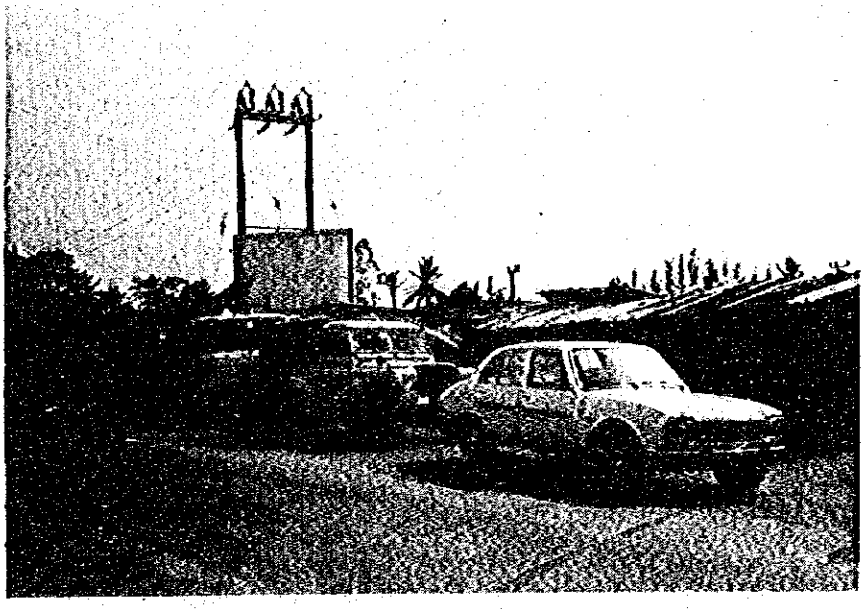
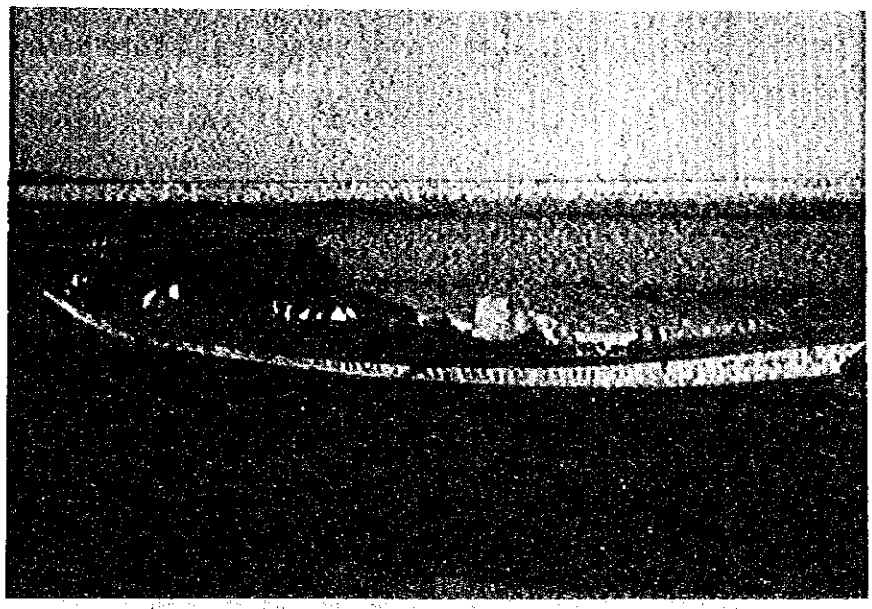
3. Photos of Site Works

Headquarters of Nigerian Ports Authority (NPA)



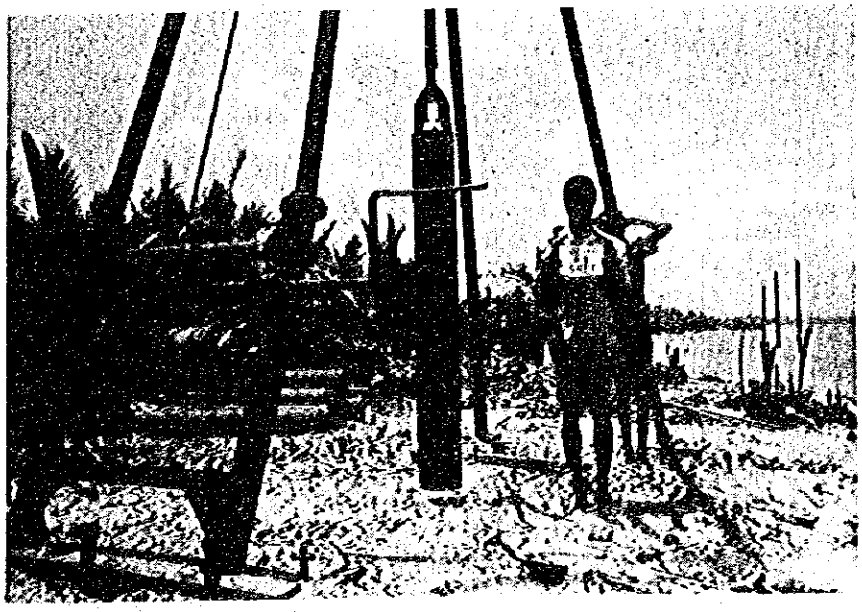
Mobilization of Drilling Equipment to the Site



