12. GUARANTEE, MAINTENANCE AND DEFECTS

12.1 Definition of "Period of Maintenance"

a) In these Condition of Contract the expression "Period of Maintenance" shall mean the period of guarantee named in Clause No. 2.11.5 calculated from the date of acceptance of the whole of the completed Works by the Owner in accordance with Section 2.11.19 hereof.

b) Execution of Work of Repair

To the intent that the Works shall at or as soon as practicable after the expiration of the Period of Maintenance be delivered upto the Owner in as good and perfect a condition (fair wear and tear excepted) to the satisfaction of the Engineer as that in which they are at the commencement of the Period of Maintenance the Contractor shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfection, shrinkages and other faults as may be required of the Contractor in writing by the Engineer during the Period of Maintenance or within twenty eight days after its expiration as a result of an inspection made by or on behalf of the Engineer prior to its expiration.

c) Cost of Execution of Work of Repair

All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall in the opinion

of the Engineer be due to the use of materials or workmanship not in accordance with the Contract or to neglect or failure on the part of the Contractor to comply with any obligation expressed or implied on the Contractor's part under the Contract. If in the opinion of the Engineer such necessity shall be due to any other cause the value of such work shall be ascertained and paid for as if it were additional work.

d) Remedy on Contractor's Failure to Carry out Work Required

If the Contractor shall fail to do any such work as aforesaid required by the Engineer the Owner shall be entitled to carry out such work by its own workmen or by other contractor and if such work is work which the Contractor should have carried out at his own cost shall be entitled to recover from the Contractor the cost thereof or may deduct the same from any moneys due or that may become due to the Contractor.

12.2 Contractor to Search

During the Period of Maintenance the Contractor shall if required by the Engineer in writing search for the cause of any defect, imperfection or fault under the directions of the Engineer. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Owner. But if such defect,

imperfection or fault shall be one for which the Contractor is liable as aforesaid the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of Section 2.12.1 hereof.

13. VARIATIONS

13.1 Contractor not to Vary Works

The Contractor shall not make any variation to the Works except in accordance with a written Variation Order of the Owner/ Engineer.

13.2 Variation Orders

The Engineer may from time to time make any variation in the quality or quantity of the Works or any part thereof that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable shall have power by a written Variation Order to order the Contractor to do and the Contractor shall do any of the following.

i) increase or decrease the quantity of any work included in the Contract,

ii) omit any such work,

iii) change the character or quality or kind of any such work,

iv) change the levels, lines, position and dimensions of any part of the Works.

13.3 Not to Invalidate Contract

No Variation Order shall in any way vitiate or invalidate the Contract but the value if any of all such variations ordered shall be taken into account in ascertaining the amount of the Contract Price.

13.4 Change in Quantities

No order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Section but is the result of the quantities exceeding or being less than those stated in the Schedule of Prices and any increase or decrease in the quantities stated in the Schedule of Prices when ascertained by measurement in accordance with the provisions of Section 2.15.2 hereof shall not be construed as a variation within the meaning of this Section.

13.5 Valuation of Variations

The Engineer shall determine what adjustment (if any) of the Contract Price shall be made in respect of work done or omitted pursuant to a Variation Order. All such work shall be valued at the rates and prices set out in the Schedule of Prices if in the opinion of the Engineer the same shall be applicable.

If the Schedule of Prices does not contain any rate or price which in the opinion of the Engineer is applicable, then suitable rates or prices based upon the direct costs of work on account of materials, labour, plant use and scaffolding plus a mark up of 30% to cover overheads, profits and site expenses shall be agreed between the Engineer and the Contractor or in default of agreement shall be fixed by the Engineer which will be taken as final and will be binding on the Contractor.

13.6 Change in Rates and Prices

If the nature or amount of any omission or addition covered by a Variation Order relative to the nature or amount of the whole of the Contract work or to any part thereof shall be such that in the opinion of the Engineer the rate or price contained in the Contract for any item of the Works is by reason of such omission or addition rendered unreasonable or inapplicable a suitable rate or price shall be agreed between the Engineer and the Contractor or in default of agreement shall be fixed by the Engineer which will be taken as final and will be binding on the Contractor.

13.7 Notice of Intended Claims

No increase of the Contract Price under clause 2.13.5 of this Section or variation of rate or price under clause 2.13.6 of this Section shall be made unless as soon as practicable and not later than thirty days from the date of the Variation Order

notice shall have been given in writing:

i) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price, and

ii) by the Engineer to the Contractor of his intention to vary a rate or price as the case may be.

13.8 Variation exceeding 20 percent

If on completion of the whole of the Works it shall be found that a reduction or increase greater than 20 percent of the sum named in the Tender as the tender price results from the aggregate effect of all Variation Order (but not from any other cause) the amount of the dismantling cost in the Contract Price shall be adjusted by such sum as may be agreed between the Contractor and the Engineer. In the event of disagreement the Engineer shall fix such sum as shall in his opinion be reasonable and proper and the Contract Price shall be adjusted accordingly.

13.9 Claims

The Contractor shall send to the Engineer once in every month an amount giving full and detailed particulars of all claims for any additional expense to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Owner/Engineer in writing which he has executed during the preceding month and no claim for payment for any such work will

be considered which has not been included in such particulars. Provided always that the Engineer shall be entitled to authorise payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition if the Contractor has at the earliest practicable opportunity notified the Engineer that he intends to make a claim for such work.

14. VESTING OF PLANT TEMPORARY WORKS AND MATERIALS FOR SECTION 2.18

14.1 Definitions

For the purpose of this Section 2.14:

i) The expression "construction plant" shall be deemed to exclude vehicles engaged in transporting any labour, equipment or materials to or from the Site.

ii) The expression "Essential Hired Plant" shall mean all Constructional Plant Temporary Works and materials of Temporary Work the withdrawal of which in the event of a forfeiture under Section 2.18 hereof might (having regard to the methods of construction employed prior to the forfeiture) endanger the safety or stability of or result in serious disturbance to the execution of any part of the Works and which are held by the Contractor under any agreement for hire thereof.

iii) The expression "Hired Plant" shall mean any Constructional Plant, Temporary Works (other than

essential hired plant) held by the Contractor under any agreement for hire thereof.

iv) The expression "Agreement for Hire" shall be deemed not to include an agreement for hire purchase with an option to purchase or for conditional sale either of which is herein referred to as an "agreement for the purchase".

v) The expression "Hire Purchase Plant" shall mean any Constructional Plant Temporary Works and materials for Temporary Works held by the Contractor under an agreement for hire purchase thereof.

vi) The expression "Proprietor" mean the owner of the plant of any Hire Purchase Plant.

14.2 Vesting of Certain Plant

All Constructional Plant, Temporary Works and materials owned by the Contractor or by any company in which the Contractor has a controlling interest shall when brought on to the Site (or in the case of hire purchase plant on the Site upon its becoming the property of the Contractor) immediately shall be and shall be deemed to become the property of the Owner.

14.3 Conditions of Hire of certain Plant

With a view to securing in the event of a forfeiture under Section 2.18 hereof the continued availability for the purpose

of executing the Works of any essential hired plant the Contractor shall not bring on to the Site any essential hired plant unless the agreement for hire thereof contains a provision that the Proprietor will on request in writing made by the Owner within 7 days after the date on which any such forfeiture has become effective and on the Owner undertaking to pay all hire charges in respect hereof from such date hire such essential hired plant to the Proprietor the same terms in all respects as the same was hired to the Contractor save that the Owner shall be entitled to permit the use thereof by any other contractor employed by it for the purposes of completing the works under the terms of Section 2.18 hereof.

14.4 Cost for Purpose of Section 2.18

In the event of the Owner entering into any agreement for hire of essential hired plant pursuant to the provision of Section 2.14.3 all sums properly paid by the Owner under the provisions of any such agreement and all expenses incurred by it (including stamp duties) in entering into such agreement shall be deemed for the purpose of Section 2.18 hereof to be part of the cost of completing the Works.

14.5 Contractor's Certificate as to hiring provisions

The Contractor shall upon request made by the Engineer at any time in relation to any item of essential hired plant forthwith notify to the Engineer in writing the name and address of the

Proprietor and shall certify that the agreement for the hire thereof contains a provision in accordance with the requirements of Section 2.14.3 hereof. The Contractor shall also upon request as aforesaid give a like notification (but without certificate) in regard to any hire purchase plant.

14.6 Hire Purchase payment by Owner

The Owner shall in order to avoid seizure by the Proprietor of any hire purchase plant be entitled to pay to such proprietor the amount of any overdue instalment or other sum payable optionally or otherwise any Agreement for Hire Purchase and in the event of his doing so any amount so paid by him shall be debt due from the Contractor to the Owner from and may be deducted by the Owner from any moneys due or that may become due to the Contractor under the Contract or may be recovered by the Owner from the Contractor at law.

14.7 Irremovability of Certain Plant etc.

No Construction Plant, Temporary Works or materials or any part thereof (except hired plant) shall be removed from the site without the written consent of the Engineer which consent shall not be unreasonably withheld where the same is no longer immediately required for the purposes of completion of the Works but the Owner will permit the Contractor the exclusive use of all such Constructional Plant, Temporary Works and materials in and for the completion of the Works until the

occurrence of any event which gives the Owner the right to exclude the Contractor from the Site and proceed with the completion of the Works.

14.8 Revesting and Removal of Plant

Upon removal of any such Constructional Plant, Temporary Works or materials as have been deemed to have become the property of the Owner under Section 2.14.2 with consent as aforesaid the property therein shall be deemed to revest in the Contractor and upon completion of the Works the property in the remainder of such Constructional Plant, Temporary Works and materials as aforesaid shall subject to the provisions of Section 2.18 hereof be deemed to revest in the Contractor who shall remove the same together with any essential hired plant or hire purchase plant. If the Contractor shall fail to remove any Constructional Plant, Temporary Works or materials as aforesaid or any essential hired plant or hire purchase plant within such reasonable time after completion of the Works as may be allowed by the Engineer then the Owner may:

i) sell any such Constructional Plant, Temporary Works and materials as aforesaid, and

ii) return at the Contractor's expenses to the person firm or company from whom any essential hired plant or any hire purchase plant was held by the Contractor such essential hired plant or hire purchase plant, and after deducting from any

proceeds of sale the cost, charges and expenses of and in connection with such sale and of and in connection with return as aforesaid shall pay the balance (if any) to the Contractor but to the extent that the proceeds of any sale are insufficient to meet all such costs, charges and expenses the excess shall be a debt due from the Contractor to the Owner and shall be deductible or recoverable by the Owner accordingly as aforesaid.

14.9 Liability for loss or injury to Plant

The Owner shall not at any time be liable for the loss of or injury to any of the Contructional Plant, Temporary Works or materials which have been deemed to become the property of the Owner under Section 2.14.2 hereof save as mentioned in Section 2.9.13 hereof.

14.10 Incorporation of Clause in Sub-Contracts

The Contractor shall when entering into any sub-contract for the execution of any part of the Works incorporated in such sub-contract (by reference or otherwise) the provisions of this Section in relation to Constructional Plant, Temporary Works and materials essential hired plant and hire purchase plant brought on the Site by the sub-contractor.

14.11 Approval of Materials etc., not implied

The operation of Section 2.14.2 hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any material at any time by the Engineer.

15. MEASUREMENT

15.1 Quantities

The quantities set out in the Schedule of Prices are the estimated quantities of the Work but they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligations under the Contract.

15.2 Works to be measured

The Engineer shall except as otherwise stated ascertain and determine by measurement the value of Work done in accordance with the Contract. He shall when he required any part or part of the Works to be measured give notice to the Contractor who shall forthwith attend or send a qualified agent to assist the Engineer or the Engineer's Representative in making such measurement and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or omit to send such agent then the measurement made by the Engineer or approved by him shall be taken to be the correct

measurement of the work.

