Nbn) and well bonded material with excess ice (Nbe). Excess ice is that ice which is in excess of the normal pore volume. Field estimates were made of the percentage of the total volume which was excess ice.

The second category is visible ice. It is subdivided into four divisions depending upon the configuration of the ice. The divisions are the individual ice crystals or inclusions (Vx), ice coatings on particles (Vc) random or irregular oriented ice (Vr) and stratified ice (Vs). Visible ice greater than 1 inch thick is known as massive ice and is presented as (ICE) or (ICE+) when soil inclusions are present.

# SYMBOLS AND TERMS USED IN LOGGING BOREHOLES

GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




## TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on Nº 200 sieve): includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as determined by laboratory tests.

| DESCRIPTIVE TERM | RELATIVE DENSITY | N BLOWS PER FOOT |
|---|---|---|
| Very loose | 0 - 20 % | 0 - 4 |
| Loose | 20 - 40 % | 4 - 10 |
| Compact, or Medium | 40 - 75 % | 10 - 30 |
| Dense | 70 - 90 % | 30 - 50 |
| Very dense | 90 - 100 % | > 50 |

*The number of blows, N, on a 2" O.D. spilt spoon sampler of a 140 lb. wt. falling 30" required to drive the sample a distance of 1' from 6" to 18".

---

FINE GRAINED SOILS (major portion passing Nº 200 sieve): includes (1) inorganic and organic siltys and clays, (2) gravelly, sandy, or silty, clays, and (3) clayey silt. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

| DESCRIPTIVE TERM | UNCONFINED COMPRESSIVE STRENGTH TON/SQ. FT. | N BLOWS PER FOOT |
|---|---|---|
| Very soft | less than 0.25 | < 2 |
| Soft | 0.25 to 0.50 | 2 - 4 |
| Firm | 0.50 to 1.00 | 4 - 8 |
| Stiff | 1.00 to 2.00 | 8 - 15 |
| Very stiff | 2.00 to 4.00 | 15 - 30 |
| Hard | 4.00 and higher | > 30 |

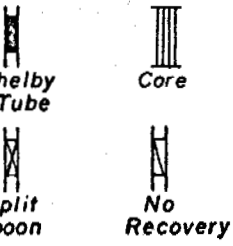
## ICE DESCRIPTION

(AFTER NRC TM Nº 79)

| | | |
|---|---|---|
| Non Visible Ice | Nf | Poorly bonded |
| | Nbn | Well bonded |
| | Nbe | Excess ice |
| Visible Ice Less than 1 inch thick | Vx | Individual ice crystals or inclusions |
| | Vc | Ice coatings or particles |
| | Vr | Random or irregularly oriented ice formations |
| | Vs | Stratified or distinctly oriented ice formations |
| Visible Ice Greater Than 1 inch thick | ICE | Ice with soil inclusions |
| | ICE | Ice without soil inclusions |

## SAMPLER TYPE

(SHOWN IN SAMPLES COLUMN)



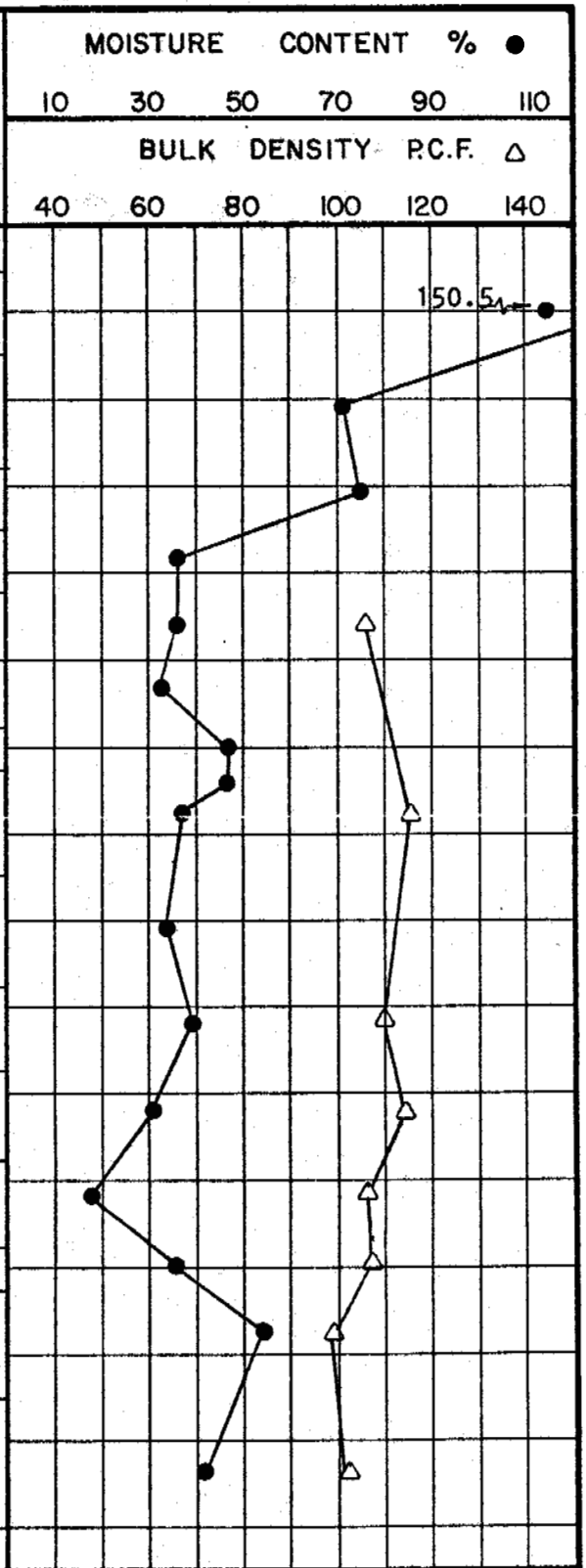
# APPENDIX D-2

## BOREHOLE LOGS FOR PLANTSITE AREA

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | ORGANICS | Vr<br>20-30% |
| 4 | SILT- trace of organics<br>- dark grey-brown | Vs - Vr<br>20-30% |
| 6 | - dark brown, trace of organics | Vs-20%<br>Vx-10% |
| 8 | | |
| 10 | - medium dark grey<br>- dark grey-brown | Vr-Vs<br>5 - 10%<br>Nbe<br>Vs-10% |
| 12 | | |
| 14 | - dark grey | 5 - 10%<br>15-20% |
| 16 | | Nbn |
| 18 | | Nbn-Vs<br>5% |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | same | same |
| 28 | | |
| 30 | | |
| | END OF HOLE | |

SAMPLE




| | | | |
|---|---|---|---|
| eoa | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 19/1/75<br>TECHNICIAN TH | HOLE Nº<br>A - 3 |
| | COMPLETION DEPTH (ft.) 30' | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | ORGANICS - brown | Vr |
| | - reddish brown | 20 - 30% |
| | | 20 - 25% |
| | ORGANICS & SILT | |
| 4 | SILT - dark grey, trace of organics | 20 - 30% |
| | | 15 - 20% |
| 6 | - medium brown | 10 - 30% |
| | | Vr - Vs |
| 8 | | 10 - 15% |
| | | 15 - 25% |
| | | Vs ➢ Vx |
| 10 | | 10 - 15% |
| | | Nbn |
| 12 | - grey brown, thin layer organic sand | |
| 14 | | |
| | - trace of fine sand | |
| 16 | - dark grey | Nbe - Vr |
| | | 5 - 10% |
| 18 | | |
| | | Nbe |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

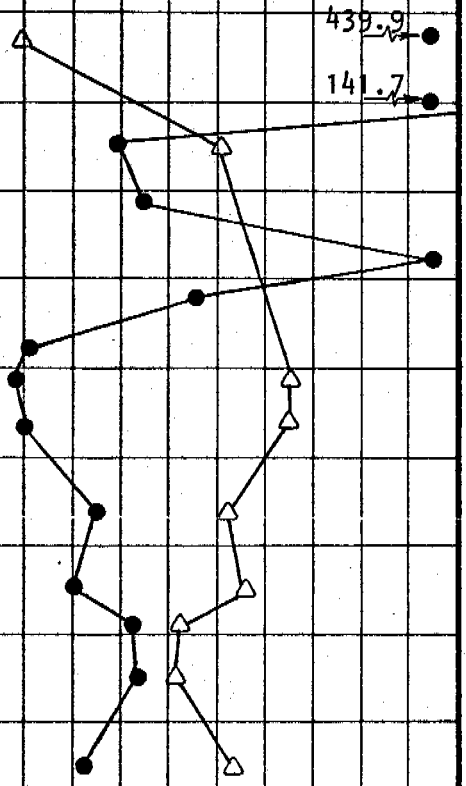
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140




| | | | |
|---|---|---|---|
| EBA | SAMPLE TYPE CRREL Barrel | DATE DRILLED 19/1/75 | HOLE Nº A - 4 |
| | | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 20 | REGION Plantsite | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SILT - dark grey-brown | |
| | - trace of organics | Vr<br>40 - 45% |
| 4 | | 15 - 20% |
| 6 | | 20 - 25% |
| | - trace of fine sand | Vs<br>10 - 15% |
| 8 | | 35 - 40% |
| 10 | | 10%<br>Vr<br>10% |
| 12 | | 20%<br>Vs - 20% |
| 14 | - 1' of ice plus 10-20% vertical soil planes | |
| 16 | 10% soil | ICE<br>+ |
| 18 | | |
| 20 | - (possibly ice wedge) | |
| 22 | | |
| | - 20 - 30% soil | Soil Inclusions |
| 24 | SILT - dark brown-grey | Nbn - Vr<br>25% |
| 26 | | |
| 28 | - trace of fine sand | Nbn |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110

BULK DENSITY P.C.F. △
40 60 80 100 120 140

190.9

665.0

462.0

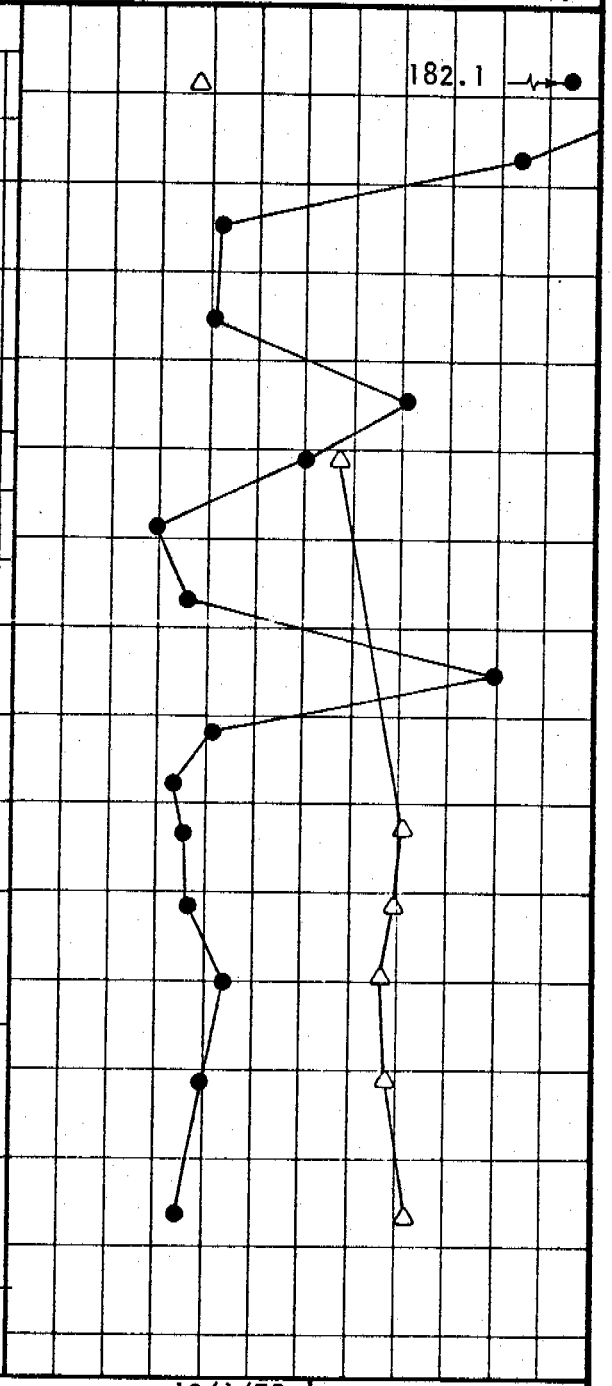
| | | | |
|---|---|---|---|
| EGA | SAMPLE TYPE CRREL Barrel | DATE DRILLED 18/1/75 | HOLE Nº A - 6 |
| | COMPLETION DEPTH (ft.) 29 | TECHNICIAN TH | |
| | | REGION Plantsite | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | ORGANICS - brown-black<br>- some silt | Vr 50% |
| 4 | SILT - dark grey-brown | 35-40% |
| 6 | | 20% |
| 8 | - medium brown | Vr - Vs<br>35 |
| 10 | - with dark brown organic laminae | Vr<br>15 - 25%<br>Vs - 20% |
| 12 | | Nbn - Vs<br>20% |
| 14 | - dark grey-brown | Vr 10% |
| 16 | | Vs 35-40% |
| 18 | - some fine sand | Nbn-Vr 5% |
| 20 | - dark grey | Nbe |
| 22 | | Vs 10% |
| 24 | | Nbn |
| 26 | | |
| 28 | - same | |
| 30 | END OF HOLE | |

SAMPLE

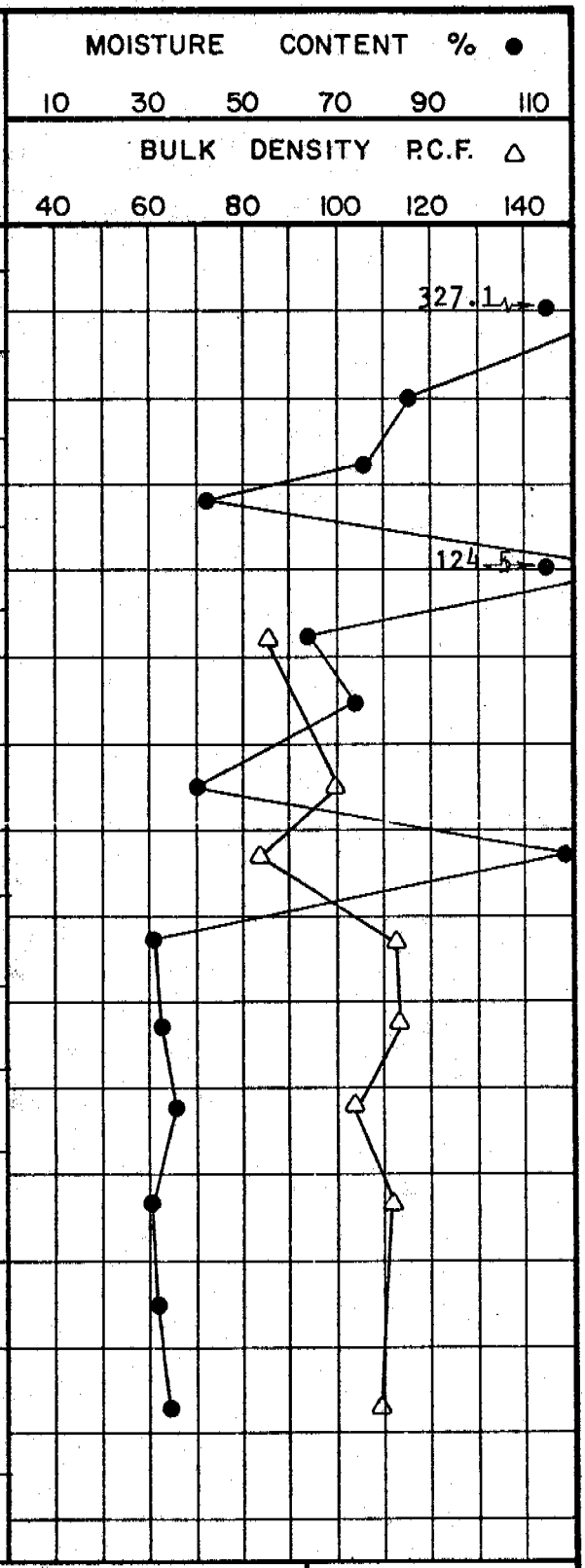
MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 19/1/75<br>TECHNICIAN TH | HOLE Nº<br>A-7 |
| | COMPLETION DEPTH (ft.) 29 | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

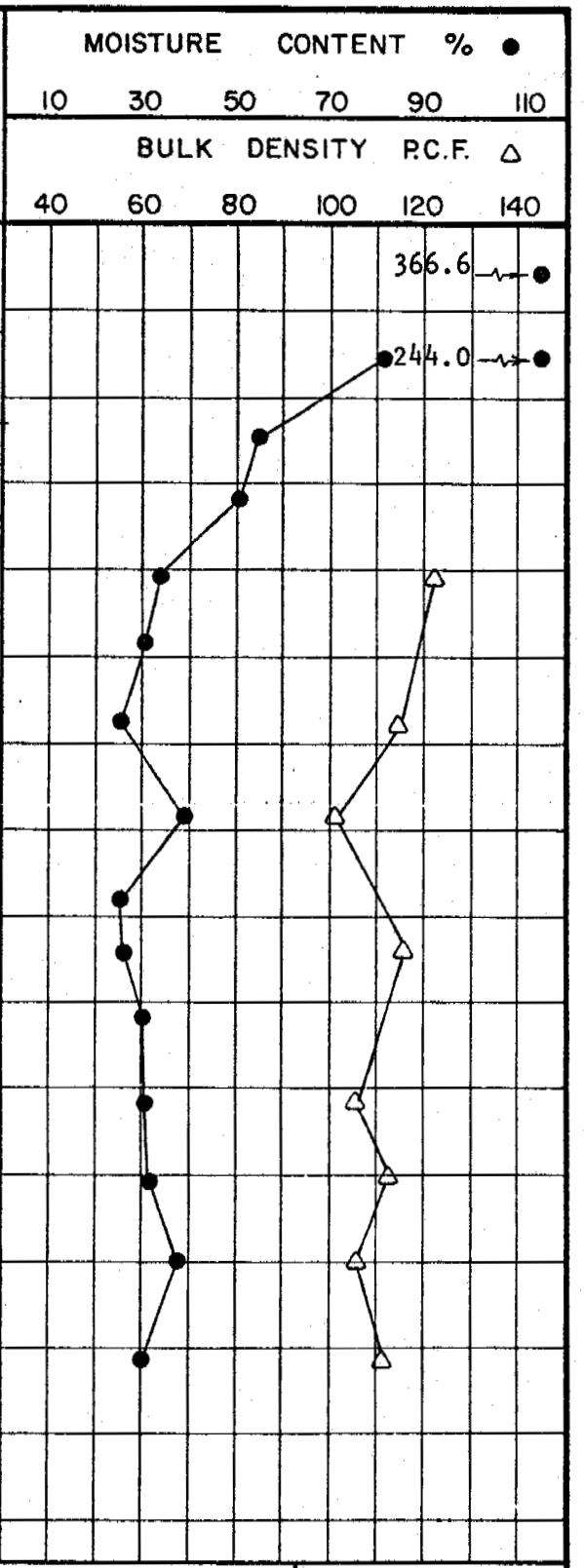
| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - twigs, roots brown | Vr 40-45% | |
| 4 | | | |
| 6 | SILT - medium grey | | |
| 8 | - dark brown, thinly laminated | 35-45% Vs 35% | |
| 10 | | 25-30% | |
| 12 | - medium grey-brown | 25% | |
| 14 | - dark grey | Vr 25% Vs 25-35% | |
| 16 | - dark grey | Vs 5% | |
| 18 | - brown - grey | Nbe | |
| 20 | | | |
| 22 | | Vr 5-10% | |
| 24 | | | |
| 26 | | | |
| 28 | - dark grey, trace of balck organics | Nbe | |
| 30 | END OF HOLE | | |




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 20/1/75 | HOLE Nº A - 8 |
| | COMPLETION DEPTH (ft.) 29 | TECHNICIAN TH | Page 1 of 1 |
| | | REGION Plant Site | |

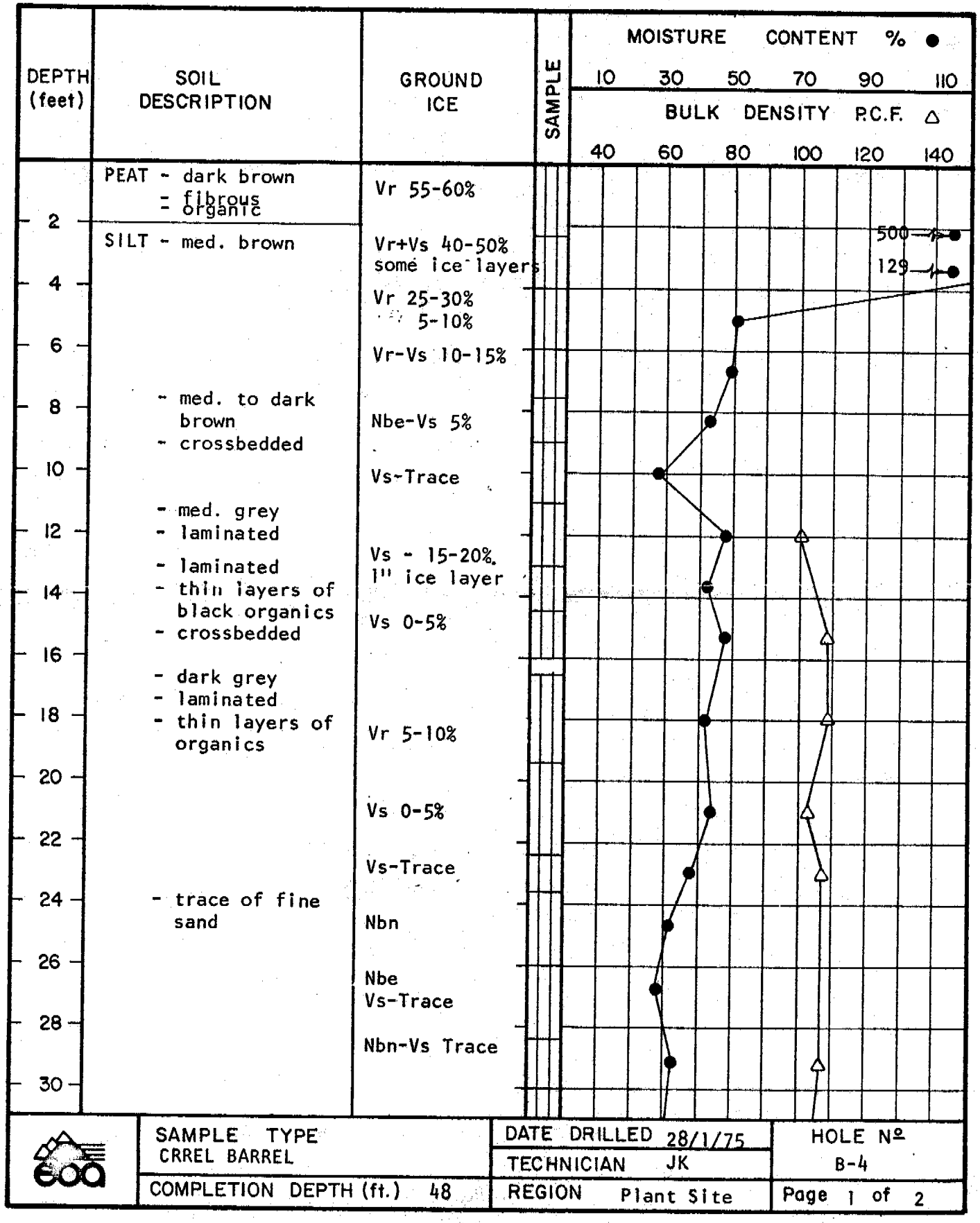
# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - roots and twigs, dark brown to black | Vr 45 - 50% | |
| 4 | ICE and 30% SILT - dark grey organic silt | TCE + 30% | |
| 6 | SILT - medium to dark brown - trace of organic | Vr 40% Vs 15% | |
| 8 | | Vx - 5% Vs -15% | |
| 10 | - thin layers of organics | Vr - 10% | |
| 12 | | Nbe | |
| 14 | - dark grey-brown | Vr 5 - 10% | |
| 16 | | | |
| 18 | | Vr 10% | |
| 20 | - dark grey | | |
| 22 | | Nbn | |
| 24 | | | |
| 26 | | | |
| 28 | END OF HOLE | | |
| 30 | | | |




| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL Barrel | DATE DRILLED 20/1/75 | HOLE Nº B - 3 |
| | COMPLETION DEPTH (ft.) 27½ | TECHNICIAN TH | |
| | | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL BARREL | DATE DRILLED 28/1/75 | HOLE Nº B-4 |
| | COMPLETION DEPTH (ft.) 48 | TECHNICIAN JK | |
| | | REGION Plant Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 32 | | Nbn |
| | - more sand | Nbn-Nbe |
| 34 | | |
| 36 | | |
| 38 | - sandy | Nbn |
| 40 | | |
| | SAND - fine<br>- crossbedded with layers of silt & organics<br>- dark grey<br>- very fine, silty<br>- grey | |
| 42 | | |
| 44 | | |
| 46 | - fine to medium<br>- uniform<br>- trace of silt<br>- trace of pebbles | |
| 48 | | |
| 50 | SILT - dark grey<br>- massive | |
| | END OF HOLE | |

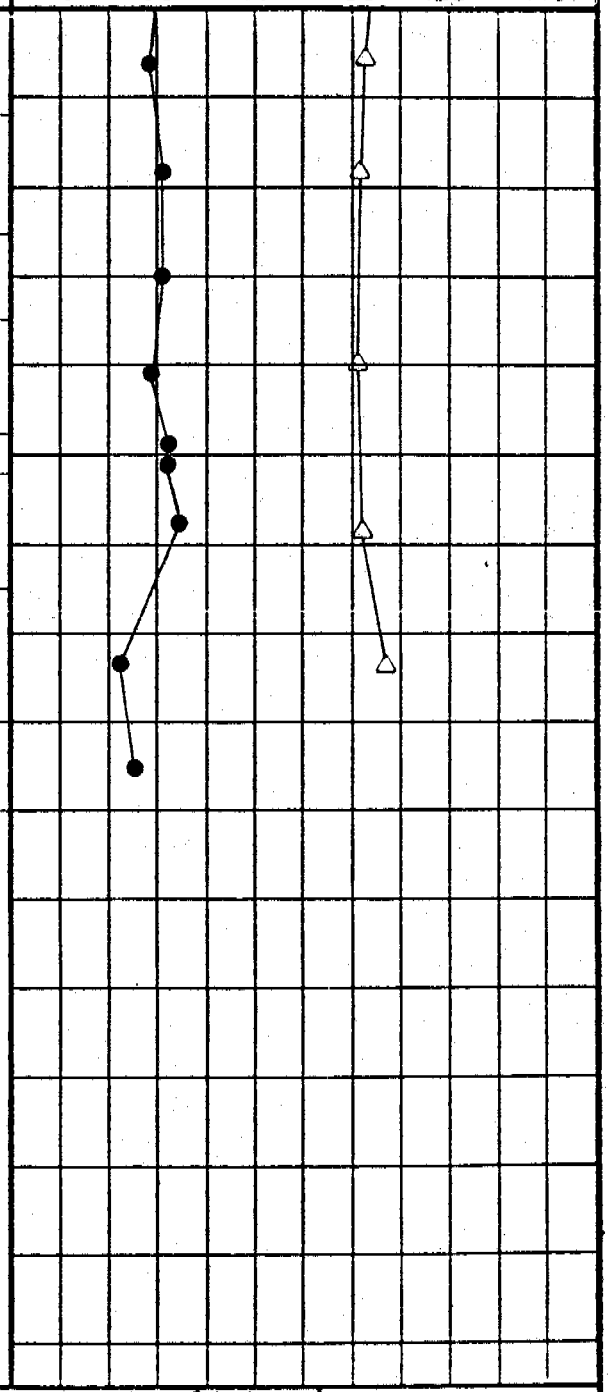
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



| | | | |
|---|---|---|---|
| eca | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 28/1/75<br>TECHNICIAN JK | HOLE Nº<br>B-4 |
| | COMPLETION DEPTH (ft.) 48 | REGION Plant Site | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | Organics - roots and dark to light brown | Vr 50% |
| 4 | SILT - medium to dark grey, some brown organics | 60-65% |
| 6 | - brown | 45% |
| 8 | - thinly laminated | 15% Vs-25% Vs |
| 10 | | 15-20% Vr |
| 12 | - greyish brown | 5-10% 5% |
| 14 | - interbedded grey & brown silt | Vs 10% |
| 16 | | |
| 18 | - grey silt with some brown laminae | Nbe-Vs 10-15% |
| 20 | - some vertical columns of brown silt | Nbe |
| 22 | - grey and brown silt | Vr 5-10% |
| 24 | | |
| 26 | | Vr 10% |
| 28 | | Nbe |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140

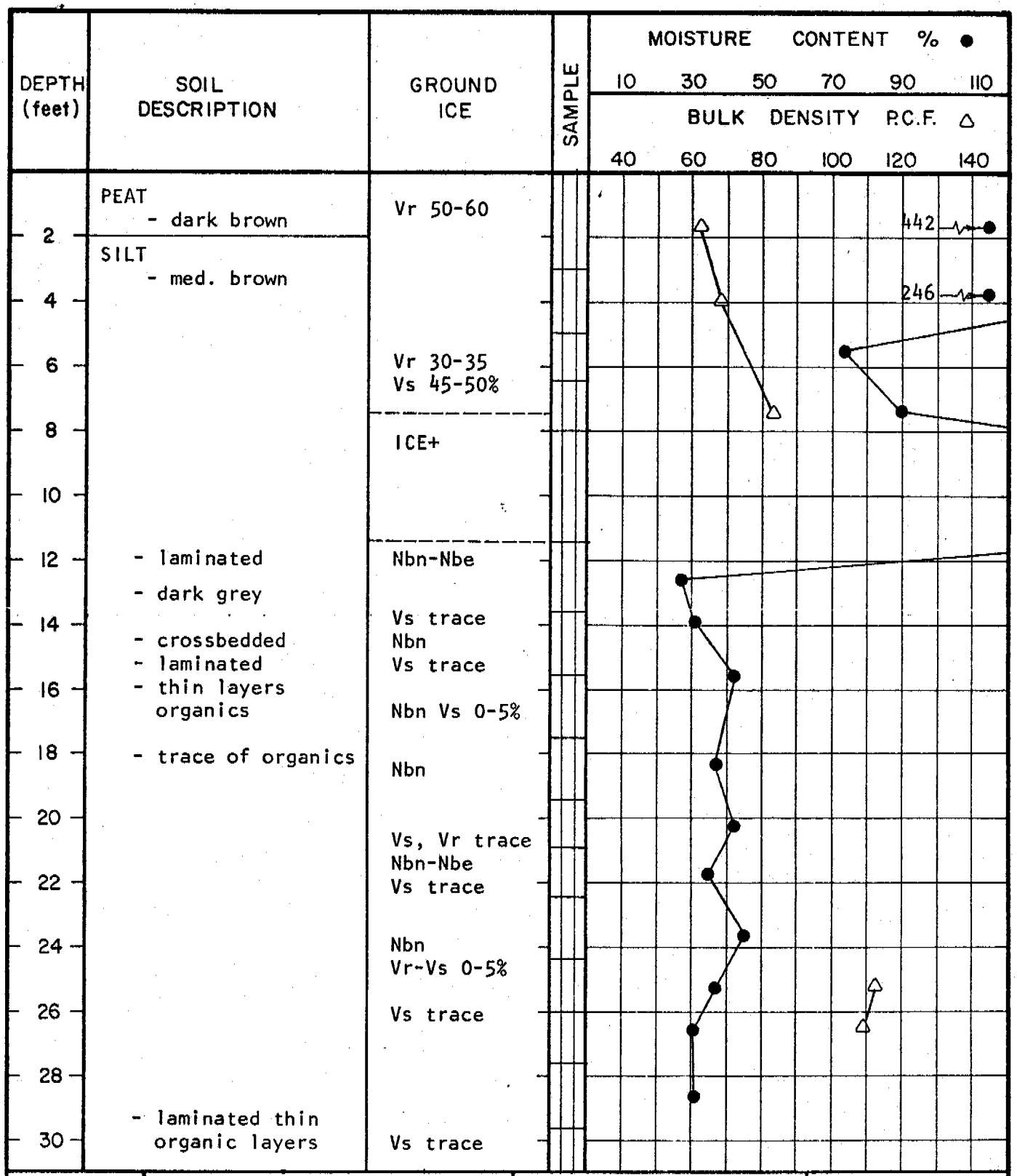
202.7

127.9

eba

| | | |
|---|---|---|
| SAMPLE TYPE CRREL Barrel | DATE DRILLED 21/1/75 | HOLE Nº B - 6 |
| COMPLETION DEPTH (ft.) 29½' | TECHNICIAN TH | |
| | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL Barrel | DATE DRILLED 30/1/75 | HOLE Nº B-7 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 49½ | REGION Plant Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 32 | | Nbn<br>Vs trace |
| 34 | | |
| 36 | | |
| 38 | | Vs trace |
| 40 | - interbedded dark grey silt & fine sand | Nbn |
| 42 | - thinly to thickly bedded | same |
| 44 | SAND<br>- dark grey<br>- very fine<br>- uniform<br>- some silt<br>- some thin organic layers | |
| 46 | | |
| 48 | SILT<br>- dark grey<br>- interbedded<br>- dark grey silt<br>- uniform fine sand<br>- trace of organics | |
| 50 | SILT<br>- dark grey<br>- massive | |
| | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110

BULK DENSITY P.C.F. △
40 60 80 100 120 140

| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL BARREL | DATE DRILLED 30/1/75 | HOLE Nº B - 7 |
| | COMPLETION DEPTH (ft.) 49 1/2' | TECHNICIAN JK | |
| | | REGION Plant Site | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SILT - trace of organics | ICE + 20% silt |
| 4 | | |
| 6 | - medium brown trace of organics | Vs - Vr 25% |
| 8 | | 10% |
| 10 | | Vr 15% |
| 12 | - dark grey | Vs 15 - 20% |
| 14 | - medium brown | 10 - 20% |
| 16 | - dark brown | 5 - 10% |
| 18 | | 10 - 15% |
| 20 | | |
| 22 | - dark grey | Nbe |
| 24 | | Vr 5% |
| 26 | | Nbe |
| 28 | | |
| 30 | - same | |
| | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

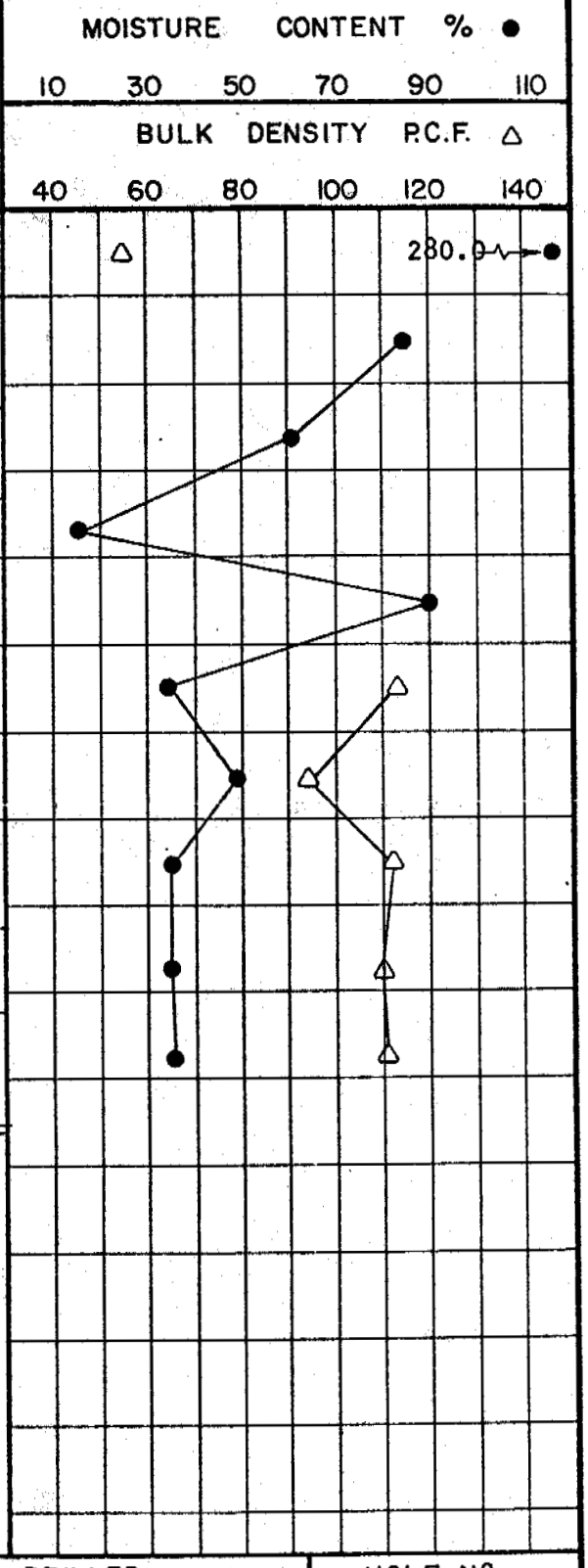
547.6

| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL BARREL | DATE DRILLED 21/1/75 | HOLE Nº B - 8 |
| | COMPLETION DEPTH (ft.) 30' | TECHNICIAN TH | |
| | | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

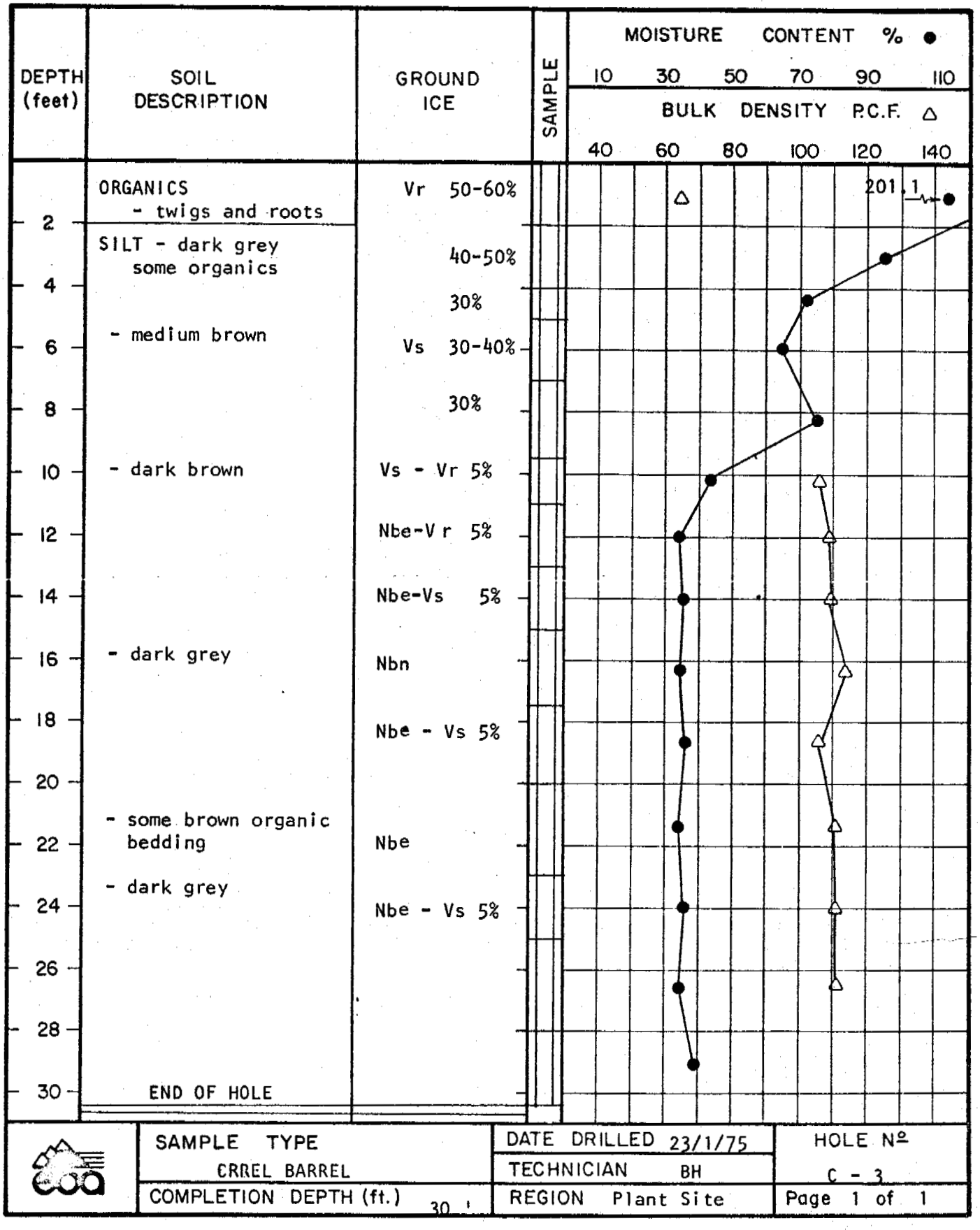
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - dark brown roots and twigs trace of silt | Vr 45-50% | |
| 4 | | 80-90% | |
| 6 | SILT - dark grey medium to dk. brown | 40 - 50% | |
| 8 | - thinly laminated | 15% $V_S$ | |
| 10 | | 35 - 40% | |
| 12 | - dark grey | $V_r$ 50 - 55% | |
| 14 | - dark brown-grey | 15 - 20% | |
| 16 | dark grey | Nbe | |
| 18 | | | |
| 20 | | | |
| 22 | END OF HOLE | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |




| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CARREL Barrel | DATE DRILLED 21/1/75 | HOLE Nº B - 9 |
| | COMPLETION DEPTH (ft.) 21 | TECHNICIAN TH | Page 1 of 1 |
| | | REGION Plant Site | |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL BARREL | DATE DRILLED 23/1/75 | HOLE Nº C - 3 |
| | | TECHNICIAN BH | |
| | COMPLETION DEPTH (ft.) 30 ' | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | ORGANICS - twigs & roots | Vr - 40-45% |
| 2 | SILT - dark grey trace of organics | 45% |
| 4 | | 30- 35% |
| 6 | - dark to medium grey layers | 40% |
| 8 | - brown some organics | Vs 5-10% |
| 10 | | Vs-Vx 10-15% |
| 12 | - becoming grey with black organic laminae | Vs 25-35% |
| 14 | | Nbe - Vs 5% |
| 16 | - grey - brown | Nbe |
| 18 | - dark brown | Nbe - Vs 5% |
| 20 | | |
| 22 | | |
| 24 | | same |
| 26 | END OF HOLE | |
| 28 | | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●

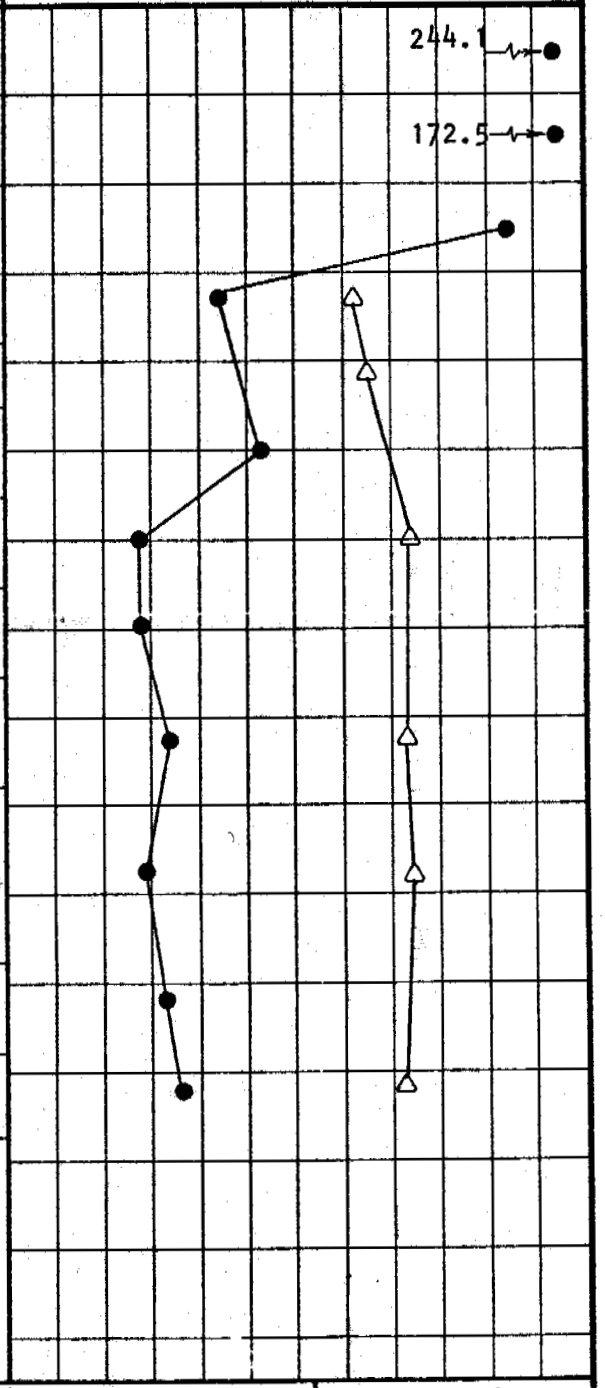
10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

244.1

172.5



| | | | |
|---|---|---|---|
| EBA | SAMPLE TYPE CRREL BARREL | DATE DRILLED 23/1/75 | HOLE Nº C- 4 |
| | COMPLETION DEPTH (ft.) 25½' | TECHNICIAN TH, BH | Page 1 of 1 |
| | | REGION Plant site | |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT<br>- dark brown<br>- fibrous | Vr 60-70% |
| 4 | SILT<br>- med. brown<br>- some organics | |
| 6 | | Vr 50-60%<br>candled |
| 8 | | Vr-Vs 45-50% |
| 10 | - trace of clay<br>- trace of organics<br>brown mottling<br>- crossbedded | Vs 25-30%<br>35-40%<br>Nbe, Vs<br>5-10% |
| 12 | - trace of organics<br>- med. to dark grey<br>- laminated | Nbn-Nbe |
| 14 | - layers of organics | Nbn-Nf |
| 16 | - layers of organics | Nbn |
| 18 | | |
| 20 | | Vs trace |
| 22 | | |
| 24 | | |
| 26 | | Vs trace |
| 28 | - thinly laminated with very fine sand<br>- laminated with fine uniform sand | Vs trace |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