Mobilization Manual-type Machine by Motor Boat

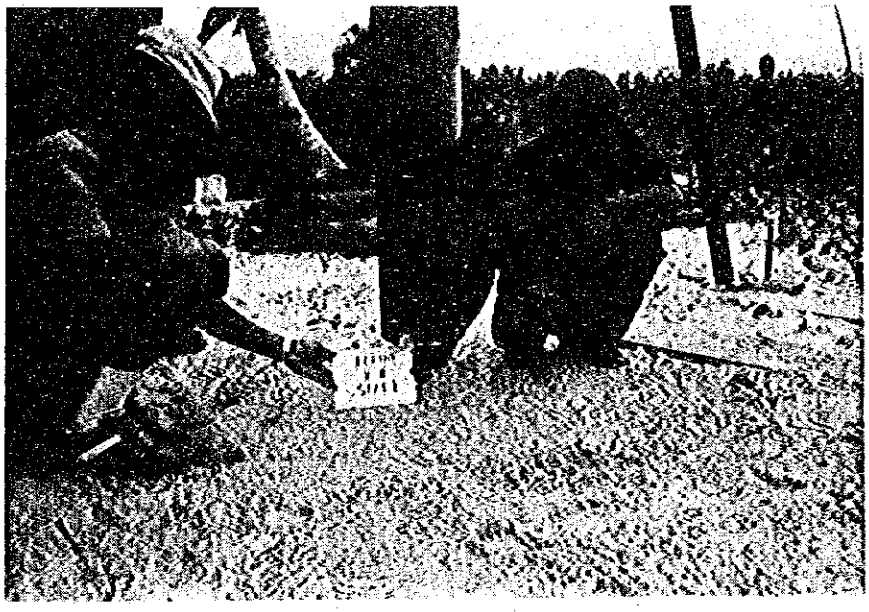
Staff Transportation to the Work Site

Start to Drill by Motor Type Boring Machine at O-1

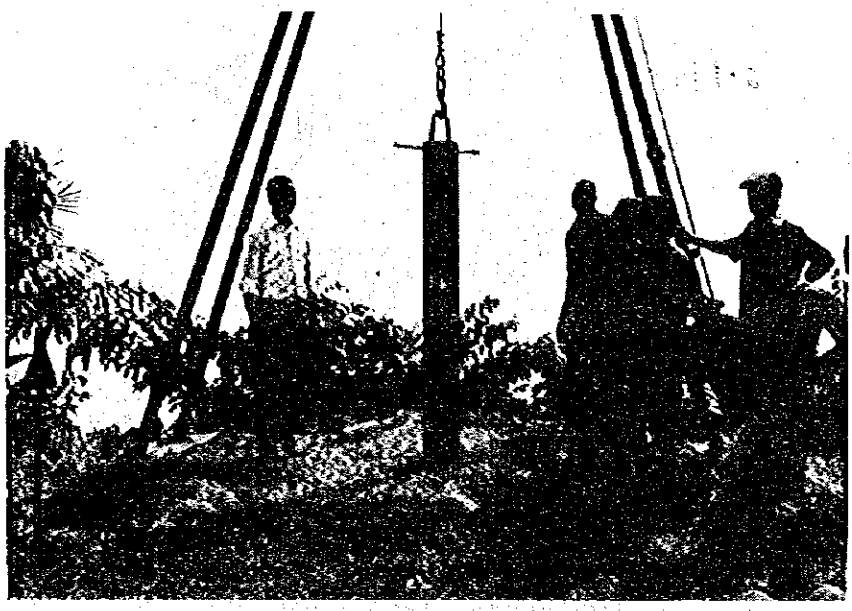


Start to Drill by Manual Type Boring Machine at O-2

Start to Drill by Motor Type Boring Machine at I-1



Start to Drill by Manual Type Boring Machine at I-2



Start to Drill by Manual Type Machine at J-1

Start to Drill by Manual Type Machine at J-2

Finish Drilling at O-1

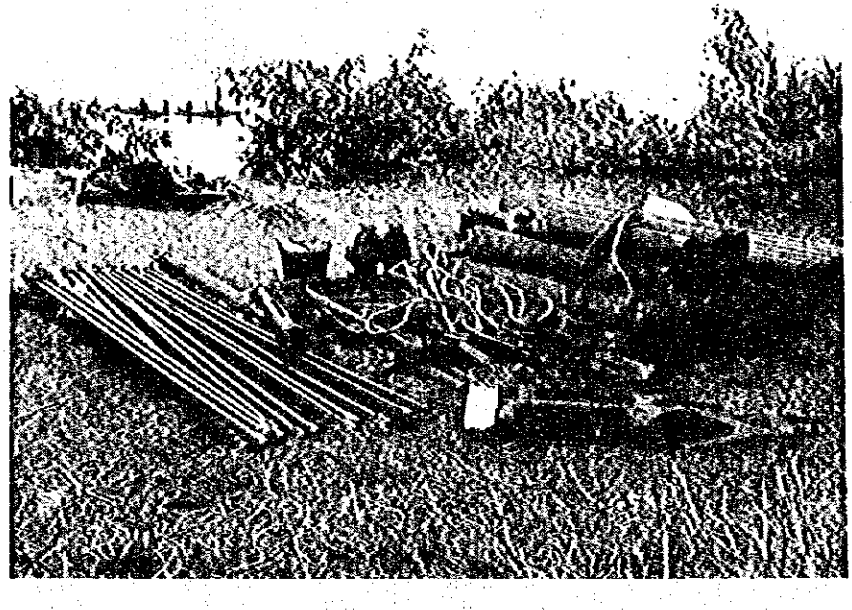
Finish Drilling at O-2

Finish Drilling at I-1

Finish Drilling at I-2

Finish Drilling at J-1

Finish Drilling at J-2

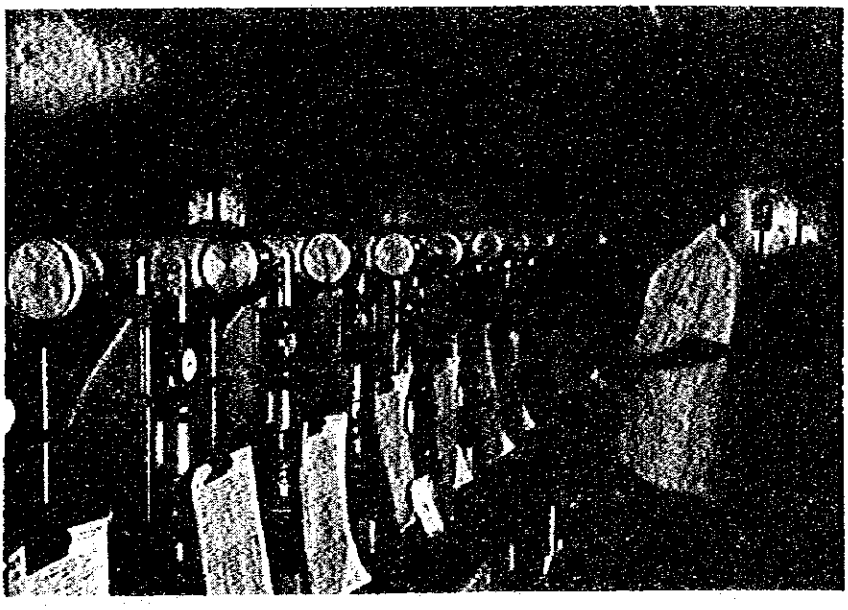


Drilling Equipment of Manual Type Rig

3 m Length Rod with Spirit Barrel

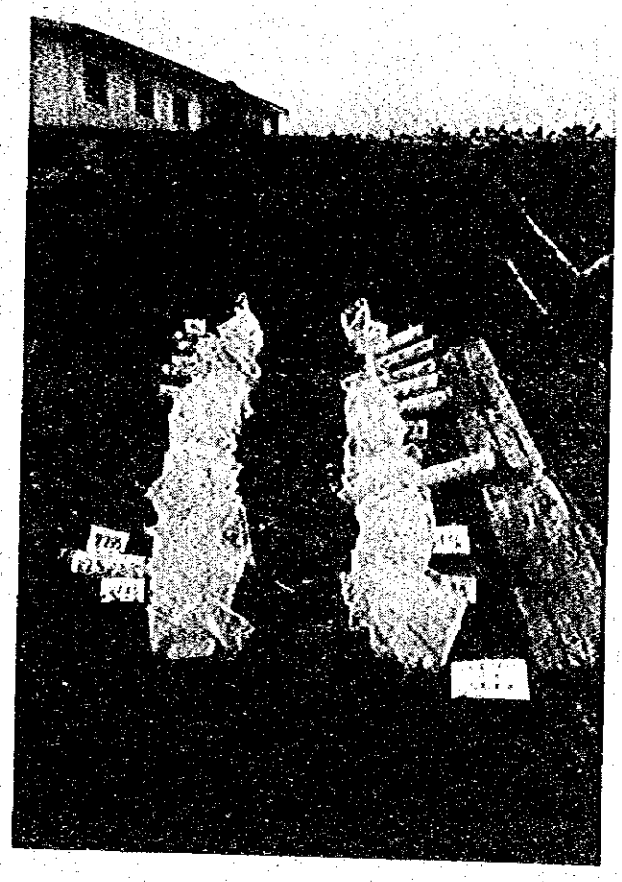
Selecting Samples for Tests at FEN Office