15.3 Records of Measurement

For those Works which depend on the existing records, the measurement shall be taken before the commencement of items of Works so involved.

The Engineer's Representative shall maintain records of the measurement of all work done under the Contract in the Measurement Books of the Owner and the Contractor as and when called upon to do so in writing by the Engineer or the Engineer's Representative shall within fourteen days attend to examine and agree such records with the Engineer's Representative and shall sign the same when so agreed and if the Contractor does not so attend to examine and agree any such records they shall be taken to be correct. If after examination of such records the Contractor does not agree the same or does not sign the same as agreed they shall nevertheless be taken to be correct unless the Contractor shall within fourteen days of such examination lodge with the Engineer's Representative for decision by the Engineer notice in writing of the respects in which such records are claimed by him to be incorrect.

15.4 Owner's Measurement Books to Govern Payment

Only those measurements which are recorded in the Measurement Books of the Owner in accordance with Sub Section 2.15.3 hereof

shall be considered for payment.

16. STATEMENTS CERTIFICATES AND PAYMENT

16.1 Monthly Payments

The Contractor shall submit to the Engineer after the end of each month four copies of a statement, each signed by the Contractor, in such form as the Engineer may from time to time prescribe showing the amounts to which the Contractor may consider himself to be entitled upto the end of the month.

a) Basically all monthly payments will be effected only according to the contractually agreed upon unit rates of the individual items of the Schedule of Prices.

b) Interim monthly payments will be made after deduction of the mobilisation advance, the retention money, taxes and the like as per terms of the Contract as detailed hereunder:

i) Previous Payments:

The total sum paid for previous payment certificate.

ii) Mobilisation Advance Recovery

Recovery of the mobilization advance shall be made from monthly payment certificate by deducting fifteen percent (15%) of the gross amount approved for payment.

iii) Retention Money

The Engineer shall make deduction for retention at ten percent (10%) from the first and the following monthly bills of the Contractor respectively until the total of such deduction amounts to 10% of the dismantling cost of in the Contract Price.

If the Contractor so desires he can submit bank guarantee from any Schedule Bank of Pakistan for the 50% (fifty percent) of the value of retention money to the Owner before payment of the certified running bill is made. In such case deductions in respect of cash retention money will be limited to 5% (five percent) of the dismantling cost in the Contract sum.

iv) Advance Income Tax

Deduction of 3% of the net payable bill amounts shall be made as advance income tax in accordance with sub section 4 of Section 50 of the Income Tax Ordinace, 1979 or similar rules enacted by the Government from time to time during the duration of the Contract. These deductions shall, however, be deposited in the Government treasury by the Owner on behalf of the Contractor.

If the contractor submits to the Owner valid exemption certificate from the Income Tax Authorities, deduction of advance income tax will not be made.

v) Other Taxes

Any other deduction for taxes and charges required by laws or the Contract or any other requirements shall also be made.

vi) Liquidated Damages

Any probable liquidated damages will be deducted according to the terms and conditions of the Contract.

vii) Other Deductions

Eventual deduction shall be made from the amounts of the bills, if any, which result from sub clause 2.16.3 of this Clause.

16.2 Time of Payment

The Contractor shall prepare the payment certificate of the Works for the monthly payment which shall be signed by the Contractor and the Engineer. Issuance of the said payment certificate shall be made as soon as all statements are approved by the Engineer. If any dispute shall arise as to the amount of any payment to which the Contractor claims he is entitled (including any question or dispute as to the amount of any deduction to be made under any provision of the Contract) the amount (if any) not in question or dispute shall be certified by the Engineer for payment without waiting for the settlement of such question or dispute and the balance (if any) shall be certified by the Engineer for payment as soon as such

question has been finally settled and the amount payable determined by the Engineer.

The amount due to the Contractor pursuant to this Clause or to any other term of the Contract shall be paid by the Owner to the Contractor within 30 days after such certificate has been received by the Owner.

16.3 Withholding of Payment

a) The Owner may withhold the whole or a part of any payment requested by the Contractor if it is necessary in the opinion of the Owner to protect himself against losses on account of the following reasons:

   i) Defective work not rectified.

   ii) Non fulfilment of any demand and due guarantee.

   iii) Claims of third parties raised against the Owner caused through the fault of the Contractor in connection with the Works.

   iv) Damages caused by the Contractor or his personnel or any Sub Contractor, to the Owner, or to a third party on the Site.

   v) Non fulfilment of the Contract by the Contractor.

b) After the reasons for withholding of payments have been eliminated, to the satisfaction of the Owner and the Engineer, payments to the Contractor will be undertaken by the Owner without delay.

16.4 Corrections and Retentions

The Engineer may introduce any correction or changes in the Contractor's payment certificate issued by him at an earlier date and shall be empowered to retain any certificate if the Works or any part thereof have not been executed to his satisfaction.

All contents in the payment Certificate issued by the Engineer and also the payments that have been made shall be considered partial and provisional and not final and on account, and any mistake in measurement or computation in the Payment Certificate shall be corrected and payment adjusted accordingly.

16.5 Payment of Retention Money

a) If the Contractor elects to submit Bank Guarantee in lieu of 50% (fifty percent) of cash Retention Money, the Bank Guarantee will be released by the Owner after issuance of the Completion Certificate for the whole of the Works subject to condition that the Contractor replaces the Bank Guarantee by Insurance Bond of equal amount from an approved Insurance Company. The Insurance Bond will be released after the issuance of the Maintenance Certificate.

b) At the end of the period of Maintenance, Provided that all outstanding claims, questions, disputes and differences of opinion have been decided and settled between the Owner and

the Contractor and have been confirmed by the Contractor in writing and provided that the Engineer has issued the Maintenance Certificate for the Works, the remaining 50% cash Retention Money will be paid to the Contractor.

c) In the event the Contractor opts for deduction of whole of the 10% of Retention Money in cash, then 50% of the cash Retention Money so deducted will be paid to the Contractor after issuance of the Completion Certificate provided that the Contractor submits to the Owner Insurance Bond of equal amount from an approved insurance company, which bond will be released after the Maintenance Certificate is issued by the Engineer.

The remaining 50% cash Retention Money, will be paid to the Contractor after issuance of the Maintenance Certificate by the Engineer provided the Contractor has complied the relevant conditions stated in sub-section 2.16.5(b) herein above.

d) In case the Engineer certifies in writing that any part of the Retention Money devolves upon or belongs to the Owner due to non fulfilment of the Contract by the Contractor then the sum so certified shall be deducted from payments to be effected under the conditions of this Clause.

16.6 Secured Advance

An advance upto 75% (Seventy five percent) of the ex-factory

price of the Cement, reinforcing steel, purchased by the Contractor & brought to the Site may be allowed to the Contractor if requested. This advance will be allowed only against an Agreement/Bond to be executed by the Contractor undertaking that these materials shall not be removed from the Site without the written approval from the Engineer and the Owner. A certificate in respect of quantity of these materials brought to Site by the Contractor will be approved by the Engineer for obtaining advance from the Owner. The advance made against these materials shall be adjusted/recovered/ deducted from the Contractor's next bill(s).

16.7 Final Payments

Not later than one month after the issue of the Maintenance Certificate the Contractor shall submit to the Engineer a statement of final account with supporting documents showing the value of the work done in accordance with the Contract, together with all further sums which the Contractor considers to be due to him under the Contract. Within one month after the receipt of this final account and of all information reasonably required for its verification the Engineer shall issue a final certificate stating:

a) The amount which in his opinion is finally due under the Contract and after giving credit to the Owner for all amounts previously paid by the Owner and for all sums to which the Owner is entitled under the Contract.

b) The balance, if any, due from the Owner to the Contractor or from the Contractor to the Owner as the case may be, such balance shall, subject to Clause 2.11.18 hereof, be paid to or by the Contractor as the case may require within twenty eight days of the Maintenance Certificate.

c) Final Payment Document

The Contractor shall execute and deliver to the Owner the following documents alongwith his final payment statement.

i. Certificate of Completion.

ii. Affidavit of Contractor.

iii. Certificate of Compliance.

iv. Release of Lien.

Blank forms of these are attached hereto as Exhibits A,B,C and D respectively.

The final statement shall be submitted with the endorsement that the Contractor has no other claim except those in to final statement. The final statement shall not be entertained without his endorsement.

The Contractor's receipt of final payment shall automatically constitute the full transfer of title of all equipment and material from the Contractor to the Owner.

16.8 Not Responsibility of the Engineer

Nothing in the Contract shall place any responsibility on the

Engineer for any payments to the Contractor for or with regard to the Works or in respect to his fulfilment of any other obligations under the Contract.

17. MAINTENANCE CERTIFICATE

17.1 Approval only by Maintenance Certificate

No Certificate other than the Maintenance Certificate referred to in Section 2.17.2 shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the Contractor or any part thereof or of the occurracy of any claim or demand made by the Contractor or of additional or varied work having been ordered by the Engineer nor shall any other certificate conclude or prejudice any of the powers of the Engineer.

17.2 Maintenance Certificate

The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer and delivered to the Owner stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer twenty eight days after the expiration of the period of Maintenance (or if different periods of Maintenance shall become applicable to different parts of the Works the expiration of the latest such period) or as soon thereafter as any Works ordered during such

period pursuant to Sections 2.12.1 and 2.12.2 hereof shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Section notwithstanding any previous entry on the Works or the taking possession working or using thereof or any part thereof by the Owner.

17.3 Cessation of Owner's Liability

The Owner shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Maintenance Certificate under Section 2.17.2.

17.4 Unfulfilled Obligations

Notwithstanding the issue of the Maintenance Certificate the Contractor and (subject to Section 2.17.3) the Owner shall remain liable for the fulfilment of any obligation incurred under the provisions of the contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such certificate is issued and for the purposes of determining the nature and extent of any such obligation the Contract shall be deemed to remain in force.

18. REMEDIES AND POWERS

18.1 Forfeiture

If the Contractor shall become bankrupt or have a receiving order made against him or shall present his petition in bankruptcy or shall make an arrangement with or assignment in favour of his creditors or shall agree to carry out the Contract under a committee of inspection of his creditors or (being a corporation) shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction) or if consent in writing of the OWNER first obtained or shall have an execution levied on his goods or if the Engineer shall certify in writing to the Owner that in his opinion the Contractor:-

a) has abandoned the Contract or

b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for 28 days after receiving from the Engineer written notice to proceed or

c) has failed to remove materials from the Site or to pull down and replace work for 28 days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under these conditions or

d) is not executing the Works in accordance with the Contract

or is persistently or flagrantly neglecting to carry out his obligations under the Contract or

e) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let any part of the Contract,

then the Owner may after giving 14 days' notice in writing to the Contractor enter upon the Site and the Works and expel the Contractor therefrom without thereby voiding the Contract or releasing the Contractor from any of his obligations or liabilities under the Contract or effecting the rights and powers conferred on the Owner or the Engineer by the Contract and may himself complete the Works or may employ any other contractor to complete the Works and the Owner or such other contractor may use for such completion so much of the Constructional Plant Temporary Works and materials which have been deemed to be reserved exclusively for the construction and completion of the Works under the provisions of the Contract as he or they may think proper and the Owner may at any time sell any of the said Constructional Plant Temporary Works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

18.2 Valuation at Date of Forfeiture

The Engineer shall as soon as may be practicable after any such entry and expulsion by the Owner fix and determine ex part or

by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount (if any) had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and what was the value of any of the said unused or partially used materials any Constructional Plant and any Temporary Works.

18.3 Payment after Forfeiture

If the Owner shall enter and expel the Contractor under this clause he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of completion and maintenance damages for delay in completion (if any) and all other expenses incurred by the Owner have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the Contractor on due completion by him then the Contractor shall upon demand pay to the Owner the amount of such excess and it shall be deemed a debt due by the Contractor to the Owner and shall be recoverable accordingly.