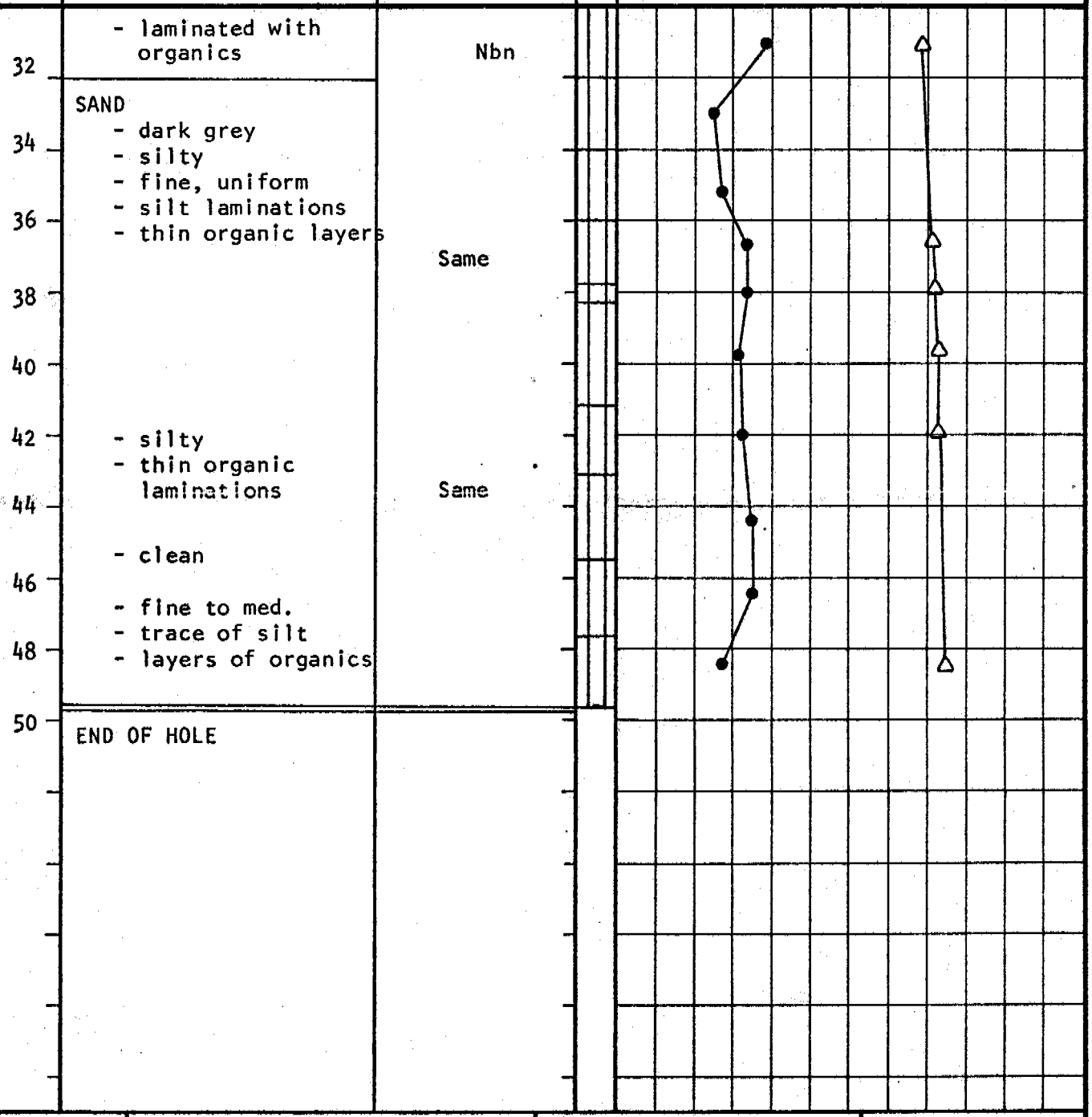
460

| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 31/1/75<br>TECHNICIAN JK | HOLE Nº<br>C-6 |
| | COMPLETION DEPTH (ft.) 49½ | REGION Plant Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 32 | - laminated with organics | Nbn | |
| | SAND<br>- dark grey<br>- silty<br>- fine, uniform<br>- silt laminations<br>- thin organic layers | Same | |
| 42 | - silty<br>- thin organic laminations | Same | |
| 44 | - clean | | |
| 46 | - fine to med.<br>- trace of silt<br>- layers of organics | | |
| 48 | | | |
| 50 | END OF HOLE | | |

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140



| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL BARREL | DATE DRILLED 30/1/75<br>TECHNICIAN JK | HOLE Nº<br>C-6 |
| | COMPLETION DEPTH (ft.) 49 1/2' | REGION Plant Site | Page 2 of 2 |

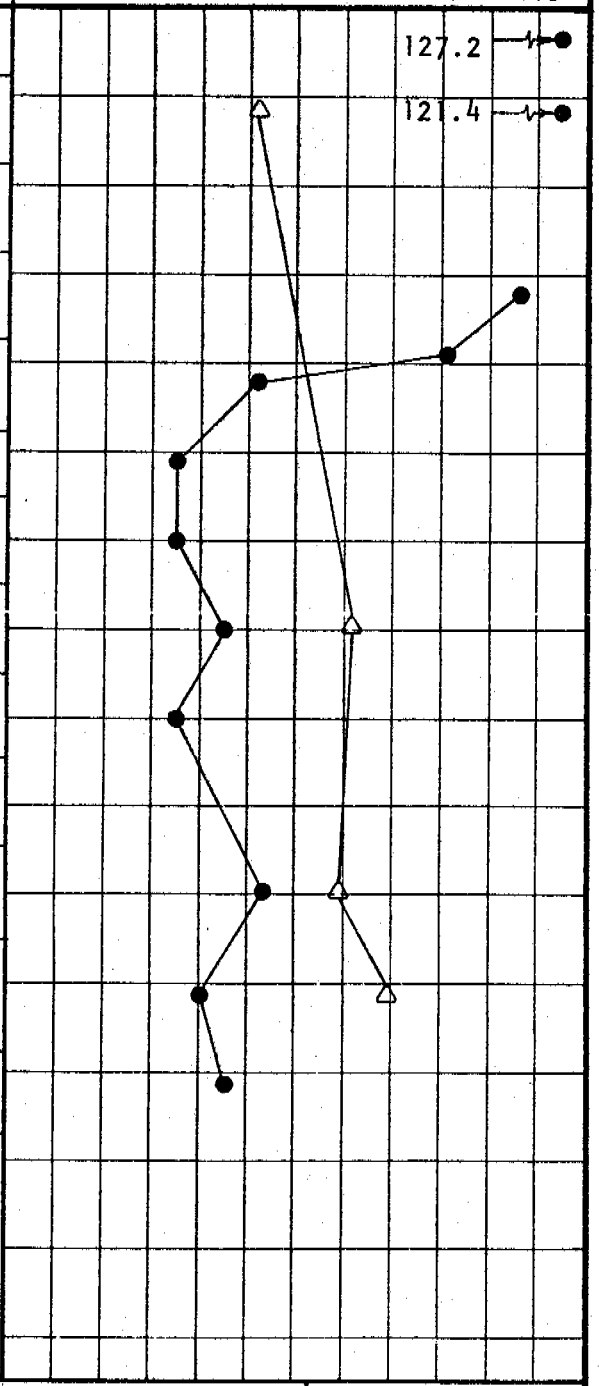
# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | ORGANICS & SILT<br>- twigs & wood chips | Vr 50-60% |
| | - dark brown, some silt | 40% |
| 4 | SILT - dark grey<br>- trace of organics | 40% |
| 6 | - some organics | 40-45% |
| 8 | - medium to dark brown | Vs - 30% |
| 10 | - dark grey | 5% |
| 12 | - mottled grey-brown | 5-10% |
| 14 | | Nbn-Vs 5% |
| 16 | | |
| 18 | - dark grey | Vs-Vr 10-15% |
| 20 | | Vs 5%<br>20% |
| 22 | | Nbe-Vr 5% |
| 24 | - same | Nbe |
| 26 | END OF HOLE | |
| 28 | | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140

127.2
121.4



| | | | |
|---|---|---|---|
| SAMPLE TYPE CRREL Barrel | | DATE DRILLED 22/1/75 | HOLE Nº C-7 |
| | | TECHNICIAN TH | |
| COMPLETION DEPTH (ft.) 25½ | | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - roots & twigs, woody | Vr 45 - 50% | |
| 4 | - dark brown | 50% | |
| | SILT - dark grey | | |
| 6 | | 40 - 45% | |
| 8 | - grey-brown, thinly laminated | Vs 45% | |
| 10 | - dark brown, thinly laminated | 20 - 30% | |
| 12 | - dark grey to dark brown silt | Nbe-Vs 10% Vr 5% | |
| 14 | | Nbe - Vs 10% | |
| 16 | | | |
| 18 | | Nbe | |
| 20 | | Vr 5% | |
| 22 | | Nbe | |
| 24 | | | |
| 26 | | | |
| 28 | - same | | |
| 30 | END OF HOLE | | |

MOISTURE CONTENT % ●

10 30 50 70 90 110

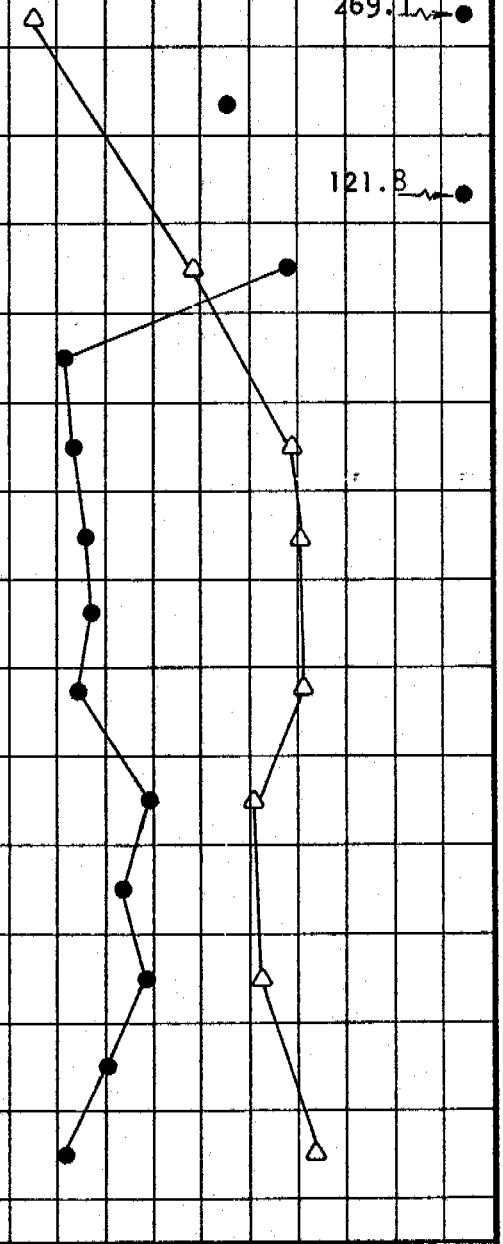
BULK DENSITY P.C.F. △

40 60 80 100 120 140

836.4 ●

269.1 ●

121.8 ●

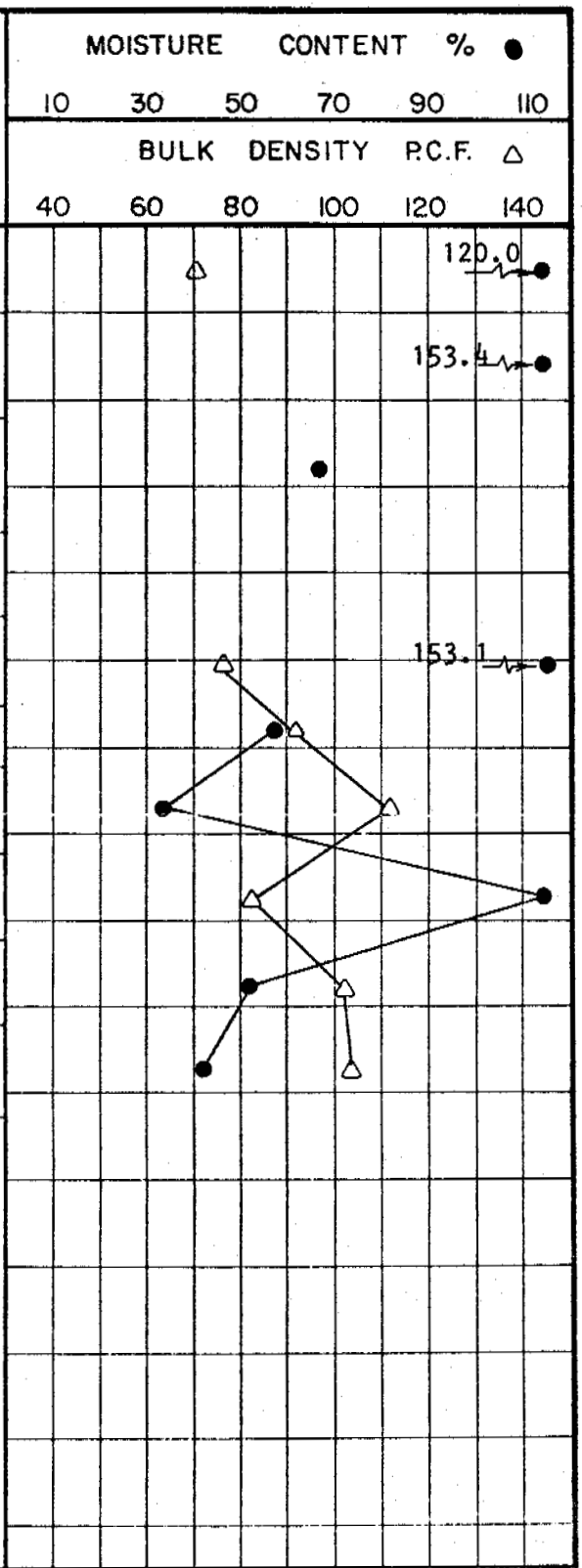


| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 22/1/75 | HOLE Nº C - 8 |
| | COMPLETION DEPTH (ft.) 30' | TECHNICIAN TH | |
| | | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - dark brown to black | Vr<br>60% | |
| 4 | SILT - dark grey, trace of organics | 80% | |
| 6 | - thinly laminated | 40 - 50%<br>Vs - 45%<br>Vr - Vs | |
| 8 | | 30% | |
| 10 | - medium to dark brown | Vs<br>25 - 30% | |
| 12 | - grey - brown | 10 - 15%<br>Vr<br>5% | |
| 14 | - medium to dark brown | 10 - 15%<br>30 - 35% | |
| 16 | | Nbe - Vr | |
| 18 | - dark grey - brown | 15% | |
| 20 | | 10% | |
| 22 | END OF HOLE | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |



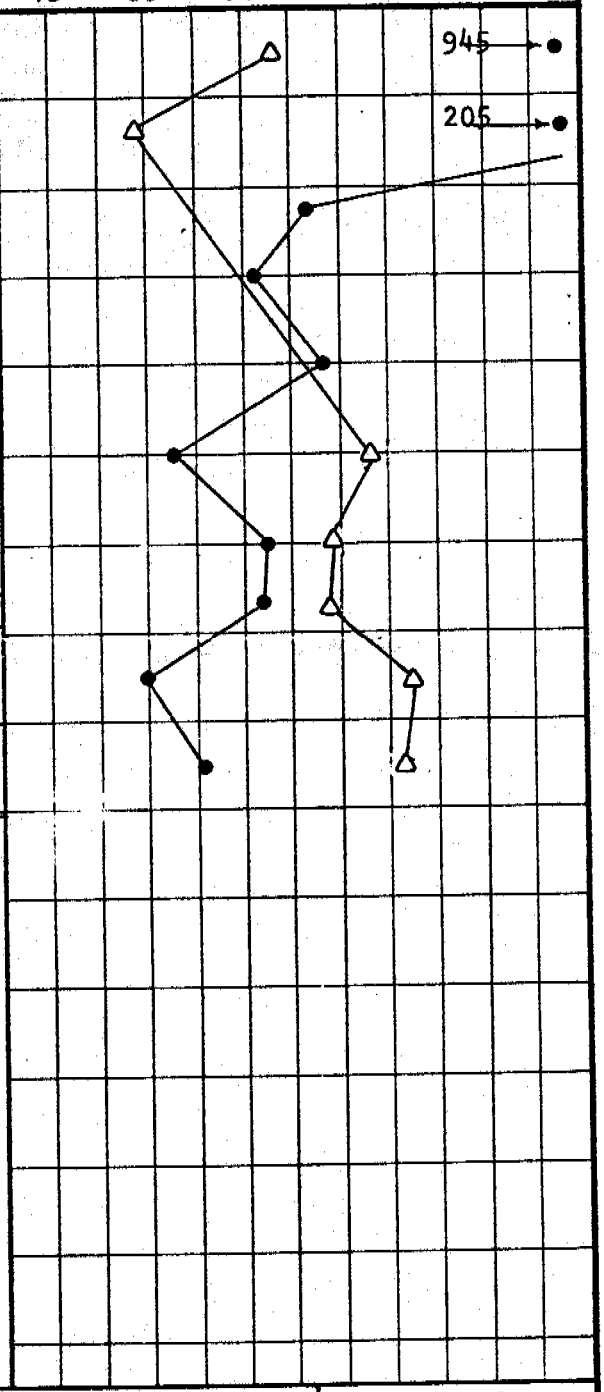

| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 22/1/75<br>TECHNICIAN TH | HOLE Nº<br>C - 9 |
| | COMPLETION DEPTH (ft.) 20½' | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT<br>- dark brown<br>- fibrous | Vr 60-70% |
| 2 | SILT<br>- medium brown<br>- some organcis | Vr 50-60%<br>Vr 30-35%<br>Vr 25-30% |
| 4 | | |
| 6 | | $V_s$-Vr-45-50%<br>Vr Vs 20-25% |
| 8 | - laminated | Vs 40-60%<br>Vs 15-20% |
| 10 | - med grey brown | Vs 20-25% |
| 12 | | Vs 40-50% |
| 14 | - dark grey<br>- laminated | Vs 20-25%<br>Vs 5-10%<br>Vs 0-5% |
| 16 | | |
| 18 | END OF HOLE | |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140




| | | | |
|---|---|---|---|
| GEOA | SAMPLE TYPE<br>CARREL BARREL | DATE DRILLED 1/2/75<br>TECHNICIAN JK | HOLE Nº<br>C-10 |
| | COMPLETION DEPTH (ft.) 18' | REGION PLANTSITE | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0–2 | PEAT<br>- dark brown | Vr 70-80% |
| 2–20 | SILT<br>- medium brown | Vr 30-35%<br>Vr 80%<br>Vr 50-60% |
| | | Vs 40-50% |
| | - laminated | Vs 50-55% |
| | | Vs 30-50% |
| | -laminated with organics | Vs 10-15% |
| | - dark grey<br>-cross bedded<br>-laminated with org organics<br>-sandy<br>-laminated with organics | Nbn - Nbe<br>Vs trace<br>Nbn-Nbe |
| | | Nbn |
| 20 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140

135%

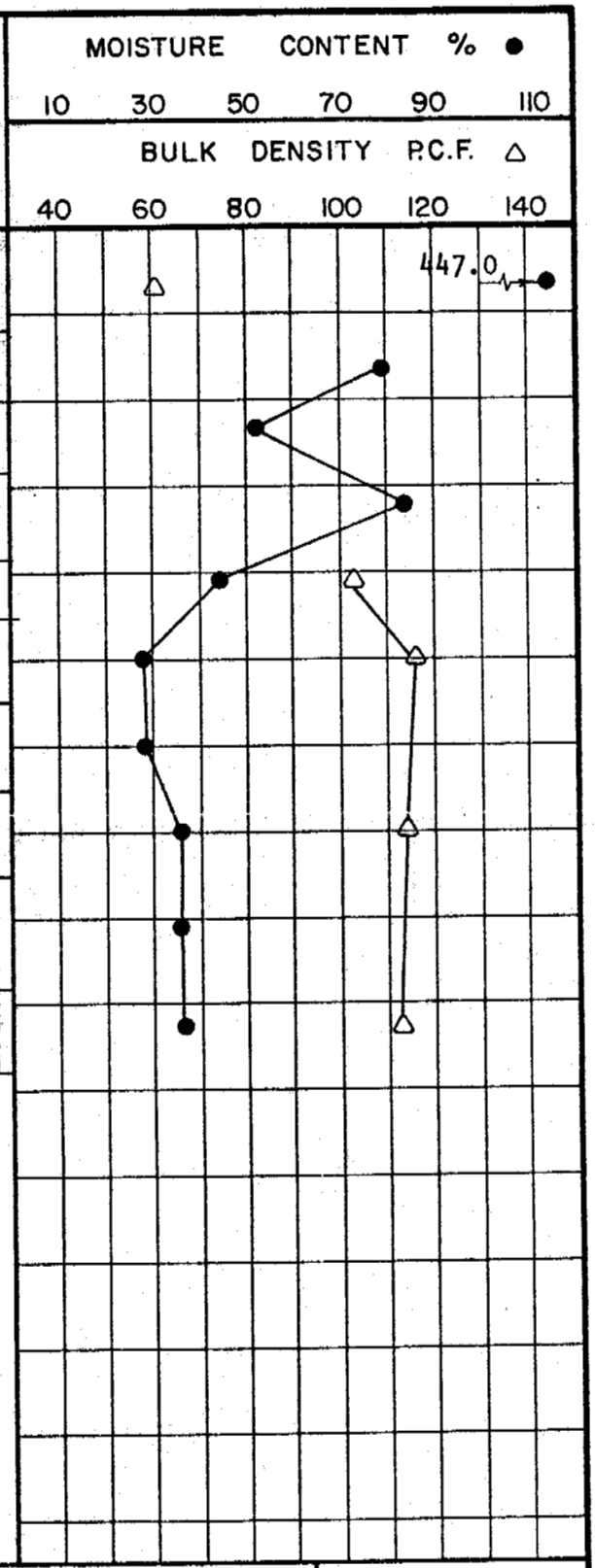
162%

| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL BARREL | DATE DRILLED 31/1/75 | HOLE Nº<br>D-1 |
| | COMPLETION DEPTH (ft.) 19 1/2 | TECHNICIAN JK | |
| | | REGION Plantsite | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | ORGANICS - dark brown | Vr 50 - 60% |
| 2 | SILT - organic grey-brown | 45 - 55% |
| | | 75% |
| 4 | - medium brown, trace of organics | 35 - 40% |
| 6 | | Vr-Vs 25 - 30% |
| | | Vs 0 - 5% |
| 8 | - laminated, brown | |
| | - medium grey | Nbe - Vs 5% |
| 10 | - trace of organics grey to brown laminae | Nbe |
| 12 | | Nf |
| 14 | - grey, cross -bedded | Nbe |
| 16 | same | |
| 18 | | |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

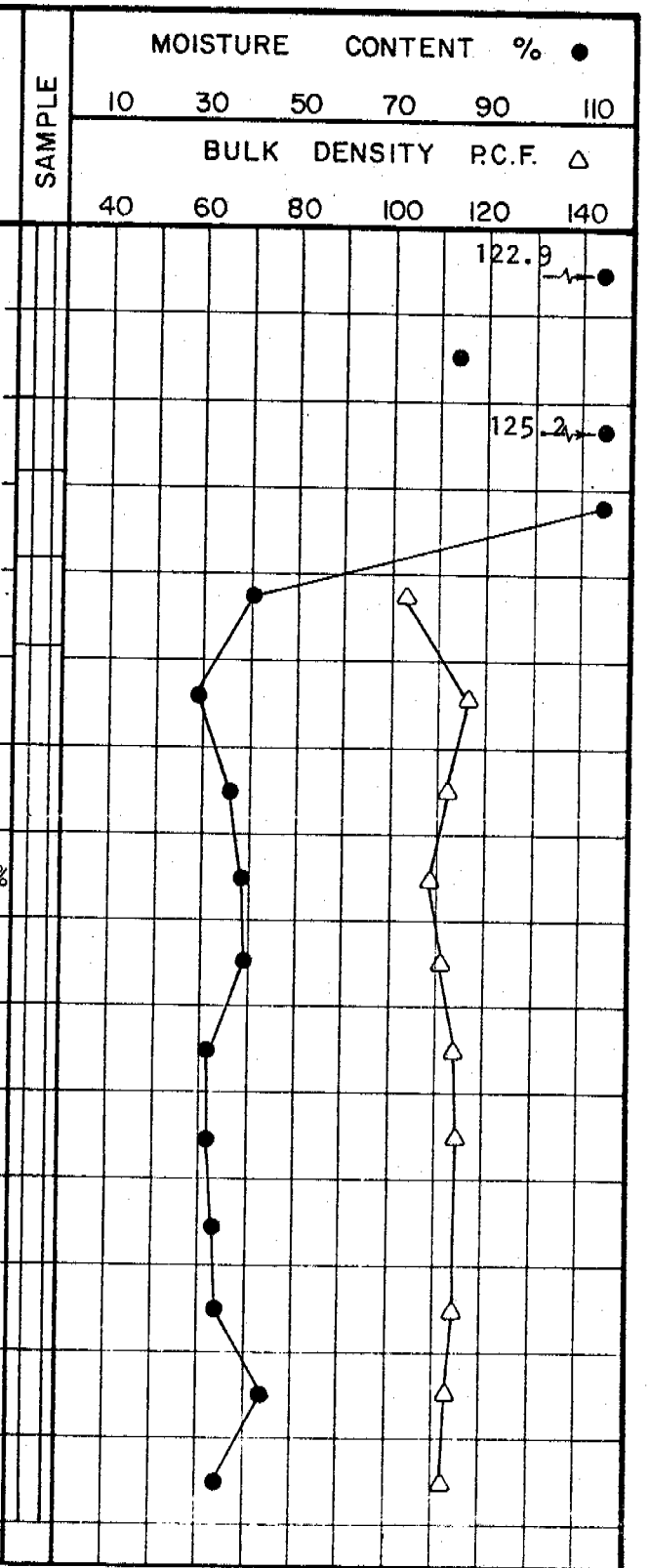



| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL BARREL | DATE DRILLED 24/1/75 | HOLE Nº D - 2 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 19½' | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - peat | Vr 50% | |
| | SILT - organic -medium grey-brown | 60-65% | |
| 4 | some organics | 35-40% | |
| | - trace of organics | 25-30% | |
| 6 | | Vs 40% | |
| 8 | - medium brown laminated | Vs 5 - 10% Nbe - Vs | |
| 10 | | | |
| | - grey with some thin brown laminae | Nbn - Nbe | |
| 12 | - cross bedded | | |
| 14 | | | |
| 16 | - dark grey laminated | Nbe - Vs 5% | |
| | - cross-bedded | Nbn - Nbe | |
| 18 | | | |
| 20 | | Nbn - Vs 5% | |
| | | Nbe | |
| 22 | - same | | |
| 24 | | | |
| 26 | | Nbe - Vs 5% | |
| | - dark grey laminated | Nbn - Nbe | |
| 28 | | | |
| 30 | | Nbe - Vs 5% | |
| | END OF HOLE | | |

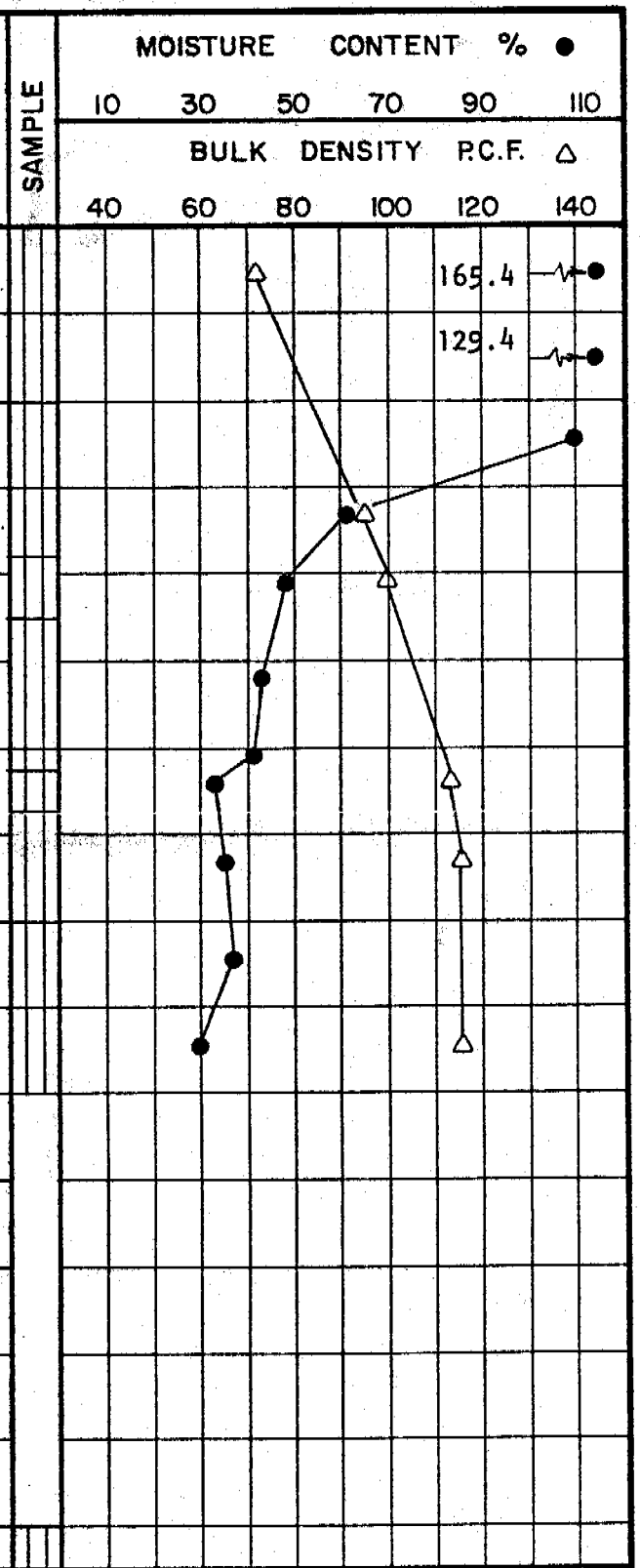



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL BARREL | DATE DRILLED 24/1/75 | HOLE Nº D - 3 |
| | COMPLETION DEPTH (ft.) 30' | TECHNICIAN JK | |
| | | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | ORGANICS - dark brown | Vr 30-40% |
| 2 | SILT - organic | 45-50% |
| | - med. grey-brown some organics | 30-35% |
| 4 | | |
| | | 20-25% |
| 6 | - medium brown | Vs 5-10% |
| | - trace of organics | Nbe-Vs 5% |
| 8 | | |
| 10 | - brown, trace of organics | Nbn-Vx tr. 6" of "soft" permafrost |
| 12 | - grey | |
| | - cross bedded | Nbe-Vs 5% · Nbn-Nbe |
| 14 | | |
| 16 | | |
| | - same | same |
| 18 | | |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 25/1/75 | HOLE Nº D-4 |
| | COMPLETION DEPTH (ft.) 50 | TECHNICIAN JK | |
| | | REGION Plant Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 32 | SILT - dark grey<br>- trace of organics | Nbn-Nbe |
| 34 | - cross-bedded | |
| 36 | - some organics. | |
| 38 | - same, | same |
| 40 | - dark grey cross-bedded<br>- layers of organics | |
| 42 | - trace of fine sand | |
| 44 | - laminated | Nbn |
| 46 | - some sand to sandy, very fine, layers of black organics | |
| 48 | | |
| 50 | | |
| | END OF HOLE | |

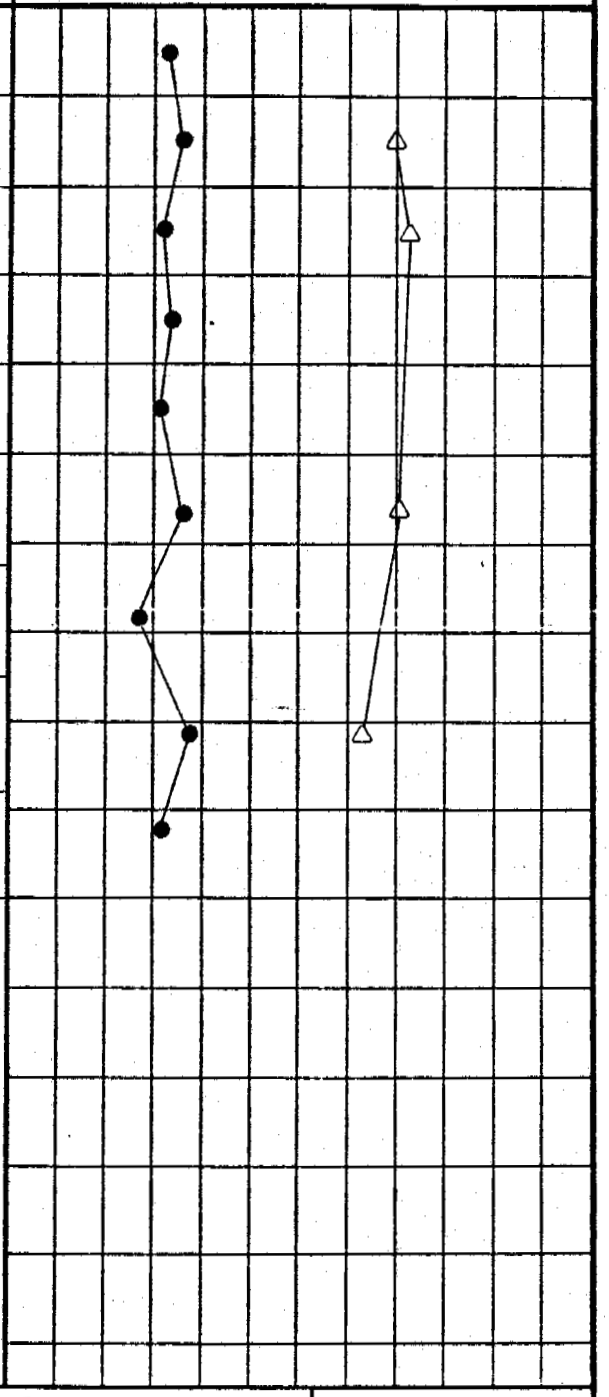
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

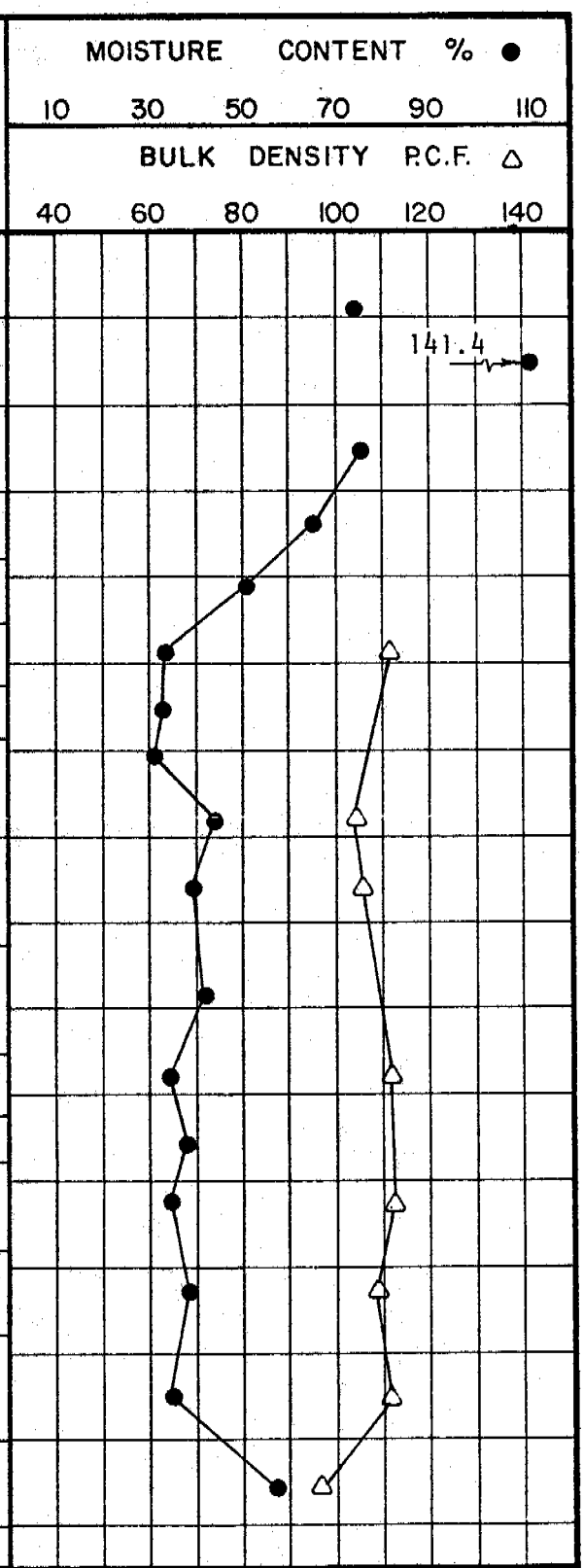


| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 25/1/75<br>TECHNICIAN JK | HOLE Nº<br>D-4 |
| | COMPLETION DEPTH (ft.) 50 | REGION Plant Site | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 0 | ORGANICS | Vr 50-60% | |
| 2 | SILT - organic | 50-55% | |
| | - medium brown some organics | 45-50% | |
| 4 | | 30-35% | |
| 6 | - laminated | Vs-Vr 30% | |
| 8 | - medium to dark grey, laminated | Vs 10-20% | |
| 10 | - layers of dark brown organics | Nbe-Vs 5% | |
| 12 | | Vx soft trace | |
| 14 | - same | Nbe-Vs 5% | |
| 16 | | Vs 1 - 5% | |
| 18 | - medium brown trace of fine sand | Vr-Vs trace | |
| 20 | - dark grey | Nbn - Nbe | |
| 22 | - some organic layers | same | |
| 24 | | | |
| 26 | - dark grey silt cross bedded layer of organics | same | |
| 28 | | | |
| 30 | | Nbe-Vs trace | |
| | END OF HOLE | | |




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL BARREL | DATE DRILLED 24/1/75 | HOLE Nº D - 6 |
| | COMPLETION DEPTH (ft.) 30' | TECHNICIAN JK | |
| | | REGION Plant site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT<br>- dark brown<br>- fibrous | Vr 60-70% |
| 4 | SILT<br>- med. brown<br>- some organics | |
| 6 | - thinly laminated | Vr-Vs 45-50% |
| 8 | - laminated | Vs 55-65%<br>Vs 25-30% |
| 10 | - dark grey<br>- thinly laminated with black organics | |
| 12 | | |
| 14 | - thickly bedded dark grey silt and fine uniform sand | |
| 16 | - thinner bedding<br>- trace of sand | Some Vs 45-50% |
| 18 | - laminated with organics | Nbn, Vs 0-5% |
| 20 | | |
| 22 | | Same |
| 24 | SAND<br>- dark grey<br>- silty | |
| 26 | - bedded with silt<br>- thinly laminated with organics | Nbn, Nbe<br>Nbn |
| 28 | - fine, uniform | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

263

136

151

122

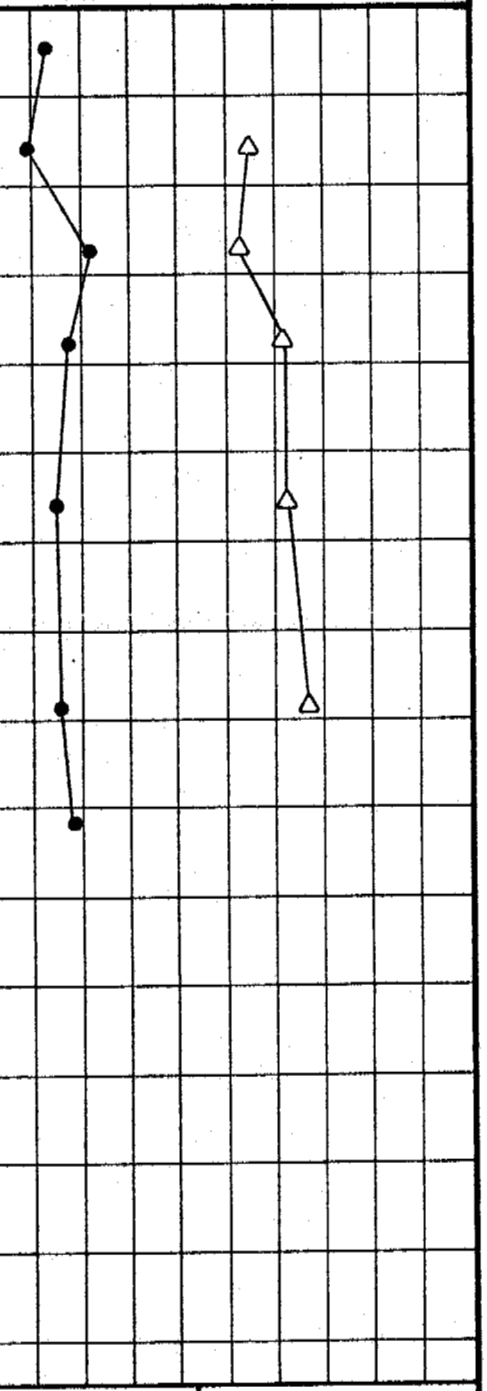
| | | |
|---|---|---|
| SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 5/2/75 | HOLE Nº<br>D-7 |
| COMPLETION DEPTH (ft.) 49½ | TECHNICIAN JK<br>REGION Plant Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 32 | | Nbn |
| 34 | - less silt<br>- fine, uniform<br>- some silt | |
| 36 | | |
| 38 | - fine to med. | |
| 40 | | same |
| 42 | | |
| 44 | | |
| 46 | - trace of organics | |
| 48 | | |
| 50 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140



| | | | |
|---|---|---|---|
| EBA | SAMPLE TYPE CRREL Barrel | DATE DRILLED 5/2/75 | HOLE Nº D-7 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 49½ | REGION Plant Site | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | ORGANICS - dark brown | Vr 50% |
| 2 | SILT - medium grey-brown, organic silt | 50-55% |
| | | 60-65% |
| 4 | - some organics | Vr-Vs 30-35% |
| 6 | - medium brown laminated | 35-40% |
| | | 25-30% |
| 8 | | |
| | - med. to dark grey cross-bedded thin layers of organics | 5-10% |
| 10 | | Nbe-Vs 5% |
| 12 | - laminated, thin layers of organics | |
| 14 | - non organic | |
| 16 | - dark grey, cross-bedded layers of organics | Nbn |
| 18 | | Vr-Vs 15-20% |
| | | 5% |
| 20 | - same | Vr 5-10% |
| | | Nbn |
| 22 | | Nbe Vr 5% |
| | - dark grey laminated | Nbn-Vr 5% |
| 24 | | |
| 26 | - laminated, thin layers of black organics | Nbn |
| 28 | | |
| 30 | END OF HOLE | |

SAMPLE

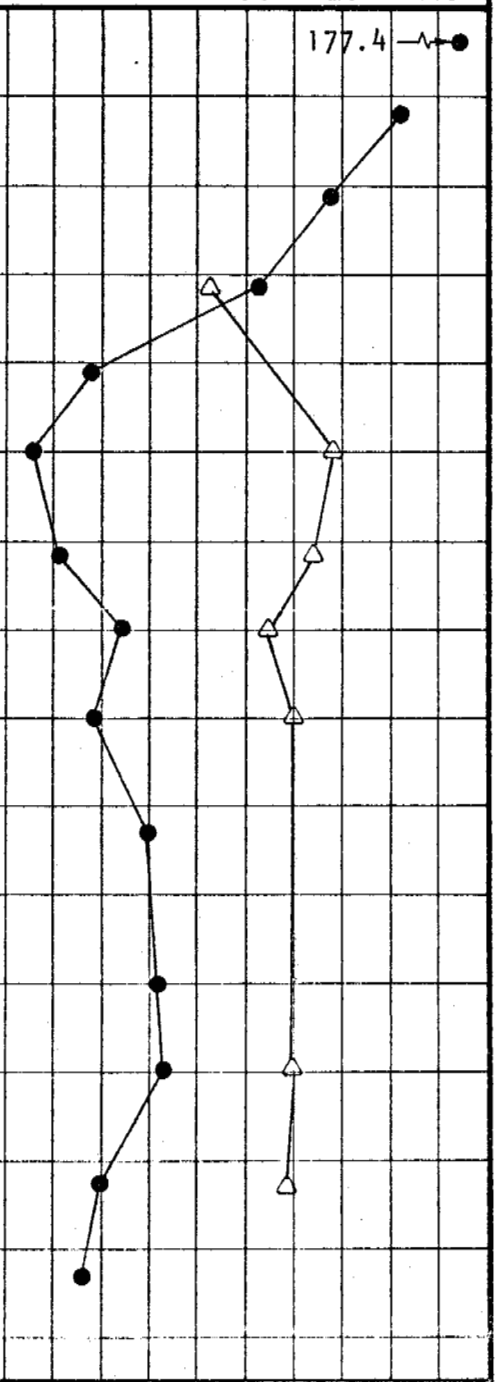
MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

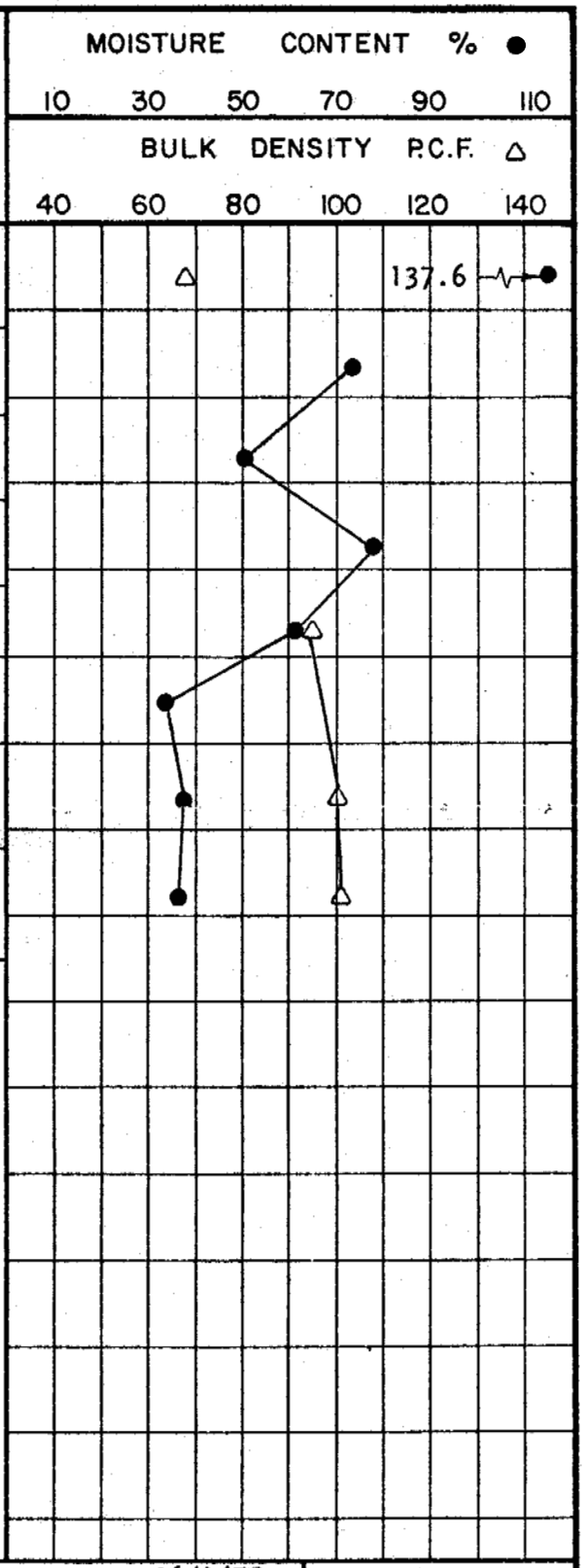
177.4



| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL Barrel | DATE DRILLED 26/1/75 | HOLE Nº D-8 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 29½ | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS - peat, fibrous | Vx - 50% | |
| | SILT - grey brown | Vr 50%-55% | |
| 4 | - med. brown, trace of organics | Vr-Vs 20-30% | |
| | - med. brown silt | Vs - 5-10% | |
| 6 | | Vr-Vs 30-40% | |
| 8 | - med. grey, laminated | Nbn-Vs 5% | |
| 10 | | Vs 30% | |
| | - crossbedded trace of organics | Nbn-Nbe | |
| 12 | | Nbn-Vs 5% | |
| 14 | - dark grey, laminated | | |
| | | Same | |
| 16 | - trace of find sand | | |
| 18 | END OF HOLE - lost core barrel | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |



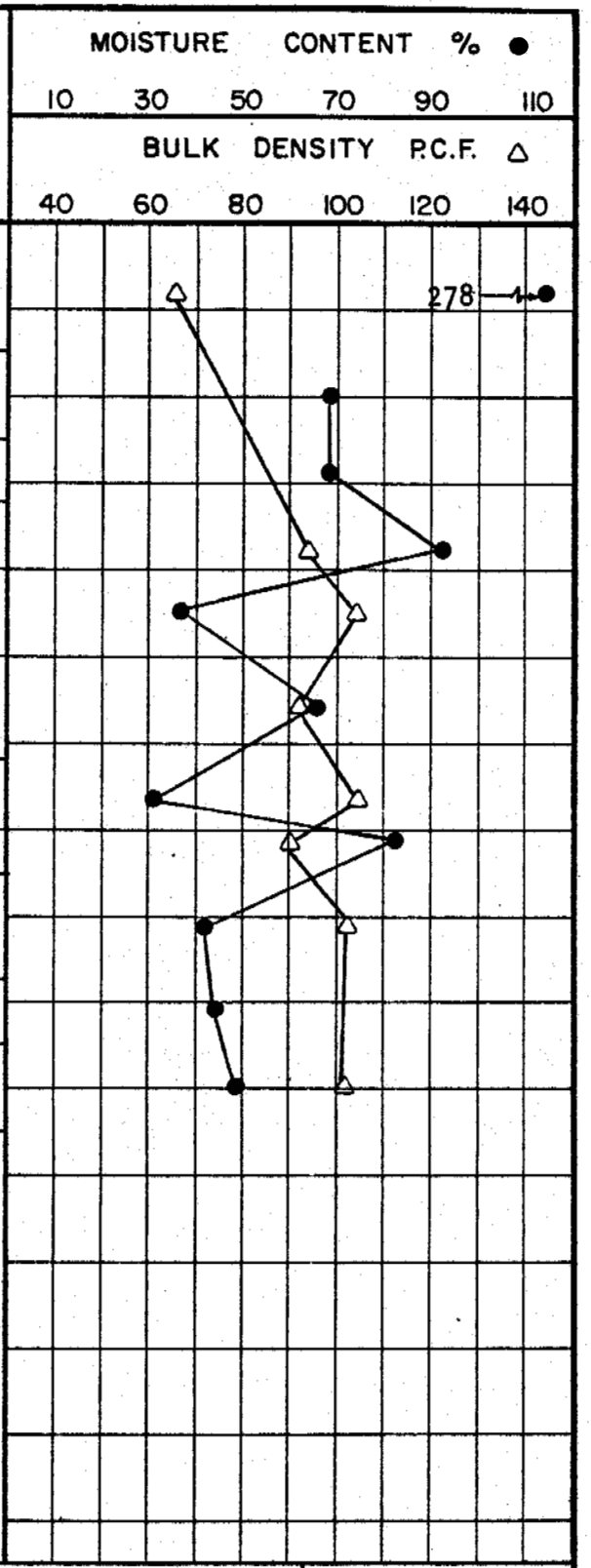

| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL Barrel | DATE DRILLED 26/1/75 | HOLE Nº D-9 |
| | COMPLETION DEPTH (ft.) 17 | TECHNICIAN JK | |
| | | REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- organic | Vr 50-60% |
| 4 | SILT<br>- med. brown<br>- some organics<br>- tr. of organics | 35-40%<br>some 1" ice lenses<br>Vr-Vs 30-50%<br>25-30% |
| 6 | | |
| 8 | | |
| 10 | | Vs 40-45% |
| 12 | - crossbedded<br>- laminated | 35-40%<br>Nbe-Vs 10% |
| 14 | - some thin layers of organics | Vs-Vr 20-25% |
| 16 | - med. grey brown<br>- crossbedded<br>- some possible reddish brown jointing | 50-60%<br>30-35% |
| 18 | | Nbe-Vs 10% |
| 20 | - dark grey laminated<br>- some reddish brown jointing | Nbn-Vs 5% |
| 22 | - trace of organic layers | |
| 24 | END OF HOLE | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE



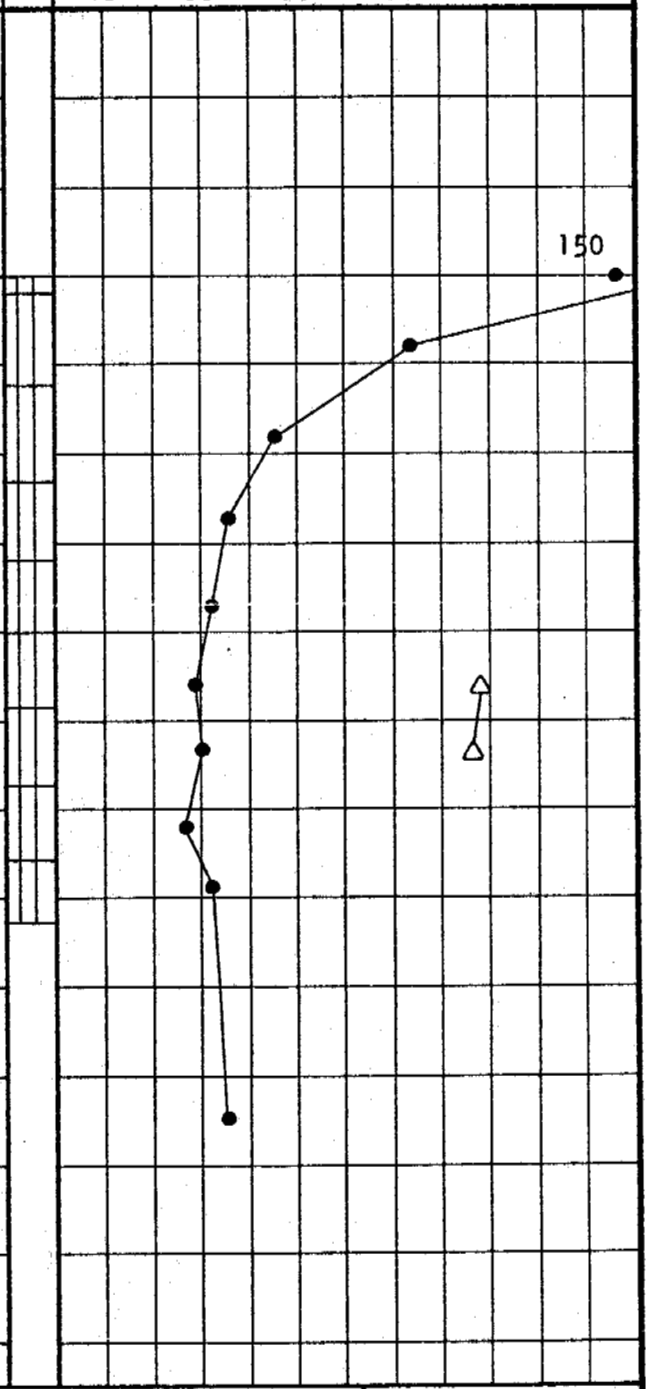

| | | | |
|---|---|---|---|
| EGA | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 29/1/75 | HOLE Nº<br>D-10 |
| | COMPLETION DEPTH (ft.) 21 | TECHNICIAN JK<br>REGION Plant Site | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SAND<br>- fine gravel<br>- silty<br>- poorly bonded<br>- fill material | |
| 6 | SILT<br>- grey brown<br>- highly organic | Vr 70-80%<br>Vr 50% |
| 10 | - some very fine sand | Vr 10-20%<br>Some 1" Vs<br>Vx 5% |
| 14 | - fine horizontal beds<br>- some crossbedding<br>- some fine sand | Nbn<br>Vr trace<br>Vs 5% |
| 18 | - grey<br>- sandy | Vs trace<br>Nbn |
| 24 | Completed hole with flight auger | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 11/2/75<br>TECHNICIAN JS | HOLE Nº<br>T1 |
| | COMPLETION DEPTH (ft.) 34' | REGION Plantsite | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE | MOISTURE CONTENT % ● 10 30 50 70 90 110 / BULK DENSITY P.C.F. △ 40 60 80 100 120 140 |
|---|---|---|---|---|
| 32 | SILT<br>- grey brown<br>- sandy | | | |
| 34 | END OF HOLE | | | |
| 36 | | | | |

| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 11/2/75<br>TECHNICIAN JS | HOLE Nº<br>T1 |
| | COMPLETION DEPTH (ft.) 34' | REGION Plantsite | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr 70-80% |
| 4 | SILT<br>- med. grey brown<br>- organic | |
| 6 | | Vs 30-40% |
| 8 | - med. brown<br>- sandy | Vs 60%<br>Vr-Vs 10-20% |
| 10 | - laminated with black organics | Vs trace |
| 12 | - laminated<br>- dark grey<br>- vertical ice lenses | Vr-Vs 10-20%<br>Vr-Vx 40-50%<br>Vr 20-30%<br>Vs-Vs 0-5% |
| 14 | | |
| 16 | - black organic laminations | Vs 5-10%<br>Nbe |
| 18 | - crossbedded | |
| 20 | | |
| 22 | - thin organic laminations | Nbe<br>Vs trace |
| 24 | | Nbe |
| 26 | - crossbedded | |
| 28 | SAND - very fine<br>- silty<br>- crossbedded<br>- organic layers | |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

606% ●

241%

SAMPLE TYPE
CRREL Barrel

COMPLETION DEPTH (ft.) 29.5'

DATE DRILLED 9/2/75

TECHNICIAN DK

REGION Plantsite

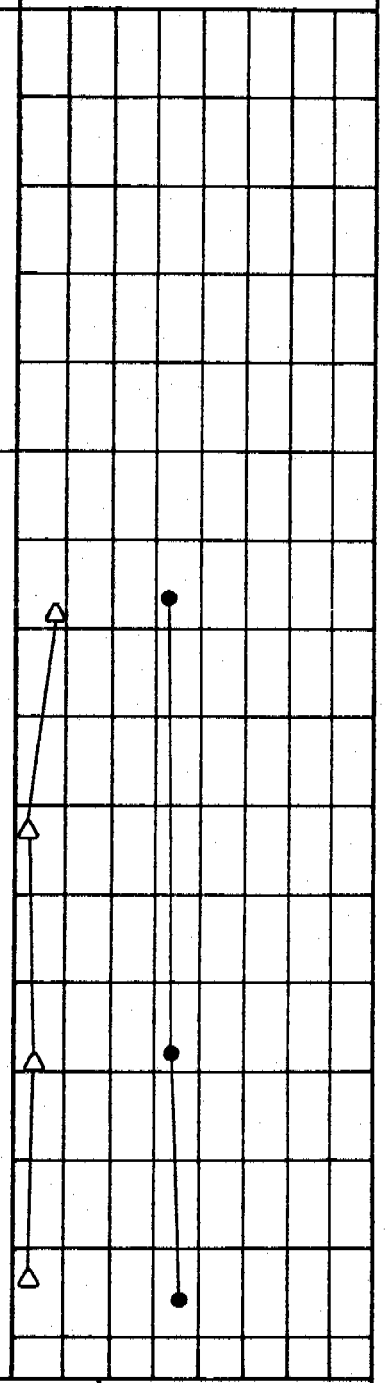
HOLE Nº
T2

Page 1 of 1

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | | | |
| 12 | SILT<br>- dark grey brown<br>- sandy<br>- very wet & loose | | UNFROZEN |
| 14 | | | |
| 16 | | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | - as above | | |
| 26 | | | |
| 28 | - as above | | |
| 30 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3

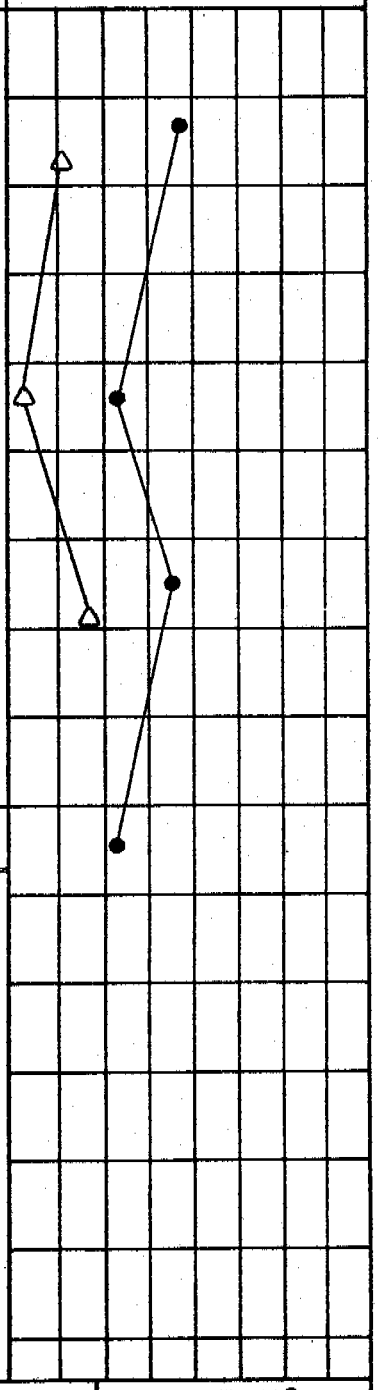


| | | | |
|---|---|---|---|
| eda | Sample Type Split Spoon | DATE DRILLED 22/2/75 | HOLE Nº LL1 |
| | | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 49.5 | REGION Plantsite | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 32 | SAND<br>- dark grey brown<br>- fine grained<br>- silty<br>- uniform<br>- loose | | |
| 34 | | X | |
| 36 | | | |
| 38 | | X | |
| 40 | | | |
| 42 | - fine to med. grained | | |
| 44 | ORGANICS - black | X | |
| | SILT<br>- dark grey brown<br>- trace of sand<br>- compact | | |
| 48 | | X | FROZEN Nbn |
| 50 | END OF HOLE | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3



Sample Type Split Spoon

COMPLETION DEPTH (ft.) 49.5

DATE DRILLED 22/2/75

TECHNICIAN TH

REGION Plantsite

HOLE Nº LL1

APPENDIX D-3

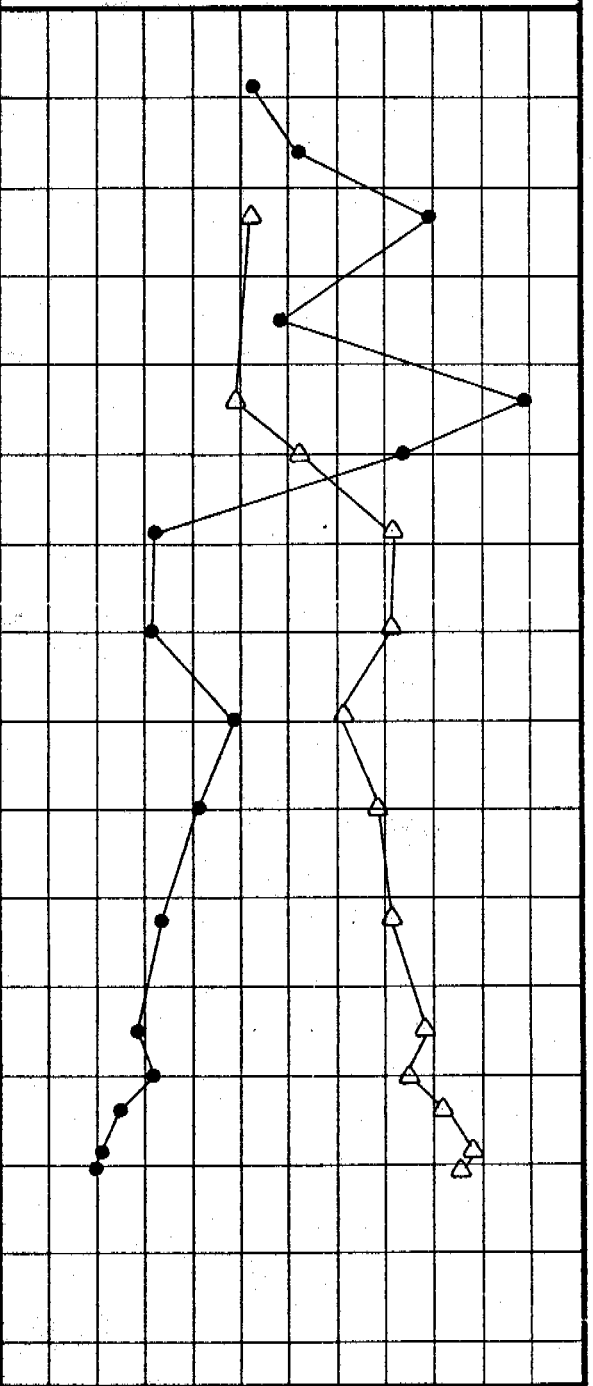
BOREHOLE LOGS FOR DRILLING PAD AREA

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | PEAT - dark brown | Vr 60-70% |
| 2 | SILT | |
| | - med. brown | |
| | - some organics | Vr 50-60% |
| 4 | | Vr-Vs 40-50% |
| 6 | | |
| 8 | - pieces of organics | Vs 35-40% |
| | | Vr-Vs 60-70% |
| 10 | - med. to dark grey brown | Vr-Vs 20-25% |
| 12 | - laminated with organics | |
| | - dark grey | Vr 40-45% |
| 14 | - crossbedded | Vs 5-10% |
| | - trace organics | Nbn-Nbe |
| 16 | - laminated with thin organic layers | some Vs 50% |
| | | Vs 50% |
| | | Nbn, Vs 5-10% |
| 18 | | Vs 25-30% |
| | - some fine sand | Nbn,Nbe Vs 0-5% |
| | - laminated with black organics | |
| 20 | | Vs 10-15% |
| 22 | | |
| 24 | SAND | |
| | - dark grey brown | Nbe |
| 26 | - silty | |
| | - fine, uniform | |
| | - laminated with black organics | |
| 28 | - roots & twigs | |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140



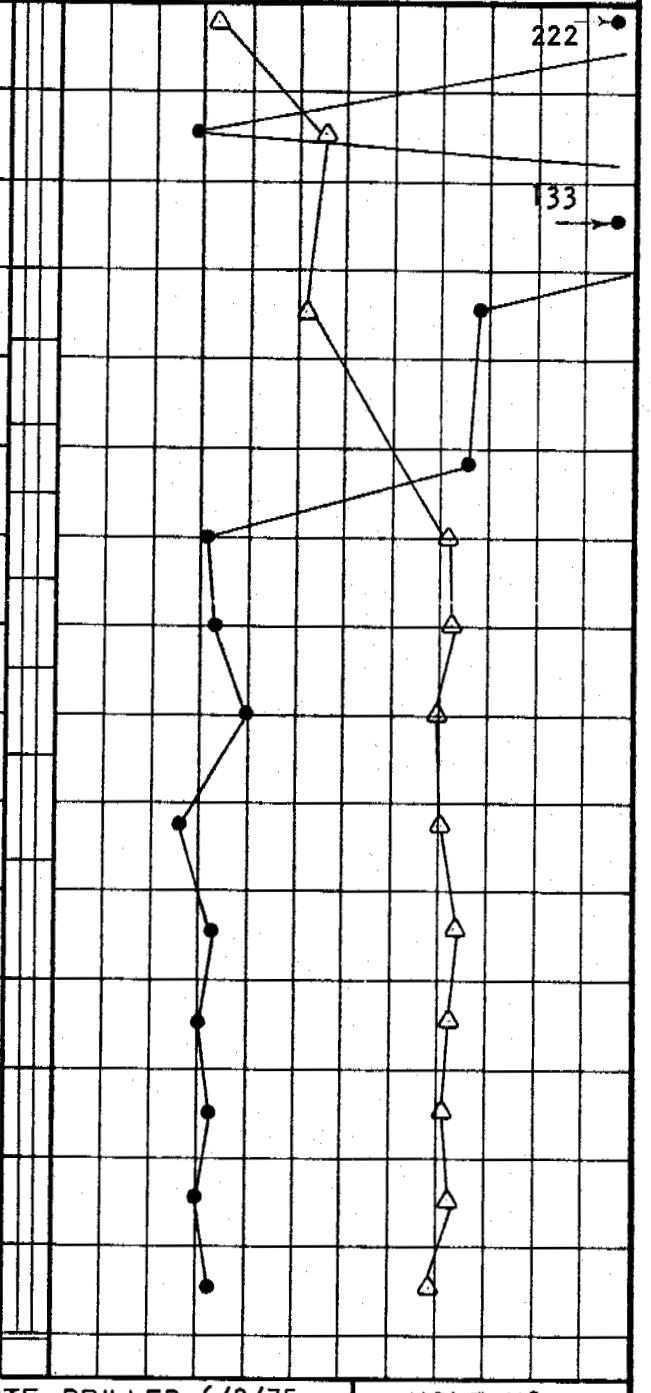
| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 7/2/75 | HOLE Nº E3 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 29½ | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr 50-60<br>Vr 70-80% |
| | SILT<br>- med. brown<br>- trace of organics | Vr 60-70% |
| 4 | | |
| 6 | | Vr 50-80% |
| 8 | | Vs-Vr 60-70% |
| 10 | | |
| 12 | - dark grey<br>- laminated with organics | Vs 5-10%<br>Nbn-Nbe<br>Vs trace<br>Nbn, Vs 0-5% |
| 14 | | |
| 16 | | |
| 18 | | |
| 20 | - interbedded with fine, uniform sand<br>- laminated with black organics | Nbn<br>Vs trace |
| 22 | | |
| 24 | | Nbn-Vs 0-5%<br>Nbn<br>Vs trace |
| 26 | | |
| 28 | | Nbn<br>Vs 0-5% |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140



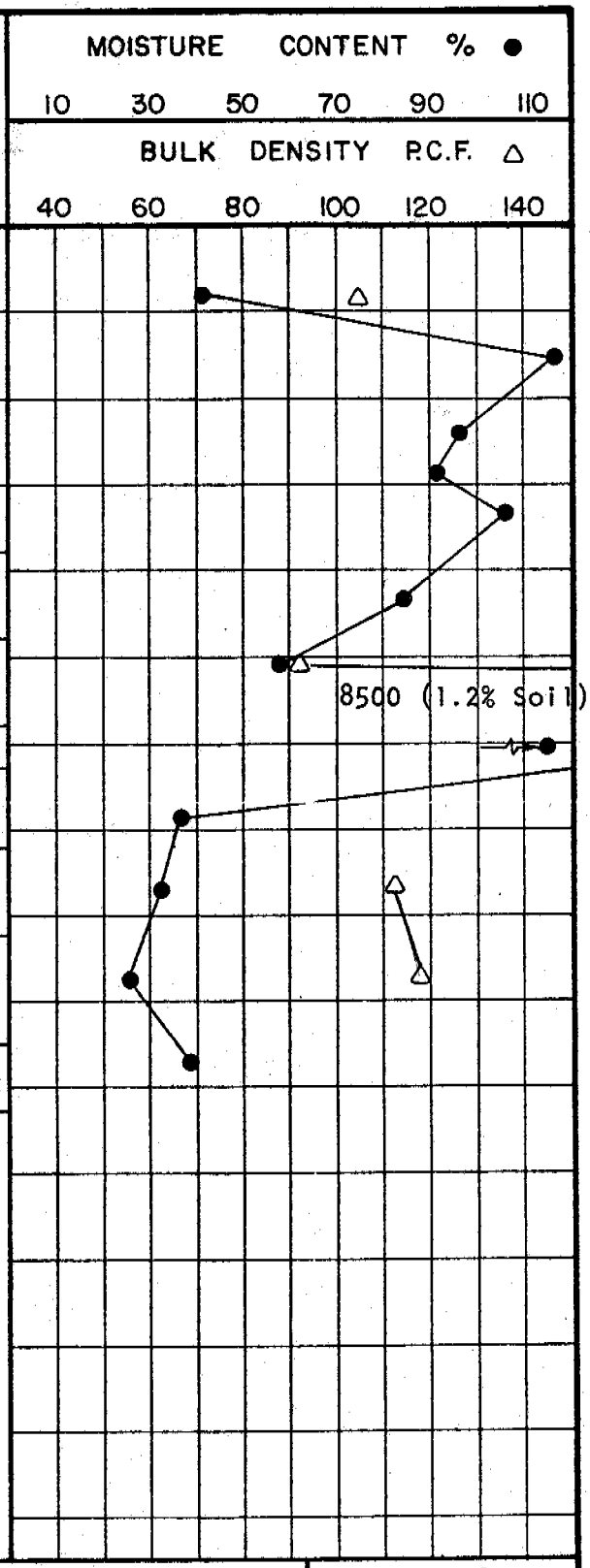

| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 6/2/75<br>TECHNICIAN JK | HOLE Nº<br>E7 |
| | COMPLETION DEPTH (ft.) 30½ | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr 50-60%<br>25-30% |
| | SILT - med. brown<br>- some organics | Nbe-Vr 45-50%<br>Vr 50-55% |
| 4 | | 40-45% |
| 6 | | |
| 8 | - crossbedded | Vr-Vs 35-40 |
| 10 | - some silt layers | ICE+ |
| 12 | - med. brown<br>- med. grey brown | Vr 60-70% |
| 14 | - laminated<br>- med. brown | Nbn-Vs 5% |
| 16 | - massive | 5-10% |
| | - med. grey<br>- laminated | |
| 18 | - dark grey<br>- laminated | Vr-Vs 20-25% |
| 20 | - trace of fine sand | Nbn-Vr 5% |
| | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 29/1/75<br>TECHNICIAN JK | HOLE Nº<br>F-2 |
| | COMPLETION DEPTH (ft.) 20½ | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT | |
| | - dark brown | Vr 60-70% |
| 2 | - organic | |
| | - fibrous | 50-60% |
| | SILT | |
| 4 | - med. brown | 45-50% |
| | - trace of organics | |
| 6 | - trace of organics | 50-60% |
| 8 | - laminated | |
| | | 30-40% |
| 10 | | 60-70% |
| | - med. grey brown | Vr-Vs 50-60% |
| 12 | - laminated | |
| | | Vs 15-20% |
| 14 | | |
| | - med. grey | |
| | - crossbedded | Vs 5-10% |
| 16 | - trace of very fine sand | |
| | - dark grey | Nbn |
| 18 | - laminated | Vs 5-10% |
| | | Some Vr |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

200

149

146

134

SAMPLE TYPE: CRREL Barrel

COMPLETION DEPTH (ft.) 20'

DATE DRILLED 29/1/75

TECHNICIAN JK

REGION Drilling Pad

HOLE Nº F-5

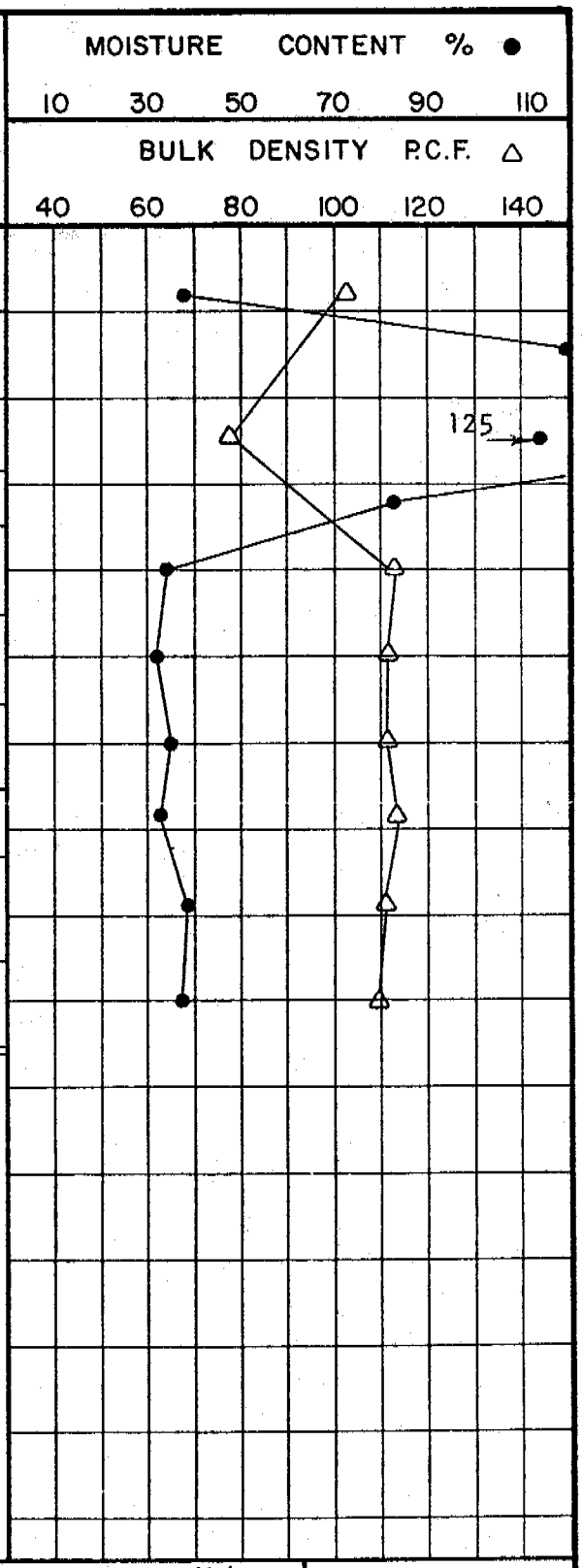
Page 1 of 1

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT<br>- dark brown | Vr 60-70% |
| 2 | SILT<br>- med. brown<br>- some organics | |
| 4 | | |
| 6 | - laminated | Vr-Vs 50-60% |
| 8 | - dark grey massive | Vs 10-20 |
| 10 | - trace of sand | Nbn, Vx 0-5%<br>Nbe, Vs 5-10% |
| 12 | - crossbedded<br>- laminated with organics | Nbn-Nbe<br>Vs 10-15%<br>Nbe |
| 14 | - trace of fine sand | Nbn-Nbe<br>Nf |
| 16 | SAND - dark grey<br>- laminated with silt | Nbn-Nbe |
| 18 | SILT- dark grey<br>- laminated with organics | |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 31/1/75 | HOLE Nº<br>F-8 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 19 | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT - dark brown<br>- fibrous | Vr 60-70% |
| 2 | SILT<br>- med. brown<br>- some organics | |
| 4 | - laminated | Vr-Vs 60-70%<br>Vs 60-70% |
| 6 | | Vs 40-50% |
| 8 | - med. to dk. gr. brown<br>- sandy | Vs 25-30%<br>Nbe Vs 0-5%<br>Nbn Vs 10-15% |
| 10 | - laminated with black organics | Some Vs 50% |
| 12 | - dark grey<br>- sandy | |
| 14 | - crossbedded<br>- interbedded with sandy silt | Nbn-Nbe |
| 16 | SAND<br>- dark grey<br>- silty, fine | Nbn |
| 18 | SILT<br>- dark grey<br>- sandy | Nbn |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

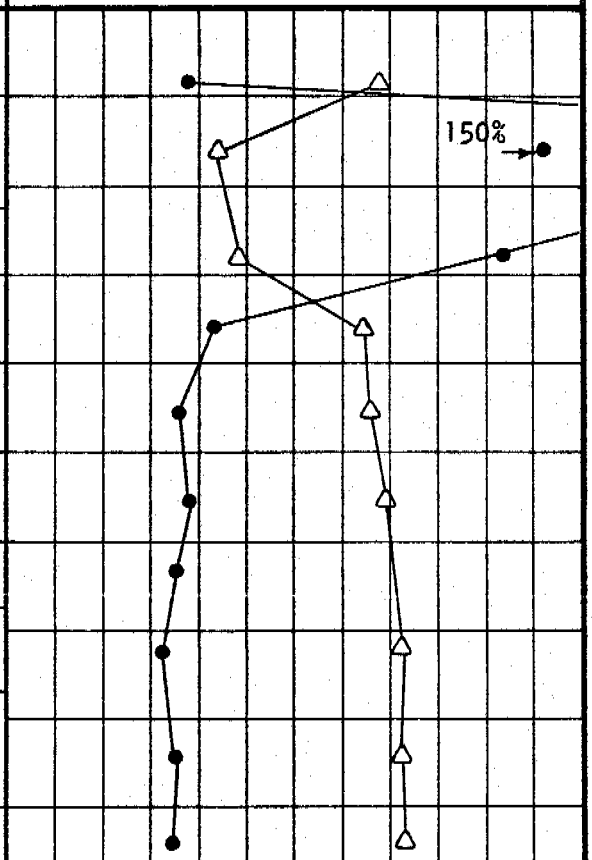
MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

150%



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 7/2/75<br>TECHNICIAN JK | HOLE Nº<br>G-10 |
| | COMPLETION DEPTH (ft.) 19' | REGION Pipeline | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr 60-70% |
| | SILT<br>- med. brown<br>- some organics | some 1" lenses<br>ICE & silt |
| 4 | | |
| 6 | | |
| 8 | | |
| 10 | - laminated<br>- dark grey brown<br>- laminated<br>- laminated with black orgnanics | Vr 60-70%<br>Vr-Vs 45-50%<br>Vs 20-25%<br>Vs 45-50% |
| 12 | | Vs 15-20% |
| 14 | - crossbedded<br>- thinly laminated with black organics | Nbe, Vs 0-5% |
| 16 | | |
| 18 | - light brown<br>- light brown, dry<br>- dark grey | Nf |
| | END OF HOLE | |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

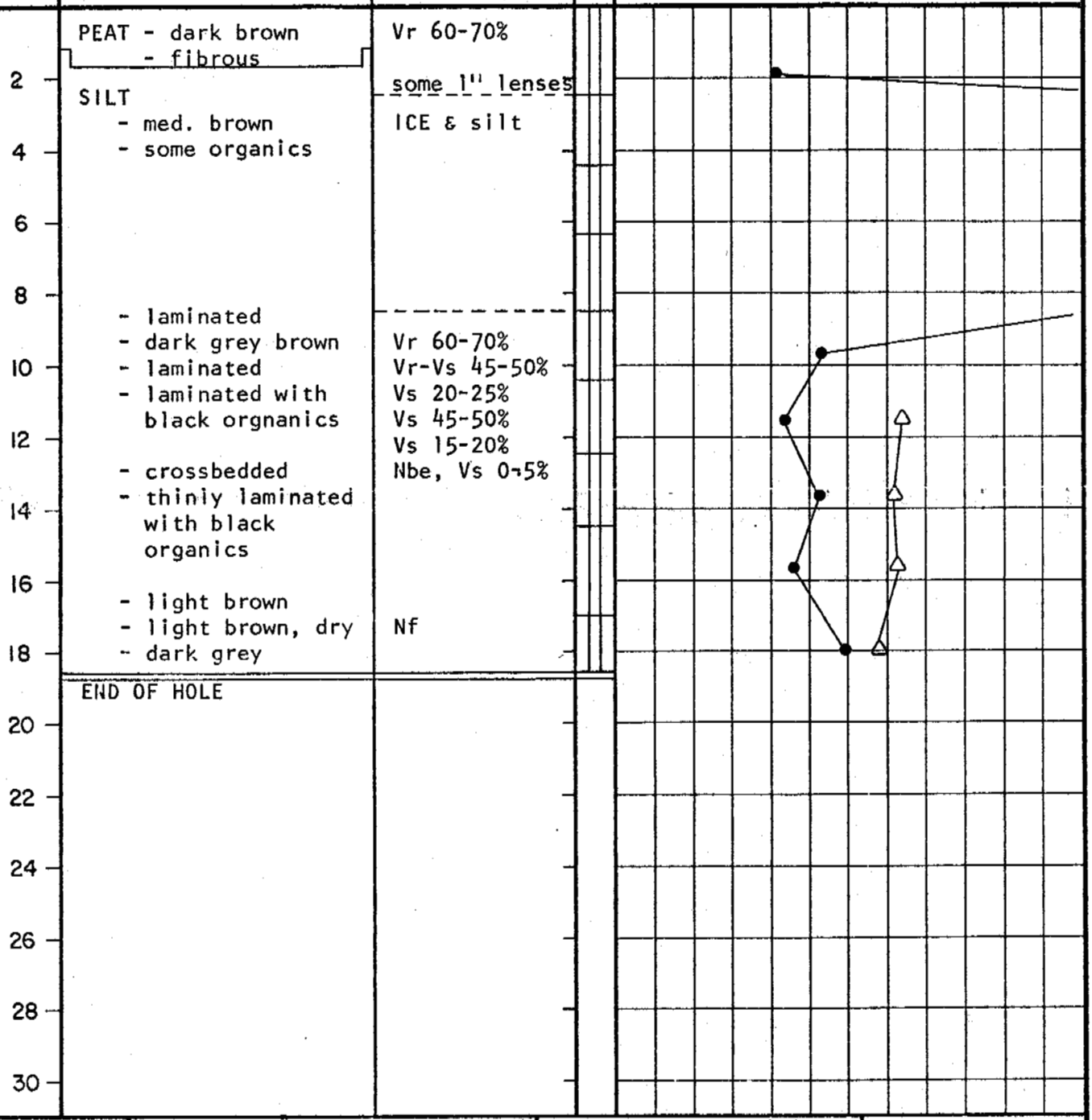
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



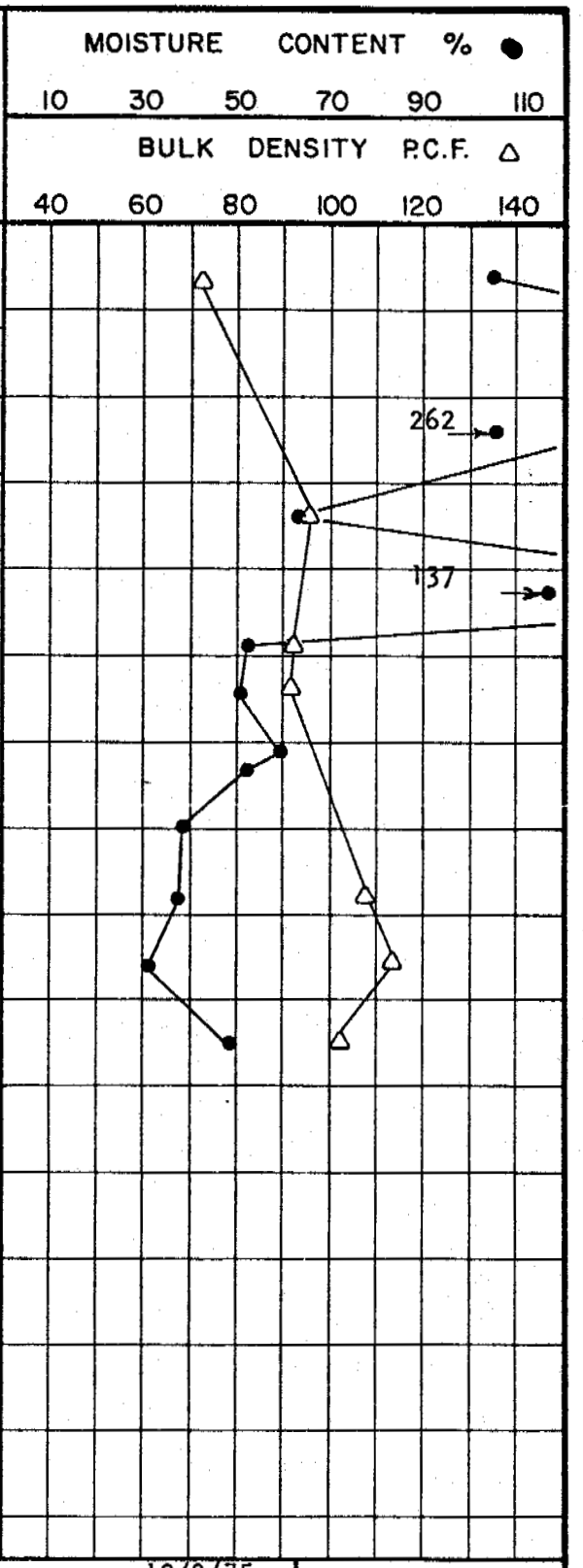
| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 7/2/75<br>TECHNICIAN JK | HOLE Nº<br>G-11 |
| | COMPLETION DEPTH (ft.) 19' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr-Vx 50-60%<br>Vr-Vs 30-40% |
| 4 | SILT - med. grey<br>- organic | Vr-Vx 70-80% |
| 6 | - med. brown<br>- very organic | |
| 8 | - med. grey brown<br>- laminated | Vr-Vs 50-60% |
| 10 | | |
| 12 | | Vr-Vs 30-40% |
| 14 | - dark grey<br>- sandy | |
| 16 | | Vs 10-20% |
| 18 | - trace of sand | Vs 30-40%<br>Nbe<br>Vs 5-10% |
| 20 | - trace of organics<br>- laminated | Vs 10-20%<br>Some Vs 30-40% |
| 22 | END OF HOLE | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 10/2/75<br>TECHNICIAN DK | HOLE Nº<br>H2 |
| | COMPLETION DEPTH (ft.) 20' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr-Vx 40-50% | |
| | SILT<br>- dark grey<br>- organic | Vr 60-70%<br>Vr 80-90%<br>Vs-Vr 50-60% | |
| 4 | | | |
| 6 | - med. brown | Vs-Vr 40-50% | |
| 8 | | | |
| 10 | | | |
| 12 | - med. grey brown<br>- trace of sand | Nbe, Vs 10-20%<br>Nbe | |
| 14 | - dark grey<br>- sandy<br>- crossbedded | Vx-Vs 5-10%<br>Nbe<br>Vs 0-5% | |
| 16 | - thin organic laminations | Nbe, Vs 5-10% | |
| 18 | | Nbe, Vs 10-20% | |
| 20 | END OF HOLE | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

249%

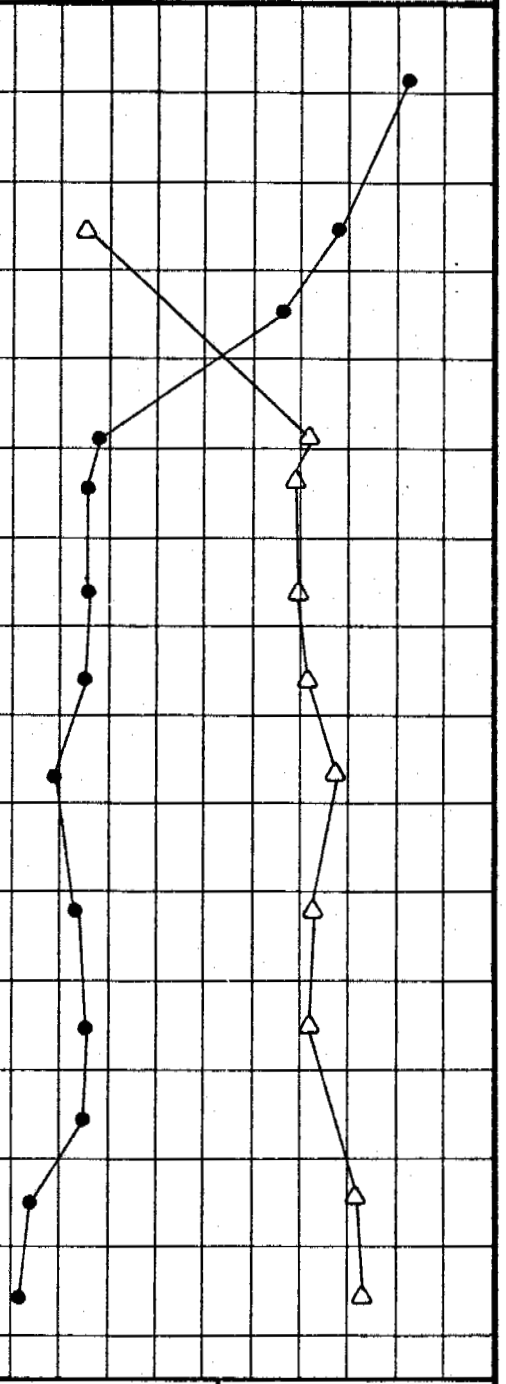
| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 10/2/75<br>TECHNICIAN DK | HOLE Nº<br>H5 |
| | COMPLETION DEPTH (ft.) 19 | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT - dark brown | Vr-Vx 70-80% |
| | - fibrous | Vx-Vs 80% |
| 2 | SILT | |
| | - med. grey | |
| | - med. brown | |
| 4 | | Vs 30-40% |
| | - laminated with organics | |
| 6 | - crossbedded | Vs 10-20% |
| 8 | | Vr-Vs 20-30% |
| | - dark grey | Vs 20-30% |
| | - crossbedded | |
| 10 | - laminated | Nbe, Vs 0-5% |
| | - thin organic laminations | |
| 12 | - sandy | Nbe |
| | | Vs - trace |
| 14 | SAND | |
| | - dark grey | |
| 16 | - very fine | |
| | - silty | |
| | - crossbedded | |
| 18 | - laminated | Nbn-Nbe |
| | - organic lenses | Nbn |
| 20 | | |
| | - 3" dry, med. sand lens | Nf |
| 22 | | Nbn |
| | | Vs-trace |
| 24 | - thinly laminated | |
| | - thin to med. organic layers | Nbe, Vs trace |
| 26 | - brown organic layers | Nbe, Vs 0-5% |
| 28 | SILT - dark grey | Nbe |
| | - sandy | some Vs |
| 30 | END OF HOLE | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140

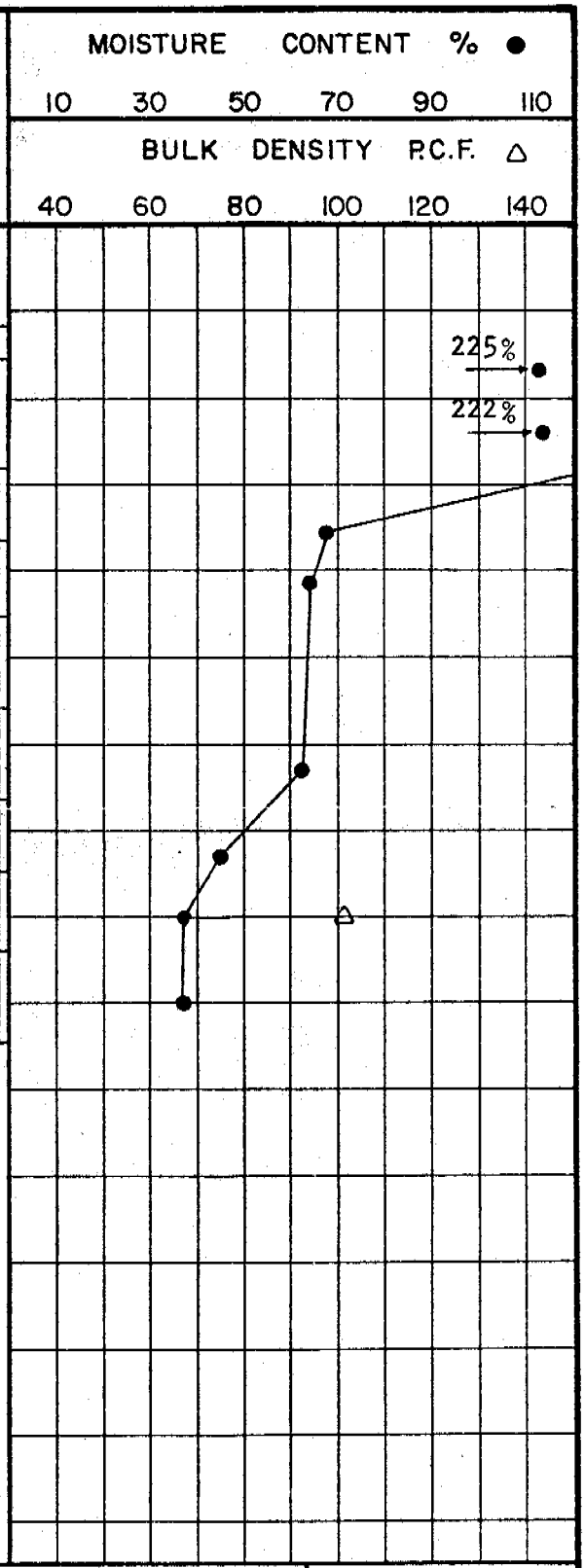


| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 10/2/75 | HOLE Nº H8 |
| | | TECHNICIAN DK | |
| | COMPLETION DEPTH (ft.) 30' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT - brown<br>- fibrous | Vr 50-60% |
| 2 | SILT | Vr 45% |
| | - med. brown<br>- organic | Vr 65-70% |
| 4 | - some organics | Some Vs |
| 6 | | Vr-Vs 70-80% |
| 8 | - fine laminations | Vs 25-35% |
| 10 | | Vr-Vs 50-60%<br>Vs 40-50% |
| 12 | - some black organics | Vr-Vs 50-60%<br>Vs 20-30% |
| 14 | - interbedded med. fine silt and very fine sand | |
| 16 | - trace of fine sand, trace of organics | Nbn-Vs 10-20% |
| 18 | - finely laminated very fine sand and med. grey brown silt | |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| CRREL | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 5/2/75<br>TECHNICIAN KS | HOLE Nº<br>1-1 |
| | COMPLETION DEPTH (ft.) 19' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT - dark brown<br>- fibrous | Vr 60-70%<br>Vr 50-60% |
| 4 | SILT<br>- med. brown<br>- organic | Vr 70-80% |
| 6 | | Vr 80-90%<br>Vr 70-80% |
| 8 | | Vr-Vs 30-35% |
| 10 | | Vs 25-30%<br>Some Vs 50-60% |
| 12 | - dark grey<br>- thinly bedded with sand | |
| 14 | - crossbedded<br>- thin organic layers | Nbn Vs 5-10% |
| 16 | - laminated with organics | Vs 40-50% |
| 18 | - thickly laminated with sand and organics | |
| 20 | END OF BOREHOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