Observation of All Samples

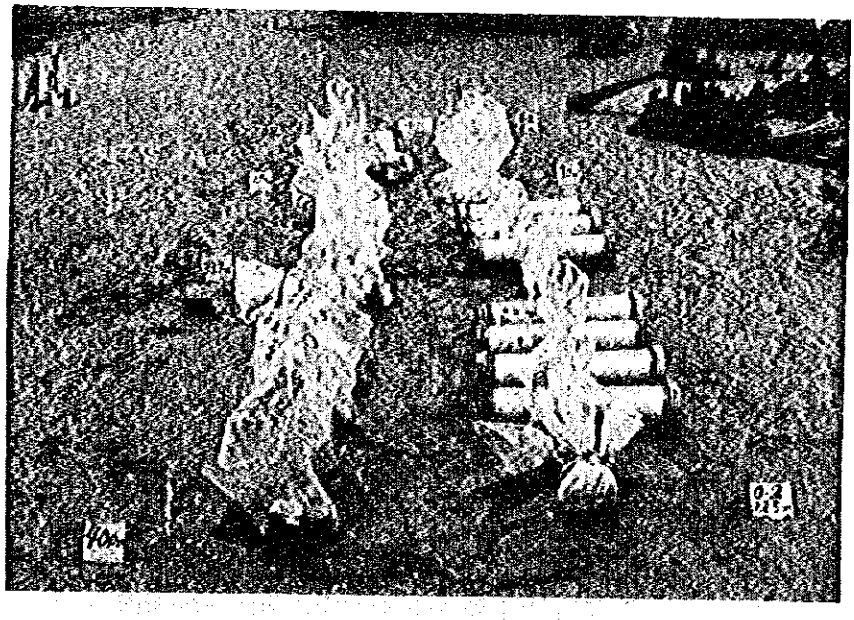


Laboratory Testing

4. Photos of Soil Samples

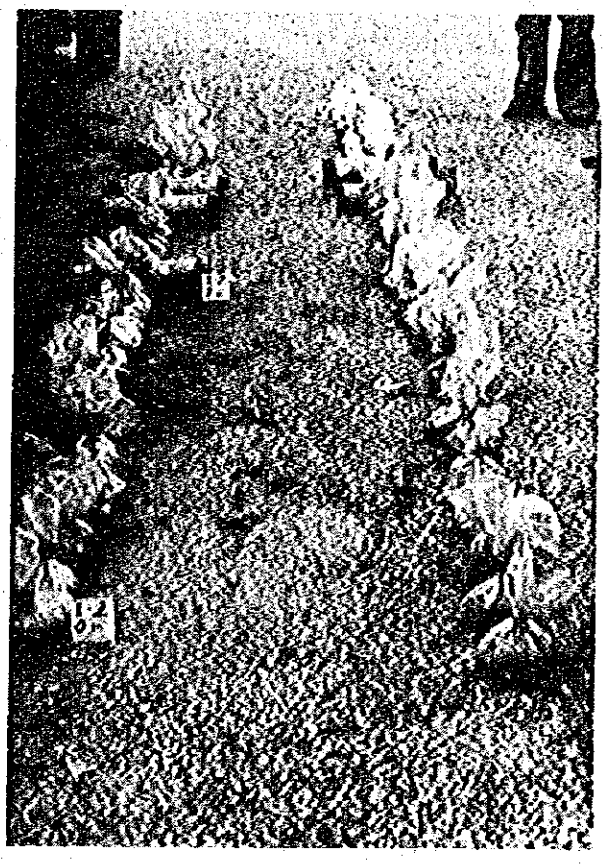


All Samples at O-1 (0 - 40.0 m depth)



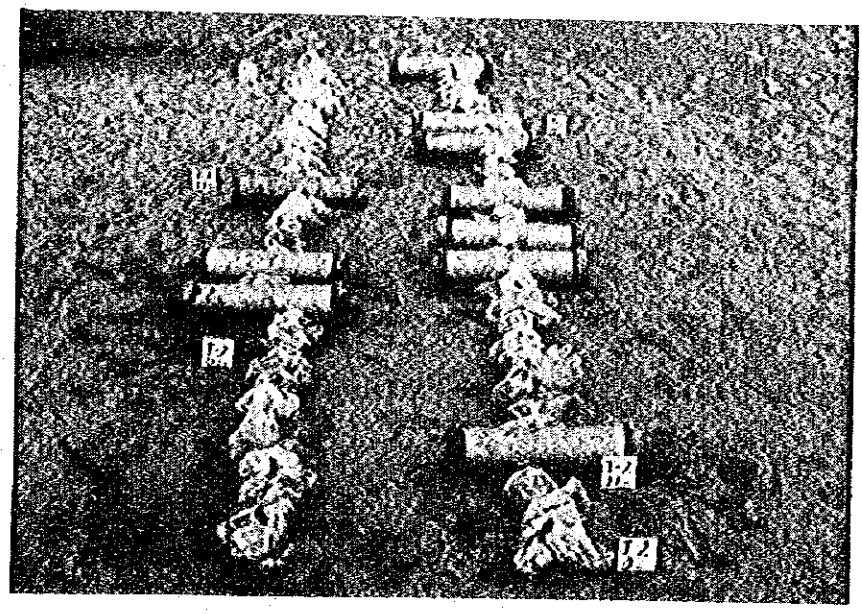
All Samples at O-2 (0 - 40.0 m depth)

All Samples at I-1 (0 - 40.0m depth)

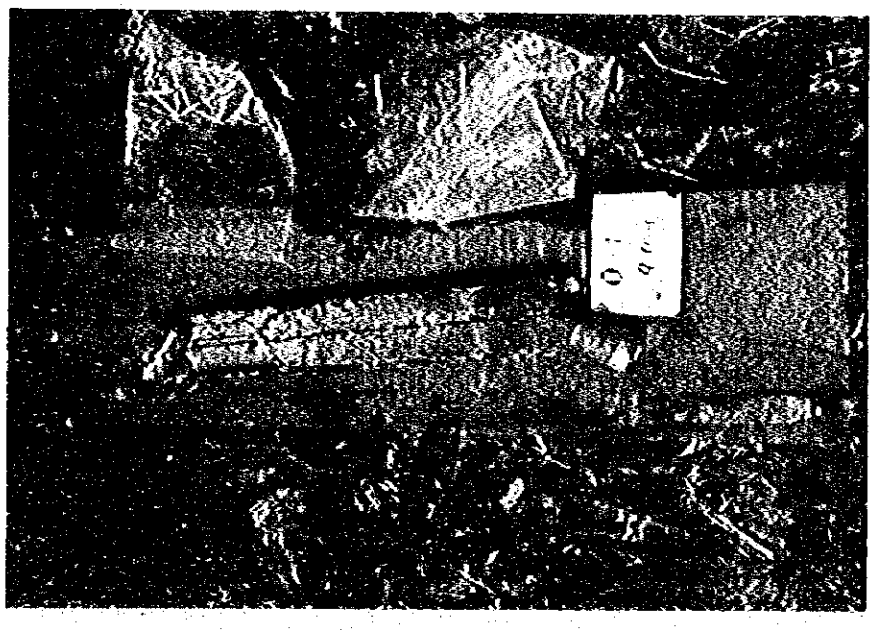


All Samples at I-2 (0 - 40.0m depth)

All Samples at J-1 (0 - 40.5m depth)