18.4 Urgent Repairs

If by reason of any accident or failure or other event occuring to in or in connection with the Works or any part thereof either during the execution of the Works or during the Period of Maintenance any remedial or other work or repair shall in the opinion of the Engineer or the Engineer's Representative be urgently necessary for security and the Contractor is unable or unwilling at once to do such work or repair the Owner may be his own or other workmen do such work or repair as the Engineer or the Engineer's Representative may consider necessary. If the work or repair so done by the Owner is work which in the opinion of the Engineer the Contractor was liable to do at his own expense under the Contract all costs and charges properly incurred by the Owner in so doing shall on demand be paid by the Contractor to the Owner or may be deducted by the Owner from any monies due or which may become due to the Contractor. Provided always that the Engineer or the Engineer's Representative (as the case may be) shall as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

19. SPECIAL RISK

19.1 No Liability for War etc. Risk

Notwithstanding anything in the Contract the Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of damage to the Works or Temporary

Works or to property whether of the Owner or third parties or for or in respect of injury or loss of life to persons which is the consequence whether direct or indirect of war, hostilities (whether war has been declared or not), invasion act of enemies, rebellion, revolution, insurrection or military or usurped power, civil war or (otherwise than among the Contractor's own employees) riot, commotion or disorder (hereinafter comprehensively referred to a "the said special risks") and the Owner shall indemnify and save harmless the Contractor against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising thereout or in connection therewith.

19.2 Work Condemned before Special Risks not Affected

Nothing contained in Section 2.19.1 shall affect any work or material condemned under the provisions of Section 2.11.9 hereof prior to the occurrence of any of the said special risks.

20. SETTLEMENT OF DISPUTES

20.1 Certain decisions to be final

Wherever in the Contract provision is made for any question, arrangement, amount, matter or thing being settled, decided, certified or determined by the Engineer or the Engineer's Representative or resting upon or being governed or controlled by or submitted to the judgement or opinion or either of them,

his assessment, decision, certificate, determination, judgement or opinion shall be final and conclusive for all purposes and shall be binding on the Contractor unless within fourteen days of the receipt thereof the Contractor by notice in writing disputes and refers the same for the decision of the Engineer.

20.2 Arbitration

If any dispute, question or controversy shall arise between the Owner and the Contractor concerning this Contract which is not specifically provided for herein, the matter in dispute shall be referred to two Arbitrators, one to be nominated by the Owner and other by the Contractor, or in the case of disagreement between the Arbitrators, to an Umpire appointed by the Arbitrators prior to their deliberations. Should the Arbitrators fail after two (2) months to resolve the matter or matters of difference, the whole matter or matters, as the case may be, shall be referred to the Umpire.

The decision of the Arbitrators or Umpire, as the case may be, shall be final and binding on both the Owner and the Contractor. Any such reference shall conform to the statutory enactment or regulation governing arbitration as may be in force in Pakistan at the time. The assessment of costs incidental to the reference and award respectively shall be at the discretion of the Arbitrators or, in the event of their not agreeing, of the Umpire appointed by them.

Work under this Contract, notwithstanding the existence of any

such dispute, question of controversy, shall continue during the arbitration proceedings.

20.3 Venue

The venue of arbitration shall be at Karachi (Pakistan).

21. GENERAL

21.1 Service of Notice on Contractor

Any notice to be given to the Contractor under the terms of the Contract may be served by sending the same by post to or leaving the same at the Contractor's principal place of business or registered office (if the Contractor is a company) or the Headquarter's at the Site of the Contractor.

21.2 Service of Notice on Owner

Any notice to be given to the Owner under the terms of the Contract shall be served by sending the same by Registered Post to or leaving the same at the office of the Secretary of the Owner.

21.3 Service of Notice on Engineer

Any notice to be given to the Engineer under the terms of the Contract shall be served by sending the same by Registered Post to or leaving the same at the office of the Engineer.

21.4 Service of Notice on Engineer's Representative

Any notice to be given to the Engineer's Representative under the terms of the Contract shall be served by sending the same by Registered Post to or leaving the same at the office of the Engineer's Representative at the Site.

21.5 Contract Variations

The Contractor shall not be capable of being varied except in writing, signed by both parties and the Owner shall not, in the absence of his specific written acceptance, be bound by any provisions, variations, deviations or exceptions in the Contractor's proposals, offerings, forms of acknowledgement of Contract, invoice packing lists or any other document which purports to impose conditions at variance with or supplemental to these documents.

21.6 Liens

Each Contractor for himself and for any persons directly or indirectly responsible to him, and for his or their materials, equipment and employees, and for all other persons performing any labour or furnishing any labour or materials for any of the work covered by his Contract, will be required to release or waive, to the full extent permitted by law, all mechanical or other liens, for or on account of the work done or equipment and materials furnished hereunder, and the improvements or structures wherein same may be incorporated, and the land to

which they are appurtenant shall at all times be free and clear of all such liens.

21.7 Time Schedule

The Contractor shall, within 15 days from award of Contract submit a detailed Contract Programme, in the form of a bar chart, for the Contract Works to the Owner and his Representatives for comments or approval. Copies of the approved bar chart as required by the Owner or his Representatives shall be provided by the Contractor.

21.8 Monthly Progress Report and Photographs

a) During the continuance of the Contract, the Contractor shall submit monthly progress reports on forms as approved by the Engineer. Such monthly reports shall show the actual progress completed as of date of the report plotted against the schedule as given in the Contract, and shall be broken down so as to indicate status of all activities associated with mobilization design, material procurement, manufacture, surveys works, tests, shipping, testing and commissioning with regard to the agreed contract programme.

b) When the work commences at the site, the Engineer shall provide the Contractor with a standard report form which shall be filled in each month and submitted by the Contractor to indicate the progress of construction, and to serve as a basis for making progress payments to the

Contractor. The progress indicated on the report each month shall be mutually agreed upon by the Contractor and the Engineer's Representative at the site before it is formally submitted to avoid delays in making progress payments.

c) The Contractor shall further submit, as part of the monthly construction progress report described above, an anticipated progress schedule indicating his best estimate of the installation work to be performed during the ensuing three month period.

d) The Owner and the Engineer reserve the right to coordinate the schedules of this Contractor and other contractors working at the site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the Owner's completion date.

e) Commencing after the first month of construction, and continuing every month until completion, the Contractor shall have photographs taken, where directed by the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

f) All progress reports and photographs shall be mailed, or submitted not later than the 15th of the month for the period covering the previous month.

21.9 Contractor to notify delays etc.

Any delay which will affect the completion of Works shall be detailed by the Contractor who shall state the action he is taking to effect completion to the Contract programme.

The Contractor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, a return of labour and supervisory staff, and details of any matters arising which may generally affect the progress of the work.

The Contractor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract programme.

The progress reports shall be set out in a format to the approval of the Owner, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Owner considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Contractor's Representatives are to attend such meetings.

The Contractor's Site Office shall prepare and submit 6 copies of a weekly progress report to the Owner's Site Office. This report shall summarize site activities and record and details

where difficulties in maintaining the agreed programme are being experienced or are likely to cause subsequent delay.

The Contractor's Site Office shall also prepare and submit to the Owner's/Engineer's Site Office 6 copies of a Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such as tests, alignment checks, etc.

The Contractor shall be responsible for expediting the delivery of all material and equipment to be provided by him and his subcontractors.

21.10 Photographs

As soon as work commences on Site, the Contractor shall provide photographs of the works from positions to be selected by the Owner. Each photographic print shall not be less than 297 mm x 210 mm and shall bear a printed description, a serial number and the date when taken.

The negatives of all photographs shall be held at the Contractor's Site Office, numbered and handed over to the Owner at the completion of the Contract.

The Contractor shall provide a number of selected photographs for submission with each copy of the monthly progress report as required by the Owner. The Contractor shall also provide from time to time as and when required by the Owner, further photographs of the Contract Works to record or illustrate

specific events.

21.11 Miscellaneous Documents Distribution

a. In addition to the number, type and distribution of documents called for under various clauses of the Contract Documents, following document distribution shall be followed by the Contractor.

	For the Owner		For the Engineer		Registered	Total
	Office	job Site	H.O.	job Site	Surveyor	
Correspondence	5	-	1	1	-	7
Insurance Certificate	2	-	1	1	-	4
Progress Reports	3	1	1	1	-	6
Progress Photos	3	1	1	1	-	6
Progress Photo Negative	1	-	-	-	-	1
Certified Test	3	1	1	1	-	6
Damage Reports	8	1	1	1	1	12

b) All documents shall be posted via air mail or by hand Cables shall be confirmed immediately by air mail counter part. All letters shall be numbered using a numbering system as instructed by the Engineer.

21.12 Cost Account Breakdown

Before completion of the project, the Contractor shall submit a complete Cost Account statement of all work performed

hereunder, broken down in such detail and using such Cost Account Code as the Owner may direct.

21.13 Coordination Conferences

Soon after the date of the Letter of Intent for the Contract, the Owner and the Engineer will require a conference with the Contractor at the Owner's or Engineer's office to discuss scheduling of drawings, equipment procurement and installation, and other similar problems which may be pertinent to the completion of the project. The Contractor's project engineer responsible for prosecution of the work shall be present at this meeting.

21.14 Language

The official language for general correspondence technical information and data, instruction manuals, literature, pamphlets, drawings, standards and test data shall be exclusively in English. All markings on equipment, dials, name plates and other items shall also be in legible English. Shipping marks, addresses and instructions on individual packages shall be printed in capital letters in English only. All meetings and discussions with the Owner, Engineer and Engineer's Representative shall be in English.

18/

21.15 Tests, Inspections & Expediting

a) All equipment and material supplied under this Contract will be subject to test or inspection.

b) After completion of works, and before being put into operation, each unit and all its appurtenances and all other mechanical and electrical equipment and materials shall be thoroughly cleaned and then inspected, under the supervision of the Engineer, for correctness and completeness of installation and acceptability for placing in operation.

SECTION IV

SCHEDULE OF PRICES

1. PREAMBLE

a. The items mentioned in the Schedule of Prices consist of furnishing all plant, labour, equipment, machinery, appliances, materials, fittings, fixtures and dismantling, demolition, disposal required for completing the items/works and the work shall be done in accordance with the Schedule of Prices, Specifications and Drawings complete in all respect.

b. Complete description of items of work in the Schedule of Prices, general directions, conditions and limitation of work, location and place of work, applicable methods, means to be adopted, type and quality of materials, use of tools, plant, and machinery are not necessarily mentioned in the description column of Schedule of Prices. These shall be referred to in accordance with specifications and drawings.

c. The tenderer may ensure himself for the correctness of quantities and application of the individual items for works as per Drawings Specifications and Contract Documents.

d. The Quantities contained in the Schedule of Prices are approximate estimated quantities and liable to be changed (increase/decrease) or omitted when the work will be actually executed. The Engineer is authorised to delete any item of work or vary quantities of any item of the Schedule of Prices. The Engineer is also authorised to include any number of new items in accordance with contract conditions.

The Owner does not expressly or by implication agree that actual quantities of work to be performed will correspond to S.O.P. No claim for the payment will be admissible on account of anticipated profit or variation in overhead expenditures for the works not actually performed nor will any adjustment in the unit rate setforth in the Schedule of Prices be made because of any increase or any decrease in the quantities indicated therein.

e. The prices and rates to be quoted in the Schedule of Prices are to be the full inclusive value of the Works described under specified items including all cost and expenses which may be required in and for the construction of the Works described together with all risks, liabilities and obligations setforth and implied in all the documents referred to on which the tender is based.

f. The rates quoted in the rate column are full value of unit price as shown in unit column and are firm and final and shall be for the works involved as per Drawings, Specifications and Contract Conditions.

g. Unit rate is to be entered against each item in the Schedule of Prices whether quantities are entered or not. Items against which no price or rate is quoted in the Schedule of Prices shall be deemed to have been covered by rates or prices quoted in the other SOP items.

h. Schedule of Prices shall be read in conjunction with conditions of Contract, Technical Specifications and the Drawings.