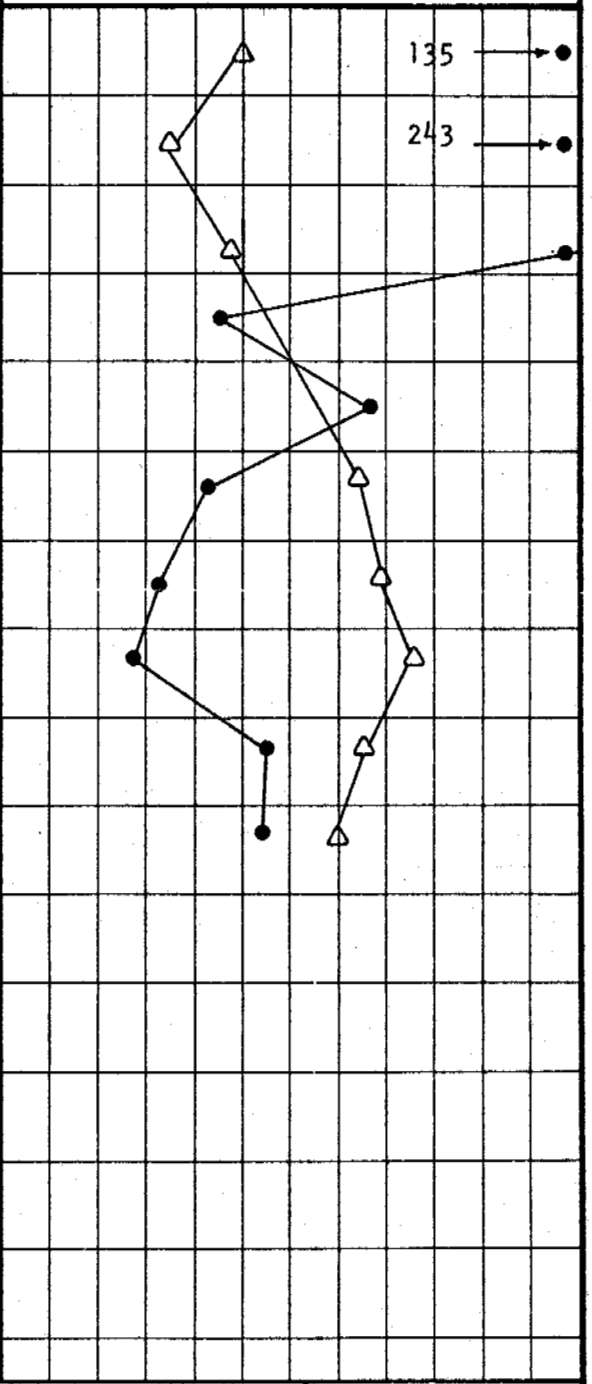
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 5/2/75<br>TECHNICIAN JK | HOLE Nº<br>1-2 |
| | COMPLETION DEPTH (ft.) 19½ | REGION Plantsite | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT - dark brown | Vr 60-70% |
| 2 | SILT | |
| | - med. brown | Vr 70-80% |
| | - some organics | |
| 4 | | Vr 60-70% |
| | | Vr-Vs 20-25% |
| 6 | | |
| | | ICE + 20% |
| 8 | - laminated | Vs 60-70% |
| | | Vs 50-60% |
| 10 | | Some Vs 30% |
| | - med. grey brown | Vx 0-5% |
| 12 | - crossbedded | Nbn, Vs trace |
| | - laminated with fine uniform sand | Nbn |
| 14 | - no sand | Some Vs 50% |
| | - crossbedded with layers of fine uniform sand | Vs 5-10% |
| 16 | | Nbn |
| | - laminated with thin organic layers | Vs 45-50% |
| 18 | | Nbn, Vs 5-10% |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

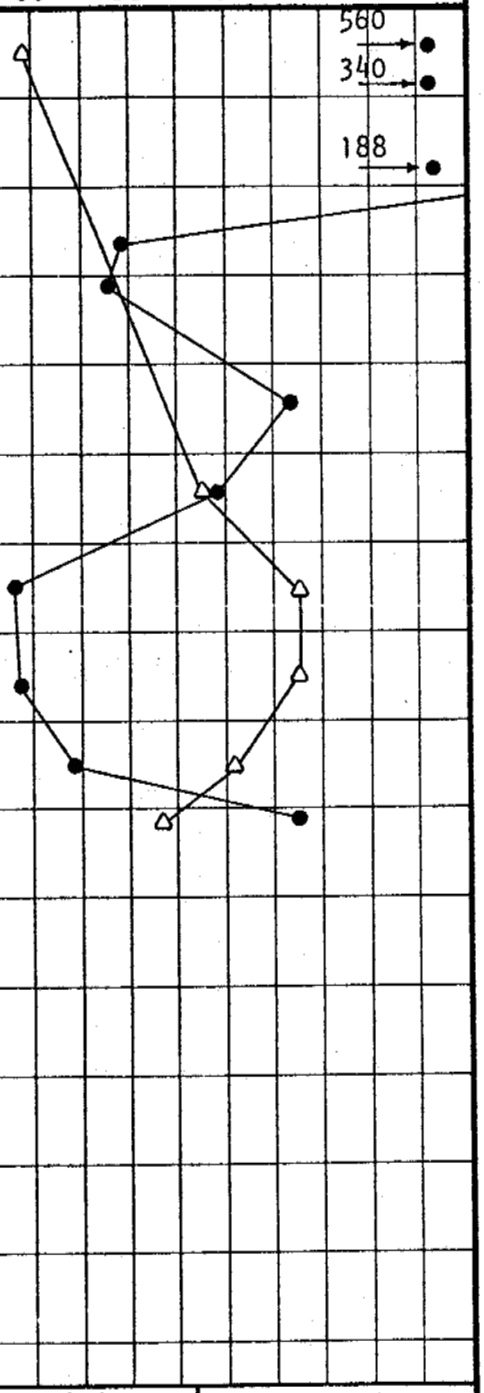
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140




| | | | |
|---|---|---|---|
| EBA | SAMPLE TYPE CRREL Barrel | DATE DRILLED 5/2/75 | HOLE Nº 1-5 |
| | | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 20 ' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | PEAT<br>- dark brown<br>- fibrous | Vr 60-70%<br>50-60% |
| 4 | SILT<br>- med. brown<br>- some organics | 45-50% |
| 6 | | ICE +<br>Vr-Vs 50-60% |
| 8 | - laminated | 40-45<br>20-25%<br>Vr 30-40%<br>15-20% |
| 10 | - laminated to crossbedded | Vs 50-60%<br>Nbn, Vs 5-10% |
| 12 | - med. to dark grey<br>- laminated | 2" thick vertical ice |
| 14 | - crossbedded | |
| 16 | - dark grey | Vr 5-10% |
| 18 | - thinly bedded with fine grained uniform sand | Nbn |
| 20 | - laminated with organics | |
| | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

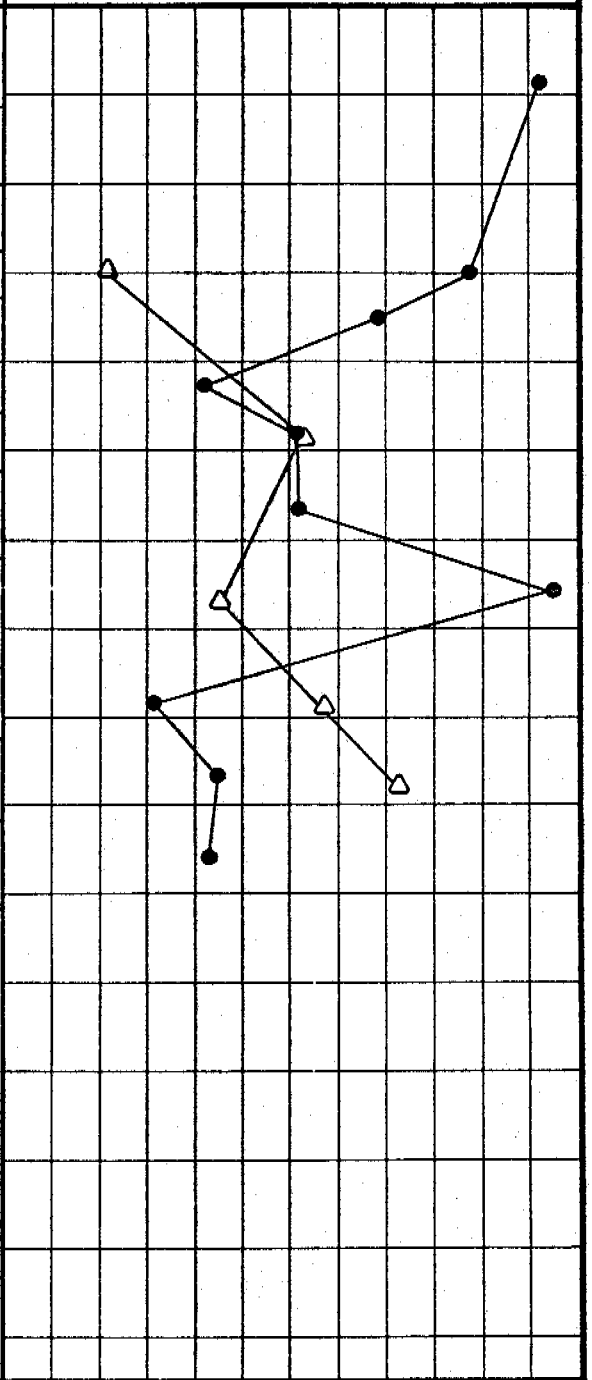
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



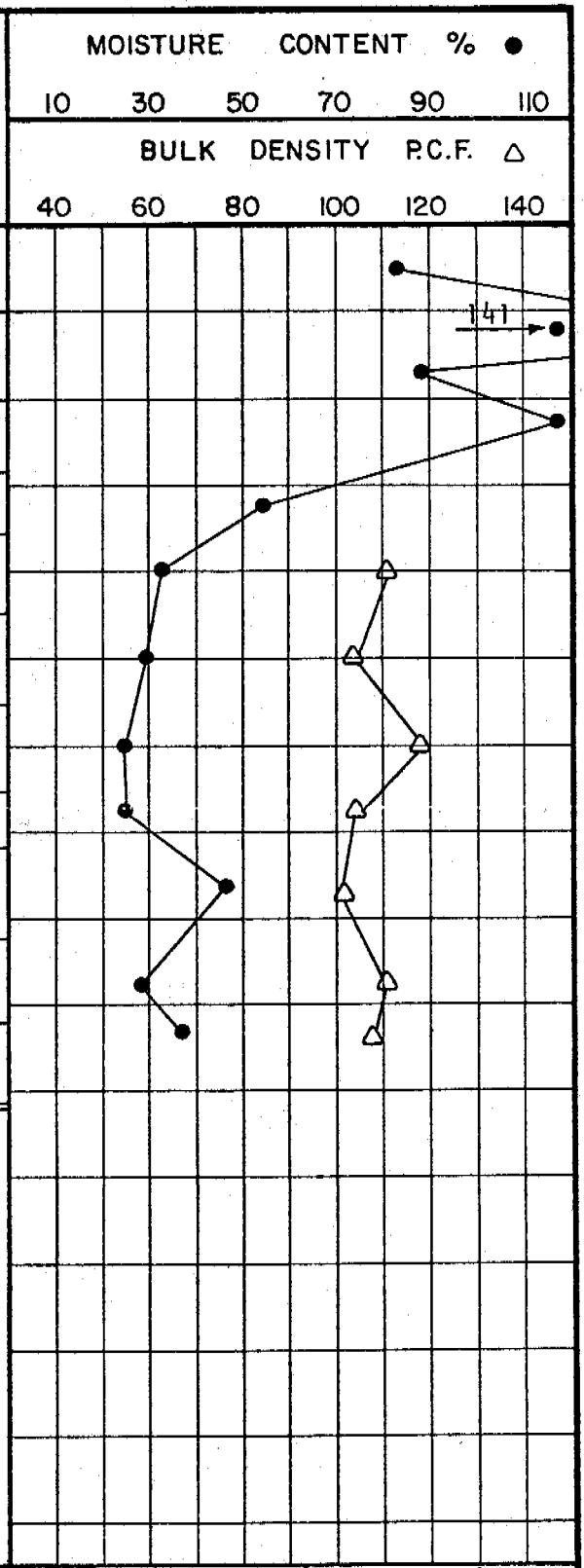
| | | | |
|---|---|---|---|
| EBA | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 5/2/75<br>TECHNICIAN JK | HOLE Nº<br>1-8 |
| | COMPLETION DEPTH (ft.) 20½ | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT<br>- dark brown<br>- fibrous | Vr 50-60% |
| 2 | SILT<br>- med. brown<br>- some organics | Vr-Vs 50-70<br>Vr-Vs 45-50% |
| 4 | | Vs 50-60% |
| 6 | - laminated | |
| 8 | - med. grey brown<br>- thin organic layers | Vs 5-10%<br>Nbe, Vs 0-5% |
| 10 | - dark grey brown | |
| 12 | | Some Vs 40-50%<br>Nbe, Vs 0-5% |
| 14 | - laminated with organics | Some Vs 50%<br>Nbn, Vs 0-5% |
| 16 | | |
| 18 | - very sandy<br>- thin organic | Nbn-Nbe |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE



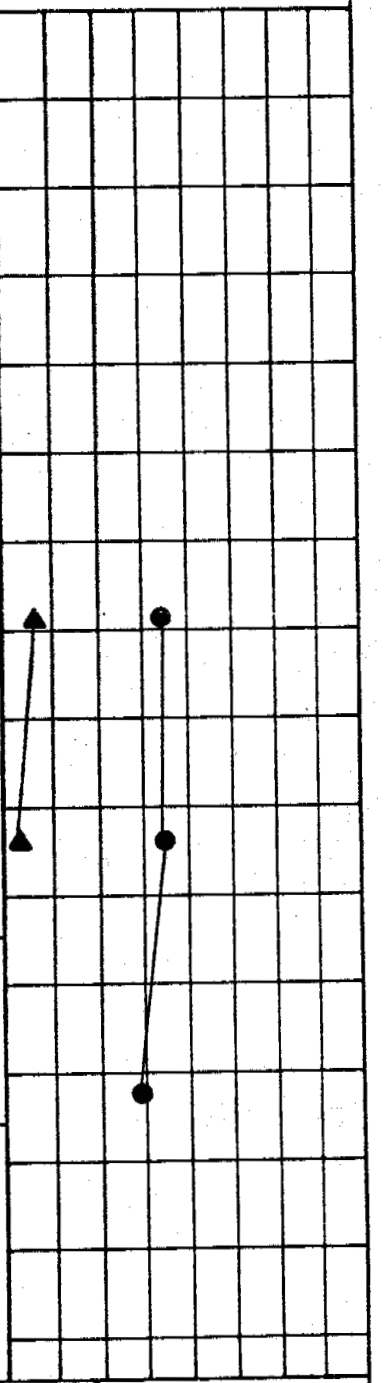

| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 5/2/75<br>TECHNICIAN JK | HOLE Nº<br>1-10 |
| | COMPLETION DEPTH (ft.) 20' | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | SILT<br>- med. to dk. grey brown<br>- trace of clay<br>- trace of organics<br>- soft to firm | | Unfrozen |
| 12 | | | |
| 14 | | | |
| 16 | | | |
| 18 | - med. brown<br>- very soft | | |
| 20 | | | |
| 22 | - dark grey<br>- laminated | | Frozen<br>Nbn-Nbe<br>Vs 0-5% |
| 24 | | | |
| 26 | END OF HOLE | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3



| | | | |
|---|---|---|---|
| eda | ICE THICKNESS (ft.) 4½ | DATE DRILLED 8/2/75 | HOLE Nº 0-18 |
| | WATER DEPTH (ft.) 8 | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 25 | REGION Drilling Pad | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | | | |
| 12 | SILT<br>- med. brown<br>- tr. to some sand | | UNFROZEN |
| 14 | | | |
| 16 | | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F ■
1 2 3

| | | |
|---|---|---|
| ICE THICKNESS (ft.) 5 | DATE DRILLED 16/7/75 | HOLE Nº BL 1 |
| WATER DEPTH (ft.) 11 | TECHNICIAN JK | |
| COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION | MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F ■ 1 2 3 |
|---|---|---|---|---|
| 32 | -med. grey brown | | | |
| 34 | | | | |
| 36 | | | | |
| 38 | | | | |
| 40 | | | | |
| 42 | | | | |
| 44 | END OF HOLE | | | |

| | | | |
|---|---|---|---|
| eda | ICE THICKNESS (ft.) 5 | DATE DRILLED 16/4/75 | HOLE Nº BL 1 |
| | WATER DEPTH (ft.) 11 | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | | | |
| 12 | | | |
| 14 | | | |
| 16 | SILT<br>- med brown<br>- some sand to sandy | | UNFROZEN |
| 18 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F ■
1 2 3

| | | | |
|---|---|---|---|
| ICE THICKNESS (ft.) 4 | DATE DRILLED 16/4/75 | HOLE Nº BL 2 |
| WATER DEPTH (ft.) 14 | TECHNICIAN JK | |
| COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION | MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F ■ 1 2 3 |
|---|---|---|---|---|
| 32 | - med. grey brown<br>- some organic's<br>- tr. of oil in sample | | | |
| 34 | | | | |
| 36 | | | | |
| 38 | | | | |
| 40 | | | | |
| 42 | | | | |
| 44 | END OF HOLE | | | |
| 46 | | | | |
| 48 | | | | |

| | | | |
|---|---|---|---|
| eda | ICE THICKNESS (ft.) 4 | DATE DRILLED 16/4/75 | HOLE Nº BL 2 |
| | WATER DEPTH (ft.) 14 | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | | | |
| 12 | | | |
| 14 | SILT<br>- med grey brown<br>- tr. very fine sand | | UNFROZEN |
| 16 | | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | - med grey<br>- tr. organics | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F ■
1 2 3

| | | | |
|---|---|---|---|
| ICE THICKNESS (ft.) 4 1/2 | DATE DRILLED 16/4/75 | HOLE Nº BL3 |
| WATER DEPTH (ft.) 13 | TECHNICIAN JK | |
| COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION | MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F ■ 1 2 3 |
|---|---|---|---|---|
| 32 | SAME | | | |
| 34 | | | | |
| 36 | | | | |
| 38 | | | | |
| 40 | | | | |
| 42 | | | | |
| 44 | END OF HOLE | | | |

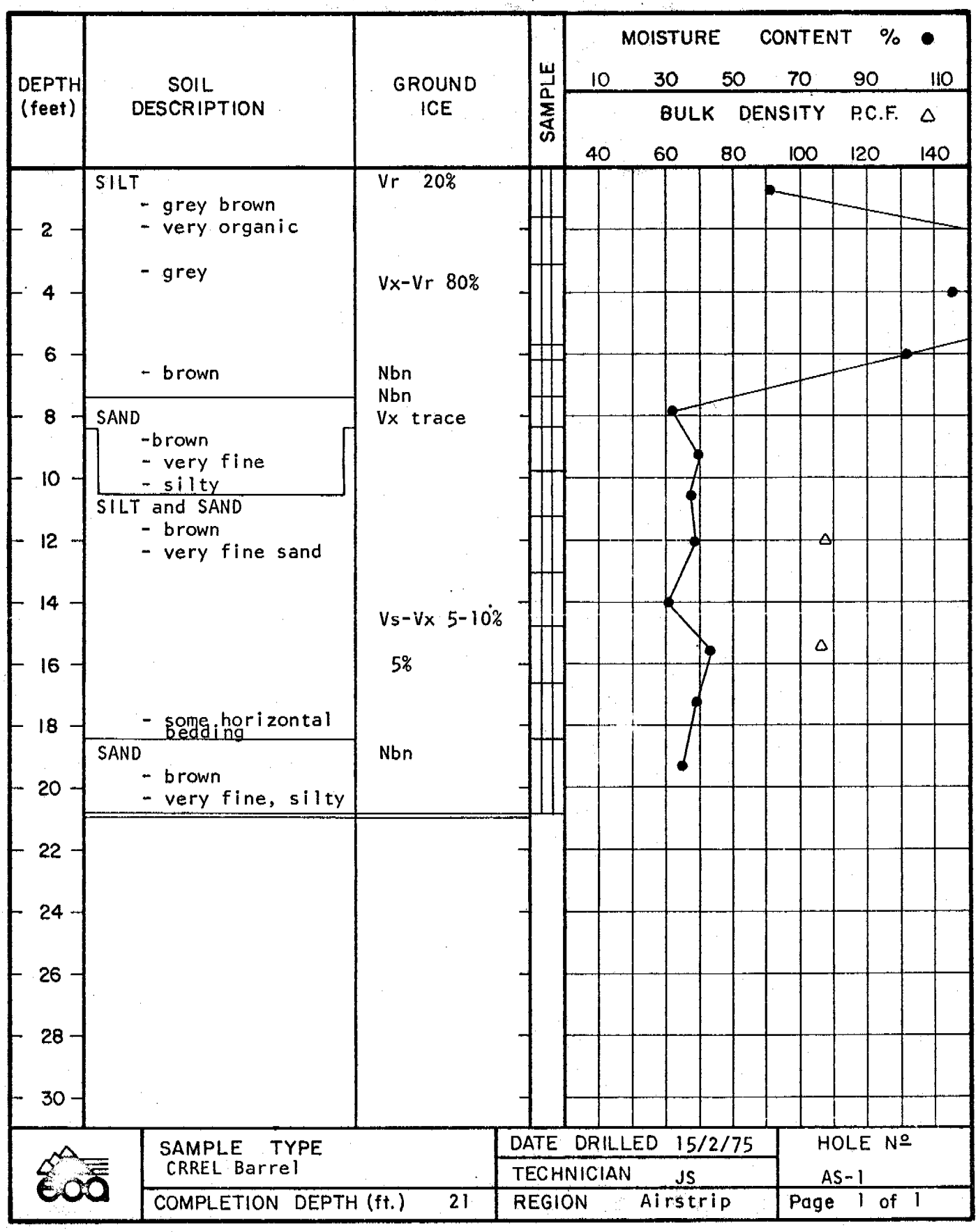
| | | | |
|---|---|---|---|
| eda | ICE THICKNESS (ft.) 4 1/2 | DATE DRILLED 16/4/75 | HOLE Nº BL 3 |
| | WATER DEPTH (ft.) 13 | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 44 | REGION BIG LAKE | Page 2 of 2 |

APPENDIX D-4

BOREHOLE LOGS FOR AIRSTRIP AND ACCESS ROADS

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

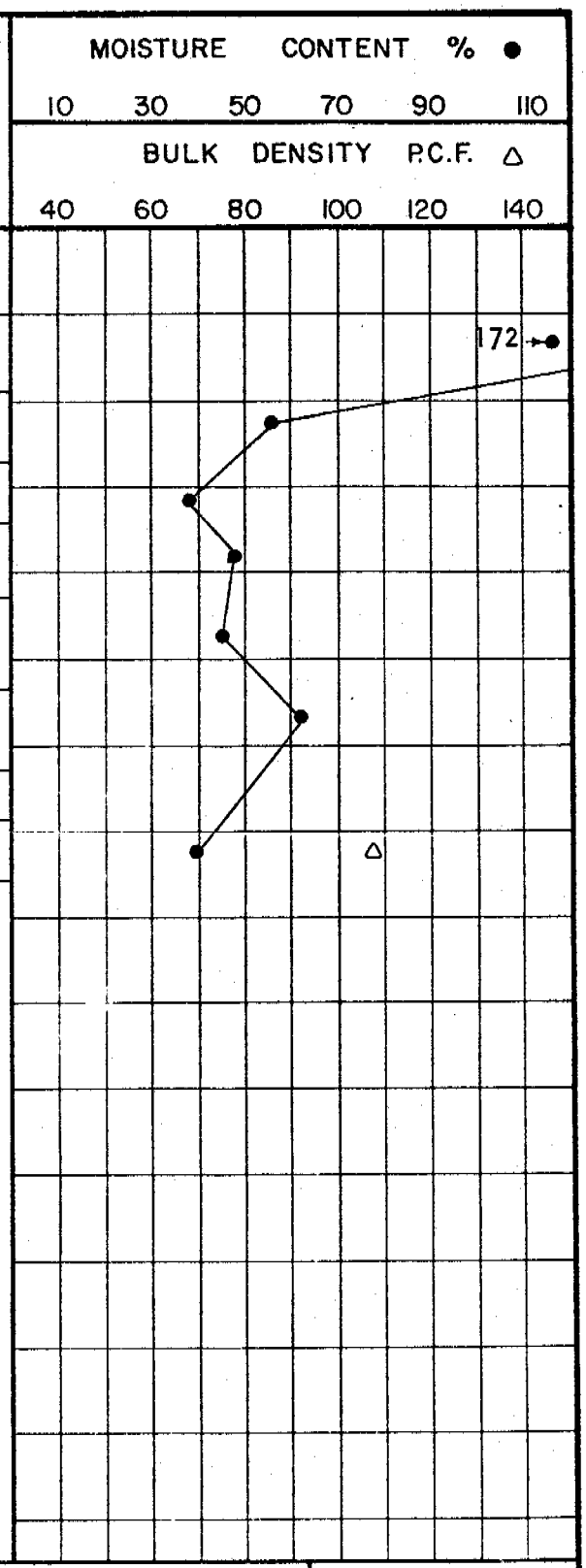



| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL Barrel | DATE DRILLED 15/2/75 | HOLE Nº AS-1 |
| | COMPLETION DEPTH (ft.) 21 | TECHNICIAN JS | Page 1 of 1 |
| | | REGION Airstrip | |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | PEAT<br>- brown | Vx-Vs 80-90% | |
| 4 | SILT<br>- grey | ICE+ | |
| 6 | - grey brown<br>- tr. sand<br>- horizontal beds | Vr 10-20% | |
| 8 | SAND<br>- very fine<br>- very silty | Vs 10% | |
| 10 | | 20-40% | |
| 12 | - grey brown | 10-20% | |
| 14 | | 5% | |
| 16 | END OF HOLE | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

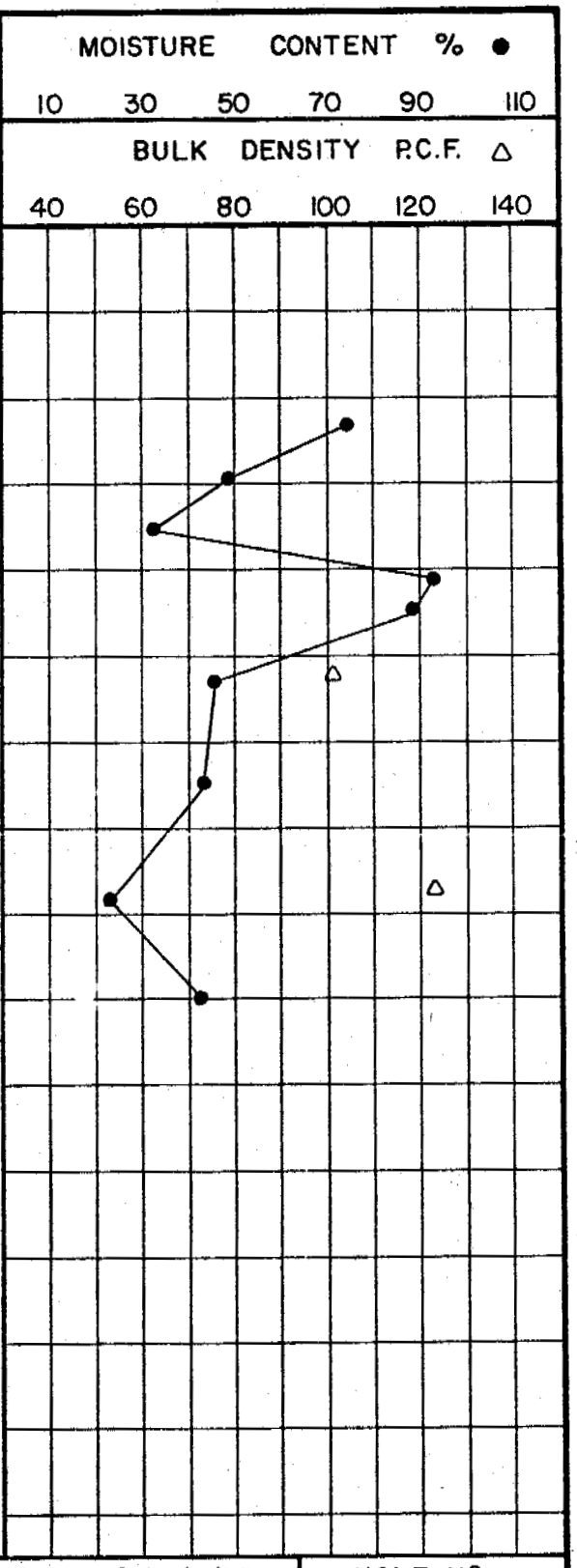



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 15/2/75<br>TECHNICIAN JS | HOLE Nº<br>AS-2 |
| | COMPLETION DEPTH (ft.) 15 | REGION Airstrip | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 0 | PEAT | ICE+ | |
| 2 | SILT | | |
| 4 | - grey brown | Vr-Vx 70% | |
| 6 | | Vr 10-20% | |
| 8 | - fine silty sand layers | Vs 50-60% | |
| 10 | | Vr 10-20% | |
| 12 | SAND - grey brown - very fine - very silty | Vr-Vs 10-20% | |
| 14 | | Vs 5% | |
| 16 | | Nbn | |
| 18 | | | |
| 20 | END OF HOLE | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 15/2/75 | HOLE Nº AS-3 |
| | COMPLETION DEPTH (ft.) 19 | TECHNICIAN JS | Page 1 of 1 |
| | | REGION Airstrip | |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 0 | PEAT | Vr-Vx 80% | |
| 2 | | | |
| 4 | SILT | 70-80% | |
| | - grey | Vr 30-40% | |
| 6 | - some very fine sand | | |
| 8 | SAND and SILT | Vr 10% | |
| | - very fine sand | Vr-Vs 10-20% | |
| 10 | | | |
| 12 | SILT | | |
| | - grey brown | | |
| | - sandy | Vx-Vs 10-20% | |
| 14 | SAND | | |
| | - very fine | | |
| | - very silty | Nbn | |
| 16 | END OF HOLE | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140

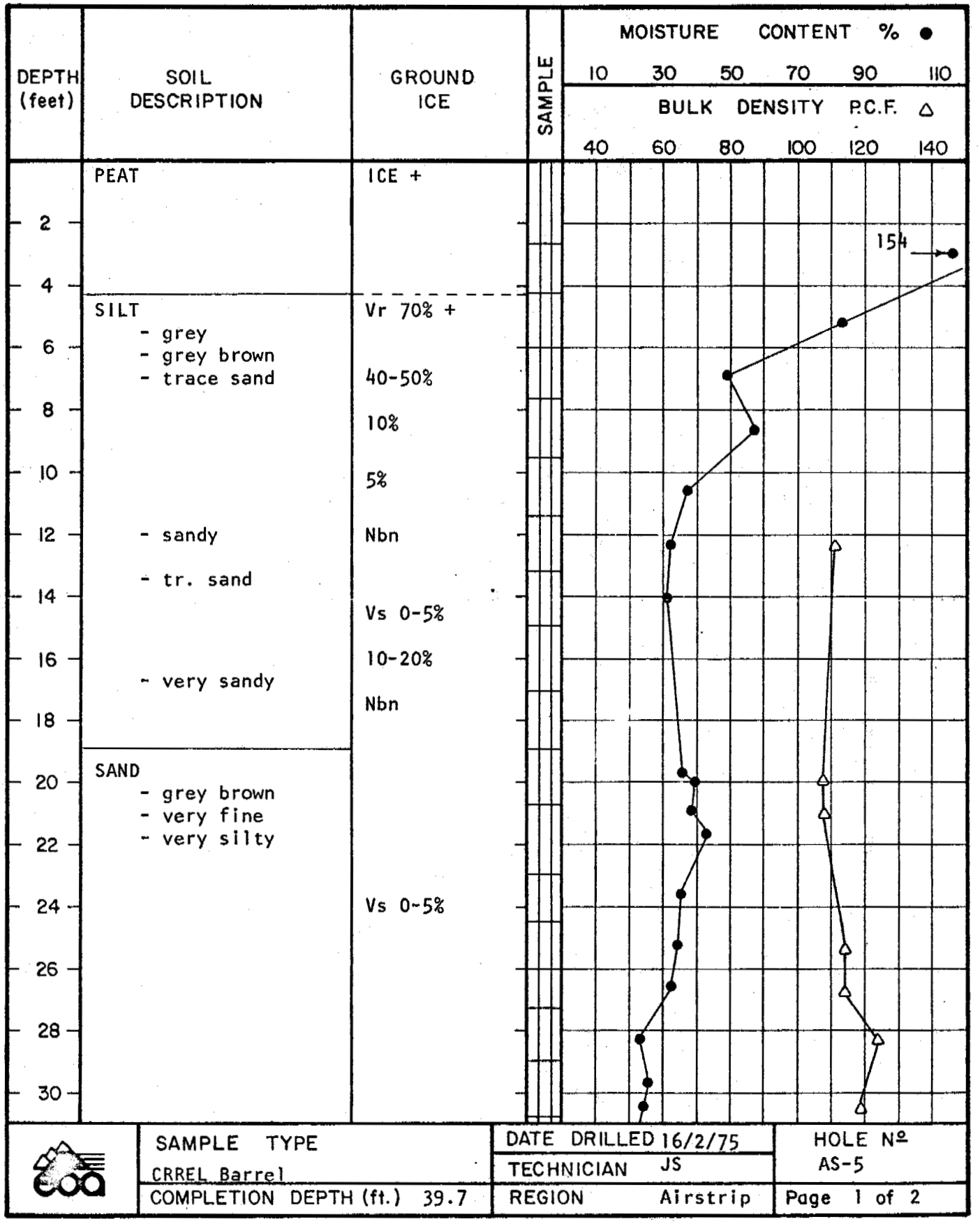
200 ●

△

| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL Barrel | DATE DRILLED 15/2/75 | HOLE Nº AS-4 |
| | | TECHNICIAN JS | |
| | COMPLETION DEPTH (ft.) 15' | REGION Airstrip | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| | SAMPLE TYPE CRREL Barrel | DATE DRILLED 16/2/75 | HOLE Nº AS-5 |
| | | TECHNICIAN JS | |
| | COMPLETION DEPTH (ft.) 39.7 | REGION Airstrip | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | - horizontal bedding | Vs 0-5% |
| 32 | | |
| 34 | | |
| 36 | - fine to med. | Vr 0-5% |
| | | Nbn |
| 38 | - very fine<br>- very silty | Vr 0-5% |
| 40 | END OF HOLE | |

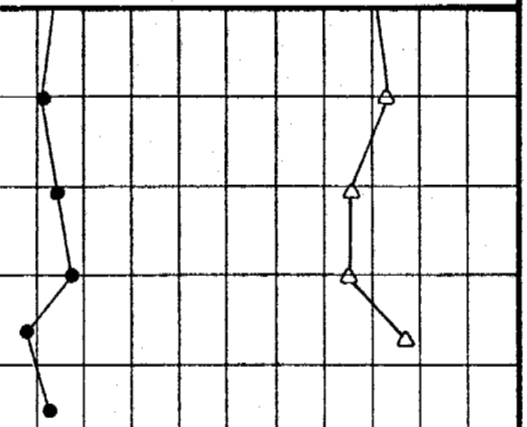
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



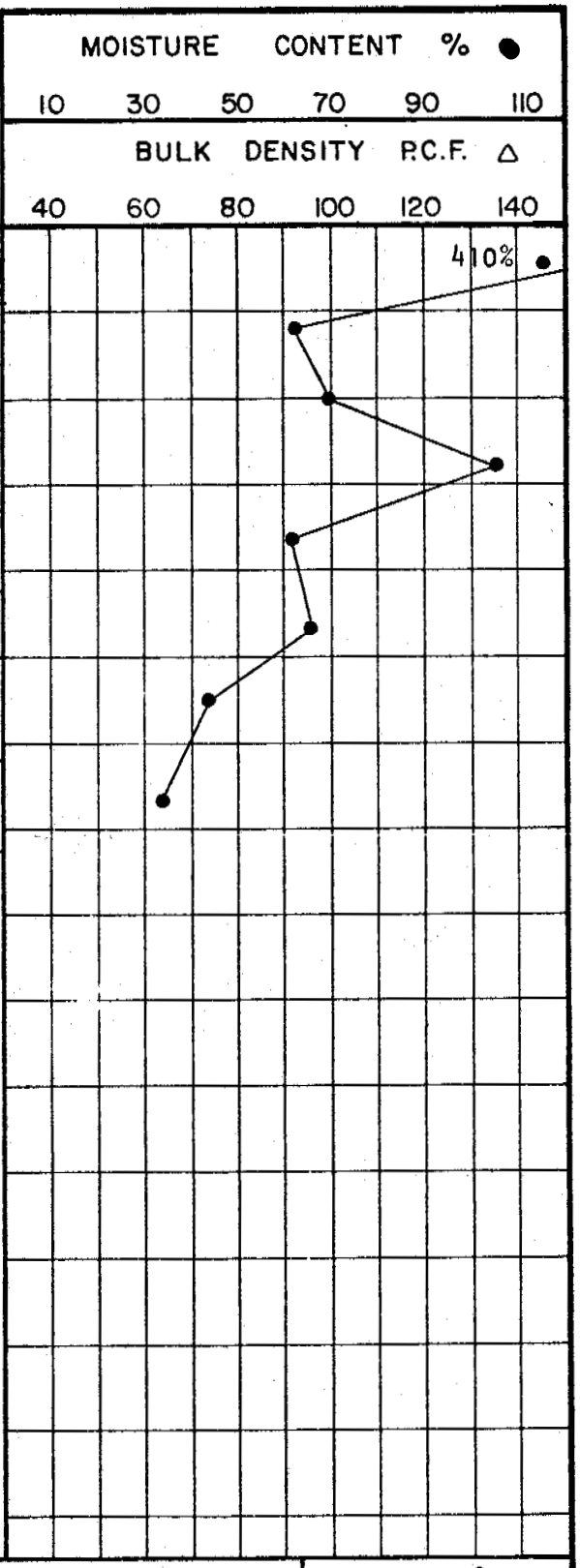
| | | | |
|---|---|---|---|
| | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 16/2/75<br>TECHNICIAN JS | HOLE Nº<br>AS-5 |
| | COMPLETION DEPTH (ft.) 39.7 | REGION Airstrip | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| | PEAT | |
| 2 | SILT | Vr 50% |
| | - grey | |
| | - organic | Vx 50% |
| 4 | - tr. sand | |
| | - grey brown | Vx 40-50% |
| 6 | | |
| | | Vr 20% |
| 8 | | |
| | | Vs 20-30% |
| 10 | | Vr 10-20% |
| 12 | SAND | Vs 0-5% |
| | - very fine | |
| 14 | - silty | |
| | END OF HOLE | |
| 16 | | |
| 18 | | |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

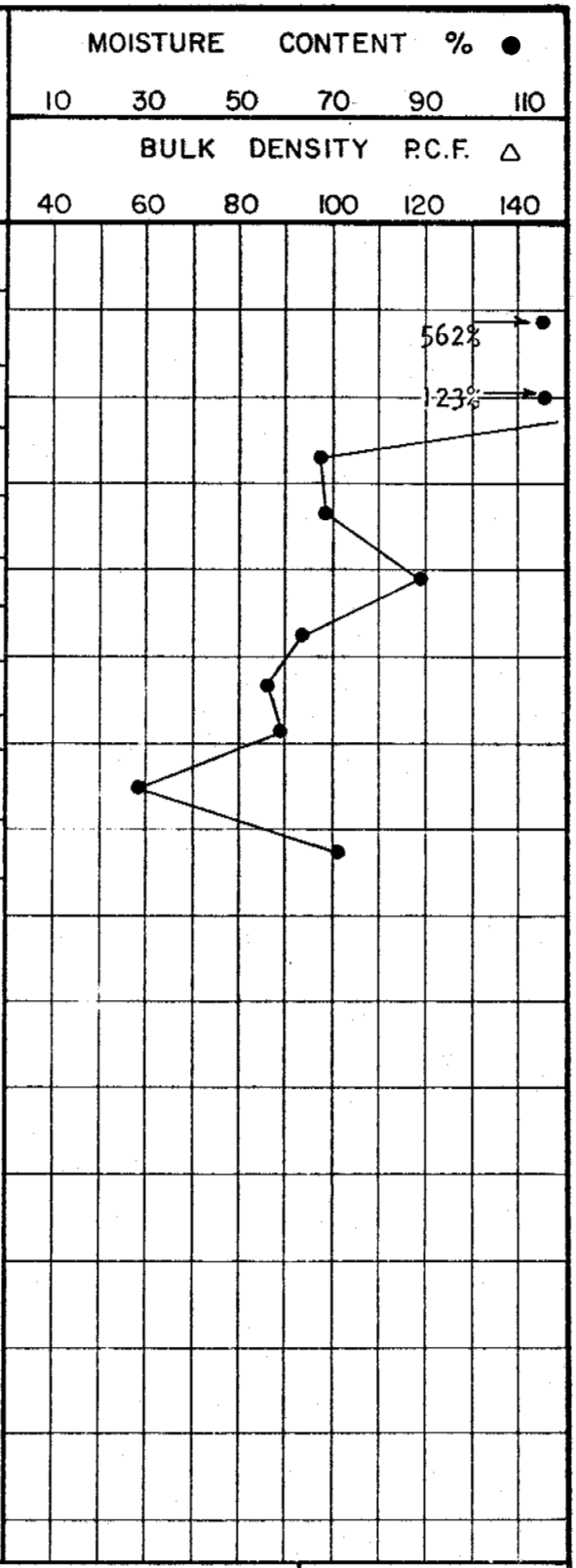



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 15/2/75 | HOLE Nº AS-6 |
| | COMPLETION DEPTH (ft.) 14.3 | TECHNICIAN JS | Page 1 of 1 |
| | | REGION Airstrip | |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 0 | PEAT | Vx-Vr 70-80% | |
| 2 | | | |
| 4 | SILT<br>- grey<br>- organic | Vs-Vr 70-80% | |
| 6 | | 60-70% | |
| 8 | | 40-50% | |
| 10 | | Vr 20% | |
| 12 | - very sandy | Vs 20-30% | |
| 14 | - grey brown<br>- some sand | Vs 0-5%<br>Vs 40-50% | |
| 16 | END OF HOLE | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 16/2/75<br>TECHNICIAN JS | HOLE Nº<br>AS-7 |
| | COMPLETION DEPTH (ft.) 15.3 | REGION Airstrip | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT | ICE + - massive |
| 4 | SILT - grey | Vx-Vs 50-60% |
| 6 | | Vs-Vr 30% |
| 8 | | Vs 40-50% |
| 8 | - grey brown | |
| 10 | | 10-20% |
| 12 | - sandy | |
| 14 | | Vs-Vr 40% |
| 16 | | Vs 20% |
| 18 | SAND - very fine - silty | 0 -5% |
| 20 | END OF HOLE | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

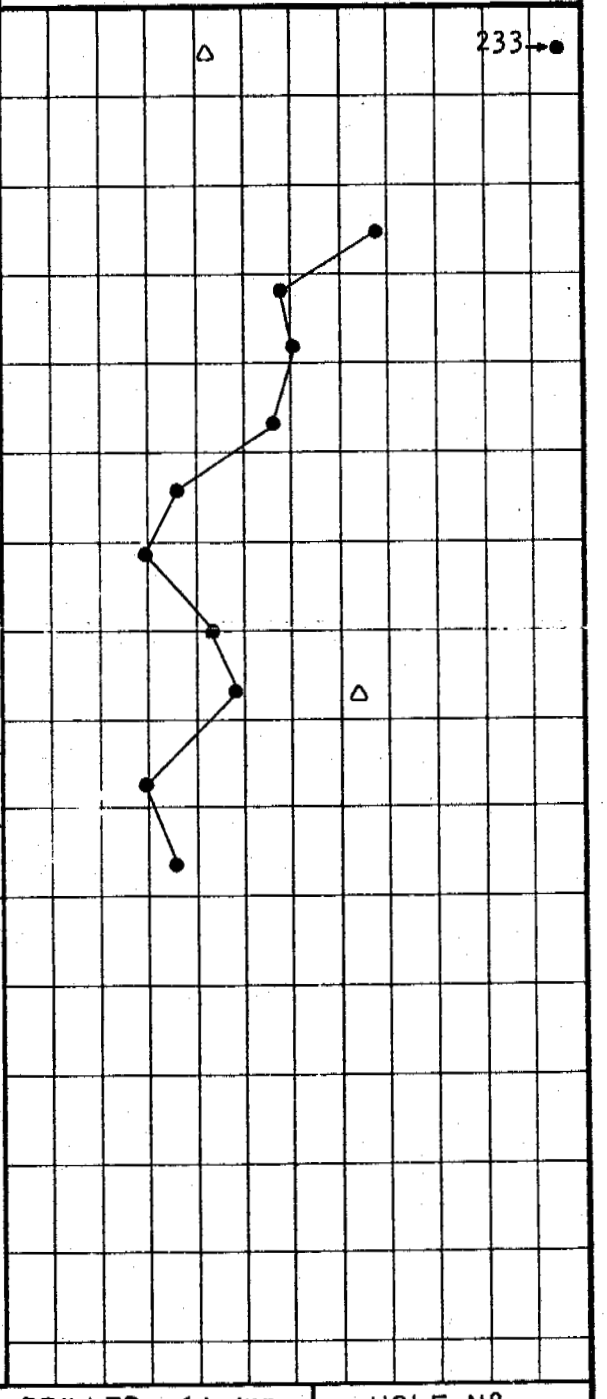
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140




| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 16/2/75 | HOLE Nº AS-8 |
| | | TECHNICIAN JS | |
| | COMPLETION DEPTH (ft.) 20 | REGION Airstrip | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | PEAT | ICE+ |
| 2 | SILT | |
| 4 | - grey | Vx 60% |
| 6 | - grey brown | Vs 30% |
| 8 | | |
| 10 | - sandy | Vx 5-10% |
| 12 | | Vs 5% |
| 14 | SAND - very fine<br>- very silty | 0-5% |
| 16 | END OF HOLE | |
| 18 | | |
| 20 | | |
| 22 | | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

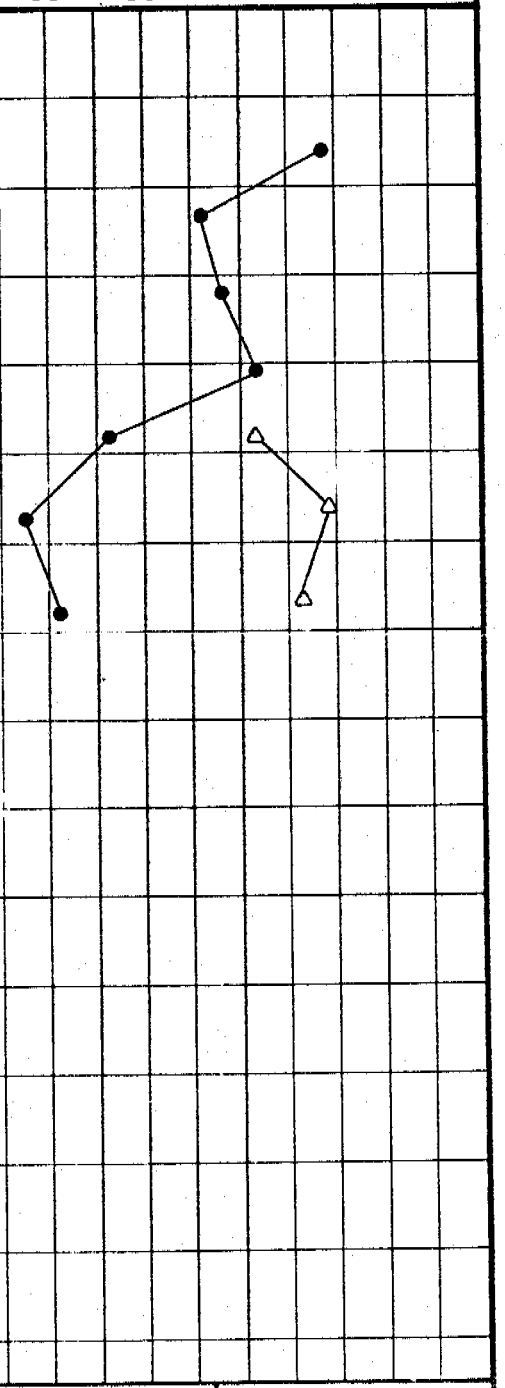
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



eda

SAMPLE TYPE
CRREL Barrel

COMPLETION DEPTH (ft.) 14.6

DATE DRILLED 16/2/75

TECHNICIAN JS

REGION Airstrip

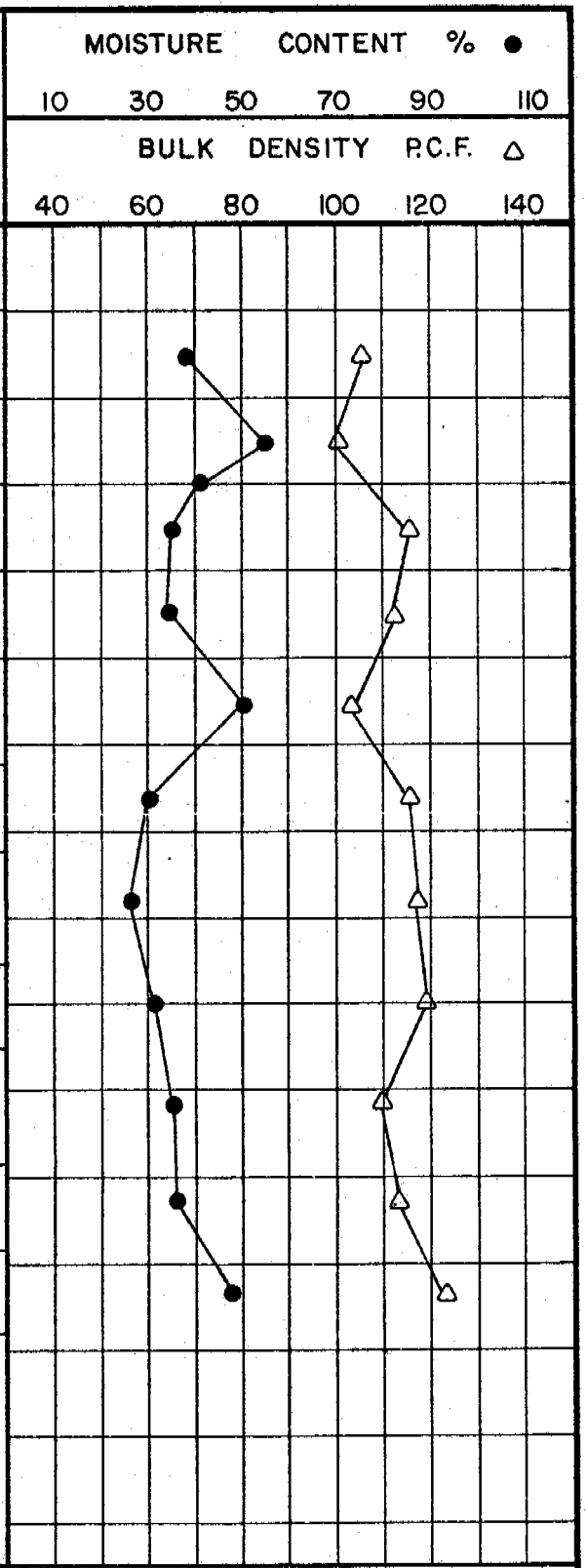
HOLE Nº
AS-9

Page 1 of 1

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SILT - medium brown, some organics | Nbn |
| 4 | | |
| 6 | - dark grey, some organics | trace of Vs |
| 8 | | |
| 10 | - grey - brown | Nbn |
| 12 | | 3/4" lens Nbn - Vs 5% |
| 14 | - trace of organics<br>- trace of sand | |
| 16 | | Nbn |
| 18 | | |
| 20 | - layers of organics<br>- trace of fine sand | |
| 22 | | |
| 24 | | |
| 26 | END OF HOLE | |
| 28 | | |
| 30 | | |