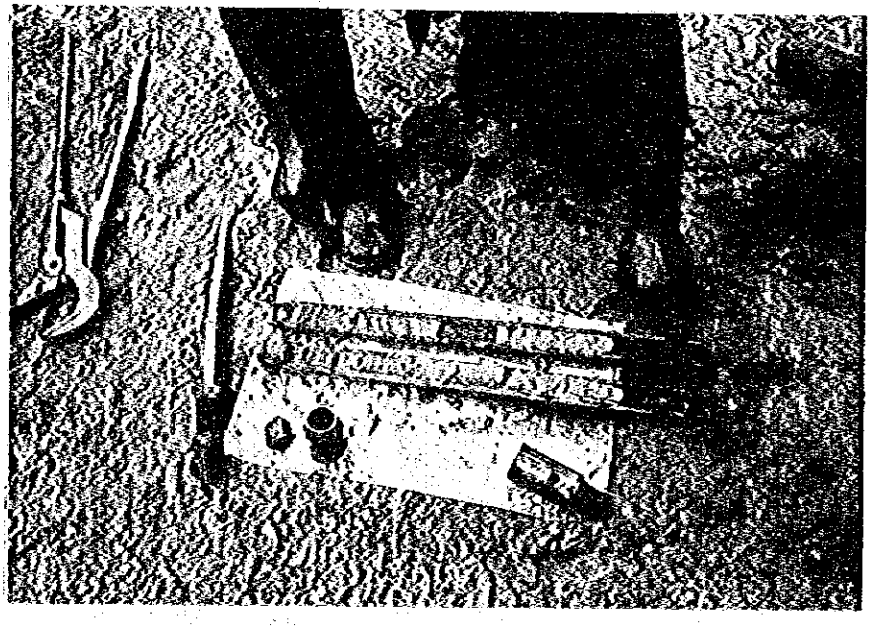


All Samples at J-2 (0 - 39.6m depth)

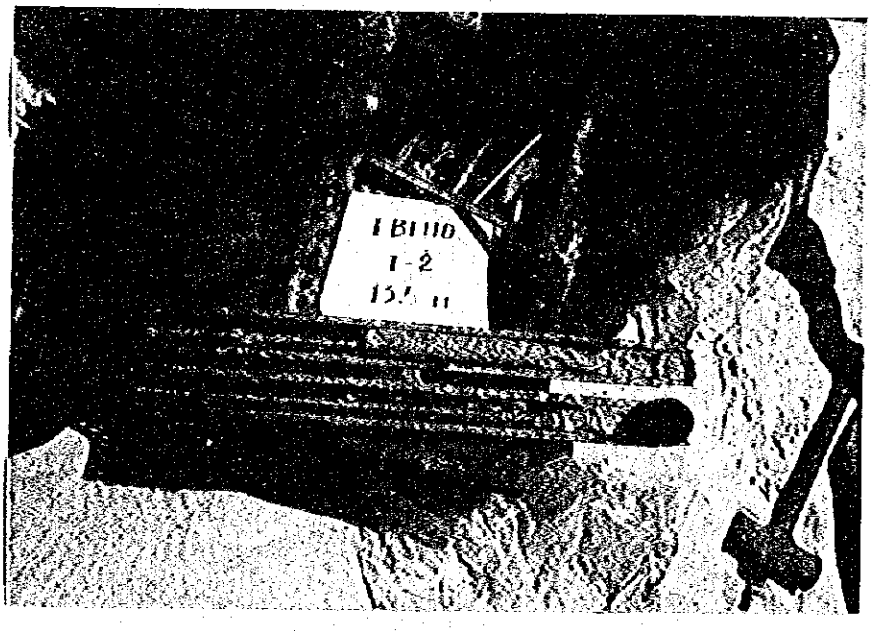


Sandy Soil Sampled by Spirit Barrel for S.P.T. at O-1

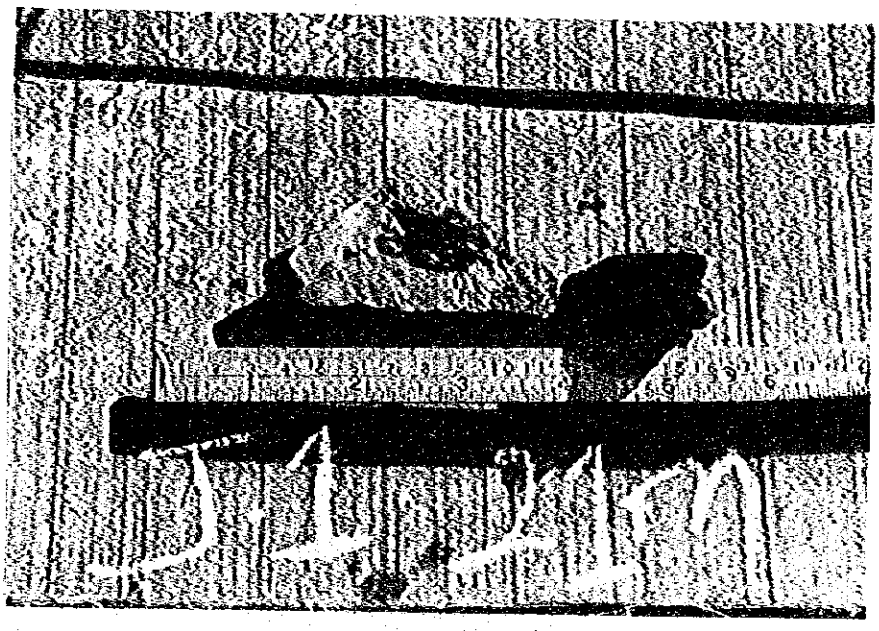
Cohesive Soil Sampled by Thin Wall Sampler at O-2



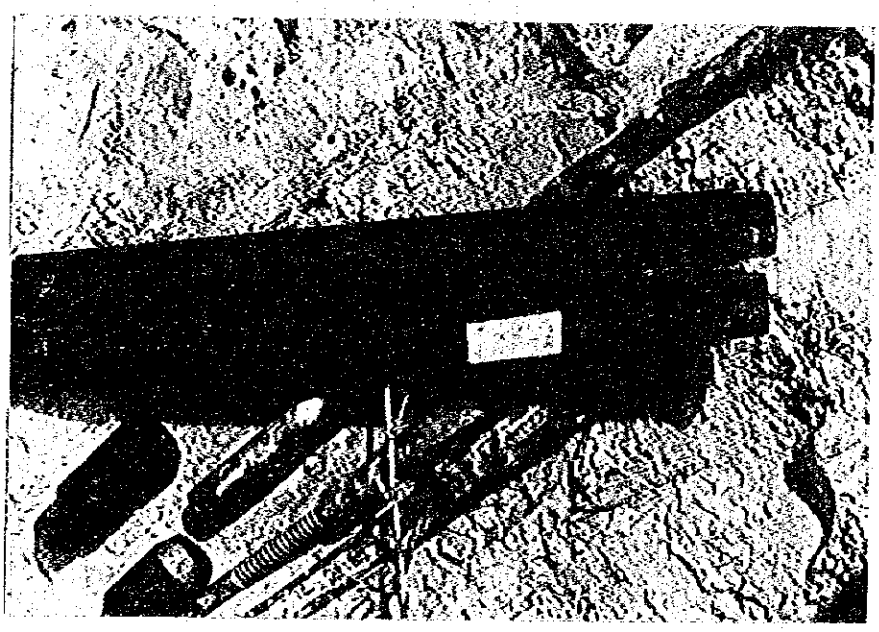
Soil at I-1 Sampled by Spirit Barrel for S.P.T. at I-1