SCHEDULE OF PRICES

PROJECT: WEST WHARF THERMAL POWER PLANT

SUBJECT:

SCHEDULE OF PRICES

DATE

SHEET OF

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "B" Station Boiler -								
1. Steam Generator with Accessories		Unit	3					
2. Burner with Accessories		Lot	each unit 1					
3. Soot Blower with Accessories		Lot	each unit 1					
4. Superheater		Lot	each unit 1					
5. Economizer		Lot	each unit 1					
6. Air Heater with Accessories		Lot	each unit 1					
7. Forced Draft Fan with Accessories		Lot	each unit 1					
8. Induced Draft Fan with Accessories		Lot	each unit 1					
9. Duct and Its Supporting structure with Accessories		Lot	each unit 1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
10. Stack and Its Supporting Structure		Lot	1					
11. Fuel Oil Service Tanks with Accessories		Unit	3					
12. Fuel Oil Pipings, Valves and Instruments		Lot	each unit 1					
13. Gas Pipings, Valves and Instruments		Lot	each unit 1					
14. Fuel Oil Transfer Pump with Accessories		Lot	1					
15. Fuel Oil Pumps with Accessories	Including strainers and booster pump	sets	4					
16. Fuel Oil Heater		sets	3					
17. Steam Pipings and Valves		Lot	each unit 1					
18. Miscellaneous Equipments, Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

081

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "B" Station Turbine -								
1. Steam Turbine with Accessories		Unit	2					
2. Condenser with Accessories		Lot	each unit 1					
3. Boiler Feed Pumps		sets	3					
4. Evaporator		sets	each unit 2					
5. Deaerator		set	each unit 1					
6. HP Heater		sets	each unit 2					
7. Evaporator Heater		set	each unit 1					
8. LP Heater		set	each unit 1					
9. Ejecotr Condenser		set	each unit 1					
10. Drain Cooler		set	each unit 1					
11. Flash Box		set	each unit 1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
12. Reserve Feed Water Tank with Accessories		set	each unit 1					
13. Air Cooler		Lot	each unit 1					
14. Oil Cooler		Lot	each unit 1					
15. Condensate Extraction Pumps		sets	each unit 2					
16. Drain Pumps		sets	each unit 2					
17. Reserve Feed Water Pumps		sets	each unit 2					
18. Steam and Feed Water Pipings and Valves		Lot	each unit 1					
19. Lubricating Oil System	Including oil tanks pumps, pipings and valves	Lot	each unit 1					
20. Seawater Pipings and Valves		Lot	each unit 1					
21. Miscellaneous Equipments Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

e61

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "B" Station Auxiliary -								
1. Chemical Injection Equipment with Accessories		Lot	1					
2. Sampling Equipment with Accessories		Lot	1					
3. Water Treatment Equipment with Accessories	Including towers, pipings and valves	Lot	1					
4. Town Water Tank with Accessories		Lot	1					
5. Soft Water Tank with Accessories		Lot	1					
6. CO2 Fire Extinguishing Plant	Including gas silinders pipings and valves	Lot	1					
7. Miscellaneous Equipments, Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "B" Station Erectrical -								
1. Generator with Accessories		Unit	2					
2. Switchgear		Lot	1					
3. Auxiliary Transformer		Lot	1					
4. Block Transformer		Lot	1					
5. Power Transformer		Lot	1					
6. Lighting Transformer		Lot	1					
7. Battery		Lot	1					
8. Switchgear for FDF and IDF		Lot	each unit 1					
9. Boiler Supervisory Control Panel		Lot	each unit 1					
10. Turbine Generator Supervisory Control Panel		Lot	each unit 1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
11. Feed Water Control Panel		Lot	1					
12. Miscellaneous Erecrical Equipments and Machinaries, Panels, Cables, etc.		Lot	each unit 1					
Sub total								
Total								

PROJECT: WEST WHARF THERMAL POWER PLANT

SUBJECT:

SCHEDULE OF PRICES

DATE

SHEET OF

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "BX" Station Boiler -								
1. Steam Generator with Accessories		Unit	2					
2. Burner with Accessories		Lot	each unit 1					
3. Soot Blower with Accessories		Lot	each unit 1					
4. Superheater		Lot	each unit 1					
5. Economizer		Lot	each unit 1					
6. Air Heater with Accessories		Lot	each unit 1					
7. Forced Draft Fan with Accessories		Lot	each unit 1					
8. Induced Draft Fan with Accessories		Lot	each unit 1					
9. Duct and Its Supporting Structure with Accessories		Lot	each unit 1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
10. Stack and Its Supporting Structure		Lot	1					
11. Fuel Oil Pipings, Valves and Instruments		Lot	each unit 1					
12. Gas Pipings, Valves and Instruments		Lot	each unit 1					
13. Fuel Oil Pumps with Accessories	Including storainers	sets	2					
14. Fuel Oil Heater		sets	4					
15. Steam Pipings and Valves		Lot	each unit 1					
16. Miscellaneous Equipments, Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "BX" Station Turbine -								
1. Steam Turbine with Accessories		Unit	2					
2. Condenser with Accessories		Lot	each unit 1					
3. Boiler Feed Pumps		sets	3					
4. Evaporator with Deaerator		set	each unit 1					
5. Deaerator Heater		set	each unit 1					
6. Closed Heater	No. 1, No. 2, No. 4, No.5	sets	each unit 4					
7. Air Ejector		set	each unit 1					
8. Evaporator Blowdown Heat Exchanger		set	each unit 1					
9. Condensate Cooler		Lot	each unit 1					
10. Condensate Storage Tank with Accessories		Lot	1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
11. Lubricating Oil System	Including oil tank, oil coller, pumps, pipings and valves	Lot	1					
12. Cooling Water Pumps with Accessories		sets	each unit 2					
13. Condensate Pumps with Accessories		sets	each unit 1					
14. Condensate Transfer Pumps with Accessories		sets	3					
15. Drip Pumps with Accessories		sets	each unit 2					
16. Steam and Feed Water Pipings and Valves		Lot	each unit 1					
17. Seawater Pipings and Valves		Lot	each unit 1					
18. Miscellaneous Equipments Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "BX" Station Auxiliary -								
1. Plant Air Compressure with Accessories	Including after cooler, air receiver, filter, pipings, valves, etc.	Lot	1					
2. Chemical Injection Equipment with Accessories	Including, tanks, pumps, pipings, valves, etc.	Lot	1					
3. Water Treatment Equipment with Accessories	Including towers, pipings and valves etc.	Lot	1					
4. Miscellaneous Equipments, Pipings, Valves, etc.		Lot	each unit 1					
Sub total								

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
- "BX" Station Erectrical -								
1. Generator with Accessories		Unit	2					
2. Switchgear		Lot	1					
3. Main Transformer		Lot	1					
4. Auxiliary Transformer		Lot	1					
5. Boiler Supervisory Control Panel		Lot	1					
6. Turbine Generator Supervisory Control Panel		Lot	each unit 1					
7. Miscellaneous Erectrical Equipments and Machinaries, Panels, Cables, etc.		Lot	each unit 1					
Sub total								
Total								

PROJECT: WEST WHARF THERMAL POWER PLANT UNIT-1

SUBJECT: Civil & Arichitectural Dismantling Works

SCHEDULE OF PRICES

DATE

SHEET OF

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
Dismantling Work								
1. Staff Quaters No.1		L.S	1					
2. Staff Quaters No.2		L.S	1					
3. Officer's Flats		L.S	1					
4. Shift Engineer's Flat		L.S	1					
5. Store Shed No.1		L.S	1					
6. Store Shed No.2		L.S	1					
7. Canteen		L.S	1					
8. Underground Tank		L.S	1					
9. Ground Reservoir		L.S	1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
10. Wall		L.S	1					
11. No. 1 Oil Tank Foundation and Dike		L.S	1					
12. No. 2 Oil Tank Foundation and Dike		L.S	1					
13. No. 3 Oil Tank Foundation and Dike		L.S	1					
14. Instrument and Control Room		L.S	1					
15. A Station (boiler and turbine room)		L.S	1					
16. Sanitary Block and Sewage Pump Room		L.S	1					
17. N.A								
18. N.A								
19. N.A								
20. N.A								
21. N.A								

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
22. N.A								
23. Guard House		L.S	1					
24. Car Parking		L.S	1					
25. Surface Cut		L.S	1					
26. Miscellaneous Foundation & etc.		L.S	1					
Total								

PROJECT: WEST WHARF THERMAL POWER PLANT UNIT 2 DATE

SCHEDULE OF PRICES

SUBJECT: Civil & Archiechtural Dismantling Works SHEET OF

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
Dismantling Works								
1. Boiler Room B Station	Above the ground floor level	L.S	1					
2. Turbine Room B Station	Ditto	L.S	1					
3. Stack B Station	Ditto	L.S	1					
4. Misc. Foundation and Wall	Ditto	L.S	1					
5. Switch Room		L.S	1					
6. Intake Water Pipe for BX Station No. 1		L.S	1					
7. Intake Water Pipe for BX Station No. 2		L.S	1					
8. Intake Water Pipe for B Station		L.S	1					
9. Stock BX Station	Above the ground floor level	L.S	1					

DESCRIPTION	SPECIFICATION	UNIT	QUANTITY	DISMANTLING COST		PURCHASE PRICE		BALANCE (a) - (b)
				UNIT-PRICE	AMOUNT (a)	UNIT-PRICE	AMOUNT (b)	
10. Boiler Structures BX Station	Above the ground floor level	L.S	1					
11. Turbine Room BX Station	Ditto	L.S	1					
12. Transformer Foundations for BX Station	Ditto	L.S	1					
13.Electric Shop, Raw Water Service Pump etc.		L.S	1					
14. Machine Shop and Store		L.S	1					
15. C.W. Tank		L.S	1					
16. Discharge Water Pipe for BX Station		L.S	1					
17. Administration Building		L.S	1					
18. Cable Trench		L.S	1					
19. Surface Cut		L.S	1					
20. Miscellaneous Foundations & etc.		L.S	1					
Total								

SECTION V

TECHNICAL GENERAL CONDITIONS

SECTION V. TECHNICAL GENERAL CONDITIONS

CONTENTS

1. INTENT

1.1 INTENT

This Section states the specific requirement for designing, furnishing, delivering, staring at Site, dismantling, equipment and material for the West Wharf Thermal Power Station.

It is intended that this Section, together with Technical Specification plus the Notice and Instruction to Tenderers, Tender form, General Conditions of Contract and Drawings shall form the Tender Documents which will ultimately become a part of the equipment and material Contract between the Owner and successful Tender.

Introduction of Site

(1) LOCATION OF SITE

The project site of the said power station is located at the West Wharf area of Karachi Bay: Bay near the center of Karachi City.

The City is the largest City in Pakistan and important commercial and industrial center. The distance between the project site and Center of the City approximately 10 km.

The site has been established as West Wharf Thermal Power Plant within the total site area of about 37,000 m^2, the power plant is Comprised of Station "A", "B" and "BX". However, Station "A" had been decommissioned and all equipment and

machinery were dismantled. Only some vacant buildings remain.

The B station comprises two turbine generator units and three boilers having a total output of 30 MW (15 MW x 2). It was commissioned in 1956, however, and these units had been refined by 1987.

The "BX" staion comprises two turbine generator and two boiler having a total output of 66 MW (33 MW x 2). It was commissioned in 1962. The units are under operation.

The surrounding of this area, north side is adjacent to the oil terminal of CALTEX. The west side face the West Wharf Road and comprises land owned by the Pakistan Navy on the south side of the load. Further down on the West side of this road are the Pakistan Oxygen & Acetylene Co., Ltd., and the Karachi Shipyard (KSY). The east side border by this site faces the Wharf, belonging to Karachi Part Trust (KPT), and has width of approximately 150 m.