SAMPLE

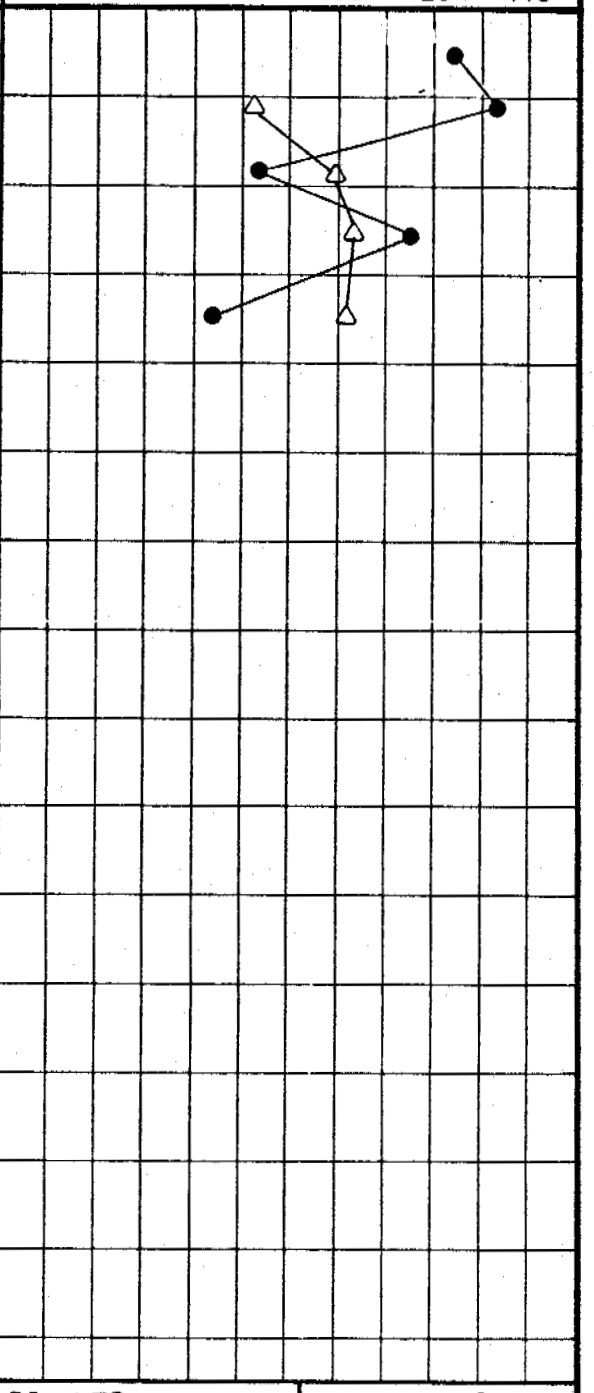



| | | | |
|---|---|---|---|
| EGG | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 14/1/75<br>TECHNICIAN JH | HOLE Nº<br>0 - 1 |
| | COMPLETION DEPTH (ft.) 25½' | REGION Roadway | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS & SILT | | |
| 4 | SILT - some organics, grey-brown | Vr | |
| 6 | | Vr - Vs 15% | |
| 8 | - trace of organics | Vs 30% | |
| 10 | END OF HOLE core barrel shoe lost in hole - hole abandonned | | |
| 12 | | | |
| 14 | | | |
| 16 | | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

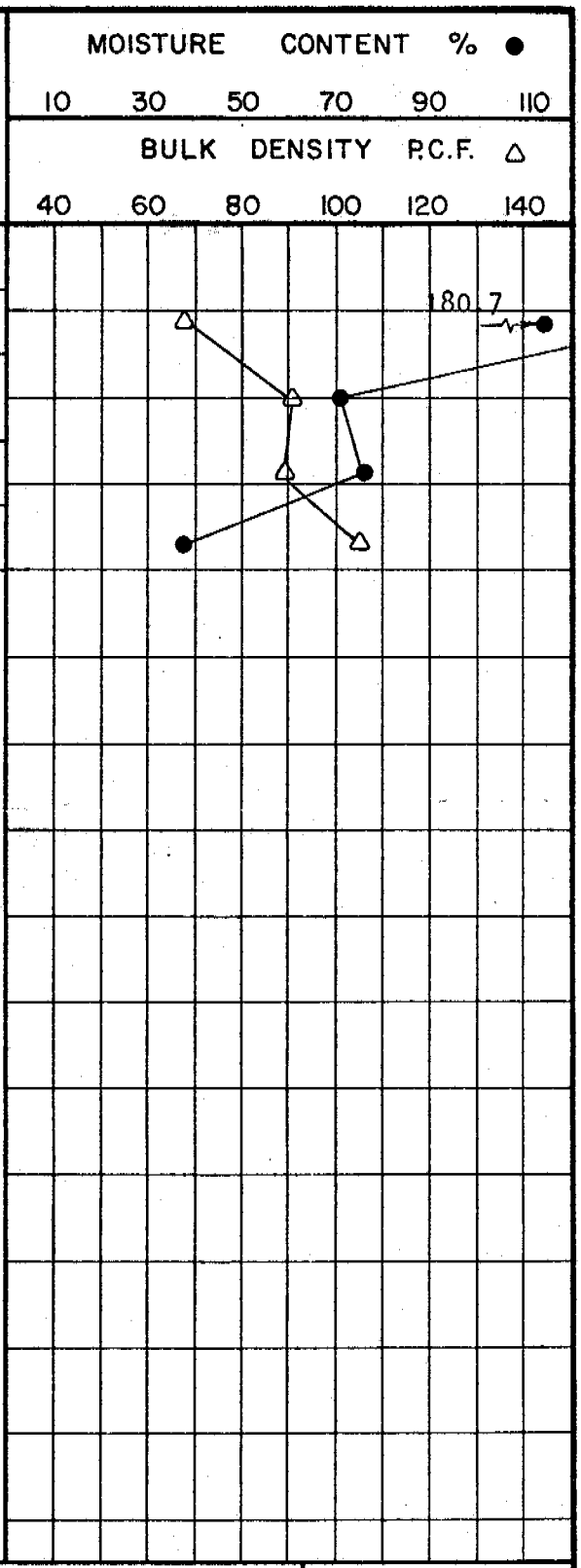
MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140



| | | | |
|---|---|---|---|
| eda | SAMPLE TYPE CRREL Barrel | DATE DRILLED 16/1/75 | HOLE Nº 0 - 2 |
| | COMPLETION DEPTH (ft.) 7½' | TECHNICIAN TH | |
| | | REGION Roadway | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ORGANICS & SILT | Vx 10% | |
| 4 | SILT - some organics | Vs 10 - 20% Vr - Vs 20 - 30% | |
| 6 | - same | | |
| 8 | - trace of organics | Nbe - Vs 5% | |
| 10 | END OF HOLE - lost second core barrel | | |
| 12 | - hole abandoned | | |
| 14 | | | |
| 16 | | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

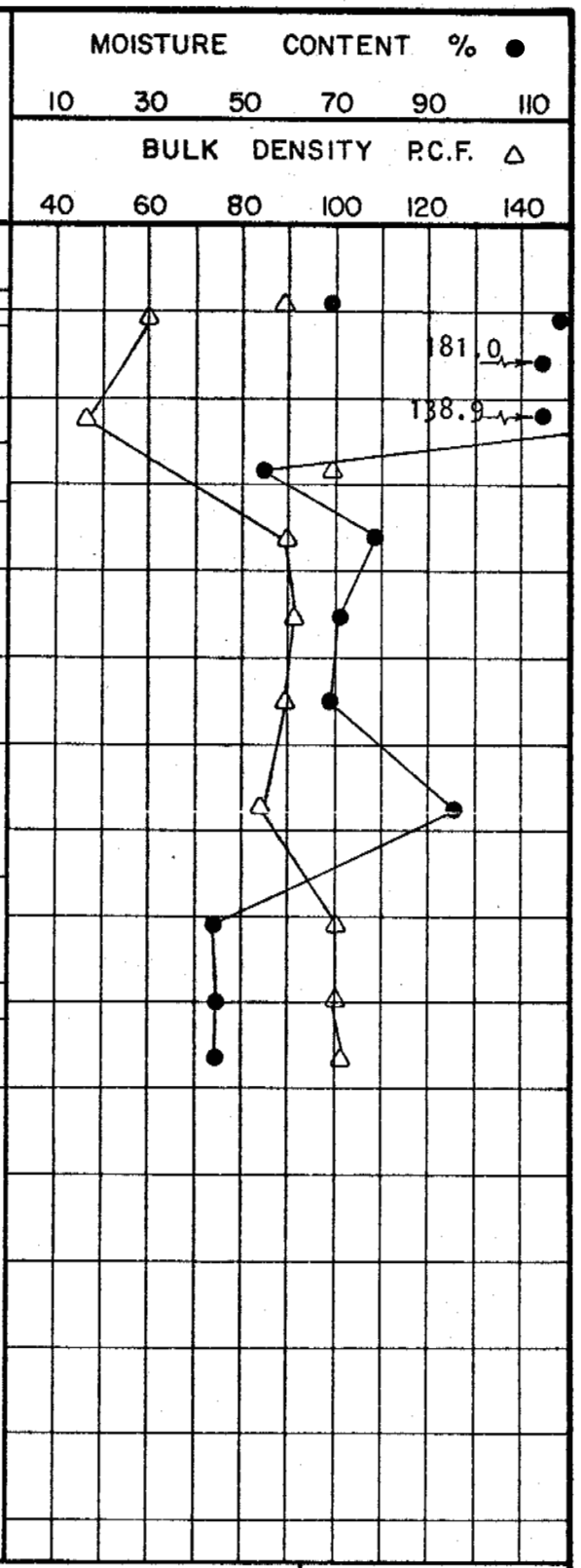



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 16/1/75 | HOLE Nº 0 - 2B |
| | COMPLETION DEPTH (ft.) 81 | TECHNICIAN TH | |
| | | REGION Roadway | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | SILT - dark brown | | |
| 4 | ORGANICS & SILT - twigs & rootlets | Vr 10-20%<br>30-40%<br>40% | |
| 6 | SILT - dark grey to brown trace of organics | 30% | |
| 8 | | 30% | |
| 10 | - dark brown | Vs 10-20% | |
| 12 | | Vr 40% | |
| 14 | - medium to dark grey, layers of black organics | Vs 10-15% | |
| 16 | - same | 5% | |
| 18 | - trace of fine sand | | |
| 20 | END OF HOLE | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |




| | | | |
|---|---|---|---|
| coa | SAMPLE TYPE CRREL Barrel | DATE DRILLED 18/1/75 | HOLE Nº 0 - 3 |
| | | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 20' | REGION Roadway | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE | MOISTURE CONTENT % ● (10 30 50 70 90 110) / BULK DENSITY P.C.F. △ (40 60 80 100 120 140) |
|---|---|---|---|---|
| | SILT - grey brown | FROZEN | | |
| 2 | ICE - clean | | | |
| 4 | | ICE | | |
| 6 | | | | |
| 8 | | | | |
| 10 | | | | |
| 12 | - 10% silt | | | |
| 14 | | | | |
| 16 | | | | |
| 18 | | | | |
| 20 | | | | |
| 22 | END OF ICE | | | |
| | NOT SAMPLED | | | |
| 24 | END OF HOLE | | | |
| 26 | | | | |
| 28 | | | | |
| 30 | | | | |

| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 18/1/75 | HOLE Nº 0 - 4 |
| | | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 24' | REGION Roadways | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SILT - organic | |
| 4 | SILT - dark grey to black with some organics | Vr 40 - 45% |
| 6 | - lighter grey | 30 - 35% 10% |
| 8 | - trace of organics | 30% Vr - Vs |
| 10 | - dark brown | 10 - 15% |
| 12 | | Vs 30 - 35%. 20% |
| 14 | | |
| 16 | | |
| 18 | - thin laminae of organics | 15 - 20% |
| 20 | | 20% |
| 22 | END OF HOLE | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

SAMPLE

MOISTURE CONTENT % ●
10 30 50 70 90 110
BULK DENSITY P.C.F. △
40 60 80 100 120 140

121.4

eba

SAMPLE TYPE
CRREL Barrel

COMPLETION DEPTH (ft.) 21'

DATE DRILLED 18/1/75

TECHNICIAN TH

REGION Roadways

HOLE Nº
0 - 4B

Page 1 of 1

# APPENDIX D-5

# BOREHOLE LOGS FOR DOCK SITE

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 2 | ICE | RIVER ICE | |
| 4 | | | |
| 6 | WATER | | |
| 8 | | | |
| 10 | | | |
| 12 | | | |
| 14 | NO SAMPLE OBTAINED | NOT FROZEN | X |
| 16 | END OF HOLE<br>River water freezing in hollow stem | | |
| 18 | | | |
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 26 | | | |
| 28 | | | |
| 30 | | | |

MOISTURE CONTENT % ●
10 30 50 70 90 110
S.P.T. RESISTANCE ▲
10 20 30 40 50

▲ 14

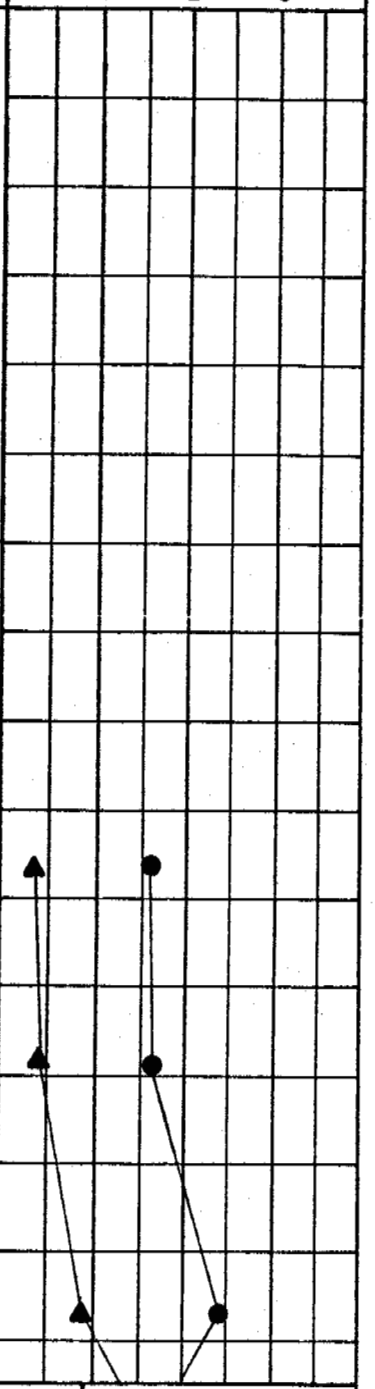
| | | | |
|---|---|---|---|
| | SAMPLE TYPE | DATE DRILLED 16/1/75 | HOLE Nº DS- 1 |
| | | TECHNICIAN NM | |
| | COMPLETION DEPTH (ft.) 14 | REGION Dock Area 2 | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 2 | ICE | | |
| 4 | WATER | | |
| 12 | | | UNFROZEN |
| 16 | SILT<br>- dark grey brown<br>- non plastic<br>- loose | | |
| 22 | - same<br>- tr. fine sand | | |
| 26 | | | |
| 28 | - med grey<br>- some organics<br>- tr. fine sand<br>- very soft | | |
| 30 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F ■
1 2 3

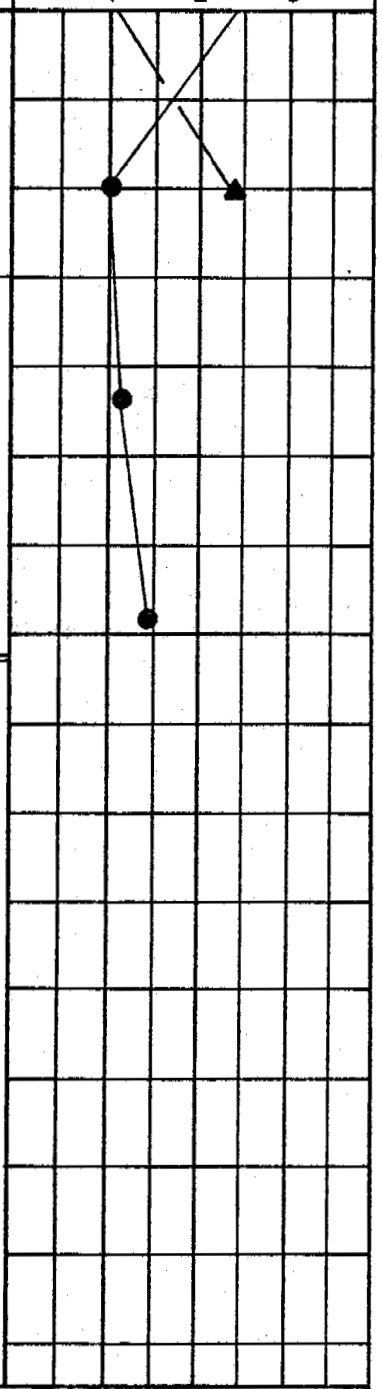


| | | | |
|---|---|---|---|
| eba | ICE THICKNESS (ft.) 4 | DATE DRILLED 17/1/75 | HOLE Nº DS-2 |
| | WATER DEPTH (ft.) 12 | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 44 1/2 | REGION Dock Site | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD'S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 32 | - harder drilling at 30' | | UNFROZEN |
| 34 | SAND<br>- med. brown<br>- fine to med. grained<br>- uniform<br>- loose | | |
| 36 | | | FROZEN |
| 38 | SILT<br>- med brown<br>- tr. fine sand | | Nbn |
| 40 | | | |
| 42 | | | |
| 44 | | | Nbn Vs - tr. |
| 46 | END OF HOLE | | |
| 48 | | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F ■
1 2 3



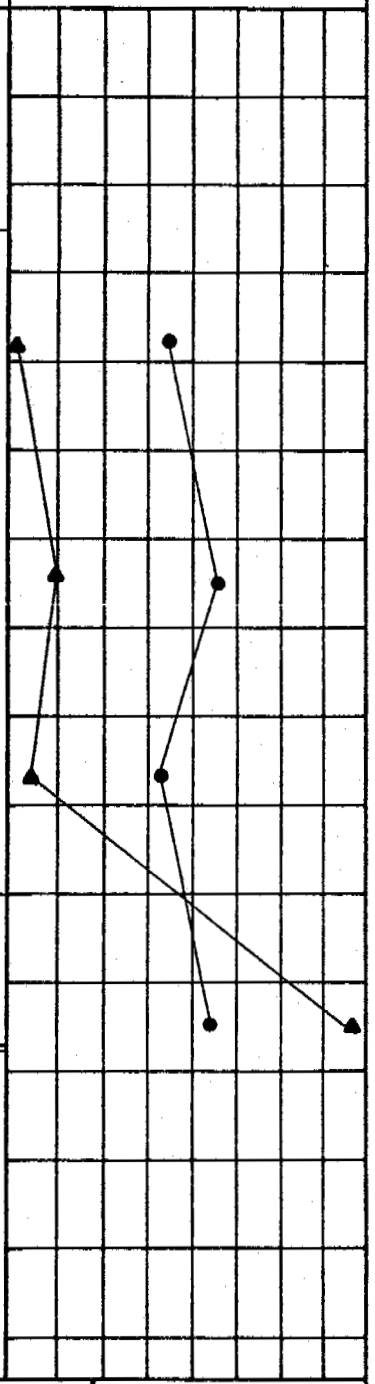
| | | | |
|---|---|---|---|
| EGA | ICE THICKNESS (ft.) 4 | DATE DRILLED 17/1/75 | HOLE Nº DS-2 |
| | WATER DEPTH (ft.) 12 | TECHNICIAN TH | |
| | COMPLETION DEPTH (ft.) 49 1/2 | REGION DOCK SITE | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 0 | RIVER ICE | | Frozen |
| 2 | SILT<br>- med. to dark grey brown<br>- organic<br>- soft<br>- saturated | | |
| 16 | SAND<br>- dark grey<br>- silty<br>- very fine, uniform | | |
| 20 | SILT<br>- dark grey<br>- sandy<br>- crossbedded<br>- thin organic layers | | Frozen<br>Nbe |
| 24 | END OF HOLE | | |

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3

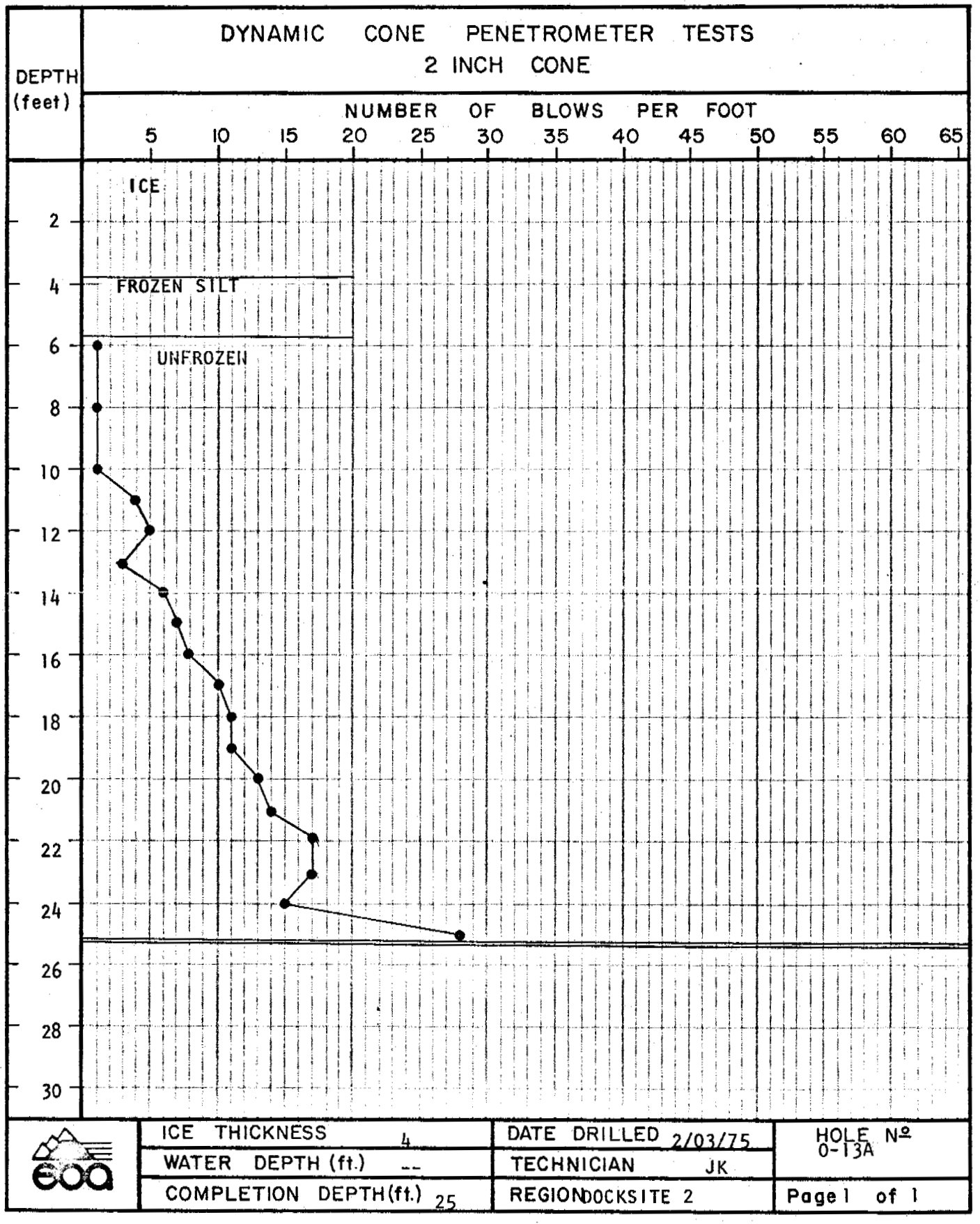


| | | | |
|---|---|---|---|
| eba | ICE THICKNESS (ft.) | DATE DRILLED 2/2/75 | HOLE Nº 0-13 |
| | WATER DEPTH (ft.) | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 23½ | REGION Docksite 2 | Page 1 of 1 |

Hollow Stem Auger

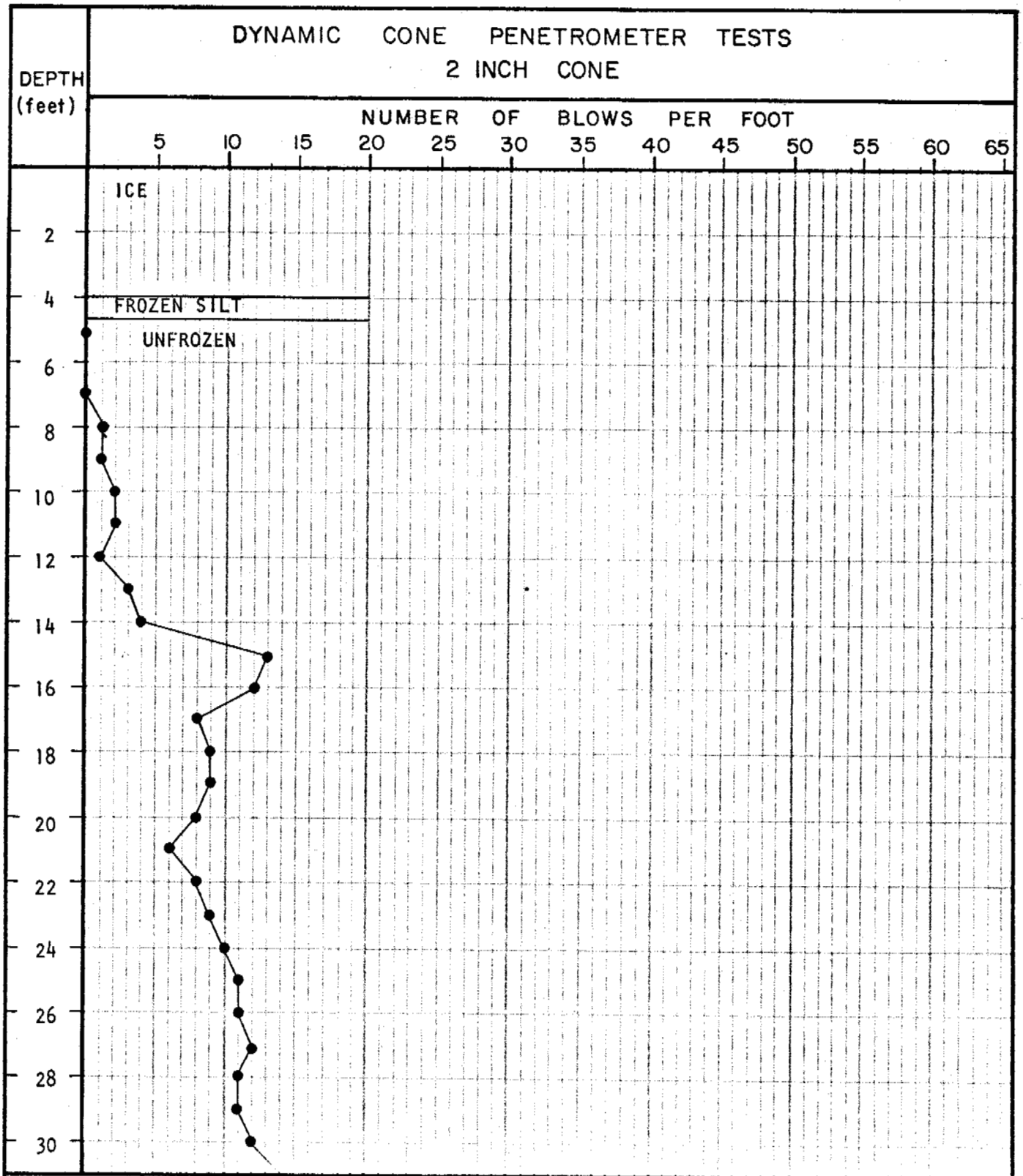
# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.



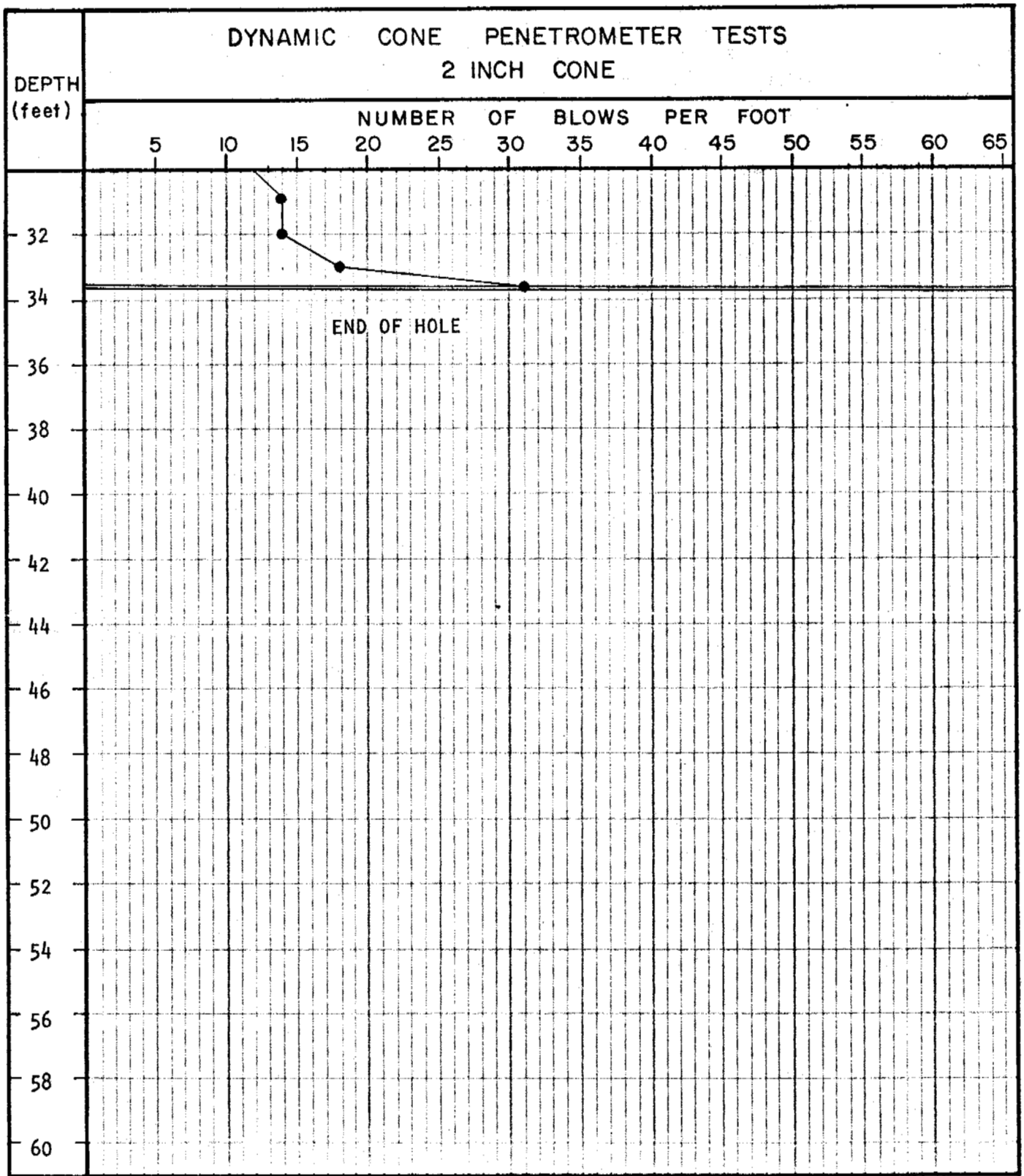

| | | | |
|---|---|---|---|
| eda | ICE THICKNESS 4 | DATE DRILLED 2/03/75 | HOLE Nº 0-13A |
| | WATER DEPTH (ft.) -- | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 25 | REGION DOCKSITE 2 | Page 1 of 1 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.



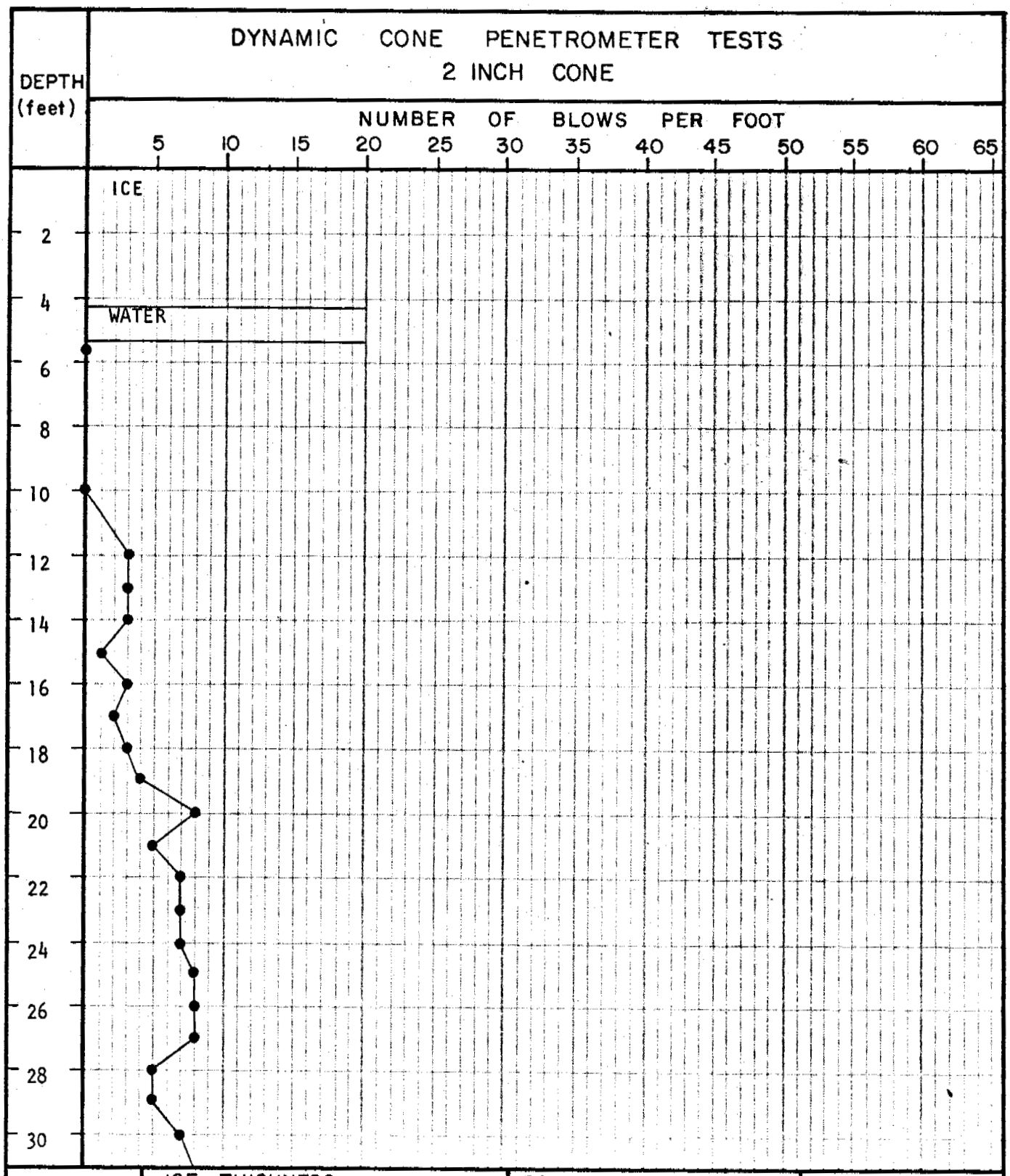

| | | | |
|---|---|---|---|
| ICE THICKNESS 4' | DATE DRILLED 02/02/75 | HOLE Nº 0 13B |
| WATER DEPTH (ft.) -- | TECHNICIAN JK | |
| COMPLETION DEPTH (ft.) 33 | REGION DOCKSITE 2 | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARD S ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| | ICE THICKNESS 4' | DATE DRILLED 02/02/75 | HOLE Nº 0 - 13B |
| | WATER DEPTH (ft.) -- | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 33 | REGION DOCKSITE 2 | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT
## RICHARDS ISLAND, N.W.T.




| | | | |
|---|---|---|---|
| eoa | ICE THICKNESS 4 1/2' | DATE DRILLED 2/2/75 | HOLE Nº 0-13C |
| | WATER DEPTH (ft.) 1' | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 39 | REGION DOCKSITE | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

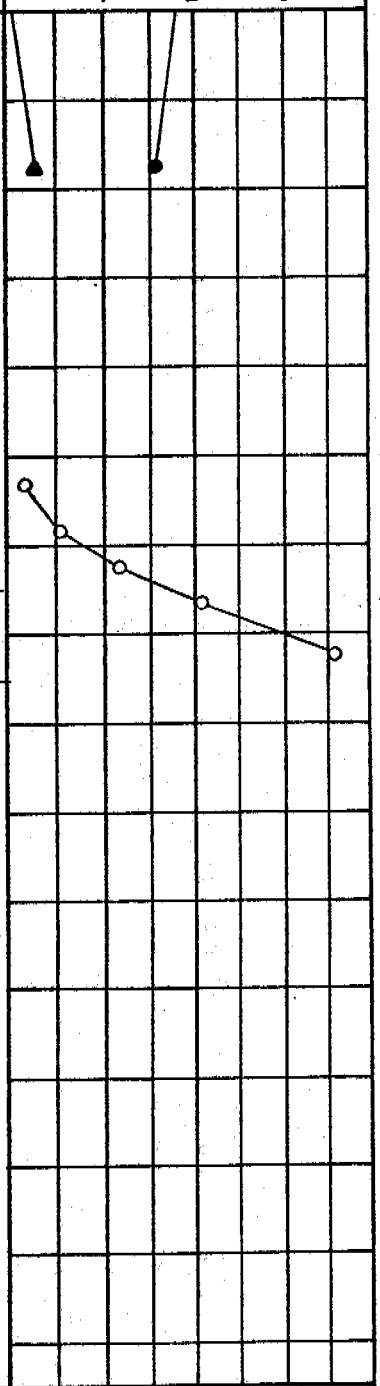
## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | SAMPLE | GROUND ICE CONDITION |
|---|---|---|---|
| 32 | SAND<br>- dark grey<br>- silty<br>- very fine<br>- uniform | | |
| 34 | | | |
| 36 | | | |
| 38 | 5' of sand up hollow stem hammered dynamic cone | | |
| 40 | | | |
| 42 | | | |
| 44 | | | Frozen |
| 46 | END OF HOLE | | |

MOISTURE CONTENT % ●

SPT RESISTANCE ▲
DYNAMIC CONE o
10 20 30 40 50 60 70

COMP. STRENGTH T.S.F ■
1 2 3



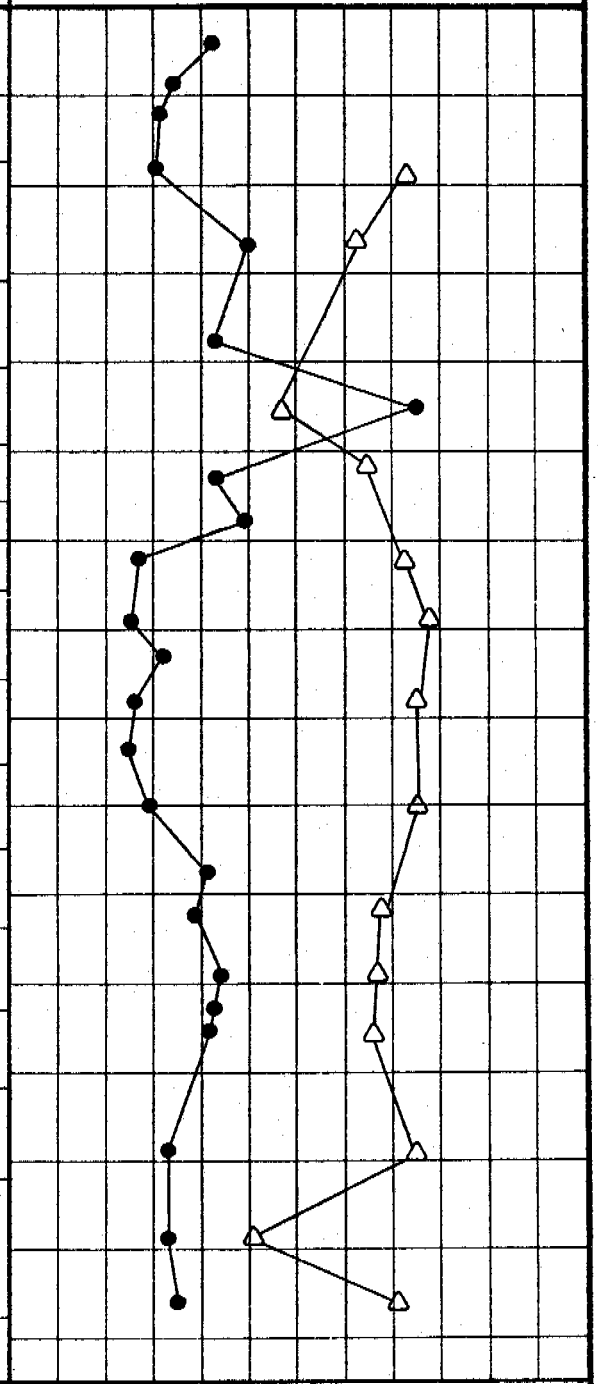
| | | | |
|---|---|---|---|
| eba | ICE THICKNESS (ft.) 4½ | DATE DRILLED 4/2/75 | HOLE Nº 013.D |
| | WATER DEPTH (ft.) 12½ | TECHNICIAN JK | |
| | COMPLETION DEPTH (ft.) 45 | REGION Docksite | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARD S ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 0 | SILT - med. grey br. | Vx-Nbn 35% |
| | - trace of sand | |
| 2 | - some organic (twigs) | Nbn 20-35% |
| 4 | | Vs 60-70% |
| 6 | - med. grey | |
| | - horizontal bedding | Vs 70-85% |
| 8 | | |
| | - high organic content (twigs) | Vs 85-95% |
| 10 | | Nbn to Vs 35-45% |
| | | Vs+Nf 35% |
| 12 | - horizontal bedding | Nbn |
| 14 | - ripple marked @ 14' | |
| | - fractured @ 15' (vert) | Nbn |
| 16 | - fractured @ 17.2' (vert) | Nbn to Nf |
| 18 | - med. to lt. grey | Nbn |
| | | Nbn to Nf |
| 20 | - ripple marked | Vs @ 30° to bedding 30% |
| 22 | | |
| | - crossbedded | |
| | - trace of organics | Vs + Nbn 25% |
| 24 | - ripple marks | |
| | - some disturbed sections | |
| 26 | - tr. fine sand | Nbn |
| 28 | - crossbedded | |
| | - ripple marked, | |
| | - tr. black organics | |
| 30 | | |

SAMPLE




| | | | |
|---|---|---|---|
| EGA | SAMPLE TYPE CRREL Barrel | DATE DRILLED 21/2/75 | HOLE Nº 0-14 |
| | | TECHNICIAN KOS | |
| | COMPLETION DEPTH (ft.) 39.1 | REGION Docksite 2 | Page 1 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

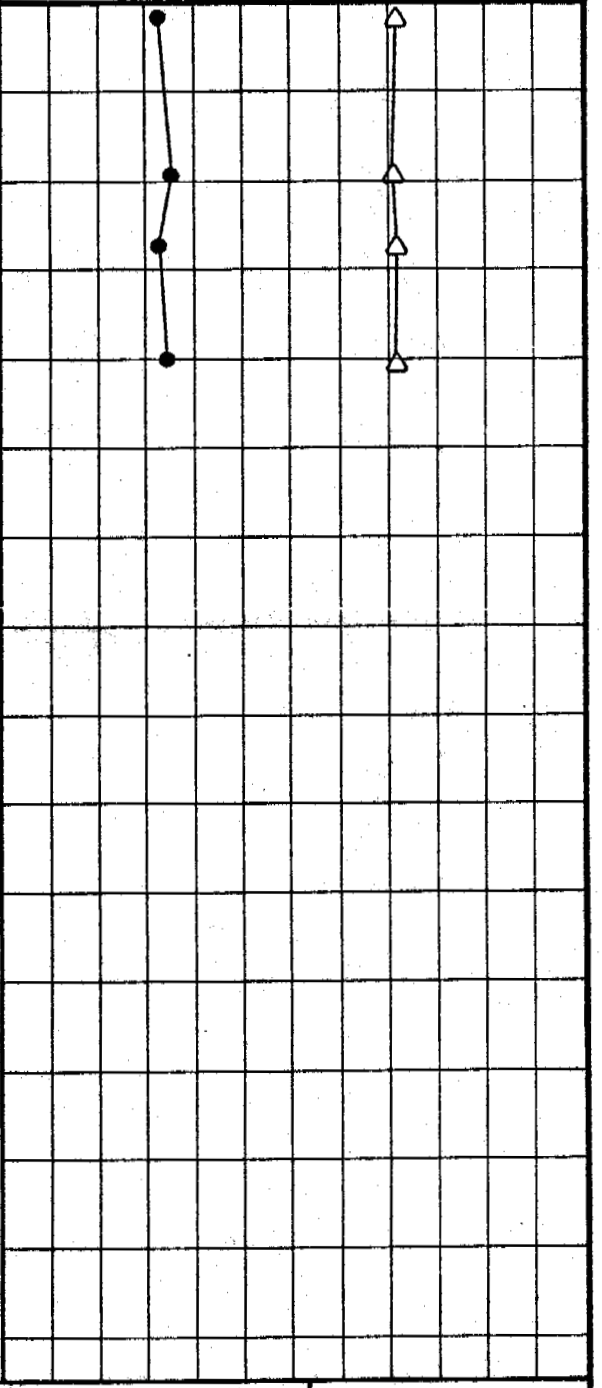
| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE | SAMPLE |
|---|---|---|---|
| 32 | SILT - med. grey<br>- tr. black organics<br>- 15° crossbedding<br>- tr. fine sand | Nbn | |
| 34 | - horiz. bedding | | |
| 36 | | | |
| 38 | | | |
| 40 | END OF HOLE | | |