Soil Sampled by Spirit Barrel for S.P.T. at I-2



Ironstone Occuring at J-1



Soil Sampled by Spirit Barrel for S.P.T. at J-2

No. 3, 1.5m

No. 5, 3.0m

No. 7, 4.5m

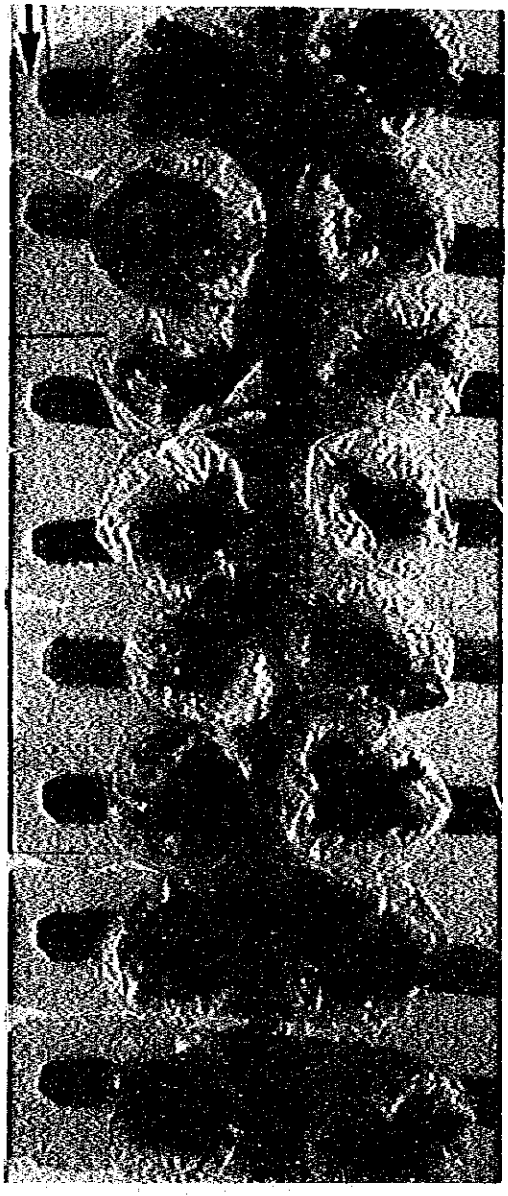
No. 9, 6.0m

No. 13, 9.0m

No. 15, 10.5m

No. 27, 19.5m

No. 29, 21.0m



No. 33, 24.0m

No. 35, 25.5m

No. 37, 27.0m

No. 39, 28.5m

No. 41, 30.0m

No. 43, 31.5m

No. 47, 34.5m

No. 54, 40.0 m

Soils at B/H 0-1

No. 2, 1.0m

No. 3, 1.5m

No. 5, 3.0m

No. 7, 4.5m

No. 9, 6.0m

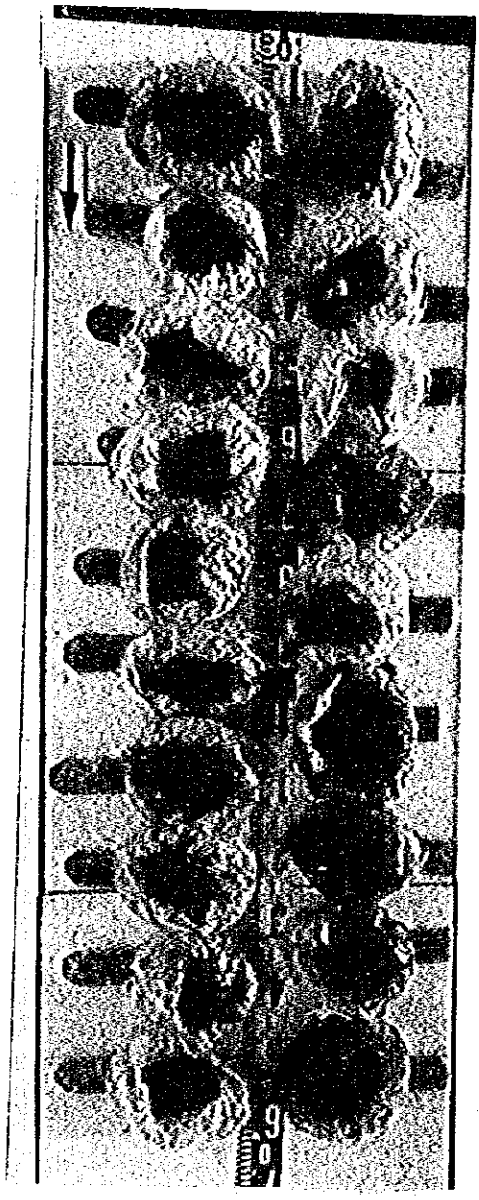
No. 10, 7.0m

No. 11, 7.5m

No. 19, 13.5m

No. 29, 21.0m

No. 31, 22.5m



No. 39, 28.5m

No. 41, 30.0m

No. 43, 31.5m

No. 45, 33.0m

No. 46, 33.5m

No. 48, 35.0m

No. 49, 36.0m

No. 51, 37.5m

No. 53, 39.0m

Soils at B/H O-2

No. 2, 1.5m

No. 4, 3.0m

No. 6, 4.5m

No. 10, 7.5m

No. 12, 9.0m

No. 14, 10.5m

No. 16, 12.0m

No. 18, 13.5m

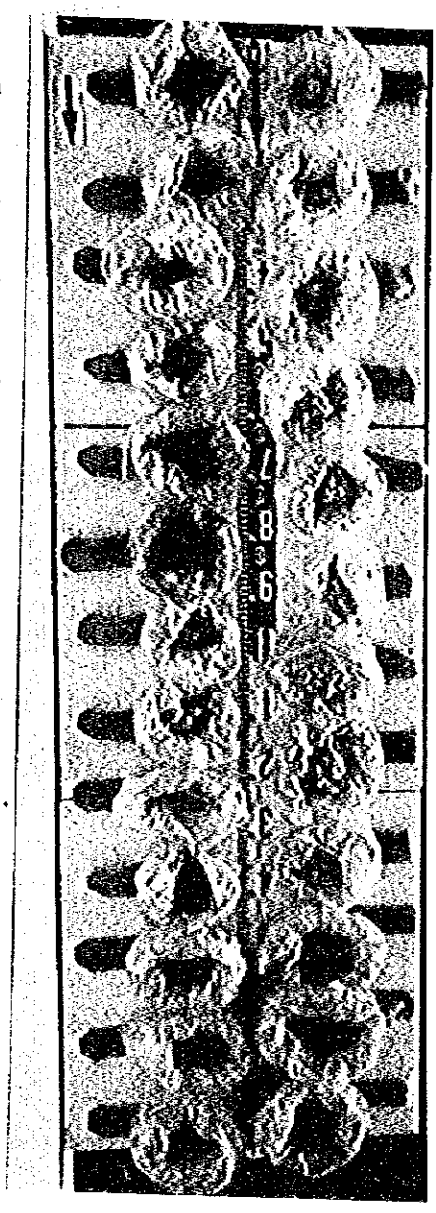
No. 20, 15.0m

No. 22, 16.5m

No. 24, 18.0m

No. 26, 19.5m

No. 28, 21.0m



No. 30, 22.5m

No. 32, 24.0m

No. 34, 25.5m

No. 36, 27.0m

No. 38, 28.5m

No. 40, 30.0m

No. 42, 31.5m

No. 44, 33.0m

No. 46, 34.5m

No. 48, 36.0m

No. 50, 37.5m

No. 52, 39.0m

Soils at B/H I-1

No. 1, 0.5m

No. 2, 0.8m

No. 3, 1.5m

No. 9, 6.0m

No. 11, 7.0m

No. 14, 8.5m

No. 15, 9.0m

No. 16, 10.0m

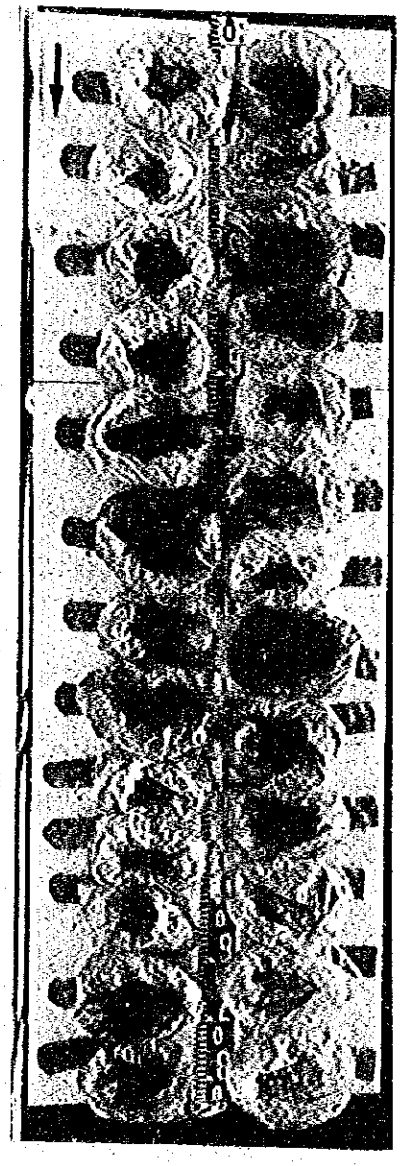
No. 20, 12.5m

No. 21, 13.5m

No. 23, 15.0m

No. 27, 18.0m

No. 29, 19.5m



No. 31, 21.0m

No. 35, 24.0m

No. 37, 25.5m

No. 38, 26.5m

No. 39, 27.0m

No. 41, 28.5m

No. 43, 30.0m

No. 46, 32.0m

No. 51, 35.5m

No. 52, 36.0m

No. 54, 37.0m

No. 56, 39.0m

No. 58, 40.0m

Soils at B/H I-2

No. 3, 1.5m

No. 5, 3.0m

No. 7, 4.5m

No. 9, 6.0m

No. 10, 7.0m

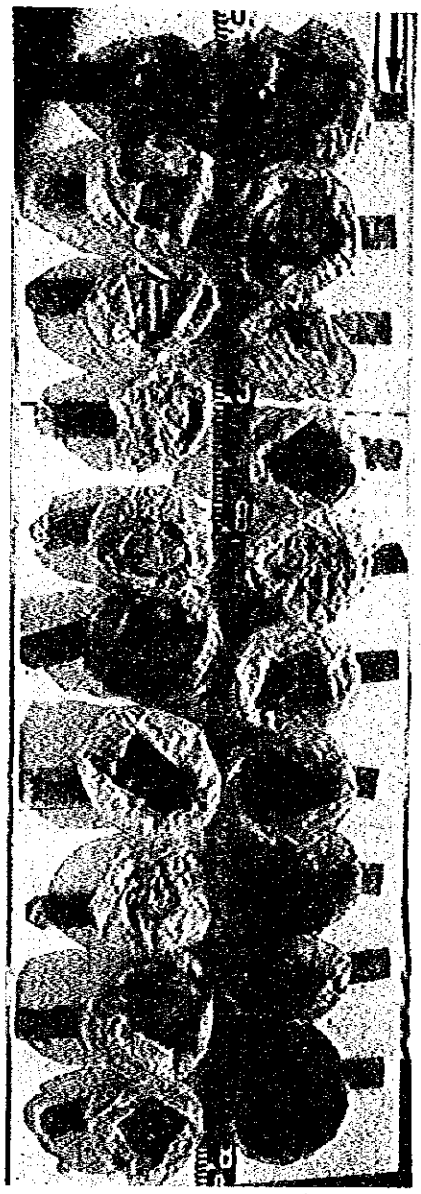
No. 13, 8.5m

No. 19, 12.5m

No. 20, 13.5m

No. 21, 14.5m

No. 22, 15.0m



No. 23, 15.5m

No. 25, 17.0m

No. 26, 18.0m