2. DEFINITIONS

The definitions contained in the Conditions of Contract shall also be applicable hereto.

3. CONDITION OF PARTICULAR APPLICATIONS

3.1 ELECTRICITY, WATER SUPPLY, AND OTHER SITE FACILITIES/ARRANGEMENTS

1) Electric Power Supply

The Owner will provide a temporary installation for electric power supply at Site. From the terminals of the Owner's distribution board the Contractor shall provide his own distribution system including overload protection devices for power services necessary to perform the construction and erection of equipment in a safe and efficient manner. The distribution system shall comply with the requirements of the local safety regulations, and shall be to the approval of the Government Electrical Inspector.

The design, location, utilization and maintenance of the system shall be to the approval of the Owner who may require the disconnection or alteration of any part which is in his opinion not acceptable. The Contractor shall be responsible for the operation of the temporary lighting and power distribution system, including all cables, spares and other items. The Contractor's power, telephone and other utilities shall be underground and routed as approved by the Owner or the Engineer at Site.

The Tenderer shall describe fully in his Tender the distribution system and equipment he proposes to install giving a detailed list of the electrical loads anticipated for the various consumers. (Annex 1.16). The Contractor shall be charged for use of electric power according to the applicable Tariff.

2) Water Supply

The Owner shall provide raw water through one water connection from KDA at the site free of cost for purpose of erection and commissioning. Since water supply is not under responsibility of the Owner, the Contractor shall ensure the required water supply by other means in case of water supply shortage or interruptions in KDA lines. From the water main connections the Contractor shall provide his own water distribution systems as necessary to satisfy sanitation, construction, cleaning and testing of the various items of equipment, components etc.

Water for drinking purposes will also be supplied by the Owner.

The water supplies will normally be available to meet the maximum demand required during construction of the Unit and shall satisfy all temporary installations as well all installations forming part of the permanent works which the Contractor requires to operate or utilize. However, the Contractor shall provide sufficient storage capacity to meet any interruptions.

The design, location, utilisation and maintenance of the distribution system shall be to the approval of the Owner/

Engineer who may require the disconnection or alternation of any part which is in his opinion not acceptable. The Contractor shall be responsible for the operation of the distribution system including spares, pipes, hoses and other items. He shall also maintain the system.

The Tenderer shall describe fully in his Tender the systems and equipment he proposes to install giving a detailed list of all consumers to which he will provide water together with the anticipated segregated consumptions.

3) Compressed Air

The Contractor shall provide his own compressed air for dismantling works and other purposes.

4) Sanitary Conveniences

Sanitary conveniences for the use of person employed by the Contractor and his subcontractors shall be provided and maintaining by the Contractor to the extent and in such a manner and at such places as shall be approved by the Owner or the Engineer and all persons connected with the works shall be obliged to use them. The Contractor shall make all temporary arrangements for refuse and garbage collection and disposal and for the proper treatment and discharge of sewage and drainage from or in connection with the works and shall maintain the same to the satisfaction of the Owner or the Engineer and the Authority concerned as long as they may be required.

The Contractor shall prohibit the committing of any nuisance on the site or upon the land of the Owner or adjacent landowners and any employee found violating this provision shall be liable to immediate dismissal and will not be again employed on the Site.

5) All goods brought to the Site under the Contract will be inspected and inventories prepared jointly with Owner's Representative prior to dismantling works by the Contractor.

6) The Contractor shall provide his own watchman service to ensure security and safety of the equipment and materials prior to the Owner taking over the Works.

7) The Contractor shall provide all rigging, planking, dunnage, tools, supplies, scaffolding, guard barriers, warning lights, construction equipment, compressed air, testing apparatus and precision instruments required to complete his work.

8) All temporary erection and dismantling facilities described above shall be removed by the Contractor after completion of the Works unless otherwise desired by the Owner.

9) The Contractor shall provide on his responsibility, an outdoor storage space adequate for storage of plant equipment and materials and for temporary site offices during the execution of the works by the Contractor.

3.2 ERECTION AND CHECKING AT SITE

The Tenderer shall provide with the Tender a list of the main constructional equipment he proposes to use on Site.

The Contractor shall submit to the Engineer in due time for approval and discussion his proposals, in CPM also, as to the method and procedure to be adopted for the erection of the equipment and particulars of temporary works involved.

The submitting of these suggestions and arrangements, and the approval thereof by the Owner/Engineer shall not relieve the Contractor of his responsibilities and duties under the Contract.

The Contractor's representative on the Site or his nominated deputy shall be given full responsibility to enter into negotiations regarding points arising from erection activities.

The carrying out of all work included in the Contract is to be supervised by a sufficient number of qualified representatives of the Contractor and full facilities and assistance are to be afforded by the Contractor for the Owner/Engineer to check the execution of the work.

The Owner reserves the right to inspect all parts of equipment in the works and/or on Site, but may at his discretion waive inspection on certain items, but this shall in no way absolve the Contractor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, the plumbing of all stanchions and columns and to the levelling,

setting and aligning of the various parts, and to the fitting and adjusting of bearings and other parts.

If the Owner/Engineer sees that the work's progress is slow in such a way the works will not be completed in the time specified, then he will order the Contractor to work overtime or in more shifts and the Contractor shall obey these orders free from additional payments and without any objections or request for compensation.

In the event of night working, the Contractor shall provide sufficient lighting to the satisfaction of the Owner/Engineer and shall provide necessary labour for continuation of the work after normal hours.

3.3 COORDINATION OF WORK AT SITE

The Contractor shall take cognizance that during the execution of the Project, other contractors will be working concurrently on the Site.

All works of his responsibility shall be coordinated so as to give necessary facilities to other contractors or their workmen or any other employees who is executing or supervising any work on Site.

The Contractor shall ensure that necessary safety precautions are observed and interferences are avoided, especially in the works as executed side-by-side by different contractors.

Due consideration shall be given to permit access to sections of the work as required by other contractors for the execution of

their works.

With a view to coordinating the Works, the Engineer will, from time to time, direct the order of the work to be carried out.

3.4 DRAWINGS

3.4.1 DRAWINGS CLASSIFICATION

Drawings are classified into the following categories.

(1) Owner's Drawings

Owner's Drawings mean the drawings which are attached to the Bidding Documents and shall be used for Bidding purposes and basic designing.

(2) Contractors Drawings

(a) Design drawings

Design drawings mean the ones concerning specifications, arrangement, diagram, list, calculation sheet, sequence, test procedure, composition, assembling, piping, structure and foundation, and as well as facility and utility for the Works, and shall be submitted by the Contractor to the Engineer.

(b) Working drawings

Working drawings means the ones for the construction and dismantling work such as specification, foundation, opening (floor, ceiling, wall), foothold, grating, cabling, tubing, installation as well as architectural

and structural work.

(c) Reference drawings

Reference drawings mean the ones to be used for conference purposes and shall be for reference purposes only.

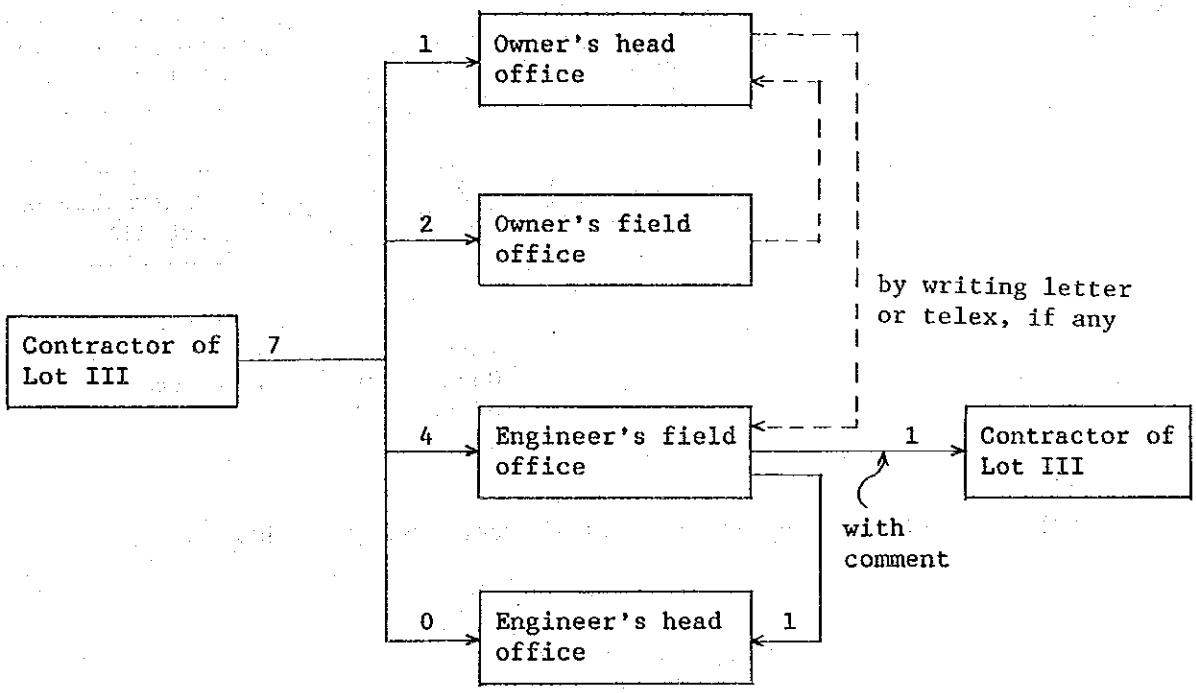
(d) Asbuilt drawings

Asbuilt drawing mean the ones showing the equipment, structures, etc., exactly as remained.

3.4.2 DRAWING MANAGEMENT (FLOW CHART)

(1) The drawings for approval shall be routed as shown below.

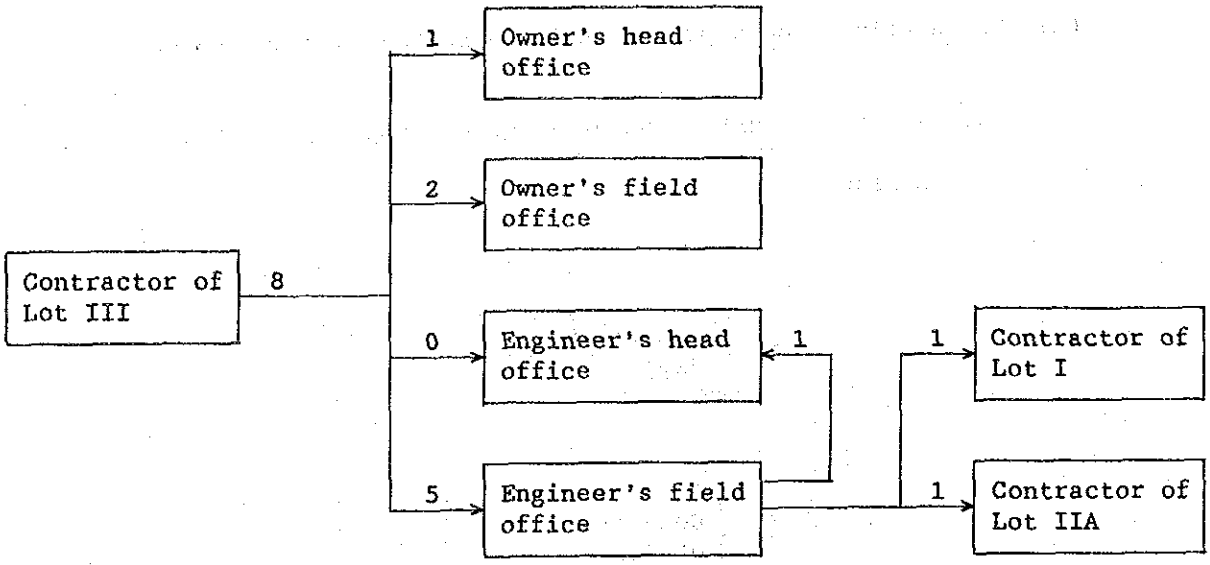
(a) Route flow until the drawings are approved by the Engineer



After receiving approval from the Engineer, the approval drawings will become the final drawings.