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE CRREL Barrel | DATE DRILLED 21/2/75 | HOLE Nº 0-14 |
| | | TECHNICIAN KOS | |
| | COMPLETION DEPTH (ft.) 39.1 | REGION Docksite 2 | Page 2 of 2 |

# BEAUFORT GAS DEVELOPMENT

## RICHARDS ISLAND, N.W.T.

| DEPTH (feet) | SOIL DESCRIPTION | GROUND ICE |
|---|---|---|
| 2 | SILT<br>- med. grey<br>- very organic (twigs)<br>- trace of organics | Vr-40%<br>Vx 5-10%<br>Vr-60% |
| 4 | | |
| 6 | - med. grey brown<br>- horizontal bedding | Vr-35%<br>Vr 45%<br>Vs 50%<br>Vx-Vs 25% |
| 8 | | Vs-15% |
| 10 | -dk. grey brown<br>- trace of black organics horiz. bedded | Vr 30%<br>horizontal & vertical |
| 12 | | Vs-15% |
| 14 | - trace fine sand<br>- mainly silt a.a. | trace of Vx<br>Nbe to Vx 5% |
| 16 | | Nbn + Vs 5-10%<br>Vs-10% |
| 18 | | Some Vr 15-25% (some vertical) |
| 20 | | Nbn + Vs to 25% |
| 22 | END OF HOLE | |
| 24 | | |
| 26 | | |
| 28 | | |
| 30 | | |

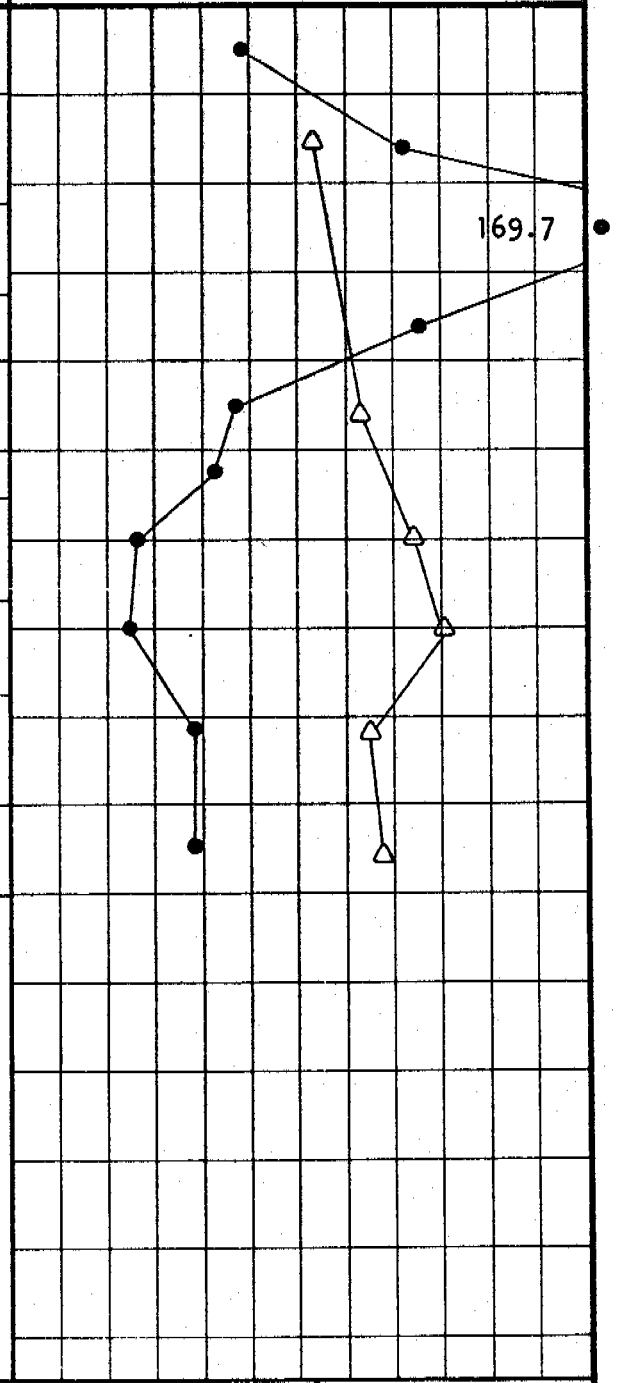
SAMPLE

MOISTURE CONTENT % ●

10 30 50 70 90 110

BULK DENSITY P.C.F. △

40 60 80 100 120 140



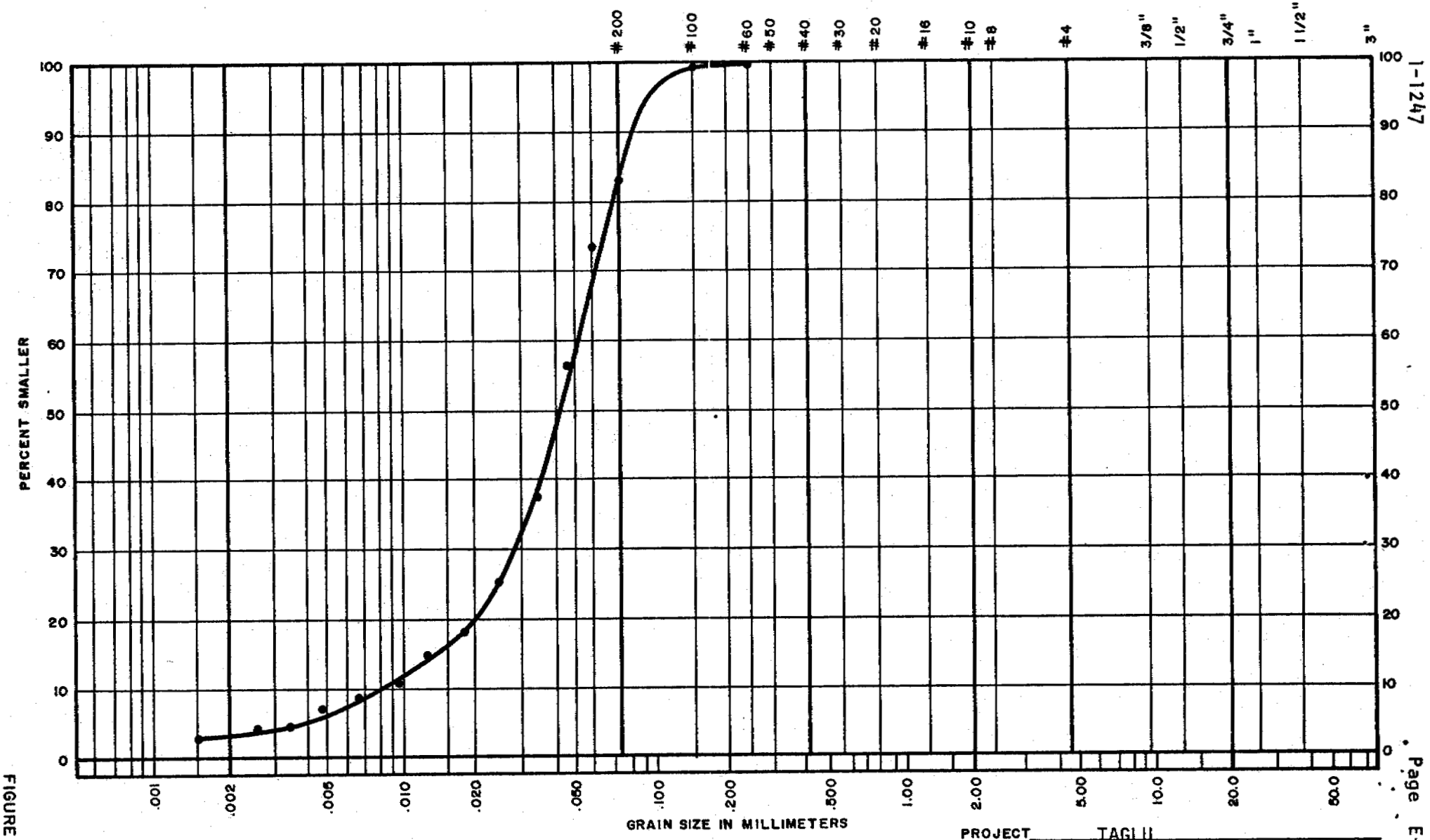

| | | | |
|---|---|---|---|
| eba | SAMPLE TYPE<br>CRREL Barrel | DATE DRILLED 21/2/75<br>TECHNICIAN TH | HOLE Nº<br>0-15 |
| | COMPLETION DEPTH (ft.) 20 | REGION Docksite 2 | Page 1 of 1 |

APPENDIX E-1

GRAIN SIZE CURVES FOR PLANTSITE AREA

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




1-1247

FIGURE

Page E-1

SAMPLE DESCRIPTION SILT, TRACE FINE SAND, TRACE CLAY

PROJECT TAGLU

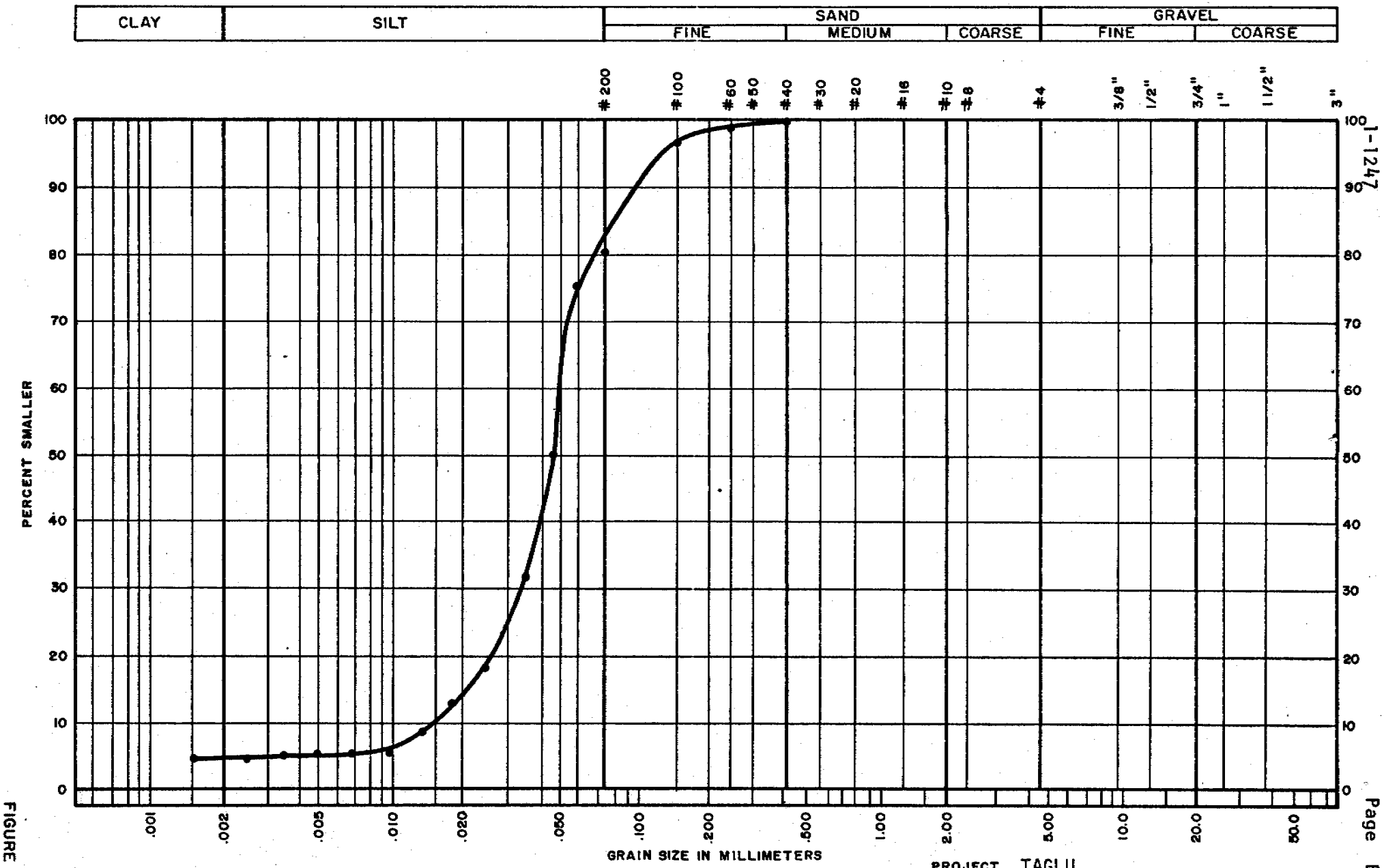
JOB No. E965.1 DATE 15 May, 1975

HOLE No. A-4 SAMPLE No.

DEPTH 9 - 10'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




1-1247

FIGURE

Page E-2

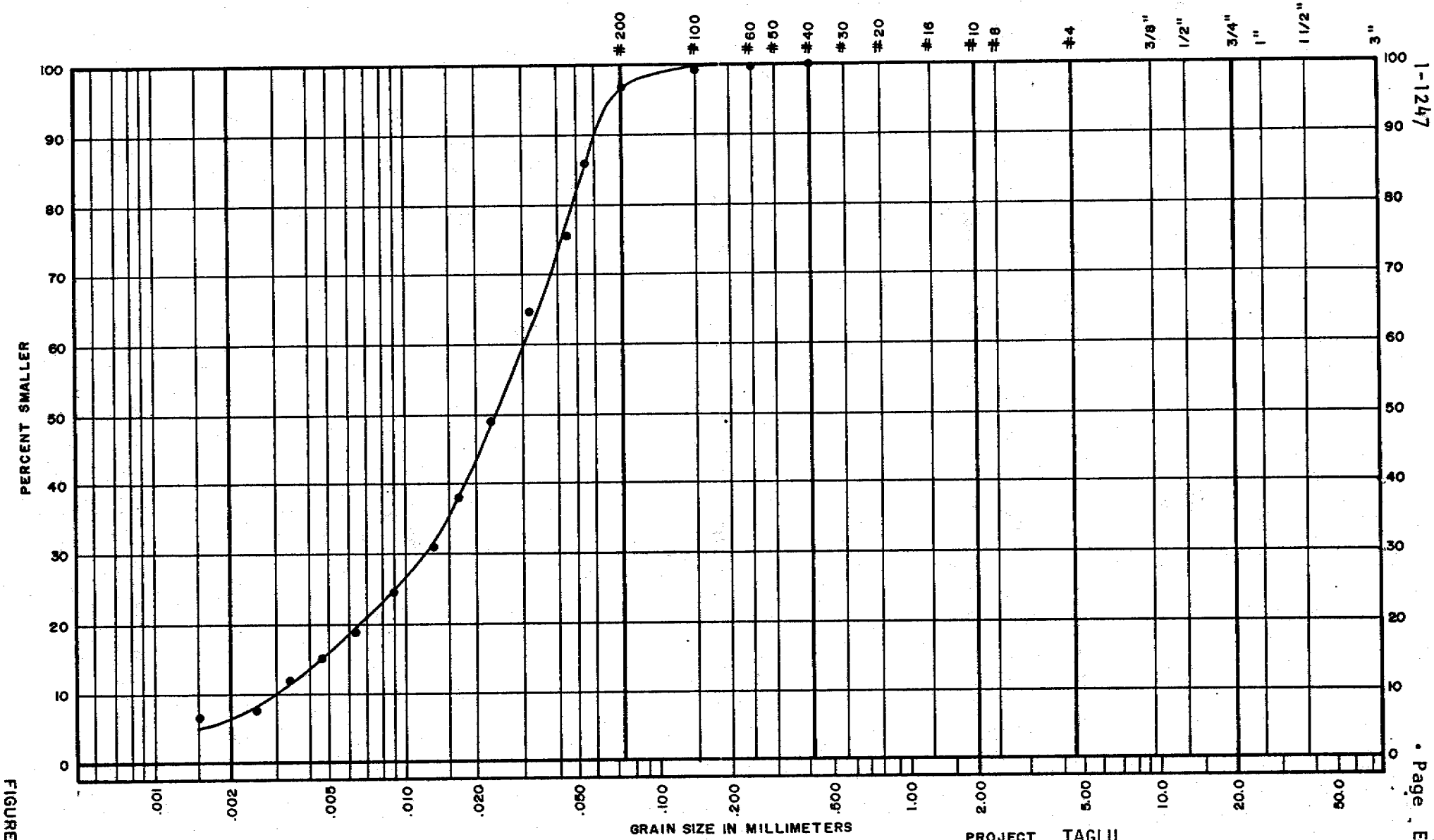
SAMPLE DESCRIPTION SILT
- some sand
- tr. clay

PROJECT TAGLU
JOB No. E965.1 DATE 16 MAY, 1975
HOLE No. A-4 SAMPLE No.
DEPTH 18 - 20'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




1-1247

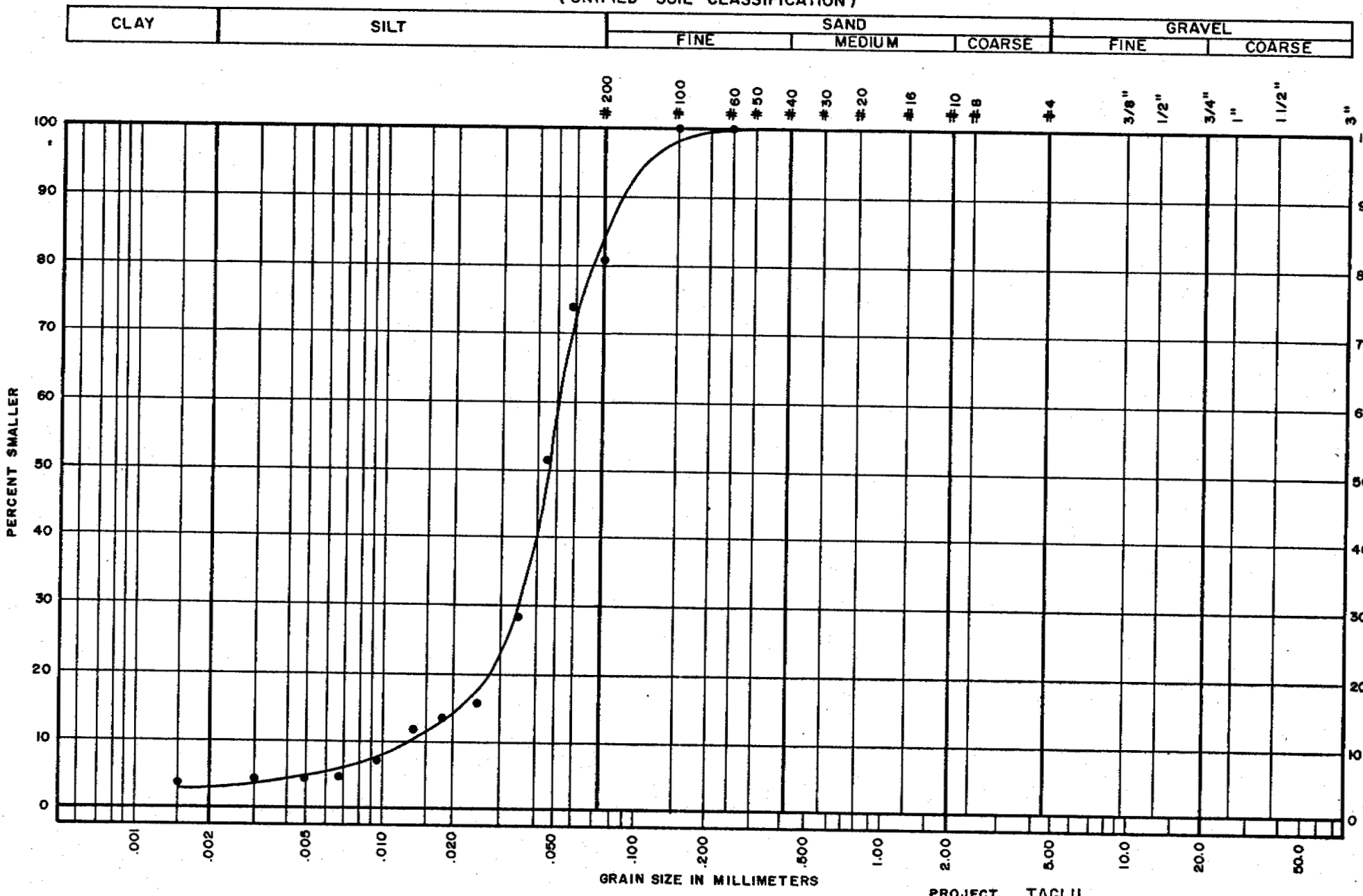
SAMPLE DESCRIPTION SILT
- tr. of clay

PROJECT TAGLU
JOB No. E965. DATE 21/5/75
HOLE No. A-8 SAMPLE No.
DEPTH 24-26'

EBA Engineering Consultants Ltd.

FIGURE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT
- some fine sand

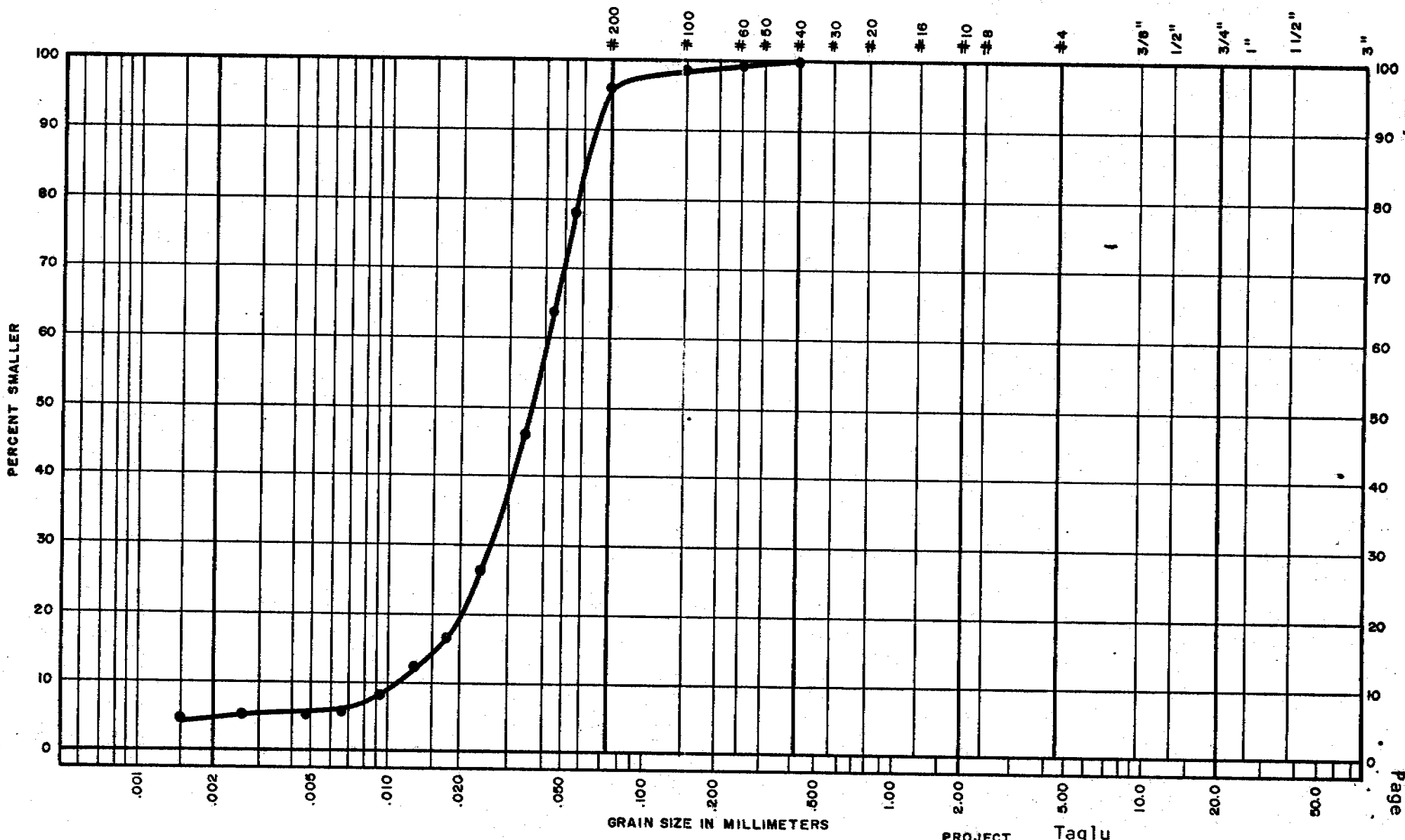
PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. B-4 SAMPLE No.
DEPTH 9 - 11'

EBA Engineering Consultants Ltd.

FIGURE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




SAMPLE DESCRIPTION Silt, Sandy

PROJECT Taglu

JOB No. E965.1 DATE 27/5/75

HOLE No. B-4 SAMPLE No.

DEPTH 32½-35 Feet

EBA Engineering Consultants Ltd.

FIGURE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

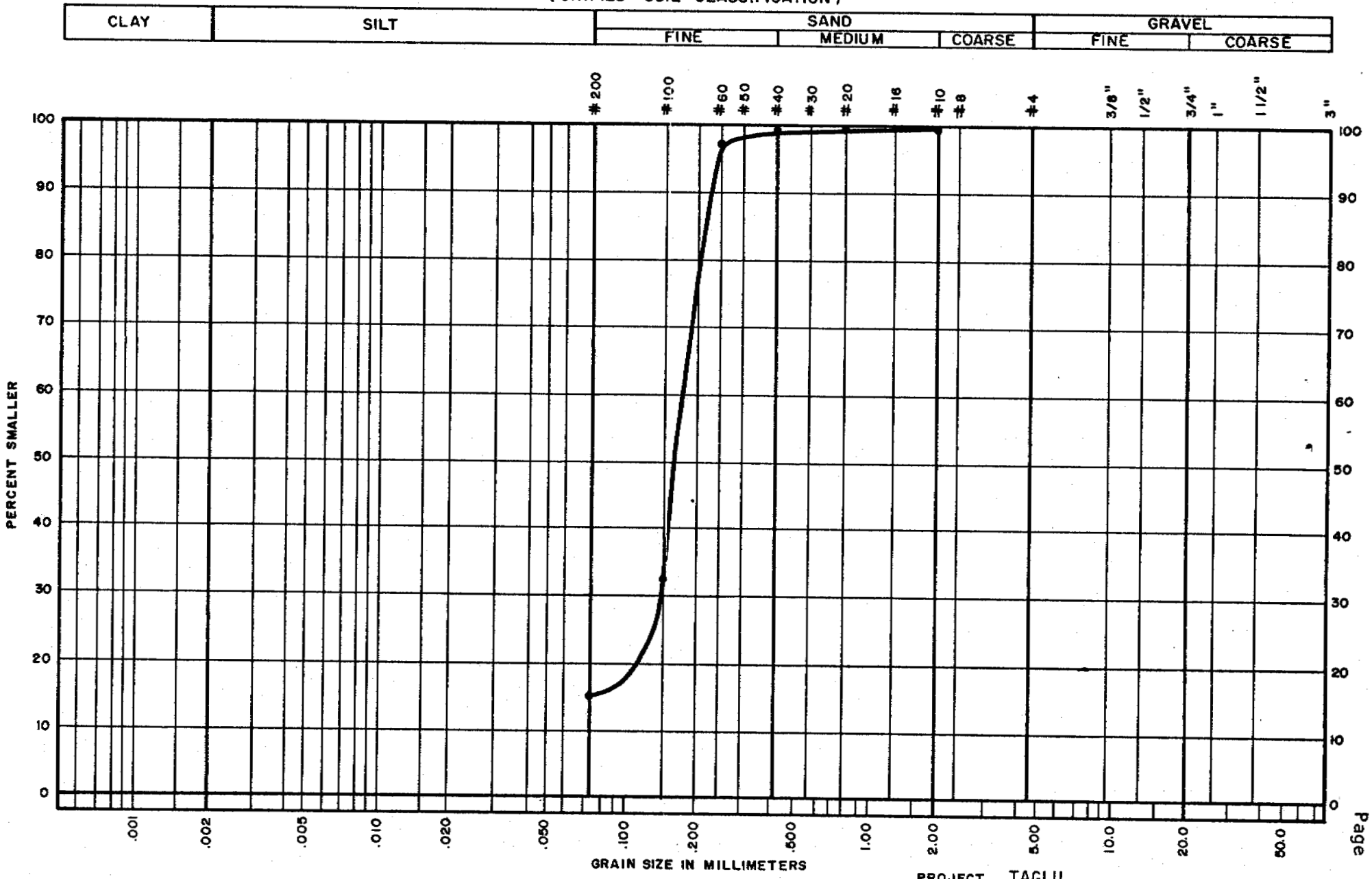


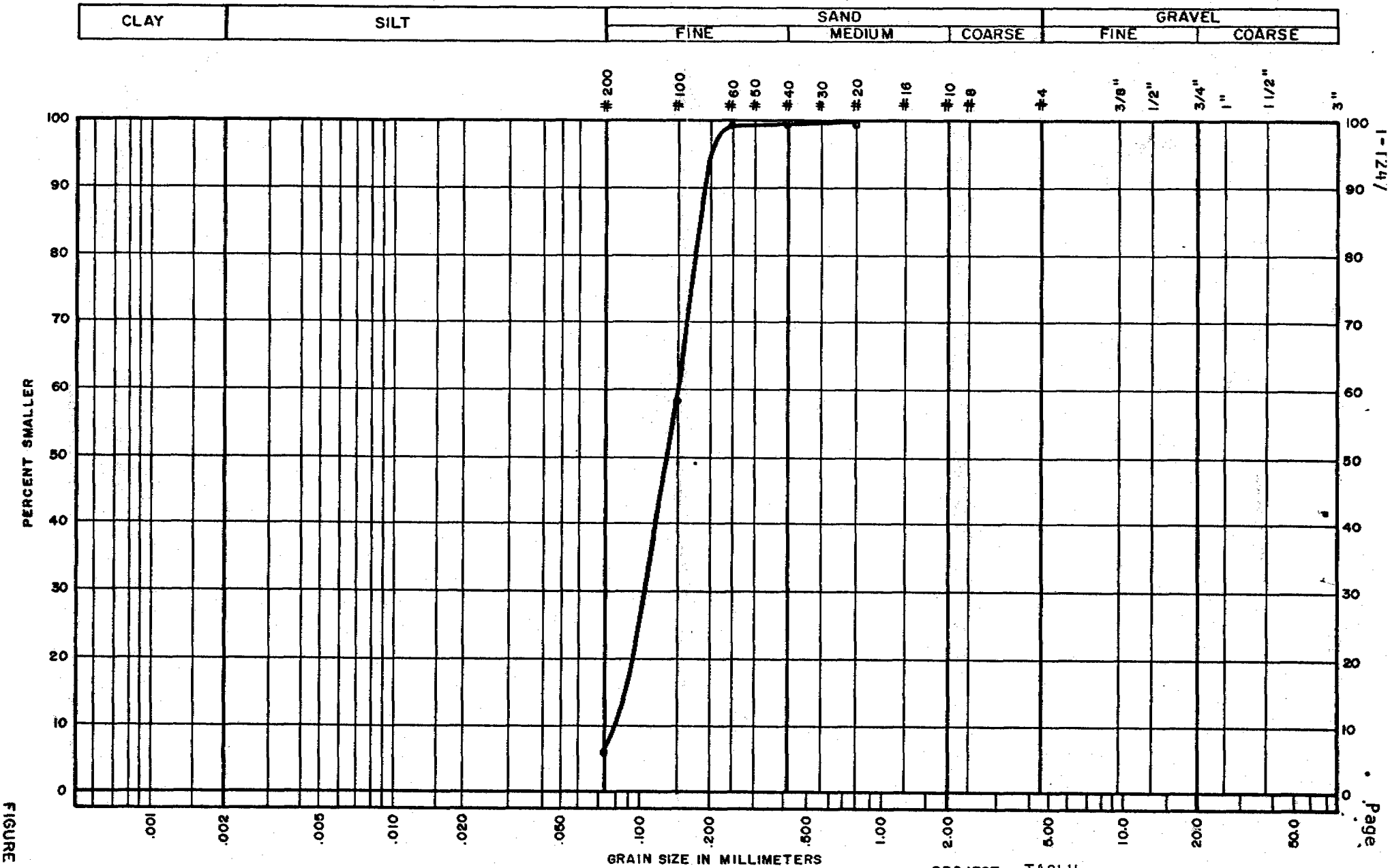

FIGURE ____

SAMPLE DESCRIPTION SAND
- fine
- some silt

PROJECT TAGLU
JOB No. E965.1 DATE 13 MAY, 1975
HOLE No. B-4 SAMPLE No.
DEPTH 43' - 45' 9"

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SAND
- fine
- tr. silt

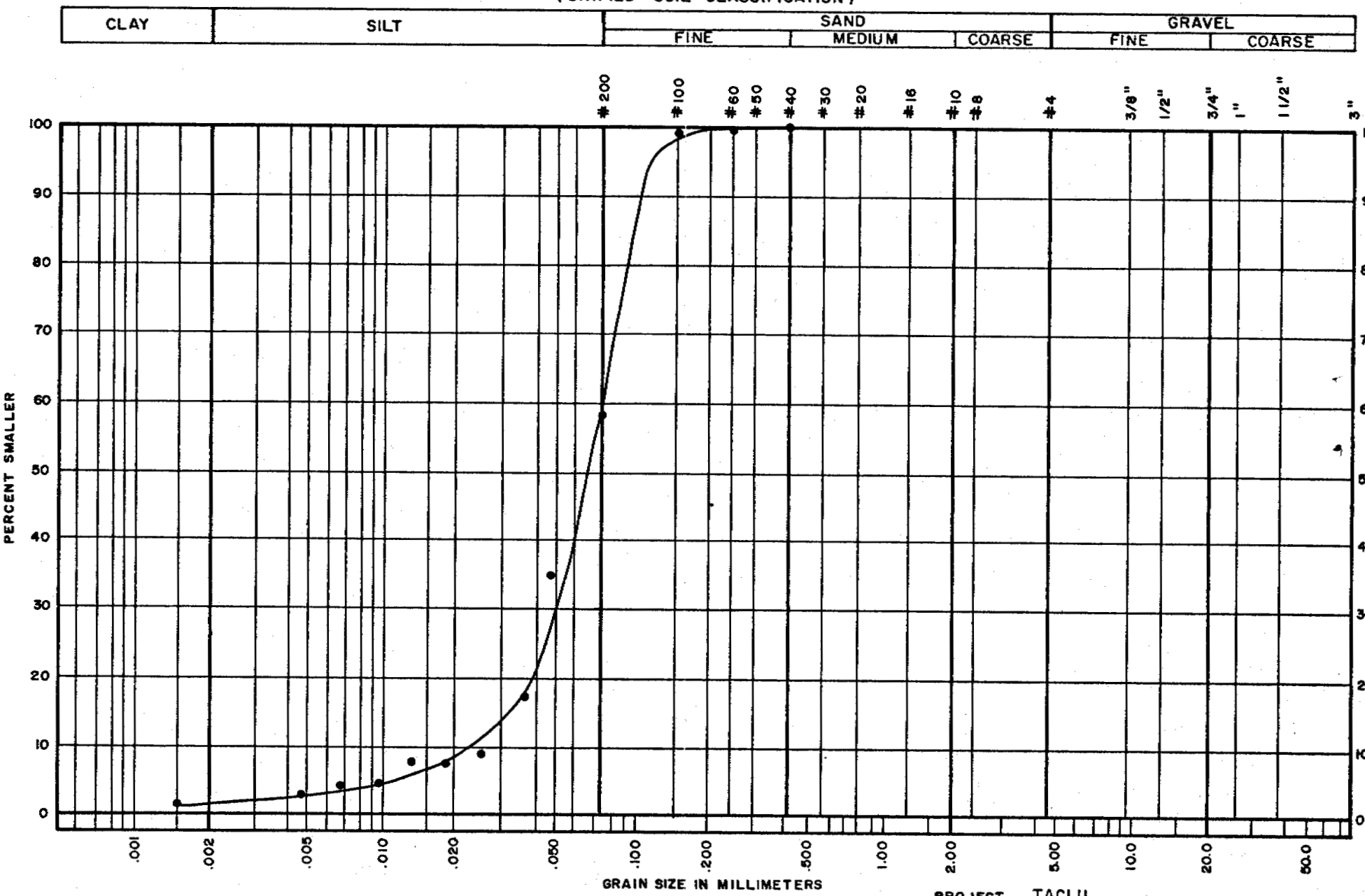
PROJECT TAGLU
JOB No. E965.1 DATE 13 MAY, 1975
HOLE No. B-4 SAMPLE No.
DEPTH 45' 9" - 48'

EBA Engineering Consultants Ltd.

FIGURE

1-1247

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

SAMPLE DESCRIPTION SILT
- very sandy

PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. B-7 SAMPLE No.
DEPTH 42 - 44 1/2'

EBA Engineering Consultants Ltd.

1-174/

Page E-8

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

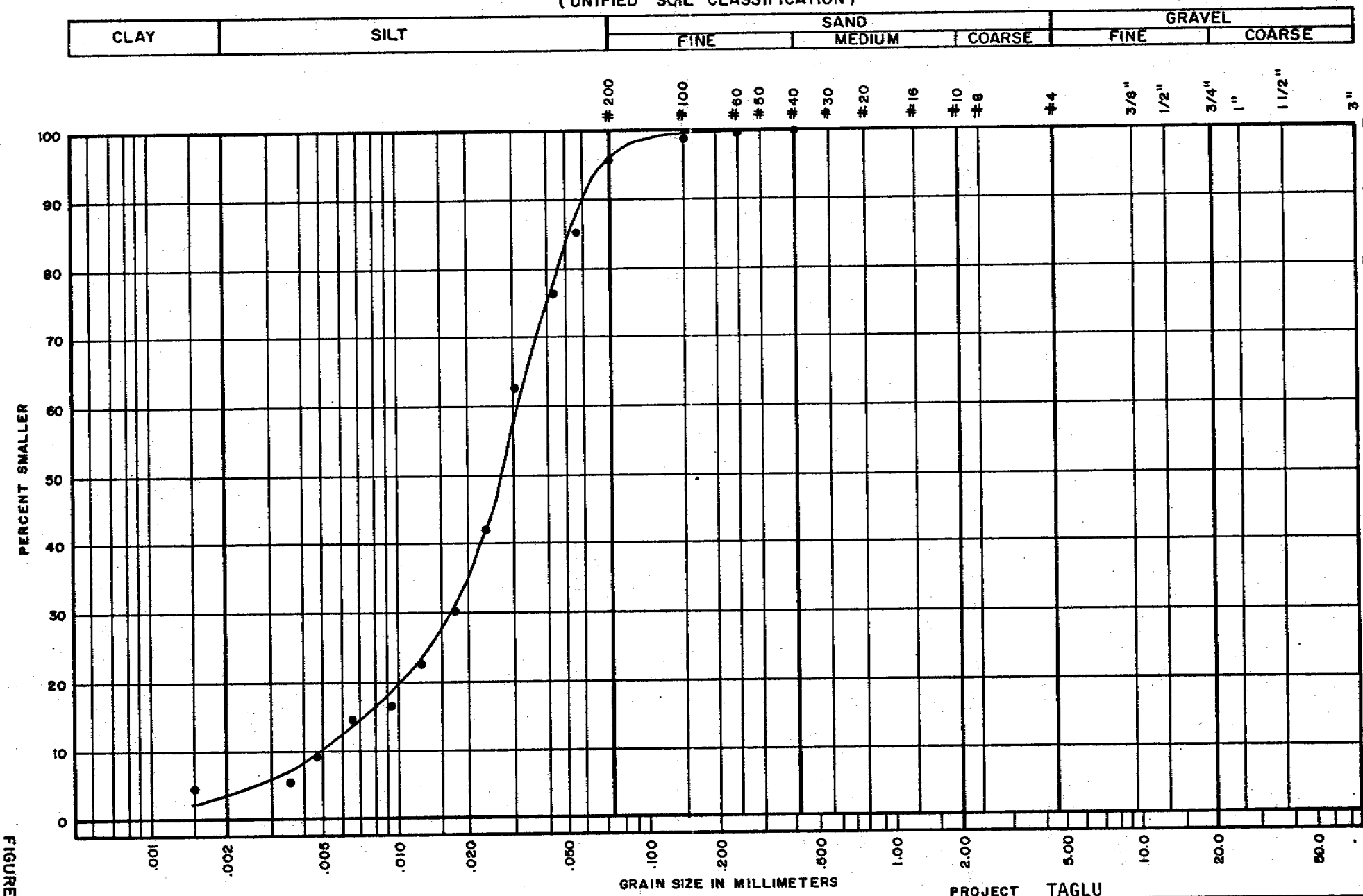



FIGURE ____

SAMPLE DESCRIPTION SILT

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PROJECT TAGLU

JOB No. E965.1 DATE 21/5/75

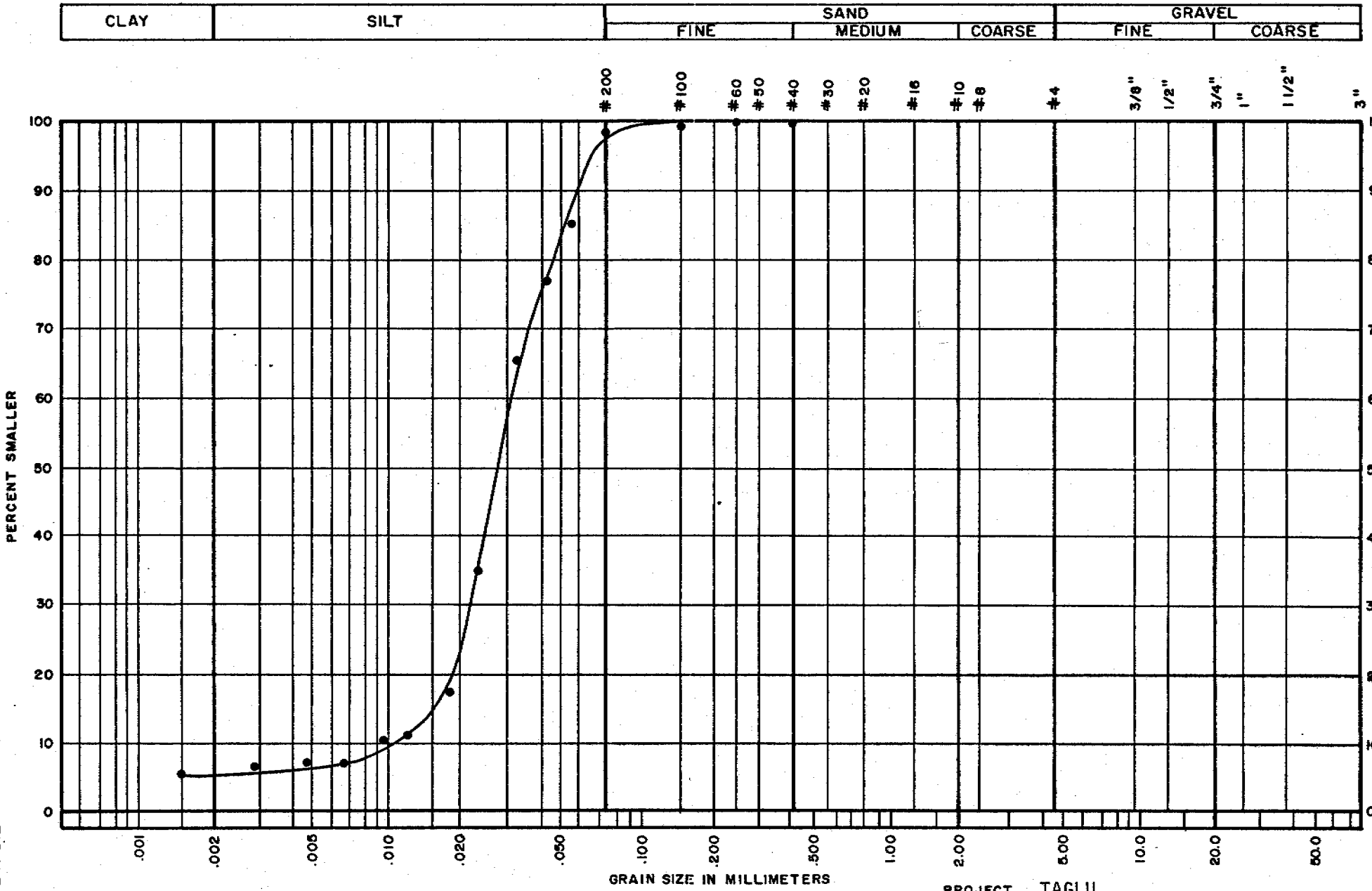
HOLE No. C-8 SAMPLE No. ____

DEPTH 17 1/2 - 20'

1-12A/

Page E-9

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




1-1247

FIGURE

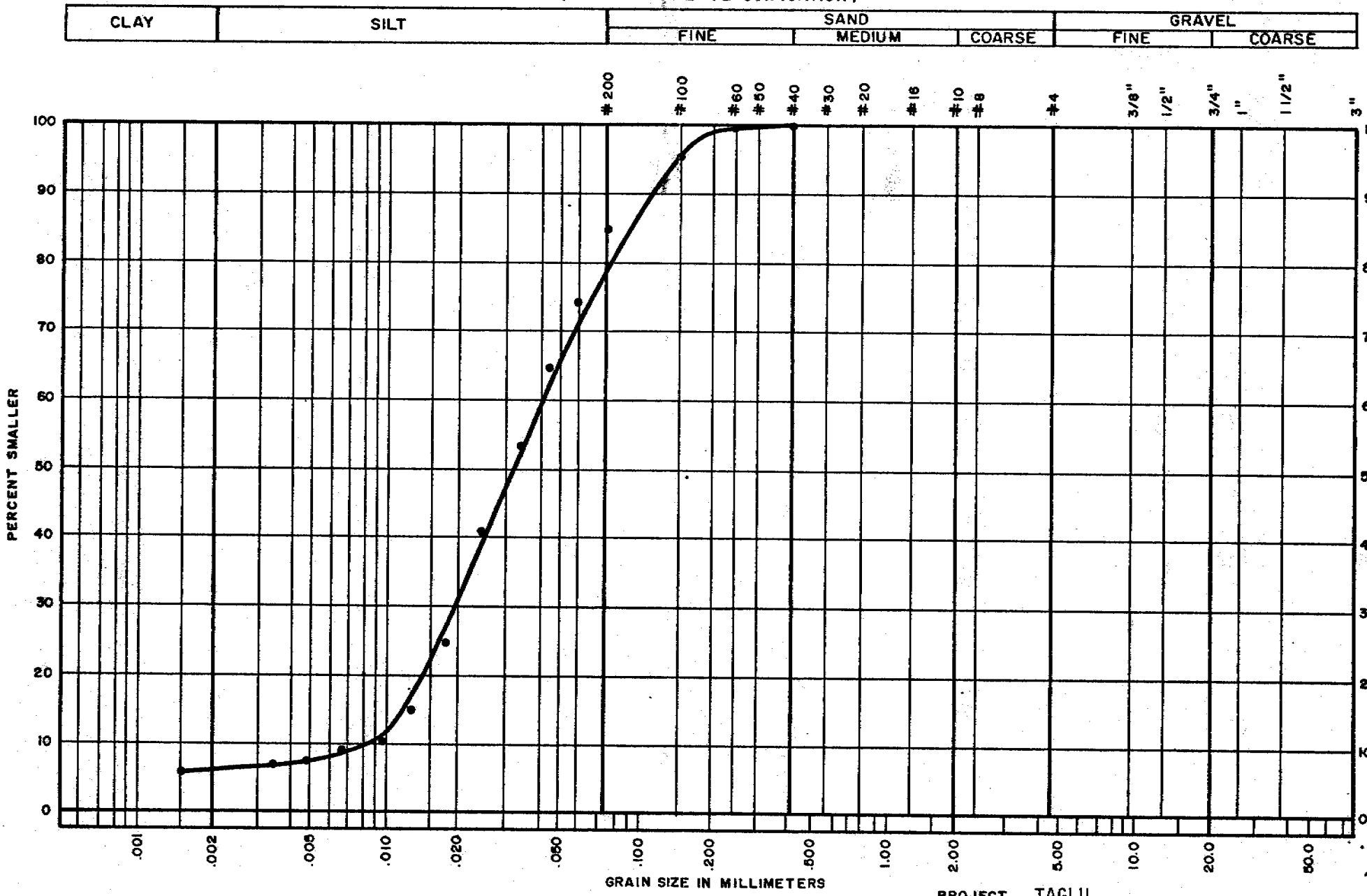
Page E-10

SAMPLE DESCRIPTION SILT
- tr. of clay

PROJECT TAGLU
JOB No. E965.1 DATE 20/5/75
HOLE No. D-2 SAMPLE No.
DEPTH 17 1/2 - 19 1/2'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)



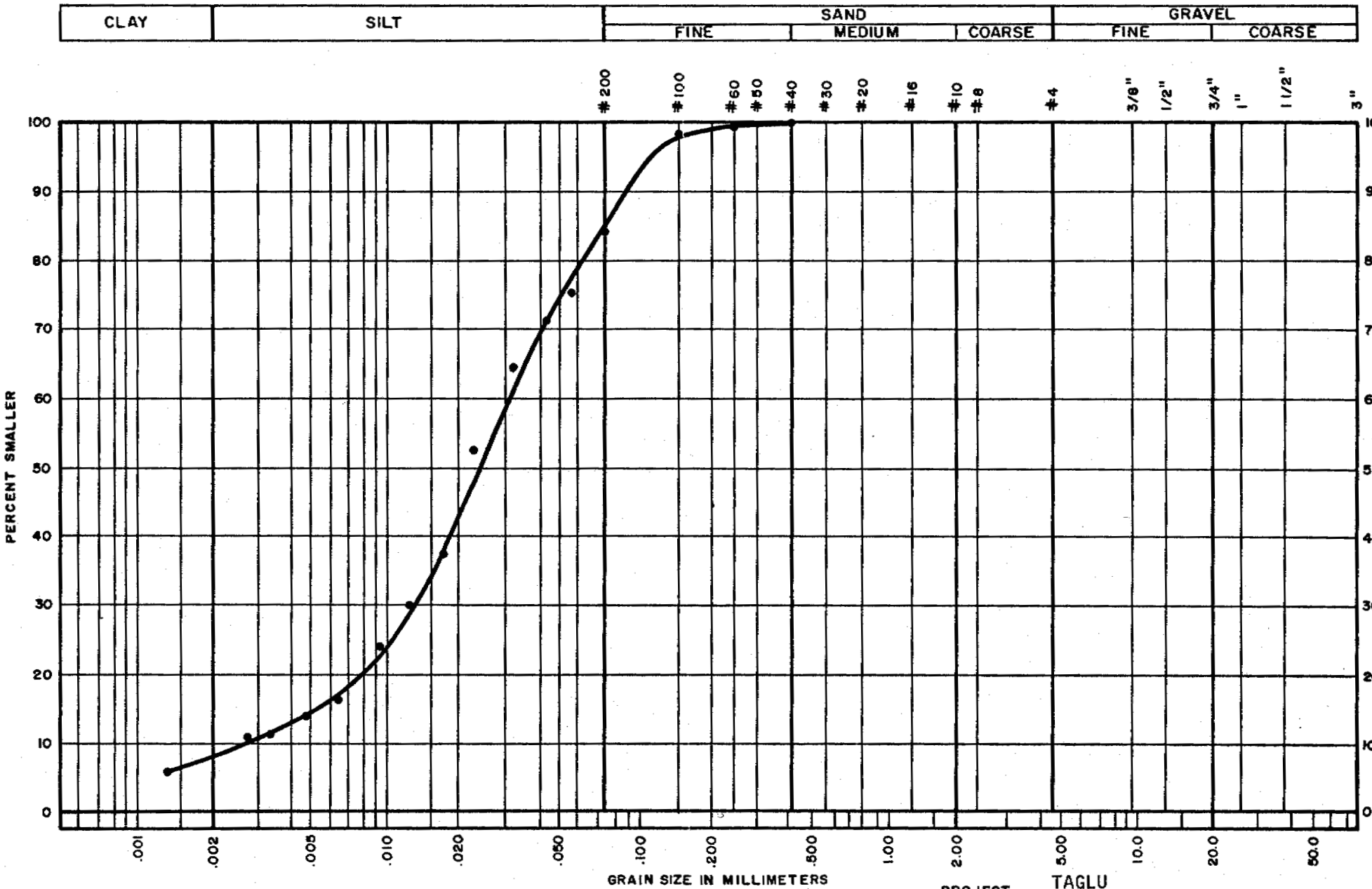

FIGURE

SAMPLE DESCRIPTION SILT
- some sand
- tr. clay

EBA Engineering Consultants Ltd.