No. 28, 19.5m

No. 30, 21.0m

No. 32, 22.5m

No. 33, 23.0m

No. 44, 31.5m

No. 47, 33.0m

No. 50, 35.0m

Soils at B/H J-1

No. 5, 3.0m

No. 77, 4.5m

No. 9, 6.0m

No. 10, 7.0m

No. 14, 9.5m

No. 17, 12.0m

No. 18, 12.5m

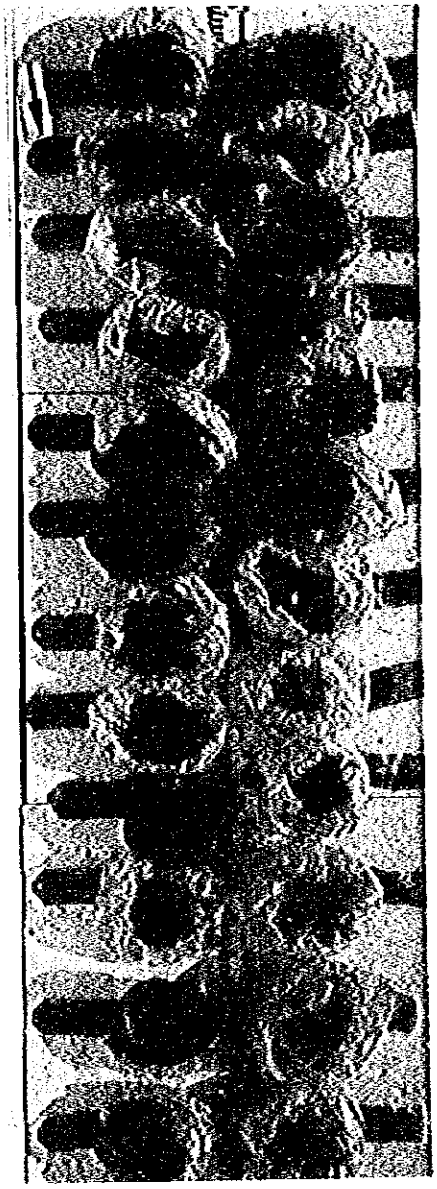
No. 22, 15.5m

No. 23, 16.5m

No. 25, 18.0m

No. 28, 20.0m

No. 29, 21.0m



No. 31, 22.5 m

No. 33, 23.5m

No. 38, 27.0m

No. 40, 28.5m

No. 41, 29.5m

No. 42, 30.0m

No. 44, 31.5m

No. 45, 32.5m

No. 46, 33.0m

No. 48, 34.5m

No. 50, 36.0m

No. 52, 37.5m

Soils at B/H J-2

5. Copy of Agreement

CONTRACT FOR SOIL EXPLORATION

FOR

THE NEW OCEAN TERMINAL PROJECT IN THE EASTERN COAST

THIS CONTRACT made and entered into this day of 27TH MARCH, 1981, in Lagos, Nigeria, by and between:

PACIFIC CONSULTANTS INTERNATIONAL

a corporation duly organized and existing under the laws of Japan, with Head Office at 8-2, Jingumae 2-chome, Shibuya-ku, Tokyo-150, Japan, represented by Mr. Yasuo Kawano, President, and hereinafter known as the "CONSULTANTS".

- and -

FOUNDATION ENGINEERING (NIGERIA) LIMITED

a corporation duly organized and existing under the laws of Nigeria, with office at 174, Western Avenue, Iganmu, P.O. Box 2100, Lagos, Nigeria, represented by Mr. P. FARRINGTON and hereinafter known as the "CONTRACTOR".

WITNESS

WHEREAS, CONSULTANTS are engaged by Japan International Cooperation Agency (hereinafter referred to as the "JICA") under a contract dated 12TH FEBRUARY, 1981 to furnish engineering services for the soil exploration in the area planned for the New Ocean Terminal Project in the Eastern Coast (hereinafter referred to as the "Project").

WHEREAS, under Section 1 of Article 4 of the approved contract for consulting services between JICA and CONSULTANTS, CONSULTANTS are authorized, subject to the approval of JICA, to engage a firm to undertake this soil exploration.