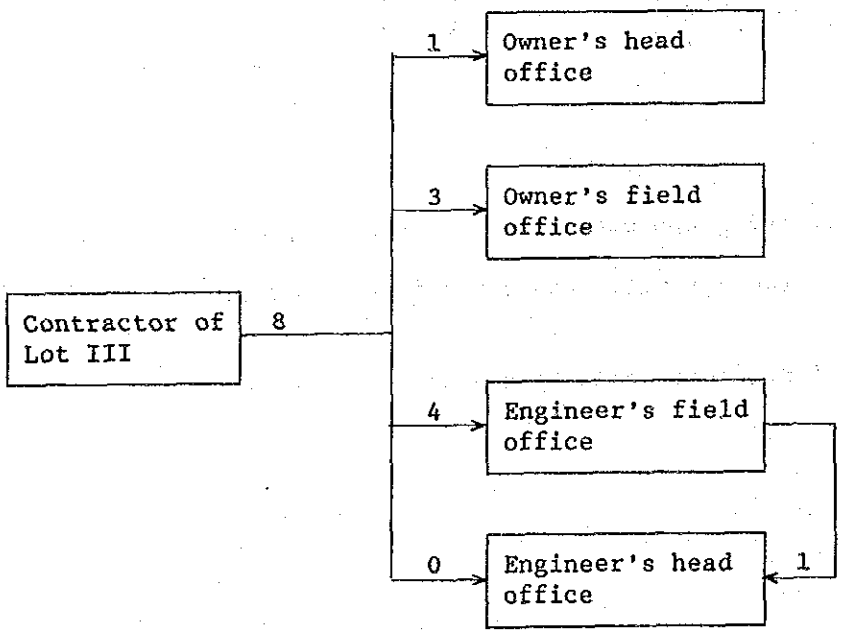
The final drawings shall be routed as shown below.

(b) Final drawings (Drawings approved by the Engineer)

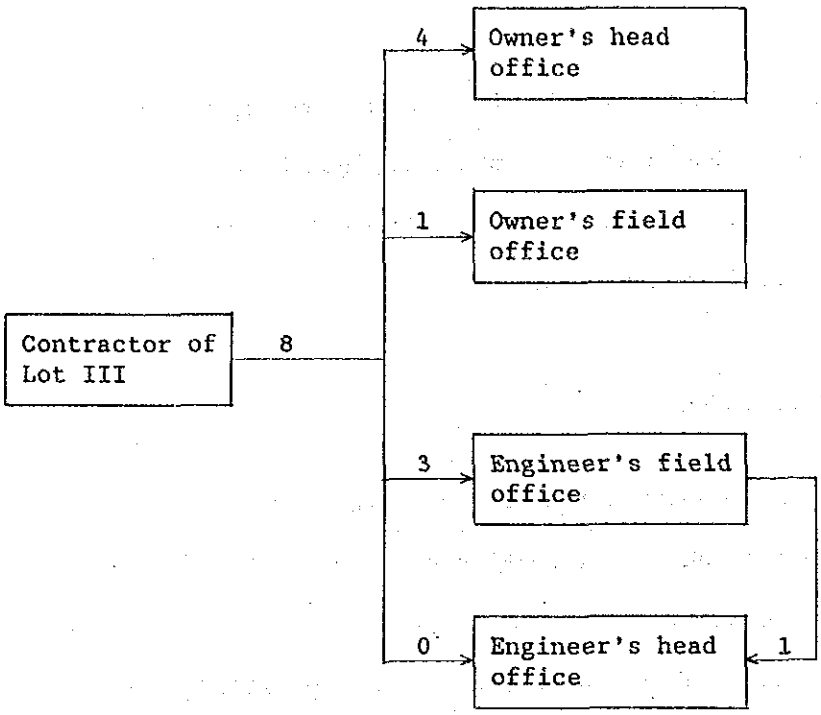


Drawings related to the works executed by the Contractor of Lot I and of Lot IIA

(2) The reference drawings shall be routed as shown below.



(3) The asbuilt drawings shall be routed as shown below.



(4) The Engineer will check the drawings to be approved, and will send the drawings back to the Contractor within one (1) month after the Engineer receives the drawings from the Contractor of Lot III.

(5) The Contractor of Lot III shall submit as early as possible the revised drawings with the Owner and Engineer's comment sheets containings answer of the Contractor of Lot III.

3.5 SAFETY

3.5.1 ENSURING SAFETY

The Contractor shall continuously take special care to ensure the safety and prevention of human and equipment accidents and maintain good sanitary conditions on and around the Site in accordance with the Local Standard Law.

CONTRACTOR's SAFETY ENGINEER

(1) The Contractor shall appoint the Safety Engineer for accident prevention, who shall work together with the Owner's safety engineer.
The Contractor shall submit in writing in the specified form the names and personal histories of the Safety Engineer and his staff in charge of accident prevention to the Owner and Engineer prior to the commencement of the execution of Works and this shall be approved by the Owner and Engineer.

(2) The Contractor's Safety Engineer for accident prevention shall be constantly present and in attendance to the Works and shall plan and conduct proper measures to prevent accident throughout the entire Works area in conformity with the provisions specified in the Specifications.

(3) Whenever the Contractor's Safety Engineer for accident prevention is off the Site on temporary leave or for other reasons, the Contractor shall assign a Deputy and report this matter to the Owner and Engineer in advance and this

matter shall be approved by the Owner and Engineer.

(4) The Contractor's Safety Engineer for accident prevention shall wear the Safety Engineer mark on the Site for easy identification.

SAFETY FACILITIES

The Contractor shall install the following facilities in order to ensure the safety of the structures installed by the Owner on and around the Site.

(1) The Contractor shall install the facilities necessary to keep safe the structures of the Owner or the third party when the Works are executed in the vicinity of these structures.

(2) The walkways on the Site, such as catwalks, ladders and temporary bridges shall be protected against falling stones and shall be equipped with safety provisions for workers and materials.

(3) Slope protection works, nets, fences and other protection works shall be installed at excavation sites and any all other places where an accident may occur.

(4) The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing, and human watch when and where necessary or required by the Engineer or by any duly constituted authority for the protection of the works or for the safety and convenience of

the public or others.

(5) The Safety guide posts, marks, signs, etc., indicating falling stones and landslide, traffic sign posts when blasting and other necessary guide posts shall be installed whenever and wherever they are necessary throughout the entire Site.

(6) The Contractor shall take sufficient measures so as not to cause any danger, hazard or obstruction to the public by installing work sign boards, traffic sign posts, lighting and protection facilities and other necessary safety devices in case the works are executed in the vicinity of the public. The Contractor shall have close communication with the police and the administrations of the roads and rivers in advance regarding traffic and other security measures.

3.6 TEMPORARY WORKS

3.6.1 PLAN OF TEMPORARY FACILITIES

The Contractor shall submit details of plan of temporary facilities, which shall be based on the plan of construction specified in the Subclause 3.6 of these Specifications to the Engineer. In case of light construction, the submission of the detailed plans may, at the direction of Engineer, be omitted.

3.6.2 TEMPORARY FACILITIES AND REMOVAL

(1) Among Temporary Facilities, drawings of those which are

specified in the Technical Specifications shall be submitted with the respective calculations.

(2) The Contractor shall remove from the Site all Temporary Facilities and construction materials to the place and by the date directed by the Engineer after the acceptance of the Works.

In case of default on the part of the Contractor in carrying out such direction, the Owner shall be entitled to carry out the same by his own force and all expenses consequent thereof shall be borne by the Contractor, except such temporary works approved by the Owner to be left on the Site.

3.6.3 EQUIPMENTS AND TOOLS

Names, numbers and capacity of equipments and tools to be furnished by the Contractor shall be specified in the plan of Temporary Facilities in advance.

3.6.4 WAREHOUSES AND STOCKYARDS

Warehouses and stockyards shall be constructed and maintained in accordance with the relevant laws and regulations, and appropriate attention shall be paid to prevent change in quality and deformation of the stored materials.

Fire extinguisher(s) shall be provided at any warehouse and office for stockyard by the Contractor.

3.7 SURVEY MARKS

Survey marks specified by the Owner shall be protected against dislocation. In case it is difficult to maintain their positions as construction work proceeds, the Contractor shall follow the direction of the Engineer.

3.8 CARE OF WORKS

From the commencement to be completion of the Works, the Contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage loss or injury shall happen to the Works or to any part thereof or to any Temporary Works from any case whatsoever, the Contractor shall at his own cost repair and make good the same so that at completion the Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions.

4. SITE CONDITIONS

4.1 SUMMARY

Note that the climatic, oceanographic, etc., information given hereunder is intended only as design reference for the Contractor.

Description	Conditions
(1) Ambient temperature (Year 1975 - 1987)	
Maximum (Highest) (May 9, 1938)	47.8 °C
Maximum (Monthly Mean)	42.7 °C
High average (Yearly Mean)	36.4 °C
Low average (Yearly Mean)	16.6 °C
Minimum (Monthly Mean)	6.1 °C
Minimum (Lowest) (Jan. 21, 1934)	0 °C
(2) Relative humidity	
Maximum (Highest Monthly Mean)	85 %
Average (Yearly Mean at 5 A.M.)	73 %
Minimum (Lowest Monthly Mean)	62 %
(3) Atmospheric pressure	
Maximum (Highest Monthly Mean)	1016.1 mb
Maximum (Monthly Mean at 8 A.M.)	1017.2 mb
Minimum (Monthly Mean at 5 P.M.)	996.7 mb
Minimum (Lowest Monthly Mean)	997.5 mb
(4) Rainfall (Average figures for 1975 - 1984)	
Maximum (Monthly Mean)	100.1 mm/Month
Total Rain Fall (Yearly Mean)	265.2 mm/Year

Greatest Rainfall in a Day (Aug. 2, 1944)	152.4 mm/Day
Rainy Season	March through October and December

(5) Wind

Maximum Momentary Wind Velocity	Over 10 Beaufort (24.5 - 28.4 m/s and over)
Maximum Average Velocity (South West direction)	5.2 m/s
Wind Direction	SW in summer NW in winter NE during rainy season

(6) Sea water temperatures of Karachi Harbour

Surface Temperature (Maximum)	32.5 ^{o}C
3 - 4 meter Deep Temperature (Maximum)	32.5 ^{o}C
Temperature Range	18.5 to 32.5^{o}C

(7) Bench mark and level

The Contractor shall lay out his work from bench mark of K.D.A (Karachi Development Authority) and shall be responsible for all measurements in connection with his work.

The Contractor shall, at his own expense, furnish all bench marks, stakes, templates, platform, equipment, and labor, including surveyors, that may be required in setting or laying out any part of the work.

The Contractor shall be held responsible for the proper

execution of the work.

The levels indicated in the Drawings and Specification, in meter, are translated to Chart Datum, which is the same as the Zero of the tidal predictions.

However, the basic datum of above bench mark are those of the Survey of Pakistan, which has it's zero point at 'Mean sea level' and which is 5.18 feet (1.579 meters) higher than the Zero of the tidal predictions.

No. 47 bench mark of K.D.A near power station is located on Dockyard Road near Glaxso Laboratory.

Therefore, level of No. 47 bench mark (R.L=3.581m) becomes EL + 5.160m.