PROJECT TAGLU
JOB No. E965.1 DATE 16 MAY, 1975
HOLE No. D-2 SAMPLE No.
DEPTH 28 - 29 1/2'

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)



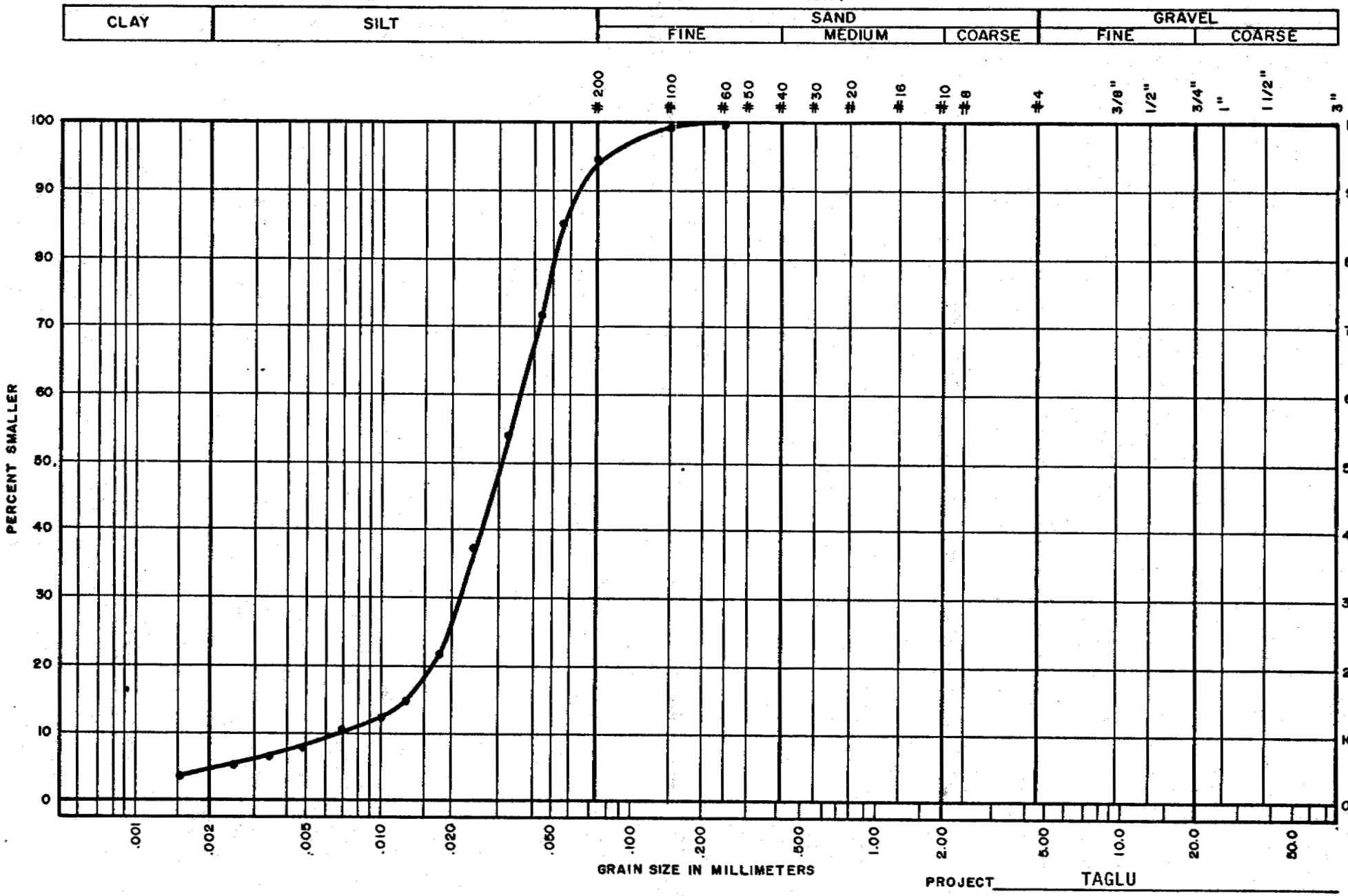

FIGURE

SAMPLE DESCRIPTION SILT, SOME FINE SAND
TRACE CLAY

PROJECT TAGLU
JOB No. E965.1 DATE 15 May, 1975
HOLE No. D-2 SAMPLE No.
DEPTH 43 - 44 1/2 '

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

SAMPLE DESCRIPTION SILT, TRACE CLAY, TRACE FINE SAND

PROJECT TAGLU

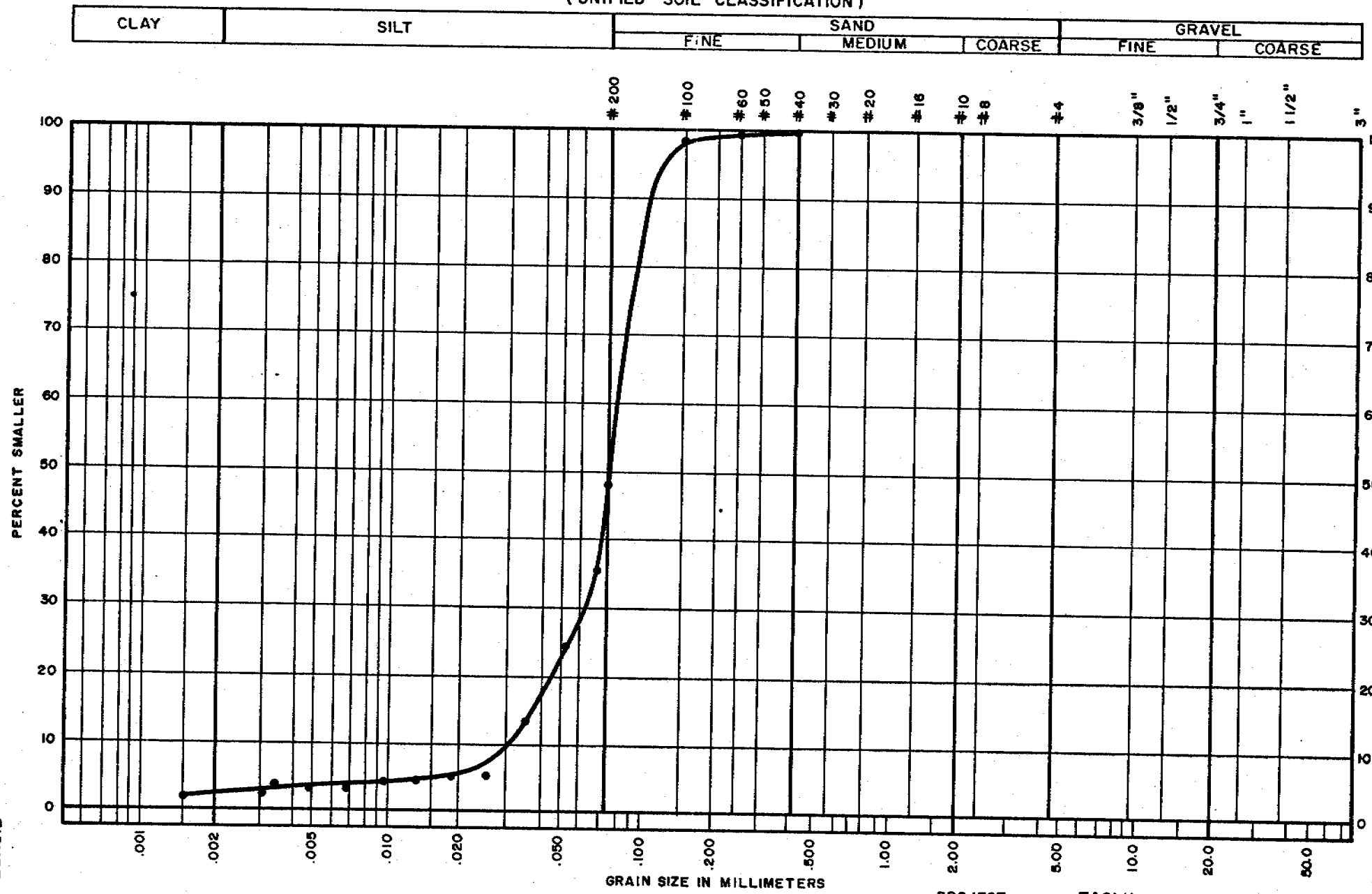
JOB No. E965.1 DATE 15 May, 1975

HOLE No. D-7 SAMPLE No.

DEPTH 8 - 9 1/2 '

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

SAMPLE DESCRIPTION FINE SAND and SILT, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

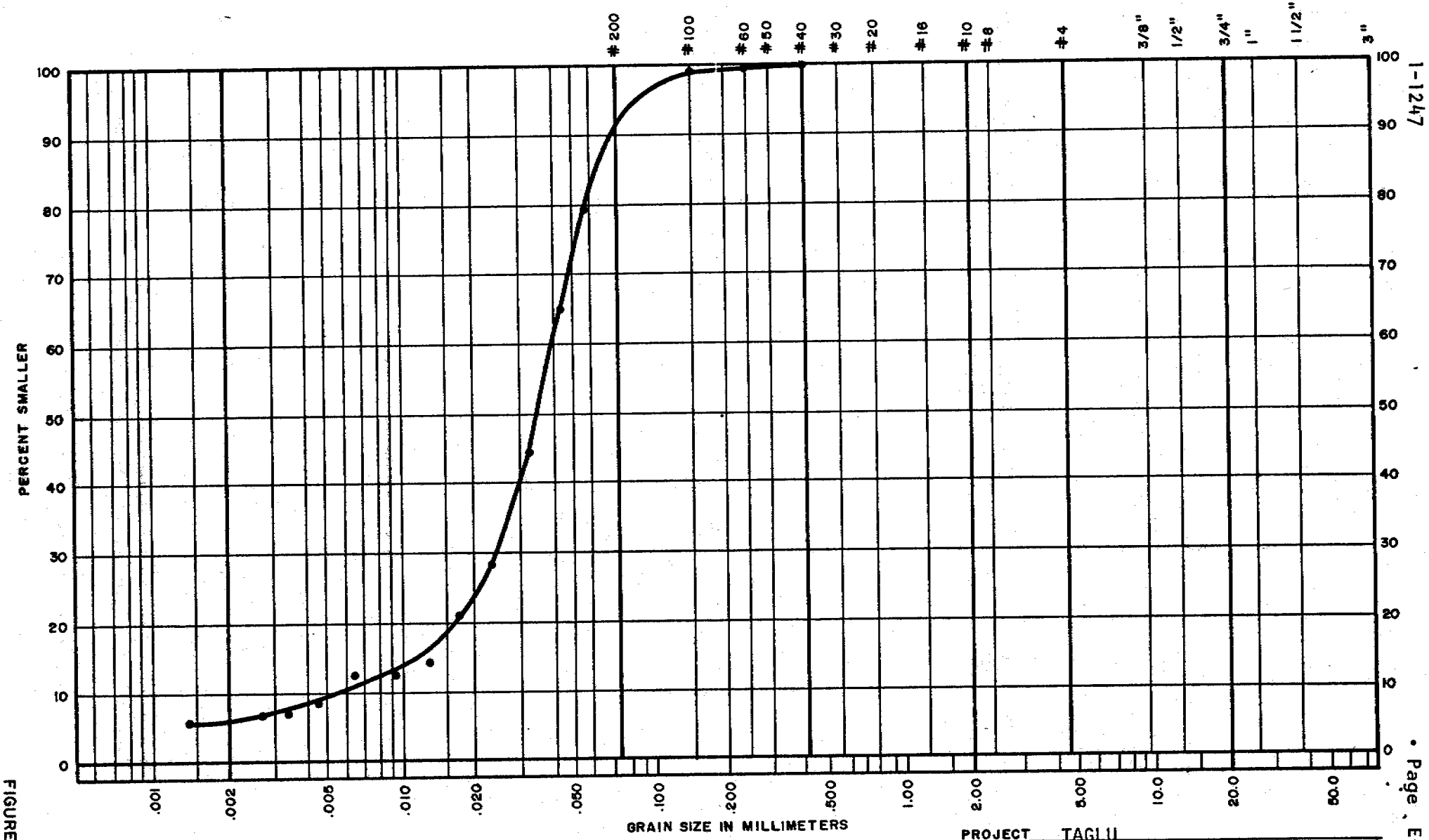
HOLE No. D-7 SAMPLE No.

DEPTH 44 1/2 - 47'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




1-1247

FIGURE

SAMPLE DESCRIPTION SILT, TRACE CLAY, TRACE FINE SAND

PROJECT TAGLU

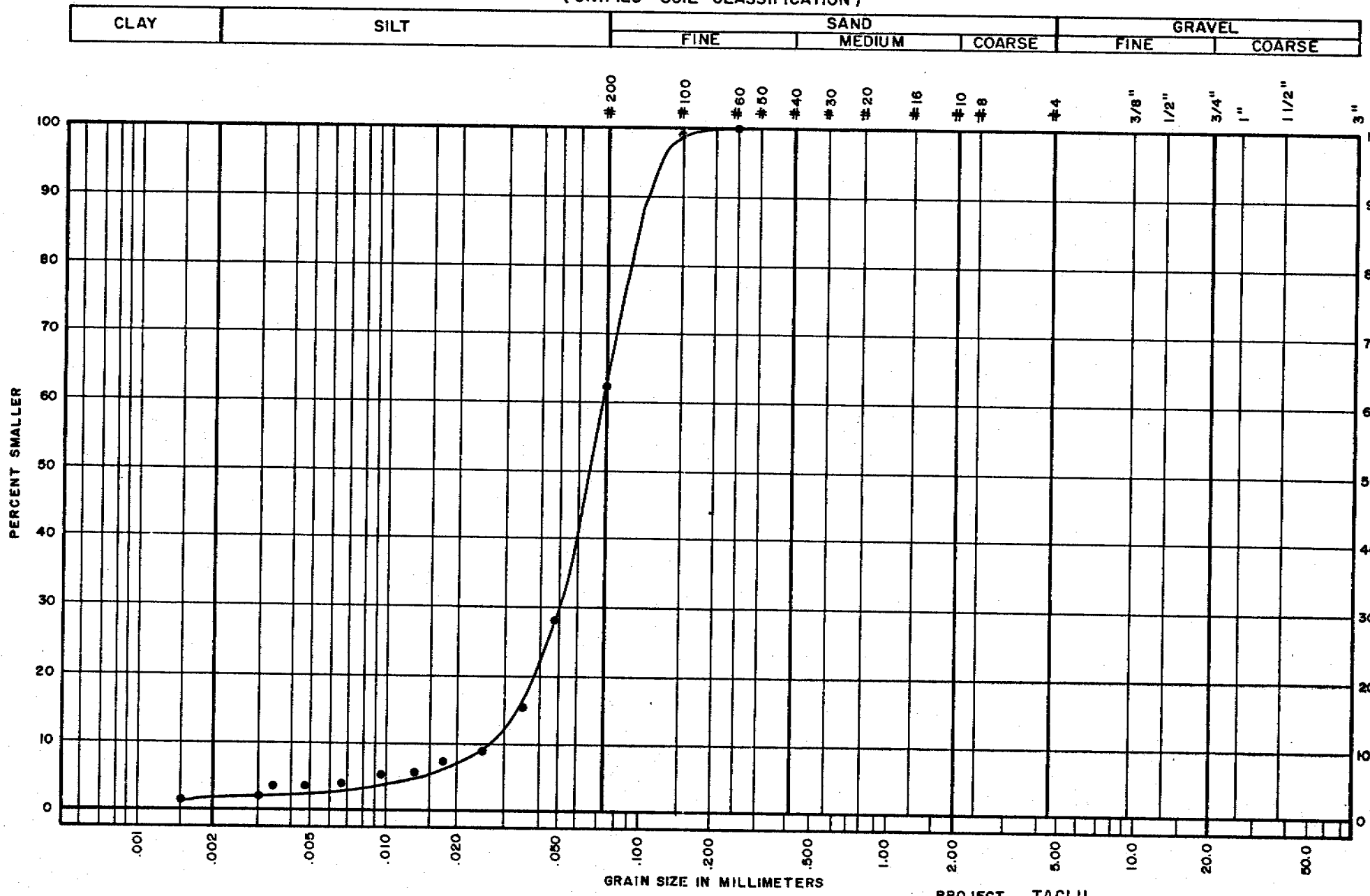
JOB No. E965.1 DATE 14 May, 1975

HOLE No. D-10 SAMPLE No.

DEPTH 12 1/2 - 14'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

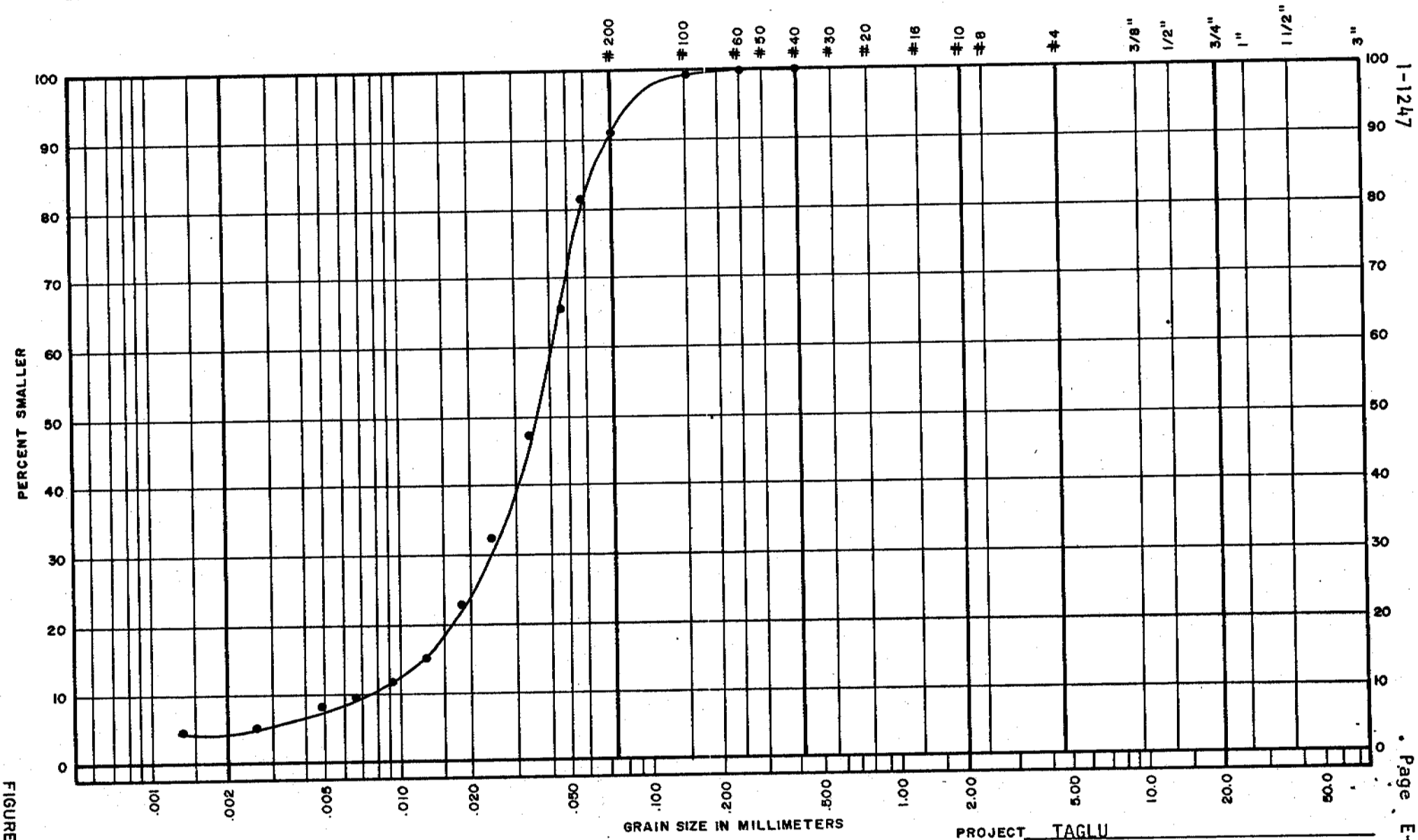
SAMPLE DESCRIPTION SILT
- very sandy

PROJECT TAGLU
JOB No. E965.1 DATE 23/5/75
HOLE No. LL1 SAMPLE No.
DEPTH 33 - 34 1/2'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




1-1247

FIGURE

SAMPLE DESCRIPTION SILT
- tr. of sand

PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. LL-1 SAMPLE No.
DEPTH 23 - 24 1/2'

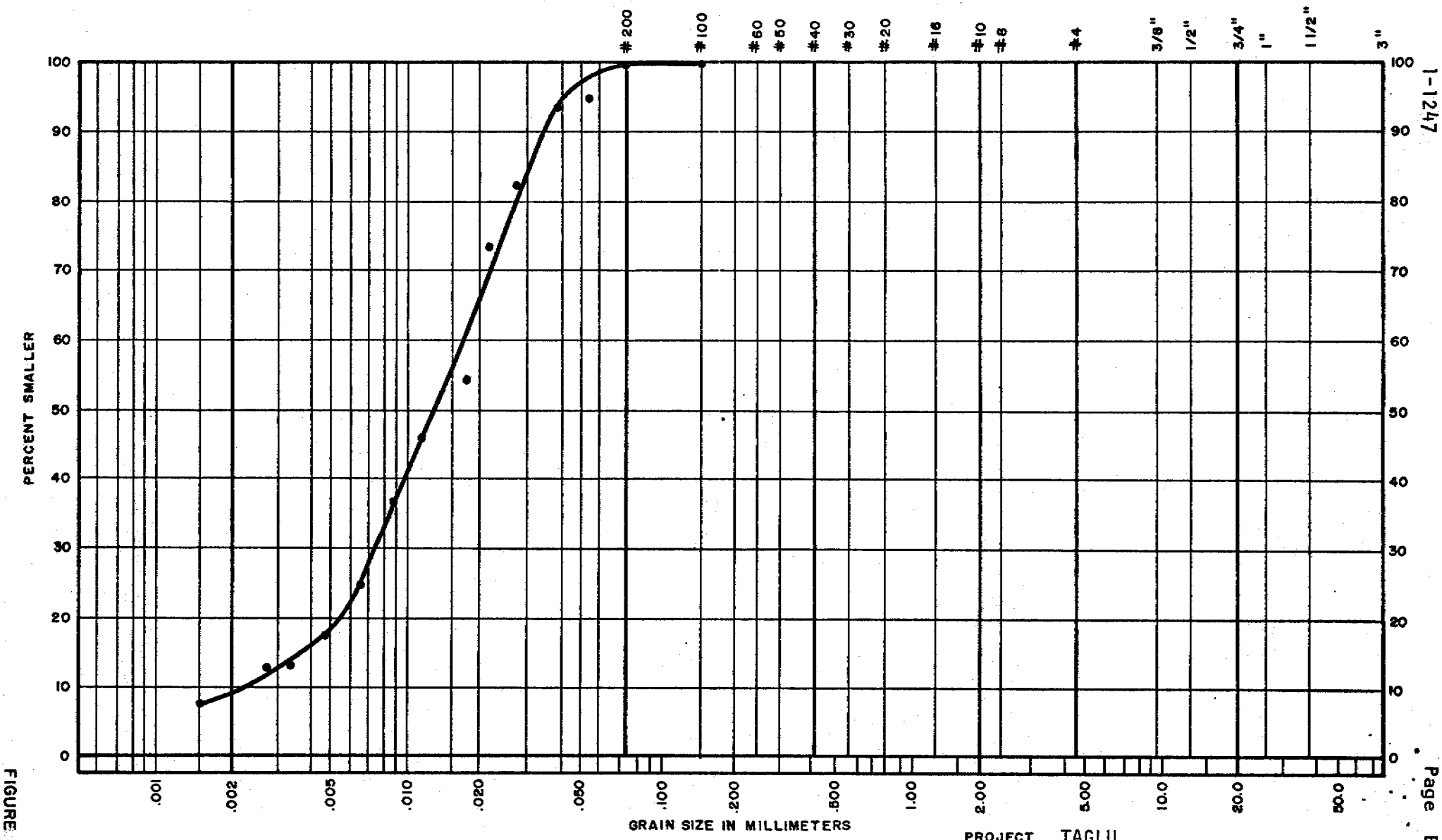
EBA Engineering Consultants Ltd.

APPENDIX E-2

GRAIN SIZE CURVES FOR THE DRILLING PAD AREA

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




SAMPLE DESCRIPTION SILT, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

HOLE No. E-7 SAMPLE No.

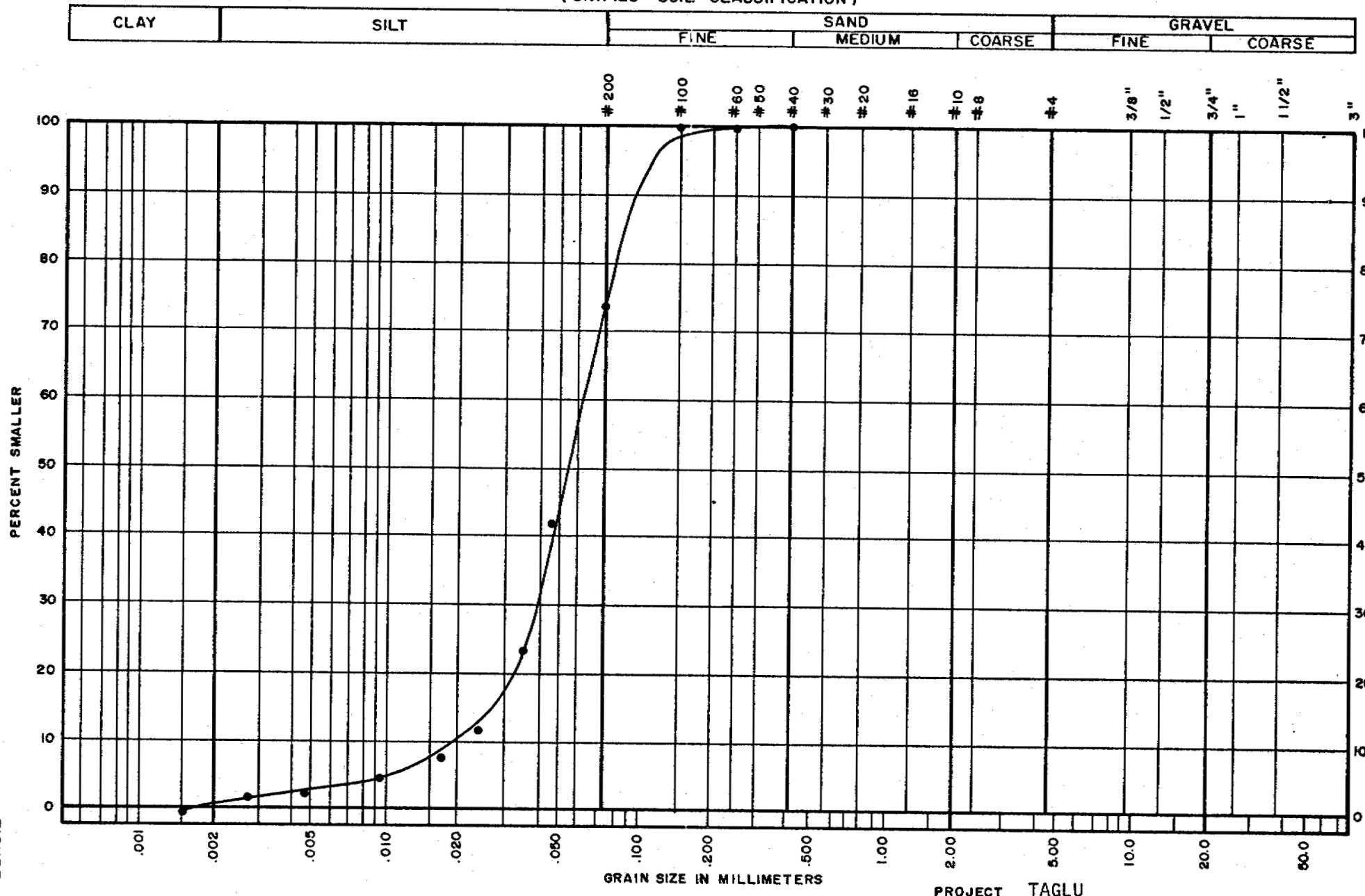
DEPTH 9 1/2 - 11'

EBA Engineering Consultants Ltd.

FIGURE

1-1247

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

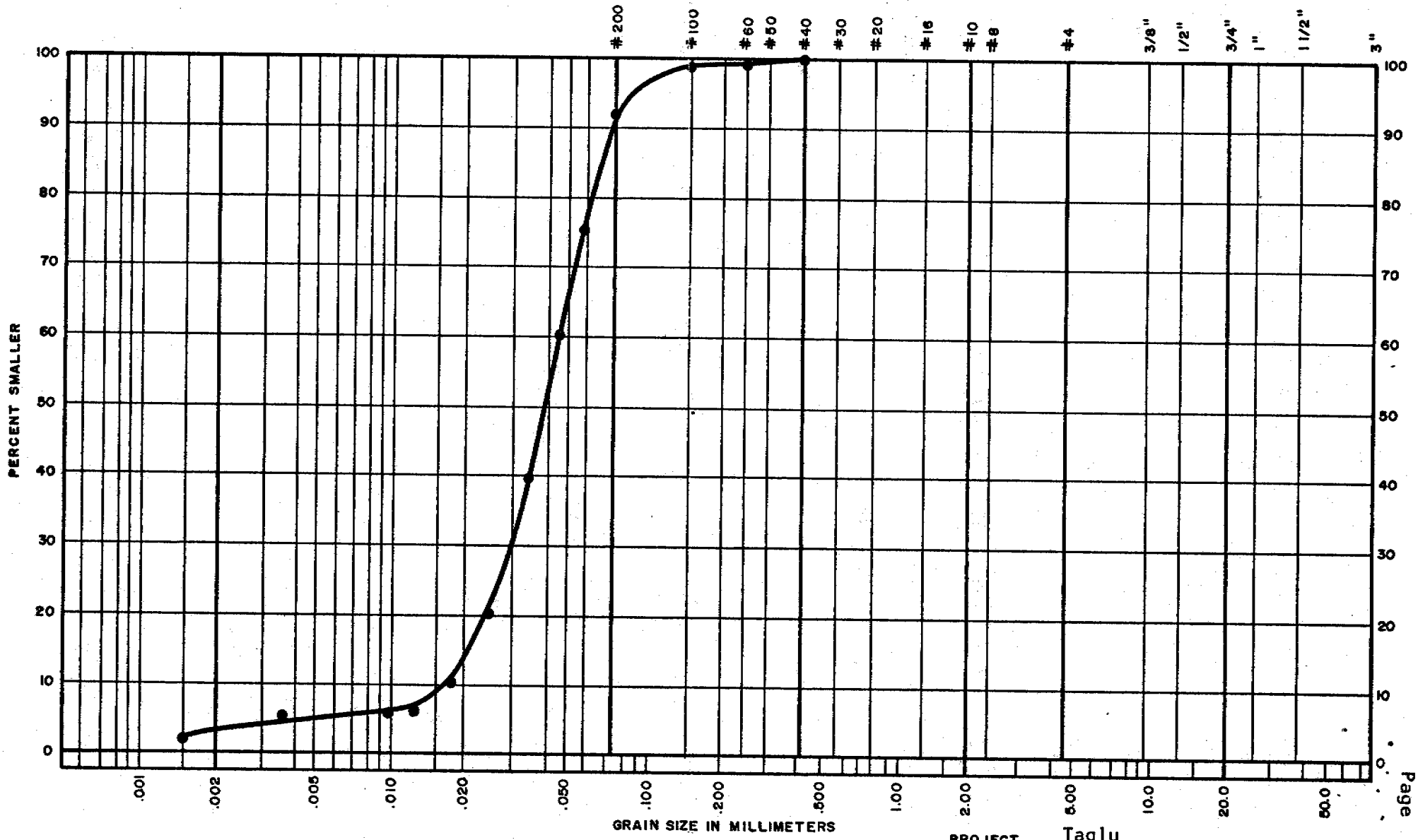
SAMPLE DESCRIPTION SILT
- sandy

PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. E-7 SAMPLE No.
DEPTH 28-30'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |




SAMPLE DESCRIPTION Silt

PROJECT Taglu

JOB No. E965.1 DATE 2/5/75

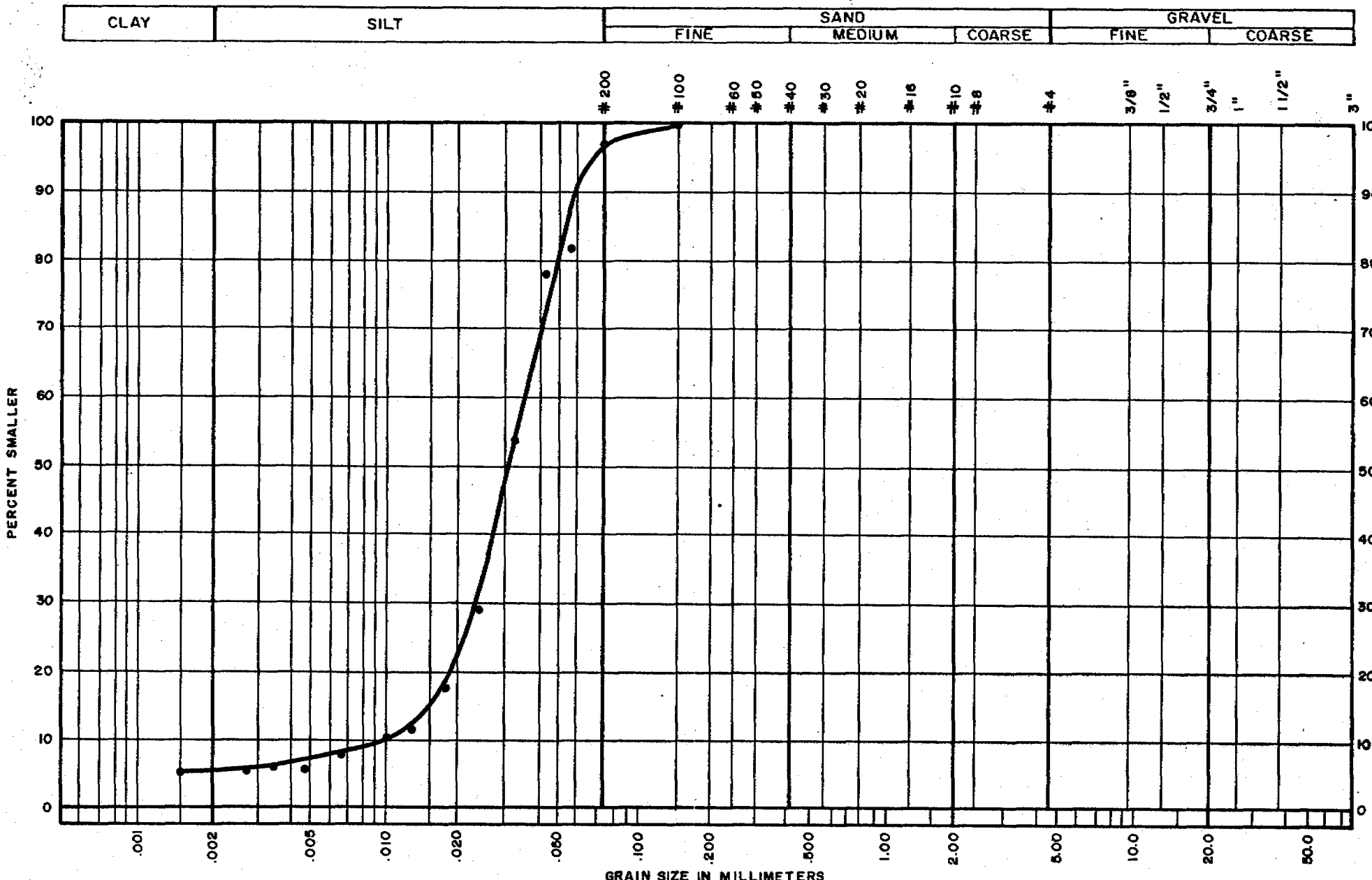
HOLE No. G-11 SAMPLE No.

DEPTH 12½-14½ Feet

EBA Engineering Consultants Ltd.

FIGURE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




1-1247

FIGURE

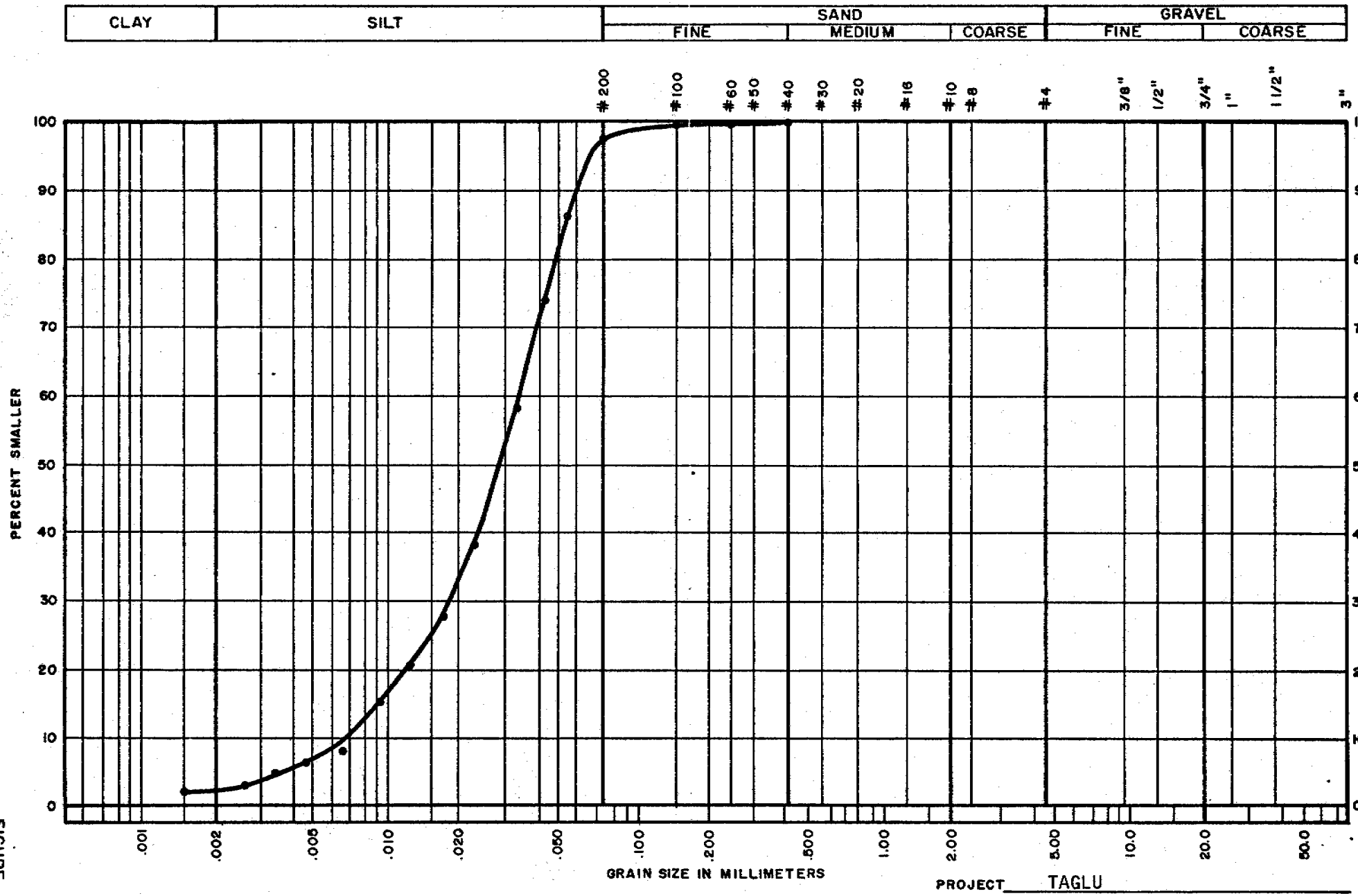
Page E-21

SAMPLE DESCRIPTION SILT, TRACE FINE SAND
TRACE CLAY

PROJECT TAGLU
JOB No. E965.1 DATE 15 May, 1975
HOLE No. 1-1 SAMPLE No.
DEPTH 13'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT, TRACE FINE SAND, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

HOLE No. 1-1 SAMPLE No.

DEPTH 16'

EBA Engineering Consultants Ltd.

FIGURE

1-1247

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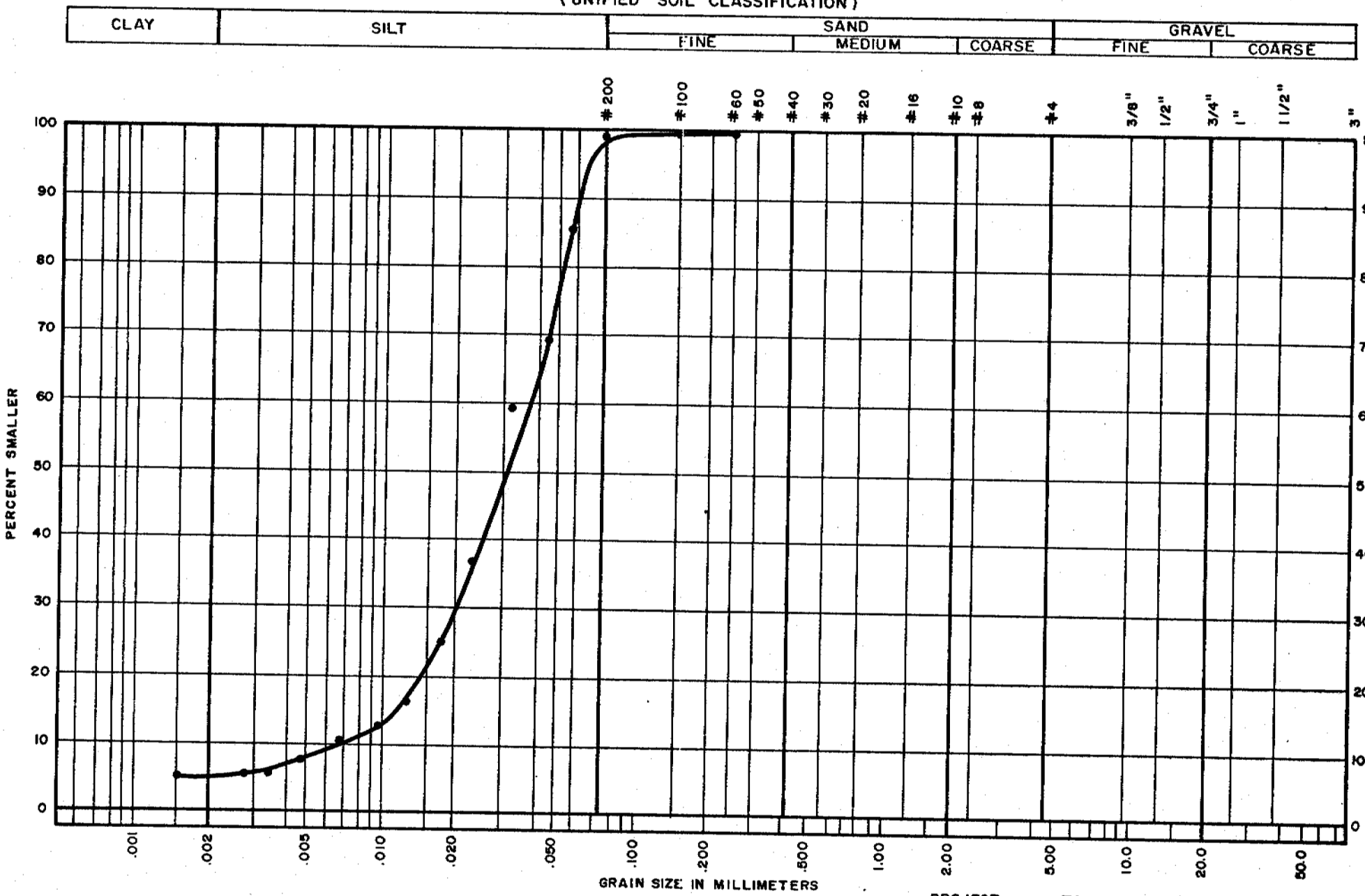
# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

HOLE No. 1-10 SAMPLE No.

DEPTH 14 1/2 - 16 1/2 '

EBA Engineering Consultants Ltd.