NOW THEREFORE, CONSULTANTS and CONTRACTOR for the mutual considerations herein contained and specified, have agreed and do hereby agree as follows:

ARTICLE 1: SCOPE OF SERVICES

1.1 Scope of Work

CONTRACTOR shall furnish all materials, supplies and facilities, labor, equipment, transportation and supervisors to accomplish the soil exploration for the Project.

The work to be done under this Contract shall consist of the following:

(a) Soil exploration by machine boring including mobilization and demobilization

(b) Standard penetration test

(c) Sampling of soil materials

(d) Classification of soils

(e) Laboratory tests of soil samples

(f) Report of soil exploration results

The number and tentative depth of the bore holes are shown in the attached drawing. Detailed requirements are hereinafter indicated in the Specifications for Soil Exploration.

1.2 Work Schedule

Within five (5) calendar days after signing the Contract, CONTRACTOR shall prepare a detailed work schedule and submit it to CONSULTANTS for approval.

1.3 Commencement and Completion of Work

CONTRACTOR shall commence the work immediately after approval of his work schedule by CONSULTANTS and shall complete it including

laboratory tests within 60 calendar days from the date of signing of the Contract. Fifteen (15) copies of the final report shall be submitted to CONSULTANTS not later than 65 calendar days from the date of signing of the Contract. Interim Darft Reports shall be submitted whenever requested by CONSULTANTS.

ARTICLE 2: LIQUIDATED DAMAGES

In case of delay in the completion of the work contemplated herein, CONTRACTOR shall be liable for liquidated damages at the rate of = = Naira, Nigerian currency, per calendar day of delay. Should CONTRACTOR be delayed in the prosecution or completion of the work by unavoidable calamity, through no fault or negligence and for reasons beyond control of CONTRACTOR, time extension may be granted for a reasonable period to be determined by CONSULTANTS.

ARTICLE 3: PERFORMANCE BOND

To guarantee the faithful and satisfactory completion of the work herein agreed upon, CONTRACTOR shall post a performance bond equivalent to ten percent (10%) of the full contract amount, or of the amount of FOUR THOUSAND ONE HUNDRED AND NINETY-FOUR Naira (N 4,194) from a surety or bonding company acceptable to CONSULTANTS.

CONSULTANTS reserve the right to proceed against this performance bond in the event of failure by CONTRACTOR to pay the salaries or wages of personnel employed, rental of equipment, cost of materials used in the work and other claims arising out of this Contract.

ARTICLE 4: PAYMENT

4.1 Payment Schedule

CONSULTANTS in consideration of the work to be done, to their satisfaction and acceptance, shall pay CONTRACTOR the sum of FOURTY-ONE THOUSAND NINE HUNDRED AND FOURTY Naira (₦ 41,940.00), Nigerian currency, in accordance with the following payment schedule:

(a) 1st Payment:

Amount - 20% of contract amount

Time - Upon mobilization of the equipment

(b) 2nd Payment:

Amount - Amount estimated based on the field work actually performed at the site minus 1st payment

Time - Within ten (10) calendar days after completion of the field work

(c) Final Payment:

Amount - Remaining amount, i.e. total amount minus 1st and 2nd payments and liquidated damages, if any

Time - Within ten (10) calendar days after acceptance of the final report

4.2 Rate and Estimated Contract Cost

The total contract cost and its breakdown estimated based on Bill of Quantities system are shown in the Table on page 6.& 7

4.3 Payment Conditions

(a) The quantities in the table are approximate only.

(b) Actual payment shall be made based on the work actually performed and the respective rates stipulated for the Pay Items.

(c) All payments are subject to verification and acceptance by CONSULTANTS.

(d) All length measurements shall be rounded to the nearest ten (10) centimeters.

ESTIMATED COST FOR SOIL EXPLORATION

1. Direct Cost

Pay Item No.	Description	Unit	Q'ty	Rate (N)	Amount (N)
	Mobilization/Demobilization				
S-1	Provide and transport to Opobo and return from James Town all necessary supervision, labour and equipment.	Lump	Sum		6,000.00
S-2	Move between Opobo and Qua-Ibo Towns and Qua-Ibo and James Town.		2	2,000.00	4,000.00
S-3	Hire of suitable water transport to carry equipment to individual sites and remove on completion.	Days	5(Say)	250.00	1,250.00
S-4	Hire of workboat for daily transport of personnel, supervisor, samples, etc.	Days	19(Say)	150.00	2,850.00
S-5	Time spent by rig crews moving to site and return on completion of site work and daily travelling time during duration of site work.	Days	61(Say)	102.00	6,250.00
	Shell and Auger Boring				
S-6	Set up and dismantle shell and auger rig at each borehole position. Includes moving between borehole positions not more than 1 Km apart.	No.	6	500.00	3,000.00
S-7	Bore through clay, silt, sand, gravel or similar soft material with shell or auger from ground level to depths not exceeding 15 m. Includes casing taking 100 mm diameter undisturbed samples in cohesive strata and Standard Penetration Tests in non-cohesive strata at about 1.5 m. intervals, taking small disturbed samples at about 0.75 m. intervals, observing water levels, making records and removing casing.	Metre	90	51.00	4,590.00

Pay Item No.	Description	Unit	Q'ty	Rate (₦)	Amount (₦)
S-8	- Ditto - from 15 m. to depth not exceeding 30 m. below ground level.	Metre	90	59.00	5,310.00
S-9	- Ditto - from 30 m. to depths not exceeding 40 m. below ground level.	Metre	60	68.00	4,080.00
S-10	Time spent by ore rig and crew using percussion tools to break up obstructions, cemented layers or other hard ground, whilst awaiting Client's instructions, bush cutting for access carrying and winching equipment, etc.	Hour	10(Say)	51.00	510.00
	Laboratory Tests				
S-11	Carry out laboratory tests as require required at our Standard Rates (Schedule attached.)	Lump Sum (Say₦300.00 x 6)			1,800.00

2. Report

Pay Item No.	Description	Unit	Q'ty	Rate (₦)	Amount (₦)
R-1	Prepare and submit 15 copies of report on subsoil conditions.	Lump	Sum		1,500.00

ESTIMATED TOTAL COST ₦41,940.00

All work to be carried out in accordance with our covering letter dated 10th December, 1980 and 27th March, 1981.

ARTICLE 5: CHANGES IN SCOPE OF WORK

CONSULTANTS may at any time, by written order, make changes within the general scope of this Contract in the number and depth of boring holes and the number of field and/or laboratory tests to meet actual field conditions.

If any such changes cover an increase or decrease in the cost or the time required for the performance of any part of the work under this Contract, adjustment through Change Order will be made. The work schedule shall be adjusted accordingly and approved by CONSULTANTS. However, the rates for each Pay Item shall be the same as stipulated under ARTICLE 4, 4.2 "Estimated Cost for Soil Exploration". In the event of an extension of the contract time, the prior consent of the surety or bonding company shall be secured for such change.

ARTICLE 6: DEFAULT

6.1 Termination

CONSULTANTS may, by written notice of default to CONTRACTOR, terminate the whole or a part of this Contract in any of the following circumstances:

(a) If CONTRACTOR fails to perform the services within the stipulated period herein or any extension thereof, or

(b) If CONTRACTOR fails to perform any one of the provisions of this Contract or to make progress as to endanger the performance of this Contract in accordance with its terms, or

(c) If in either of these two circumstances CONTRACTOR does not remedy such failure within a period of ten days after receipt of the notice from CONSULTANTS specifying such failure.