(8) Sea water level

a) The Highest High Water Level (The Highest Astronomical Tide is adopted as design H.H.W.L)

H.H.W.L = E.L + 3.23 m

b) Mean Sea Water Level

M.S.L = E.L + 1.64 m

c) The Lowest Low Water Level (The lowest Astronomical Tide is adopted as design L.L.W.L)

L.L.W.L = E.L - 0.43 m

(9) Ground level (G.L)

G.L. = E.L + 4.80 m

5. METEOROLOGICAL DATA

The project areas is characterized by hot and humid weather conditions with long summers (May - October), and comparatively short and mild winters (November - February). The summers are characterized by high humidity and frequent cloud coverage with southwesterly monsoon winds. During the winters, the wind direction changes to northeast, while the humidity and temperatures are moderate.

Note that the meterological, etc., information given hereunder is intended only as design reference for the Contractor.

5.1 AMBIENT TEMPERATURES

The average mean, maximum and minimum monthly temperatures of the area for the period 1975 - 84 are shown in Table 5-1. It is seen from the data that the maximum temperatures during the year range between 28°C to 43°C and the minimum between 6°C to 27°C. It is also observed from the available data that the hottest period of the year is May - June and the coldest is in January.

5.2 PARTICIPATION AND HUMIDITY

Humidity and the precipitation data (in mm) for the years 1975 - 84 was studied, and the monthly average figures are given in Table 5-2. The table and a reference to the other pertinent records showed that the frequency of fog is maximum at the outset of the northeast monsoons in the months of October to January, with April to

September free from fog. On the average, however, there are 10 occasions of fog in a one year period. The visibility in the area is generally fair and limited to a small amount of haze.

The Table 5-2 shows that the relative humidity is maximum from May to August (75% - 85%) corresponding to the onset of the southwest monsoons and is minimum (60% - 70%) in December and January. Since the area is generally humid as a result of the influence of the Arabian Sea, the variation in the annual average relative humidities is not large and is of the order of 30% only. The average diurnal maximum for relative humidity in July and January are recorded as 59% - 75%, respectively.

5.3 WIND

Winds in the area are predominantly in the direction of southwest and west and strongest during the summer monsoon season of May to October. The data for the past ten years, i.e. 1975 - 84, was studied, and typical wind rises for summer and winter are presented in Fig. 5-1. From these wind rises, it is obvious that the areas most frequently influenced by the pollution originating from the power plant are in the east and northeast direction from the plant.

This area is not affected by the cyclones and thunder storms originating from the east coast of Africa or Bay of Bengal, because they normally follow a route which is several hundred kilometres south of the Karachi coast.

Table 5-1 Ambient Temperature

(Average Temperatures for the period 1975 - 1984)

Month	Temperature °C Max.	Min.	Mean
Jan.	28.7	6.1	18.2
Feb.	32.3	7.9	20.3
Mar.	35.4	11.5	24.1
Apr.	40.1	18.2	28.4
May	41.2	21.9	30.6
June	42.7	26.2	31.7
July	37.1	25.4	30.4
Aug.	35.5	24.2	28.7
Sept.	37.5	23.0	29.1
Oct.	38.8	15.9	27.2
Nov.	36.2	11.1	23.3
Dec.	30.8	8.3	19.6

Table 5-2 Precipitation and Humidity

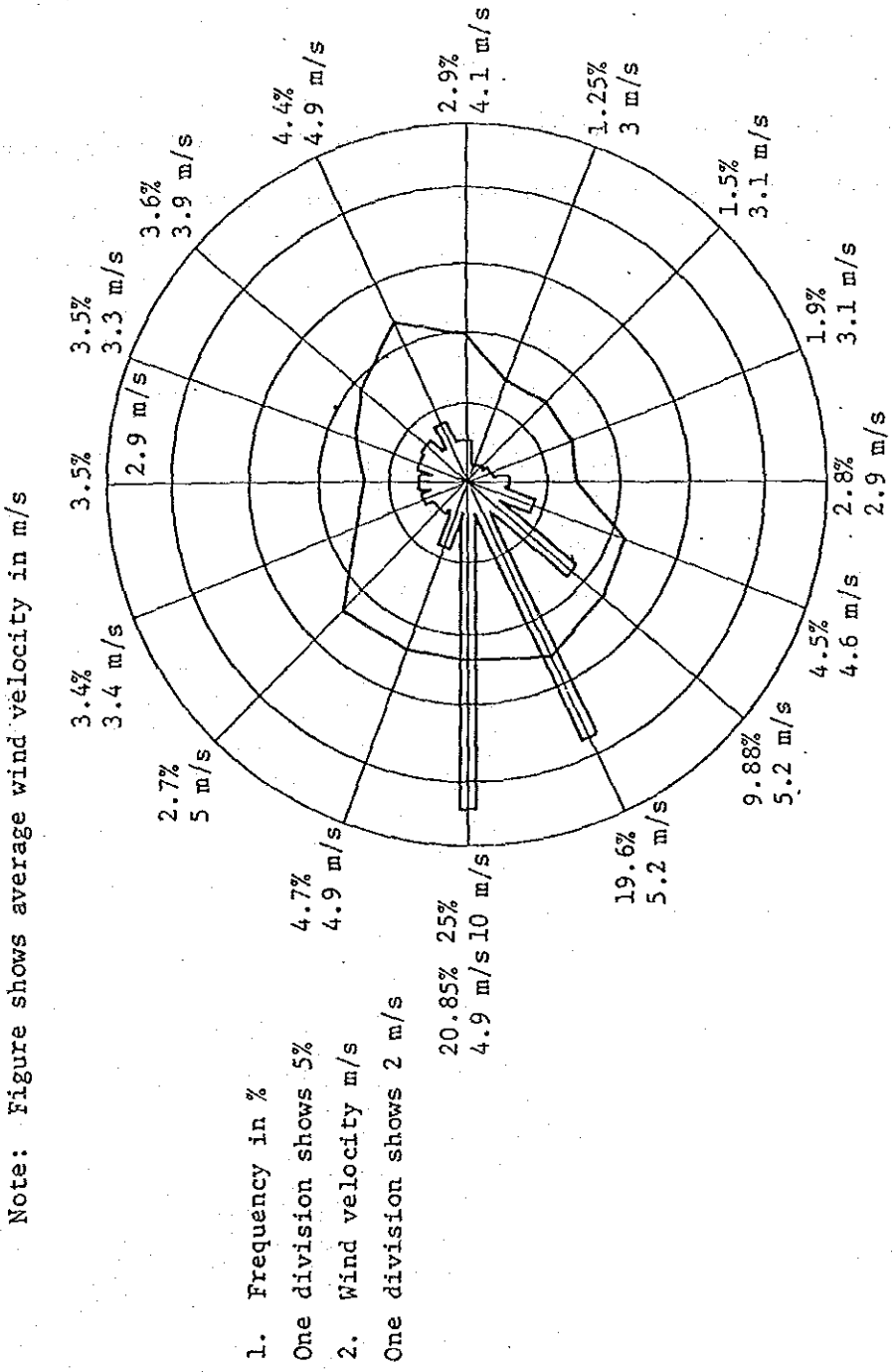
(Average figures for 1975 - 1984)

Month	Average precipitation (in mm)	Average relative humidity
Jan.	12.1	62 %
Feb.	20.6	69 %
Mar.	13.1	72 %
Apr.	1.1	75 %
May	-	75 %
June	9.8	76 %
July	74.6	80 %
Aug.	100.1	85 %
Sept.	20.0	80 %
Oct.	3.1	75 %
Nov.	2.0	62 %
Dec.	8.7	65 %

Table 5-3 Atmospheric Pressures for Karachi

	Mean pressure mb.		
	G.M.T.		Mean
	0.30	12.00	
January	1017.0	1015.0	1016.0
February	1014.9	1012.9	1013.9
March	1011.9	1010.0	1010.9
April	1008.4	1006.4	1007.4
May	1004.8	1002.9	1003.9
June	999.6	997.6	998.6
July	998.4	996.7	997.5
August	1000.8	999.3	1000.0
September	1005.6	1003.8	1004.7
October	1011.0	1008.8	1009.9
November	1014.9	1012.6	1013.8
December	1017.2	1015.0	1016.1
Year	1008.7	1006.7	1007.7
No. of Years	50	50	50

Fig. 5-4 Wind Rose of Karachi-Airport



Note: Figure shows average wind velocity in m/s

1. Frequency in %
One division shows 5%
2. Wind velocity m/s
One division shows 2 m/s

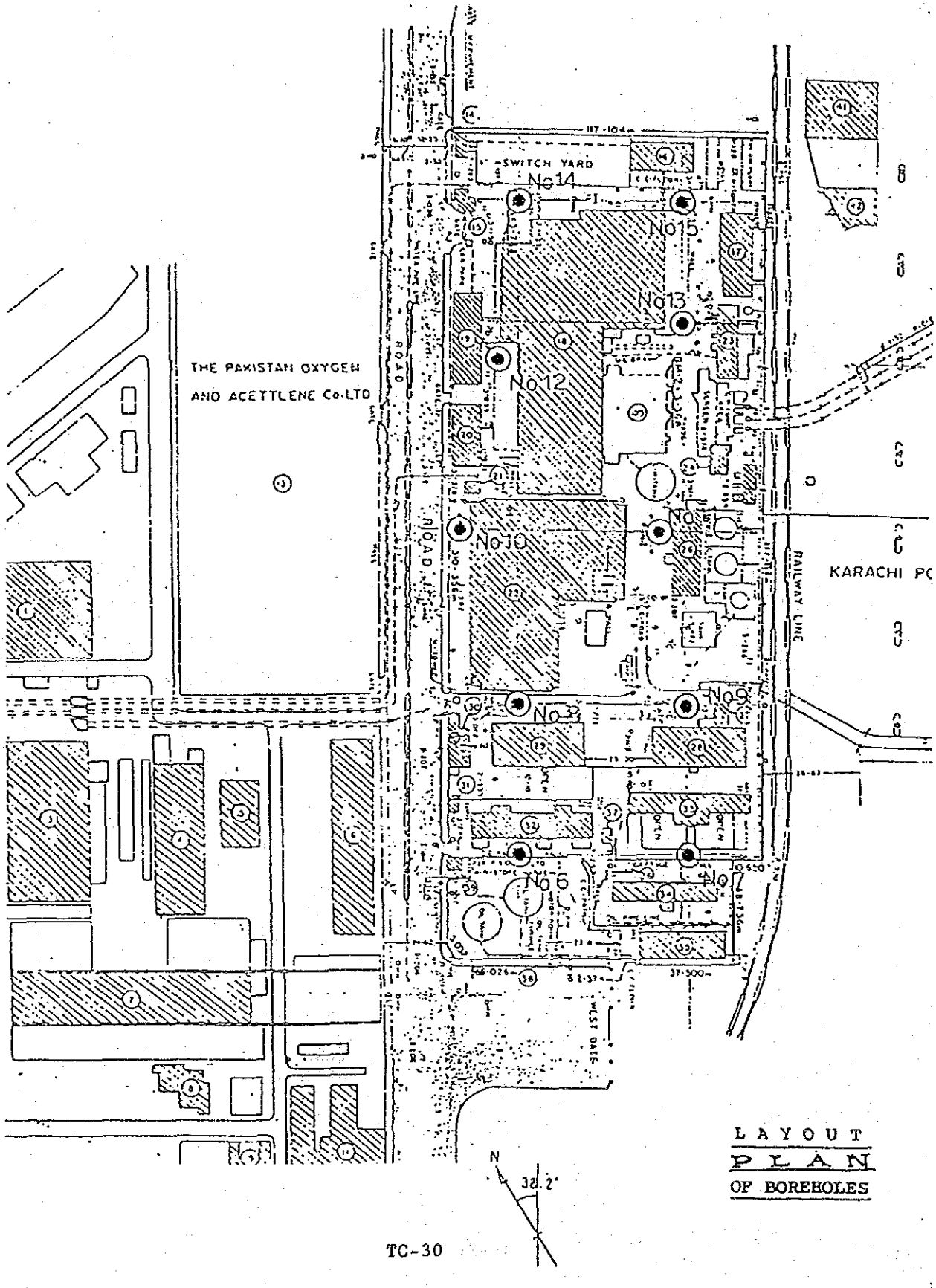
6. SOIL CONDITIONS

The boring and soil tests have been executed by the Owner, and the boring logs and N-values are as summarized in the following tables and drawings.