FIGURE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

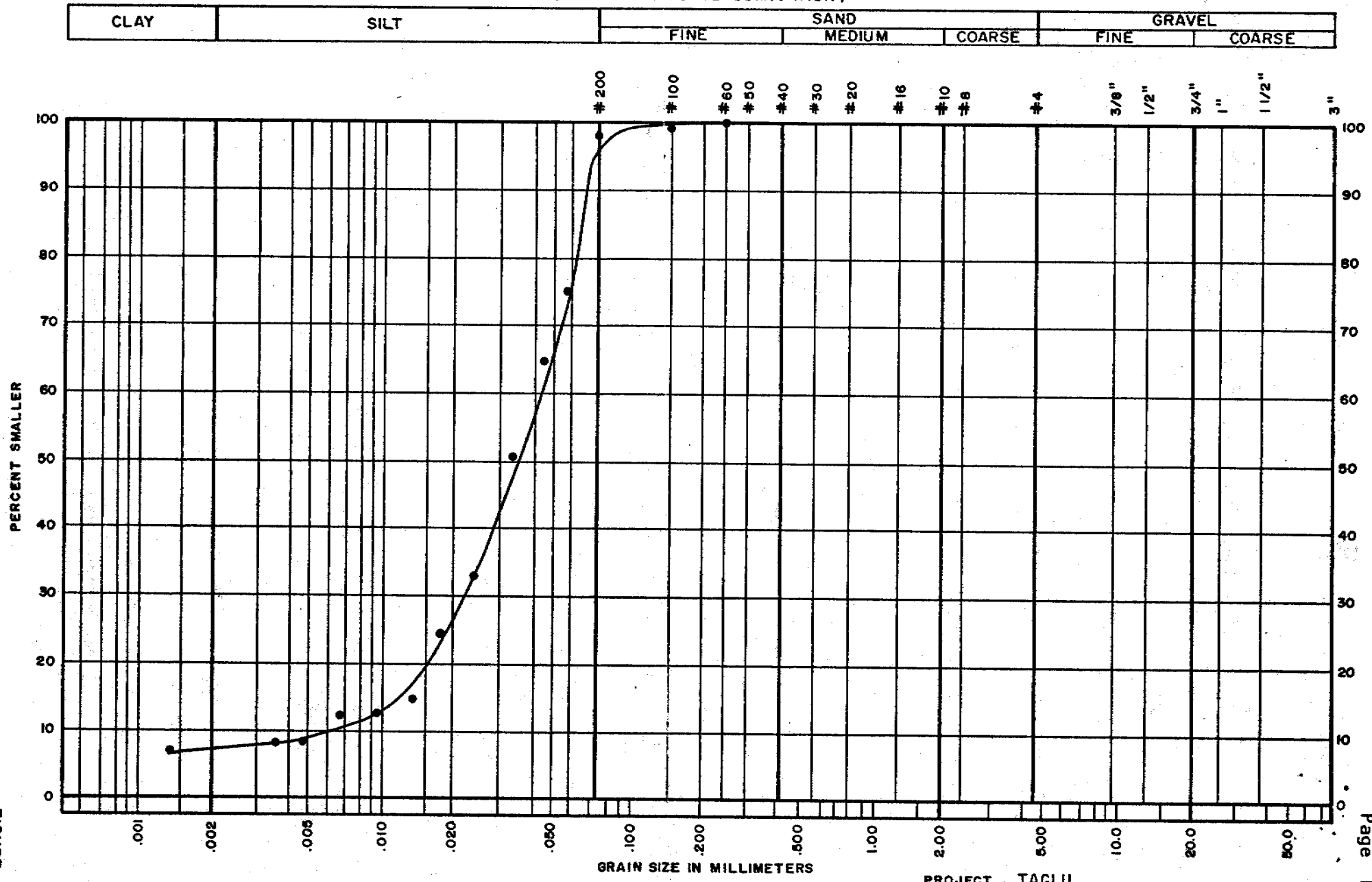



FIGURE _____

SAMPLE DESCRIPTION SILT
- tr. of clay

PROJECT TAGLU
JOB No. E965.1 DATE 22/5/75
HOLE No. BL-1 SAMPLE No. _____
DEPTH 27'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

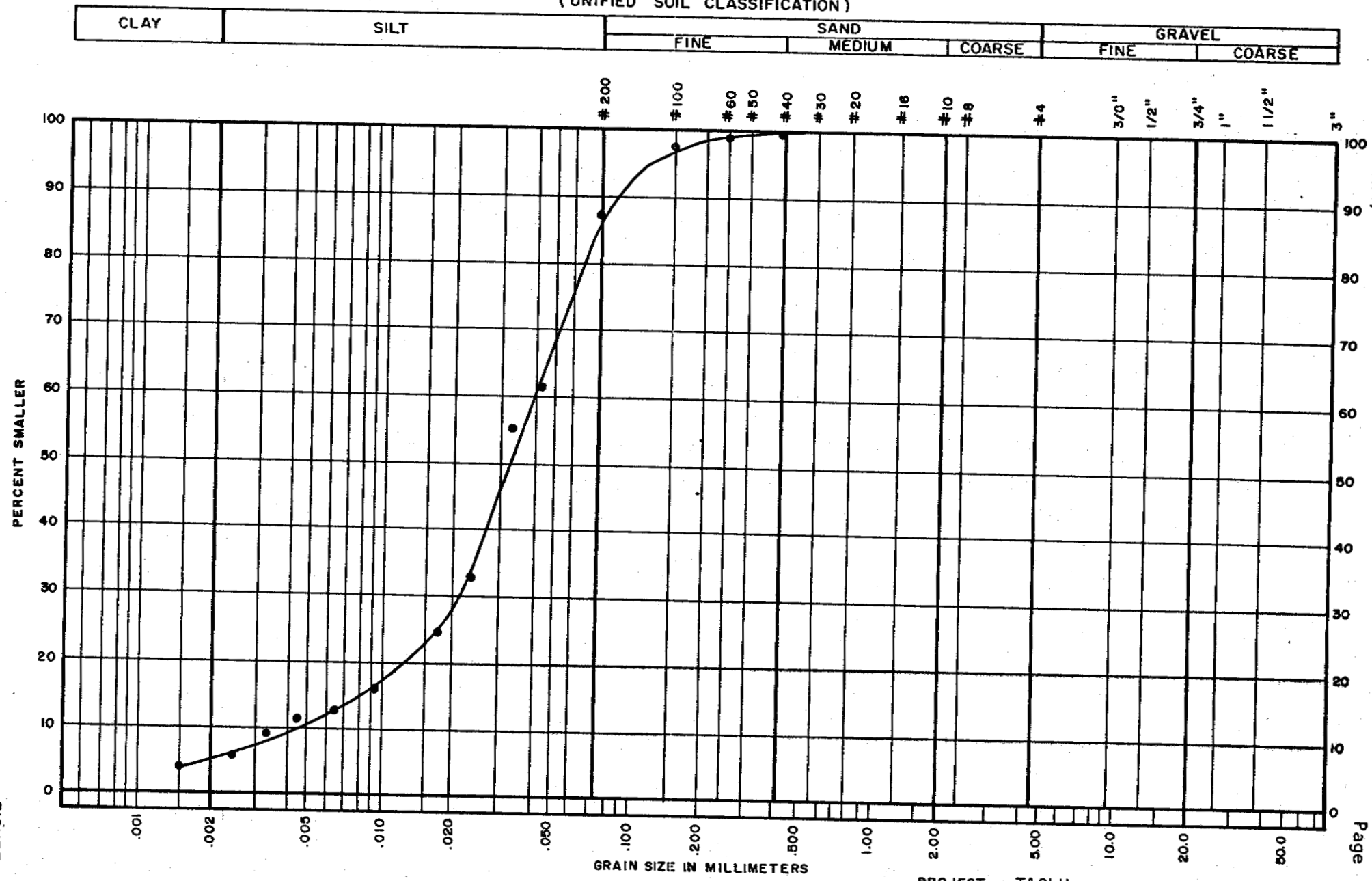



FIGURE ____

EBA Engineering Consultants Ltd.

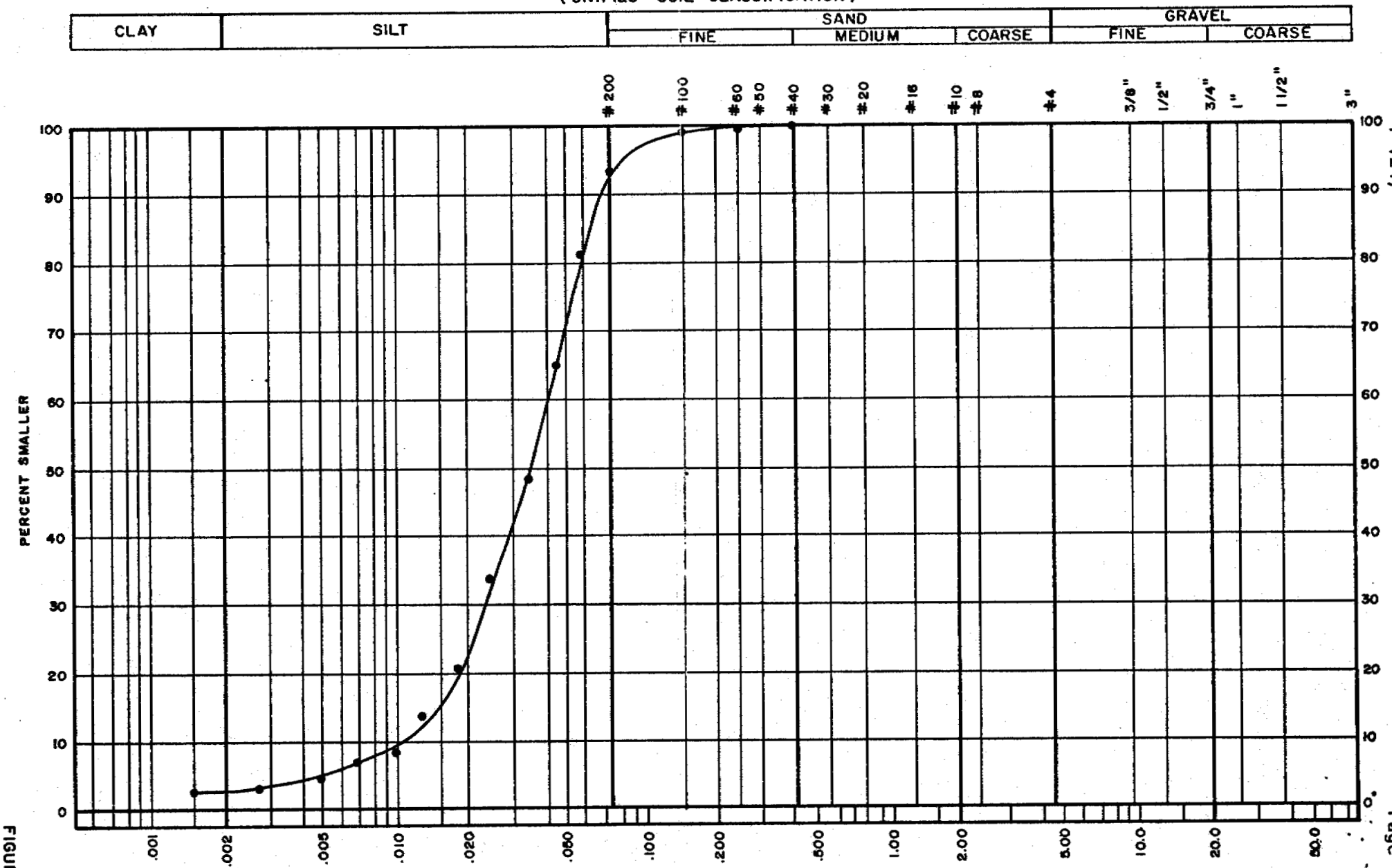
SAMPLE DESCRIPTION SILT
- some fine sand

PROJECT TAGLU
JOB No. E965.1 DATE 23/5/75
HOLE No. BL-2 SAMPLE No.
DEPTH 27'

# APPENDIX E-3

## GRAIN SIZE CURVES FOR AIRSTRIP AND ACCESS ROADS

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)



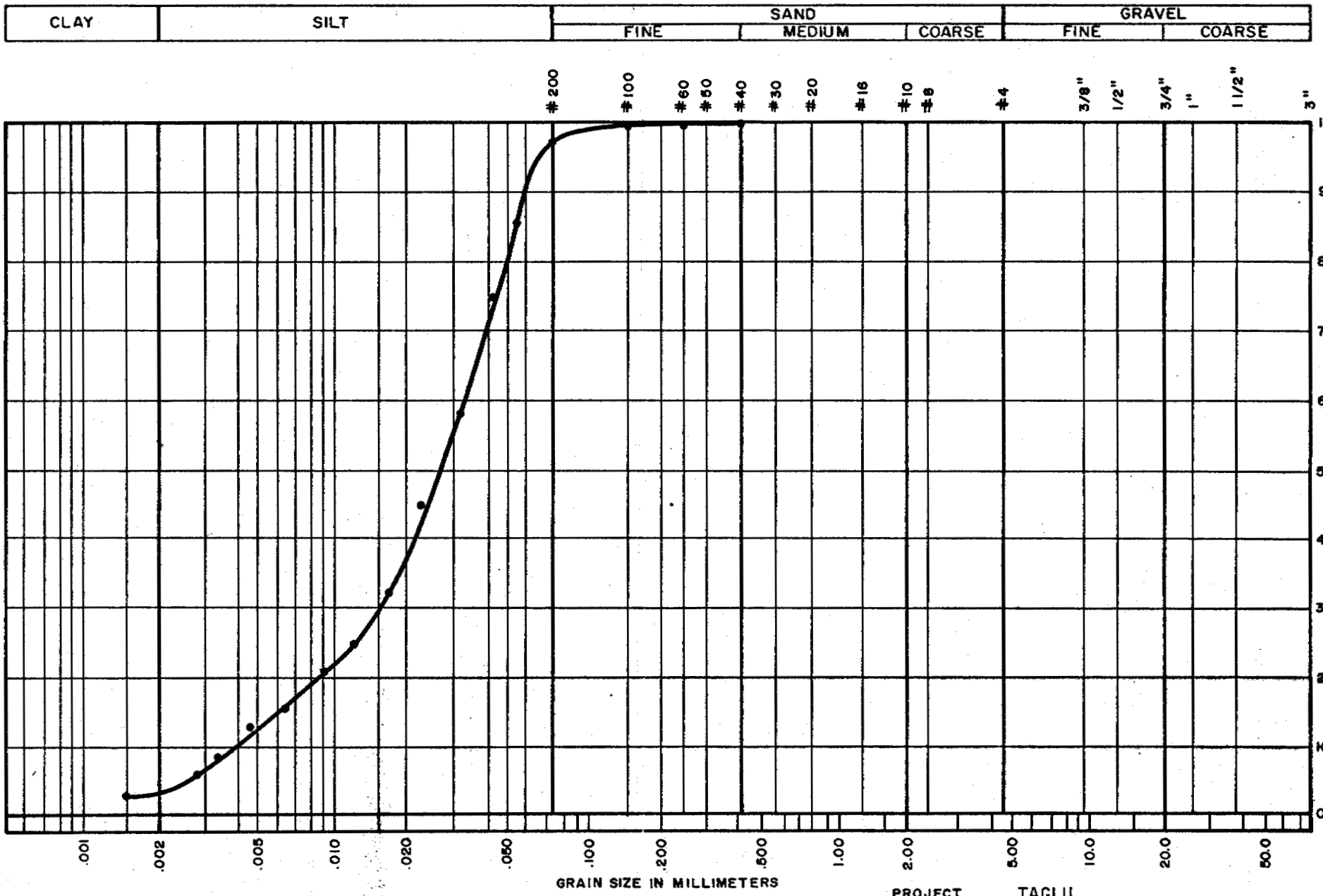

FIGURE

SAMPLE DESCRIPTION SILT
- tr. of sand

EBA Engineering Consultants Ltd.

PROJECT TAGLU
JOB No. E965.1 DATE 26/5/75
HOLE No. AS-6 SAMPLE No.
DEPTH 8 1/2 - 10'

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT, TRACE CLAY, TRACE FINE SAND

PROJECT TAGLU

JOB No. E965.1 DATE 14 May, 1975

HOLE No. AS-6 SAMPLE No.

DEPTH 20' - 8" - 23'

EBA Engineering Consultants Ltd.

FIGURE

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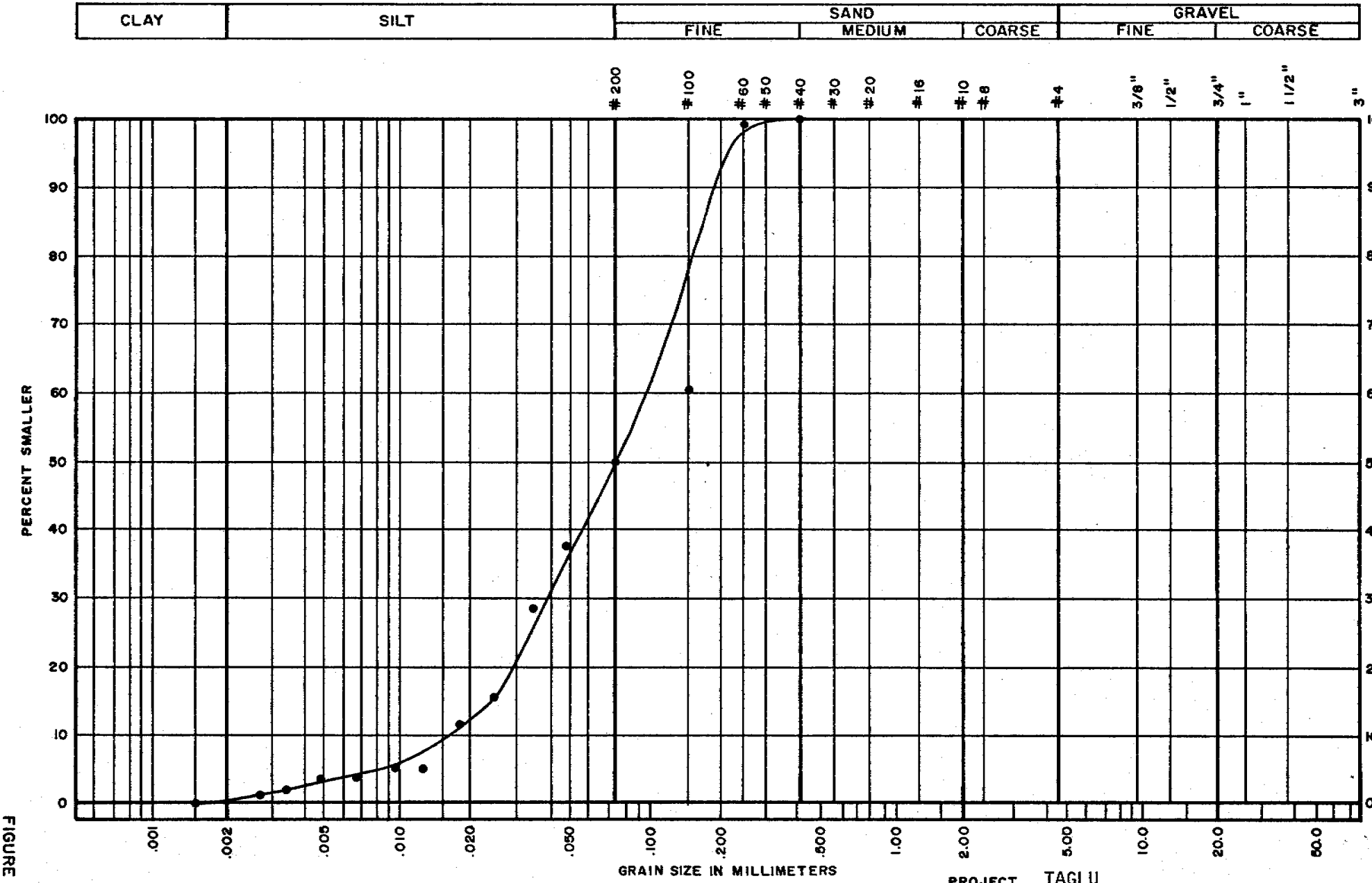
# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT and SAND

PROJECT TAGLU

JOB No. E965.1 DATE 21/5/75

HOLE No. AS-6 SAMPLE No.

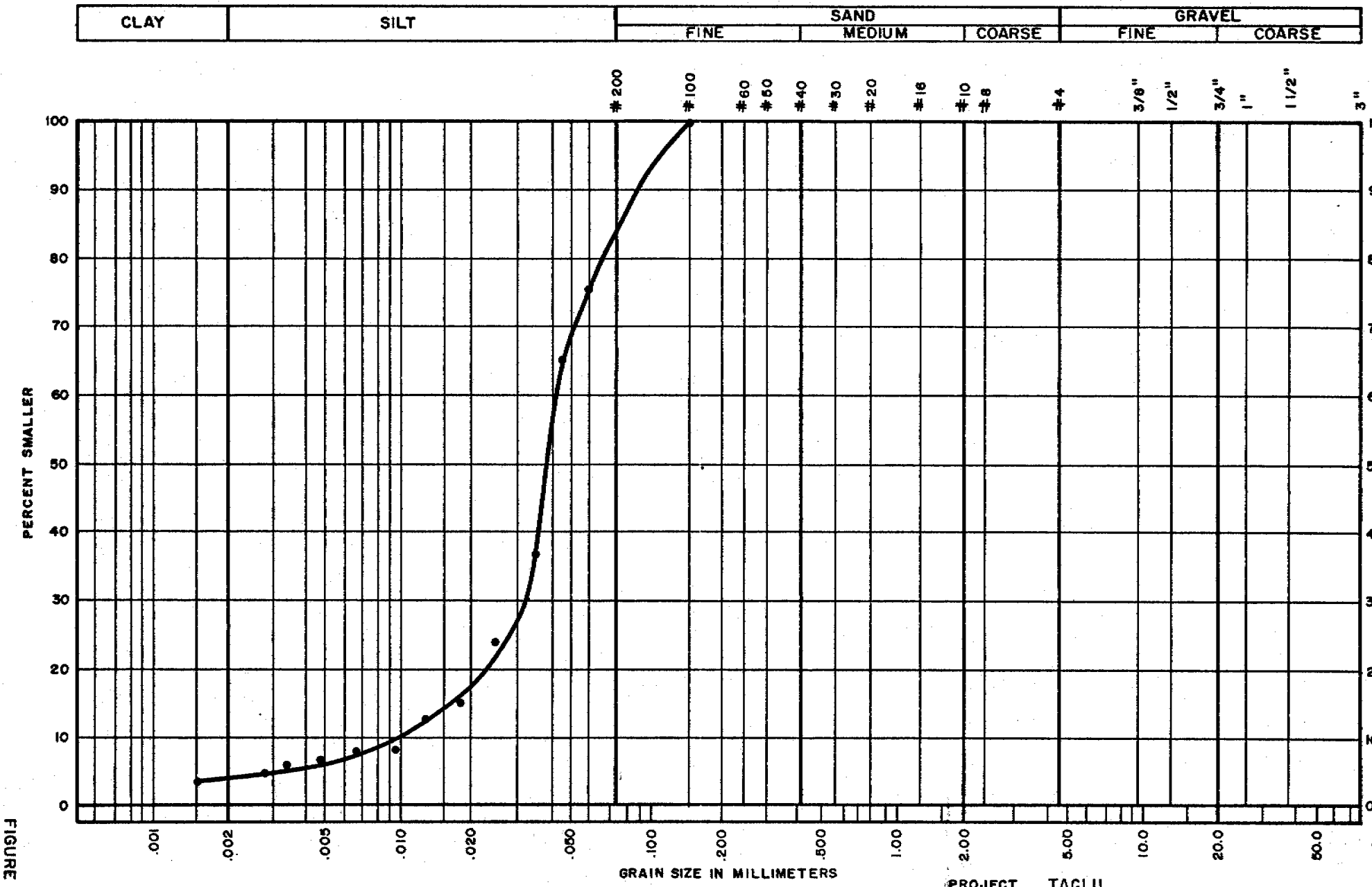
DEPTH 37 - 37 1/2'

EBA Engineering Consultants Ltd.

FIGURE

1-1247

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT, TRACE FINE SAND, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

HOLE No. 0-1 SAMPLE No.

DEPTH 6 - 8'

EBA Engineering Consultants Ltd.

FIGURE

1-1241

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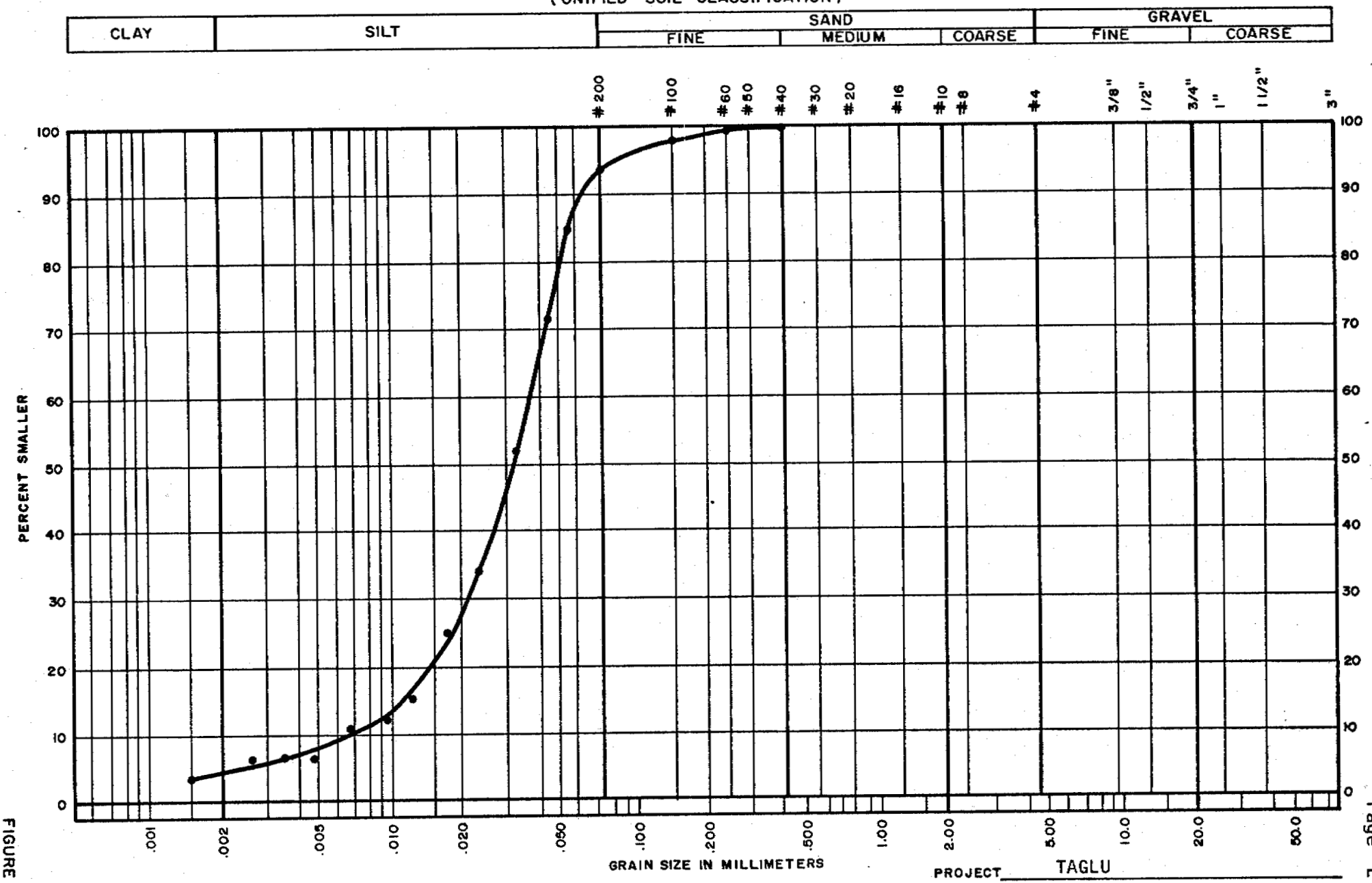
# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT, TRACE FINE SAND, TRACE CLAY

PROJECT TAGLU

JOB No. E965.1 DATE 15 May, 1975

HOLE No. 0-3 SAMPLE No.

DEPTH 15 - 17 1/2'

EBA Engineering Consultants Ltd.

FIGURE

1-124/

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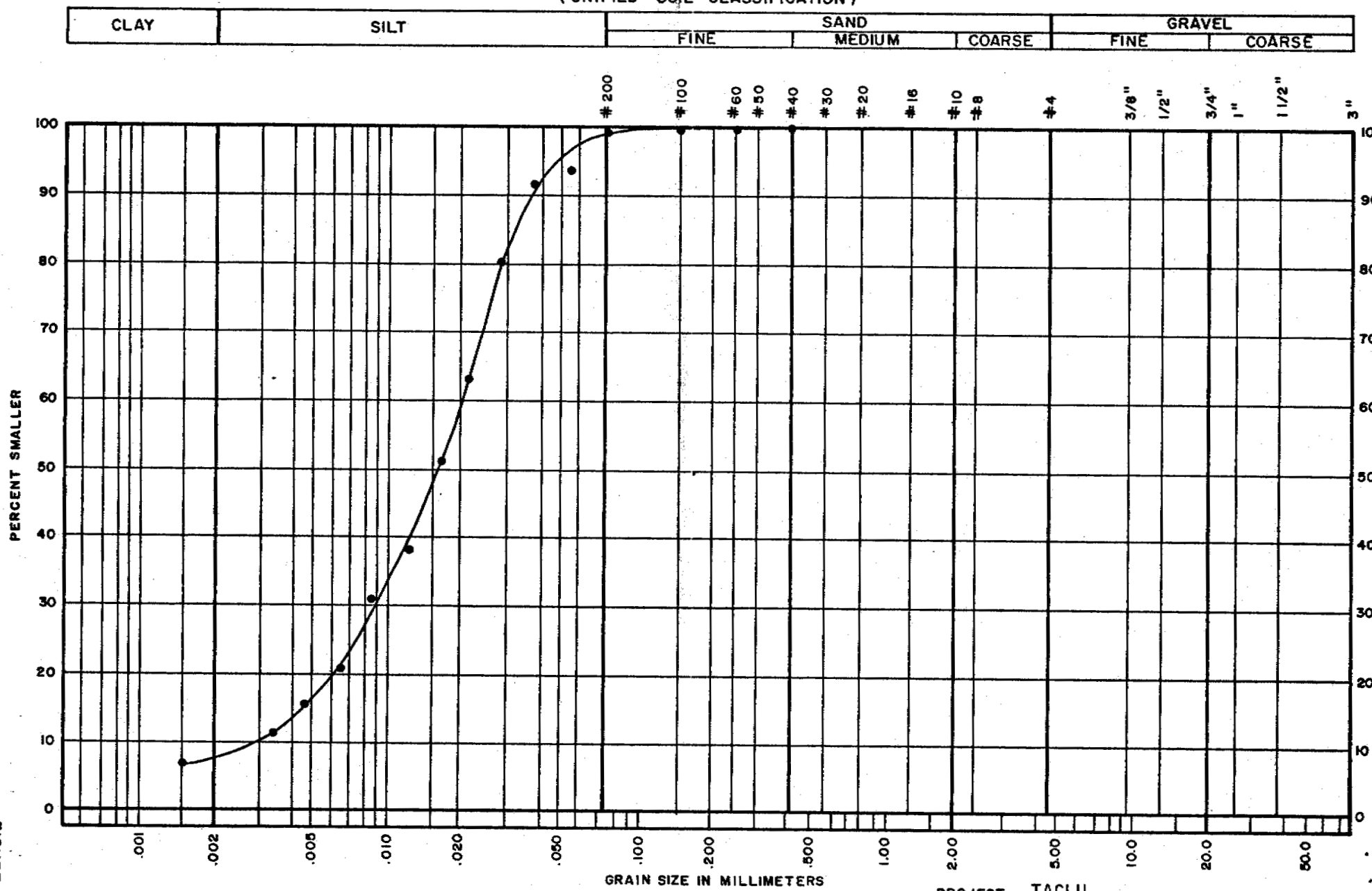
# GRAIN SIZE DISTRIBUTION
( UNIFIED SOIL CLASSIFICATION )




FIGURE

SAMPLE DESCRIPTION SILT
- tr. of clay

PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. 0-2B SAMPLE No.
DEPTH 5 - 6 1/2'

EBA Engineering Consultants Ltd.

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

| CLAY | SILT | SAND | | | GRAVEL | |
|---|---|---|---|---|---|---|
| | | FINE | MEDIUM | COARSE | FINE | COARSE |

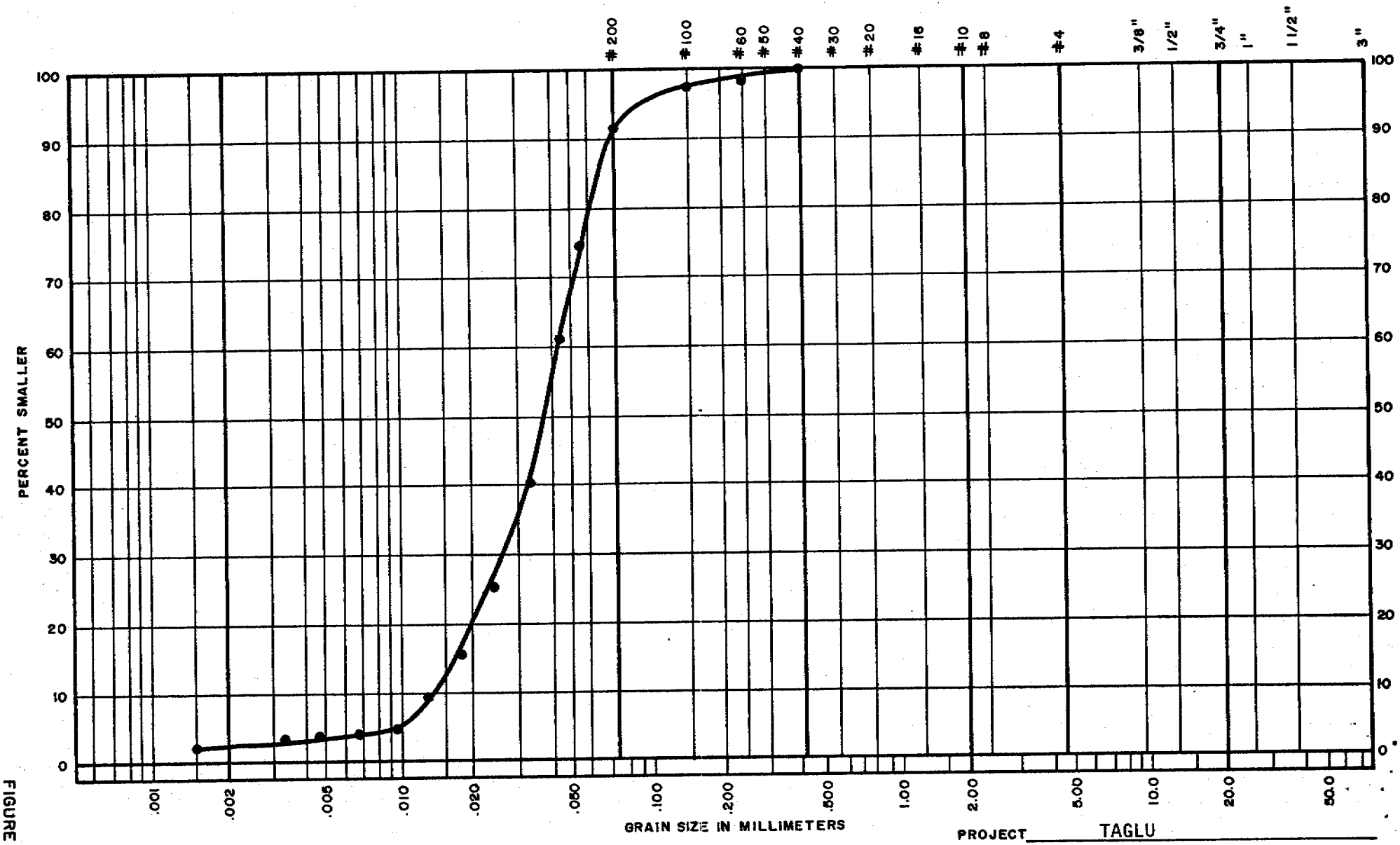



FIGURE ____

SAMPLE DESCRIPTION SILT

PROJECT TAGLU

JOB No. E965.1 DATE 3/6/75

HOLE No. 04-B SAMPLE No. ____

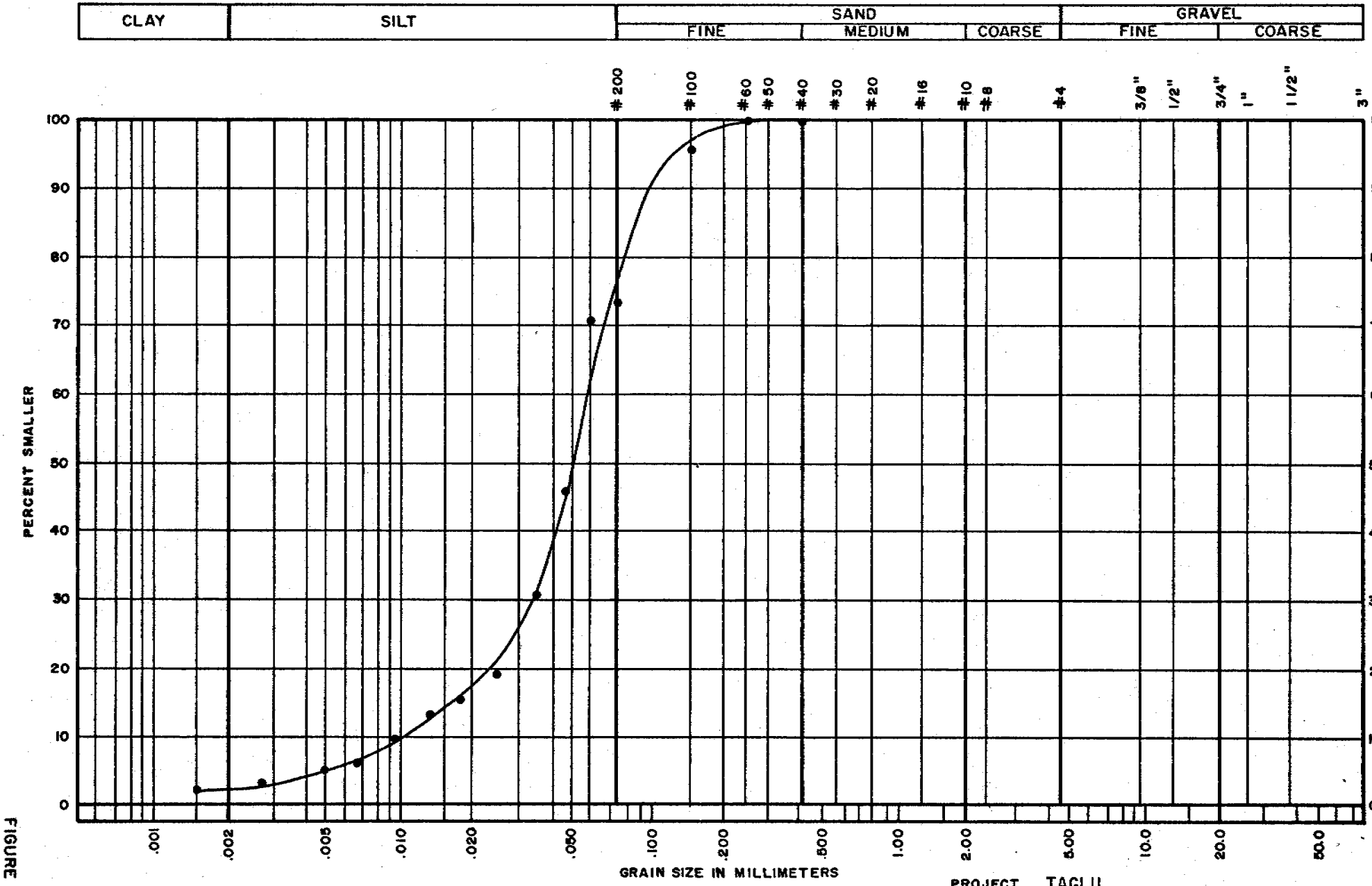
DEPTH 14 - 15 Feet

EBA Engineering Consultants Ltd.

APPENDIX E-4

GRAIN SIZE CURVES FOR DOCK SITE

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




FIGURE

SAMPLE DESCRIPTION SILT
- sandy

PROJECT TAGLU
JOB No. E965.1 DATE 21/5/75
HOLE No. 0-13 SAMPLE No.
DEPTH 22-23 1/2'

EBA Engineering Consultants Ltd.

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# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)

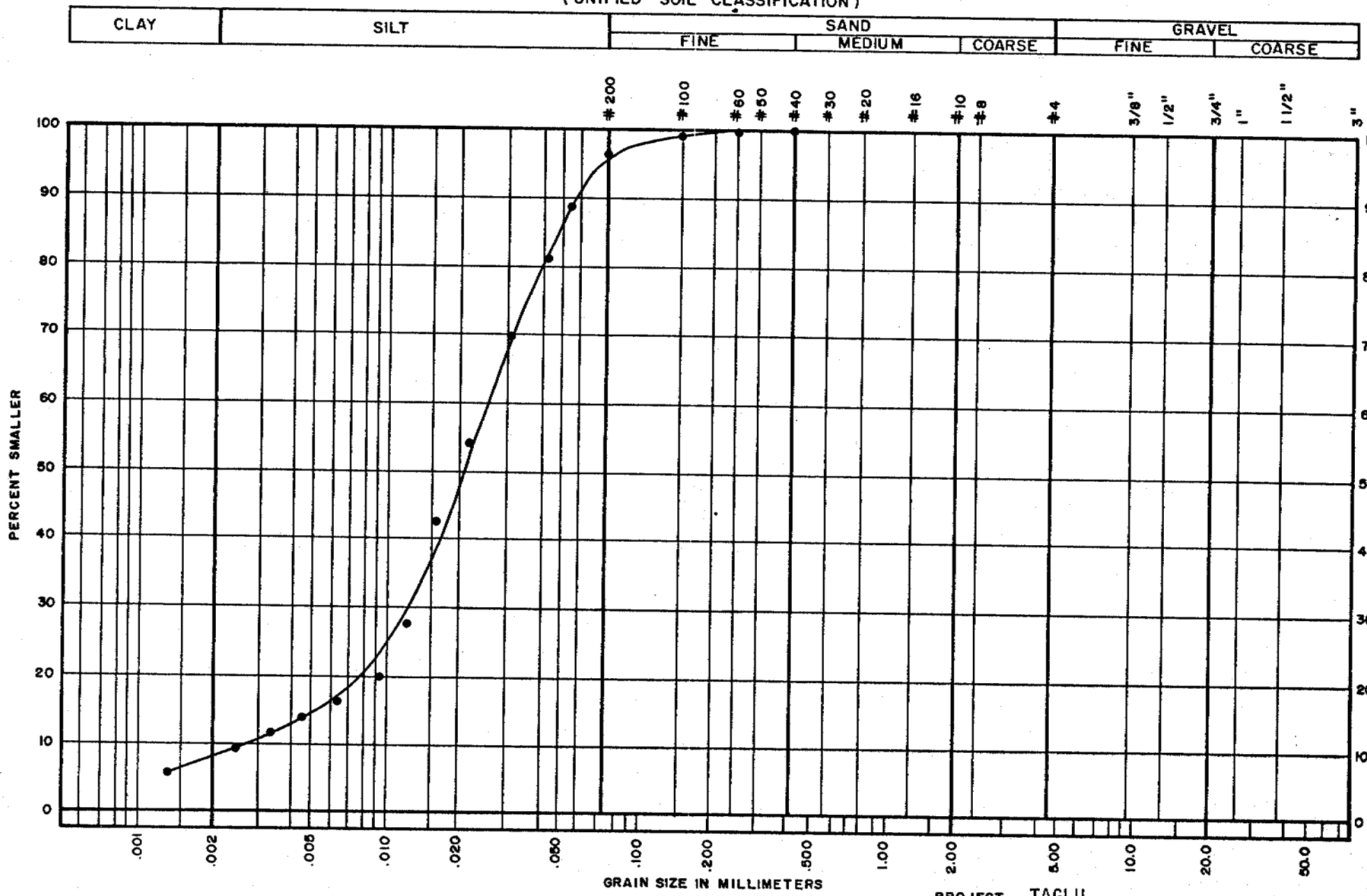



FIGURE ____

SAMPLE DESCRIPTION SILT

EBA Engineering Consultants Ltd.

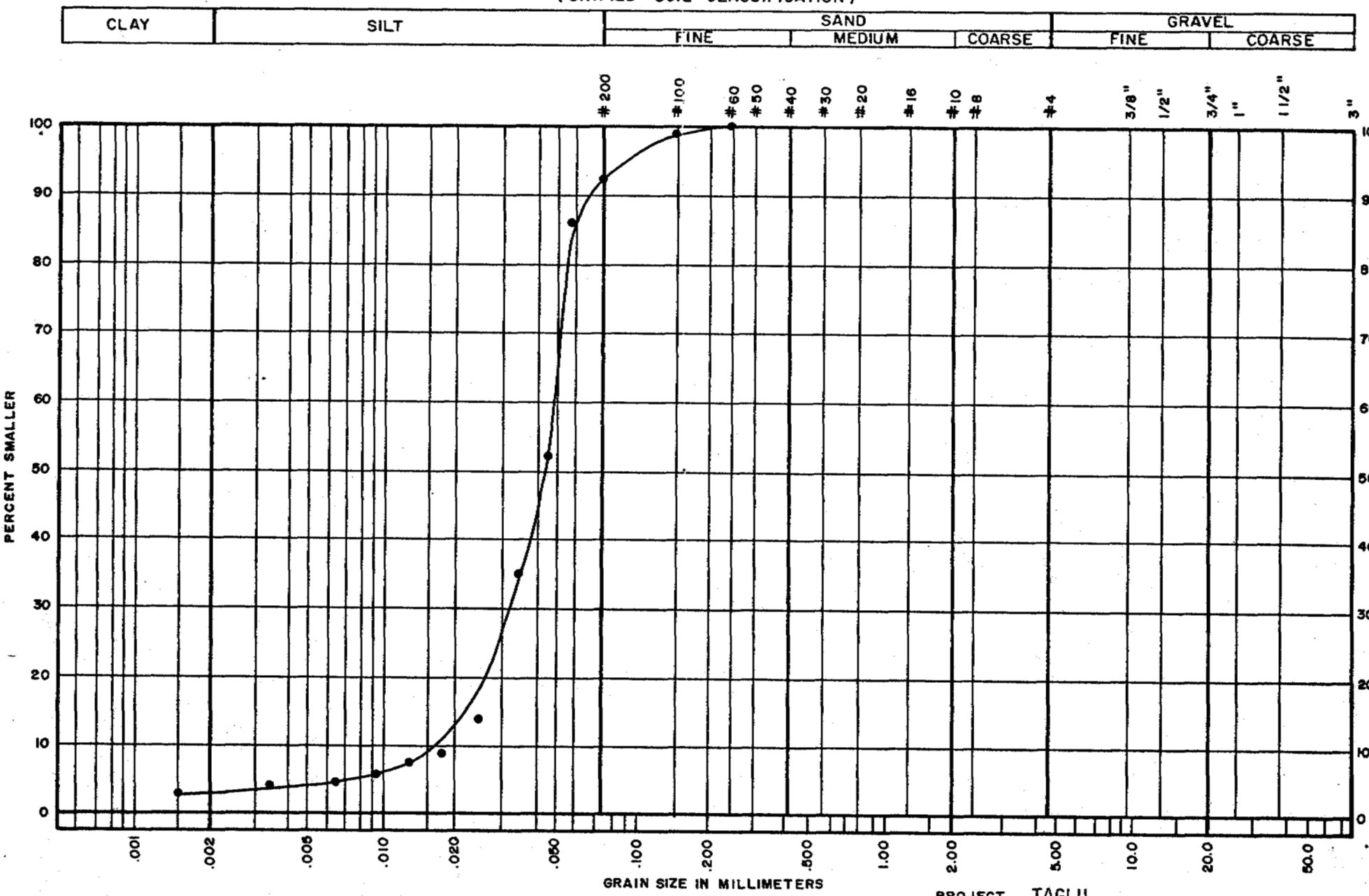
PROJECT TAGLU

JOB No. E965.1 DATE 21/5/75

HOLE No. 0-13-D SAMPLE No. ____

DEPTH 18 - 19 1/2'

# GRAIN SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION)




SAMPLE DESCRIPTION SILT

PROJECT TAGLU

JOB No. E965.1 DATE 16/5/75

HOLE No. 0-14 SAMPLE No.

DEPTH 12 - 13.2'

EBA Engineering Consultants Ltd.

FIGURE

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| D-9 | D-34 | 7 696 180 | 501 725 |
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A.L.U.R.

A.L.U.R.