6.2 Work Performed

If this Contract is terminated because of the circumstances provided in (a), (b) or (c) of this Clause, CONSULTANTS, in addition to any rights provided in this Clause, may require CONTRACTOR to transfer title and deliver to CONSULTANTS in the manner and to the extent directed by CONSULTANTS any or all works, supplies, drawings, information and data, whether complete or incomplete.

ARTICLE 7: SUBCONTRACTOR

CONTRACTOR shall not sublet, without approval of CONSULTANTS, any part of the work included in the Contract.

PACIFIC CONSULTANTS INTERNATIONAL

By:

for Yasuo KAWANO
President

FOUNDATION ENGINEERING (NIGERIA) LIMITED

By:

P. PARRINGTON
MANAGING DIRECTOR.

FOUNDATION ENGINEERING (Nigeria) LTD.
P. O. BOX 2160 LAGOS.
TEL. 845090/845393

WITNESS

NIGERIAN PORTS AUTHORITY

SPECIFICATIONS FOR SOIL EXPLORATION

1. General

The soil exploration shall include both geological investigation in the field and laboratory tests. The geological investigation shall consist of drilling test holes, classification of soils, standard penetration test and sampling soil materials. The laboratory tests shall be executed as specified and/or directed by the Consultants. A complete report shall include soil classifications and engineering comments on them, geological profiles and recommendations of a competent geologist with respect to this investigation operation. The scope of the work shall cover the following items:

a) Machine boring

b) Classification of soils

c) Standard penetration test

d) Sampling of soil materials

e) Laboratory tests

1-1 Locations and Quantities

Locations and number of test holes required for this work are shown on the attached drawing. Direction of test holes shall be vertical.

The quantities of the work quoted in the schedule is tentative and may be changed according to the geological conditions of the site. The Consultants reserve the right to increase or decrease the quantities of the work with no change of the rates of Pay Items stipulated in the Contract. Completion data may, however, be adjusted according to modification of the quantities.

1-2 Mobilization and Demobilization

Mobilization shall consist of delivery to the site of all equipment, materials and supplies to be furnished by the Contractor, the complete assemblies in satisfactory working conditions of all such equipment on the job and satisfactory storage at the site of all materials and supplies. Demobilization shall consist of removal from the site of all equipment and excess materials and supplies after completion of the work as directed by the Consultants.

2. Field Test

The test equipment and procedure other than specified herein shall

conform with the requirements described in ASTM D 1586 or equivalent.

2-1 Equipment

All equipment which the Contractor proposes to use in the work shall be in complete operating condition and capable of satisfactory performance of all the work specified herein and directed by the Consultants. The Contractor shall submit to the Consultants a list of the equipment he proposes to use in the work and he shall provide a unit or some units of machinery necessary to complete the work within the specified contract period.

2-2 Procedures

1) Inspection

No work shall be performed without direction by the Consultants. The Contractor shall not remove casing or equipment from any completed boring holes without permission of the Consultants.

2) Drilling and Sampling

The diameter of the bore holes shall be large enough to allow for all the sampling required. Minimum required diameter of the holes is approximately 86 mm.

All boring works shall be done vertically with a drilling machine of 88 mm or more in crown diameter by driving casing pipes of 103 mm or more in nominal diameter when drilling is progressed through sand, silt or any unstable materials to protect the drilling and allow the holes to stay open.

When the Contractor proposes to adopt other drilling methods, the prior written approval by the Consultants shall be taken.

The soil condition, color of slime core and other important items shall be carefully observed and recorded at every depth while drilling is being undertaken.

Soil samples shall be taken at 2 meter intervals out of split-barrel samplers which are used for Standard Penetration Test. Sampling shall be started from the top of holes. During drilling and sampling, water in the bore hole or casing at all times shall be maintained at or above the surrounding ground water level. Samples shall be prepared in accordance with the applicable requirements under Provision 5) of 2-2, Section 2 "Preserving Samples".

Boulders or rock layers, if encountered, shall be drilled continuously by means of percussion drilling or coring to approximately 2 meters deep to know the character and thickness of the same.

Drilling shall be suitably cased to permit obtaining samples of the size or sizes specified or directed. Casing shall consist of standard pipe with couplings and shall be advanced vertically by driving, chopping and washing, coring or by any methods approved by the Consultants. Casing shall not be driven below sampling elevation.

3) Standard Penetration Test (N-value test)

This is a procedure for soil boring with a split-barrel sampler in order to obtain a measure of the resistance of the soil against penetration of the smapler and to get representative soil samples for identification purposes and other laboratory tests. The test shall be carried out at 2 meter intervals from the top of the ground surface. The number of blows to effect a 6-inch penetration shall be recorded and if 50 blows result in less than 30 mm penetration, the test shall be stopped and data recorded.

4) Classification of Soils

Soil samples shall be identified and classified in accordance with the Unified Soil Classification System. Each stratum shall be measured and described in writing. Visual description shall state the color, class of soil (gravel, sand, silt, clay and peat), the intermixing of soil class (i.e. sandy gravel, clayey silt, etc.), the relative sizes of non-cohesive soil particles (coarse, medium or fine sand) and so on. Notes shall also be made for shells roots, odors and any other significant factors.

5) Preserving Samples

Two sets of soil samples shall be taken for every 2 meter depth and on every change of stratum. One set shall be preserved as specimens and the other shall be used for laboratory tests. Undisturbed sample of cohesive soil shall be taken and retained in 100 mm diameter steel tubes (such tubes will remain Contractor's property). Disturbed soil samples shall be placed in strong plastic bags secure against moisture loss. All samples shall have detailed legible labels.

2-3 Records

1) General

The Contractor shall keep accurate driller's logs and records of all the work accomplished under this Contract and deliver complete legible copies of these logs and records to the Consultants upon completion of the work or at such other time or times as he may be directed. The Consultants have the right to examine such records at any time prior to their delivery to him. Logs shall be prepared separately for each boring. All depths and elevations shall be measured in

meters based on the ground levels that will be informed from time to time by the Consultants.

2) Records

Records shall contain the following items:

(a) Bore hole No., reference elevation, ground elevation and date of boring.

(b) Size and depth of bore hole, and size and length of casing.

(c) Sample number with depth, height of drop and weight of hammer, size and length of rod, number of blows for every 15 cm (6 inch), and depth, thickness and visual classification of soil samples.

3. Laboratory Tests

The samples shall be used for the laboratory tests herein specified. Tests shall be made in a soil testing laboratory of Contractor.

1) Specific gravity test

The specific gravity test for materials passing the No. 4 (4.75 mm) sieve shall be performed in accordance with ASTM Method D 854, or equivalent, while for materials retained on the same sieve, it shall be performed in accordance with ASTM Method C 127 or equivalent.

2) Natural water content

The water content shall be expressed as the percentage of the weight of water contained to that of dry soil particles of the sample. The wet weight of soil shall be determined immediately after securing the sample to minimize the effects of air drying. The sample shall be dried in a controlled constant temperature of 105°C to 110°C to constant weight or for 24 hours. The sample shall then be cooled to room temperature in a dissicator and weighed within one hour.

A balance with respective accuracy of 0.01 g, 0.1 g and 1 g for samples of less than 100 g, 100 g to 1,000 g and more than 1,000 g shall be used for weighing samples.

3) Seive analysis

The analysis shall be performed in accordance with ASTM Method D 422 or equivalent.

4. Report of Survey

After completion of the laboratory tests, a final report summarizing all the work performed, findings and recommendations for the work shall be prepared and submitted in 15 copies.

The report shall be properly bound in folder and shall contain among others a description of the test procedure, number of tests performed, boring logs or geological profiles, maps, summary tables of the results and complete details of the test results both in tabular and graphical forms.