Note that the soil conditions, etc., information given hereunder is intended only as design reference for the Contractor.

BOREHOLES LOCATION PLAN

WEST WHARF STEAM POWER PLANT PROJECT



LAYOUT
PLAN
OF BOREHOLES

TC-30

BORE LOGS

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 6

BORE LOG

Date: 15.5.89 to 16.5.1989 Ground Elev: 4.633m Ground Water Table: 4.16m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION	LOG	SAMPLE SPT/UDS.	STANDARD PENETRATION TEST Blows/foot (N-Value) 20 40 60 80 100
1–2	2.00	2.00	Brownish medium dense fine to med. SAND with gravel.			16, 10
2–3	2.50	0.50	Brownish medium dense fine SAND with shell fragments.			12, 7
3–4	3:50	1.00				
4–6			Brownish medium dense medium to coarse SAND with shells.			10, 16, 16
7–9	9.50	6.00	Greyish medium dense fine SAND with mica and shell fragments.			29, 15, 13
10–11	11.00	1.50	Brownish grey stiff Silty CLAY.			30
12–18	18.50	7.50	Greyish dense fine SAND with mica.			34, 46, 46
19–26	26.50	8.00	Greyish very stiff to hard Silty CLAY.			72, 23, 68, 105
27–30	30.50	4.00	Brownish grey hard Silty CLAY with traces of sand and gravel.			17, 15
31			Borehole completed.			

SPT Sample: ☐

PGEL
PENCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 7

BORE LOG

Date: 14.05.1989

Ground Elev: 4.603m

Ground Water Table: 4.11m

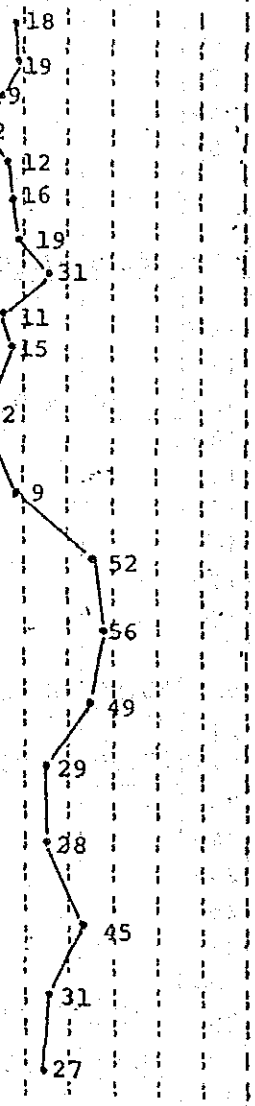
SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION
1–2	2.50	2.50	Brownish grey medium dense fine SAND with mica & shell fragments.
3–8	8.50	6.00	Grey to brownish grey very loose to dense micaceous SAND with shell fragments.
9–10	10.50	2.00	Dark grey med. dense med. to coarse SAND with shell fragments.
11–20	20.5	10.50	Grey very loose to very dense fine SAND with traces of mica and shell fragments.
21–30	30.50	10.00	Greyish very stiff to hard Silty CLAY.
31–			

LOG

SAMPLE SPT/UDS.

STANDARD PENETRATION TEST Blows/foot (N-Value)

20 40 60 80 100



SPT Sample: ☐

PGEL

PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 8

BORE LOG

Date: 28.4.89 to 29.4.89. Ground Elev: 4.615m Ground Water Table: 4.11m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION
1	1.50	1.50	Brownish grey medium dense fine to medium SAND.
8	8.50	7.00	Grey loose to medium dense fine SAND with shell fragments and mica.
12	12.50	4.00	Grey loose to medium dense fine to medium SAND with some gravel.
20	20.50	8.00	Brownish grey medium dense to dense fine micaceous SAND.
22	22.50	2.00	Brownish very dense medium SAND.
29	29.00	6.50	Brownish grey hard Silty CLAY.
30	30.50	1.50	Brownish grey hard Silty CLAY with gravel.
31			Borehole completed.

LOG

SAMPLE SPT/UDS.

STANDARD PENETRATION TEST Blows/foot (N-Value)

20 40 60 80 100

13, 5, 14, 8, 17, 14, 19, 19, 9, 15, 5, 30, 37, 21, 16, 83, 38, 34, 39, 87

SPT Sample: ☐

PGEL

PENCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 9

BORE LOG

Date: 26.4.89 to 27.4.89 Ground Elev: 4.697m Ground Water Table: 4.38m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION
1–3	3.50	3.50	Brownish medium dense fine to med. SAND with traces of gravel.
4–5	5.50	2.00	Dark grey very loose to loose fine to medium micaceous SAND.
6–9	9.00	4.50	Greyish medium dense medium to fine SAND with traces of mica.
10–11	10.50	1.50	Greyish medium dense fine to medium SAND with traces of mica, gravel and shell fragments.
12–20	20.50	10.50	Grey medium dense to dense fine to medium micaceous SAND.
21–27	28.00	7.50	Brownish grey hard Silty CLAY.
28–30	30.50	2.50	Light brownish very dense silty fine SAND with traces of gravel and clay.
31			Borehole completed.

LOG

SAMPLE SPT/UDS.

STANDARD PENETRATION TEST Blows/foot (N-Value)

20 40 60 80 100

19, 29, 17, 3, 6, 19, 25, 30, 12, 22, 25, 36, 39, 17, 12, 37, 47, 84, 75, 56

SPT Sample: ☐

PGEL

PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 10

BORE LOG

Date: 30.4.89 to 01.5.89 | Ground Elev: 4.789m | Ground Water Table: 4.13m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION
1–3	3.60	3.60	Brownish grey loose to medium dense fine SAND with shell fragments.
4–5	5.00	1.40	Dark grey loose fine SAND with traces of shell fragments.
6–8	9.00	4.00	Dark grey medium dense fine SAND with mica.
9–10	10.00	1.00	Brown medium dense fine SAND with some mica.
11–12	12.50	2.50	Greyish dense fine to medium micaceous SAND.
13–16	17.00	4.50	Grey medium dense to dense fine to medium micaceous SAND with shell fragments.
17–18	19.00	2.00	Brown dense fine to medium SAND.
19–20	20.00	1.00	Brownish dense fine SAND with traces of clay.
21–30	30.50	10.50	Brownish grey to grey hard silty CLAY.
31			Borehole completed.

LOG | SAMPLE SPT/UDS.

STANDARD PENETRATION TEST Blows/foot (N-Value)

20 40 60 80 100

17, 4, 7, 6, 16, 27, 23, 10, 24, 32, 30, 26, 49, 56, 43, 32, 35, 40, 40, 36

SPT Sample: □

PGEL

PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 11

BORE LOG

Date: 23.4.89 to 24.4.89 | Ground Elev: 4.810m | Ground Water Table: 3.88m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION
1–8	8.00	8.00	Brownish grey to grey, loose to dense, Silty fine to medium SAND, occasional traces of coarse sand and shell fragments.
8–18	18.45	10.45	Grey to brownish grey, medium dense to dense, Silty fine to medium SAND, with mica and occasional shell fragments.
18–30	30.50	12.05	Brownish, hard Silty CLAY with coarse sand and traces of fine gravel.
31			Borehole completed.

LOG | SAMPLE SPT/UDS. | STANDARD PENETRATION TEST Blows/foot (N-Value)

20 40 60 80 100

8 9 12 11 14 32 37 32 20 39 28 49 37 74 85 10[illegible] 100 10[illegible] 100 79

SPT Sample: ☐

PGEL

PENCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 12

BORE LOG

Date: 11.5.89 to 12.5.89 | Ground Elev: 4.667m | Ground Water Table: 4.08m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION	LOG	SAMPLE SPT/UDS.	STANDARD PENETRATION TEST Blows/foot (N-Value) 20 40 60 80 100
1–3	3.45	3.45	Grey to brownish grey, loose to medium dense, Silty fine SAND.			9, 17, 15
4–5	5.50	2.05	Greyish, very stiff, Silty CLAY.			23, 28, 28
6–10	10.5	5.00	Grey to brownish grey, fine to medium micaceous SAND, with traces of silt, coarse sand and fine gravel.			10, 8, 12, 15
11–19	19.00	8.50	Brownish grey to grey, medium dense to dense, fine to medium micaceous SAND, with traces of silt, coarse sand and fine gravel.			38, 48, 38, 17
20–30	30.50	11.50	Grey, very stiff to hard, Silty CLAY.			112, 20, 35, 23, 12, 13
31			Borehole completed.			

SPT Sample:

PGEL
PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

246

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 13

BORE LOG

Date: 2.5.89 to 3.5.89 | Ground Elev: 4.707m | Ground Water Table: 4.08m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION	LOG	SAMPLE SPT/UDS.	STANDARD PENETRATION TEST Blows/foot (N-Value) 20 40 60 80 100
1–12	12.50	12.50	Brownish grey to grey, loose to medium dense, silty fine to medium SAND with shell fragments and mica.			7, 14, 15, 11, 5, 4, 21, 19, 9, 15
13–14	14.50	2.00	Brown, very dense, medium to coarse SAND with gravel.			30, 96
15–20	20.00	5.50	Grey, medium dense to dense, silty, fine micaceous SAND.			28, 40, 40
21–30	30.50	10.50	Greyish brown, very stiff to hard, Silty CLAY with occasional traces of coarse sand and gravel.			24, 38, 26, 34, 42
31			Borehole completed.			

SPT Sample: □

PGEL
PAKCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 14

BORE LOG

Date: 4.5.89 to 10.5.89 | Ground Elev.: 4.722m | Ground Water Table: 4.16m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION	LOG	SAMPLE SPT/UDS.	STANDARD PENETRATION TEST Blows/foot (N-Value) 20 40 60 80 100
1–8	8.50	8.50	Grey, loose to medium dense, fine to medium, micaceous SAND with silt and shell fragments.			4, 4, 5, 4, 8, 5, 15, 11, 4
9–10	10.50	2.00	Grey, very stiff Silty CLAY.			22
11–16	17.00	6.50	Grey and brownish, medium dense to dense, fine micaceous SAND with traces of silt.			25, 30, 35
17–19	19.00	2.00	Brownish, very dense, fine to medium SAND, with occasional gravel.			97, 110
20–24	25.00	6.00	Grey, very stiff to hard, Silty CLAY.			22, 42
25–30	30.50	4.50	Brownish, very dense, silty fine SAND.			106, 51, 53
31–			Borehole completed.			

SPT Sample: □

PGEL
PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

KESC WEST WHARF POWER PLANT

BORE HOLE NO: 15

BORE LOG

Date: 18.4.89 to 22.4.89 Ground Elev: 4.707m Ground Water Table: 4.38m

SCALE (m)	DEPTH (m)	THICKNESS (m)	SOIL NAME/DESCRIPTION	LOG	SAMPLE SPT/UDS.	STANDARD PENETRATION TEST Blows/foot (N-Value) 20 40 60 80 100
1–10	10.00	10.00	Grey to dark grey, loose to medium dense, silty fine micaceous SAND with occasional shell fragments.			12, 15, 15, 4, 4, 20, 16, 8, 10, 16, 20, 55, 69, 52, 50, 33, 90
11–20	20.50	10.50	Brownish grey, medium dense to very dense, fine to medium SAND with traces of silt and gravel.			
21–30	30.50	10.00	Brownish grey, hard Silty CLAY with occasional gravel.			14, 16, 14
31			Borehole completed.			

SPT Sample: □

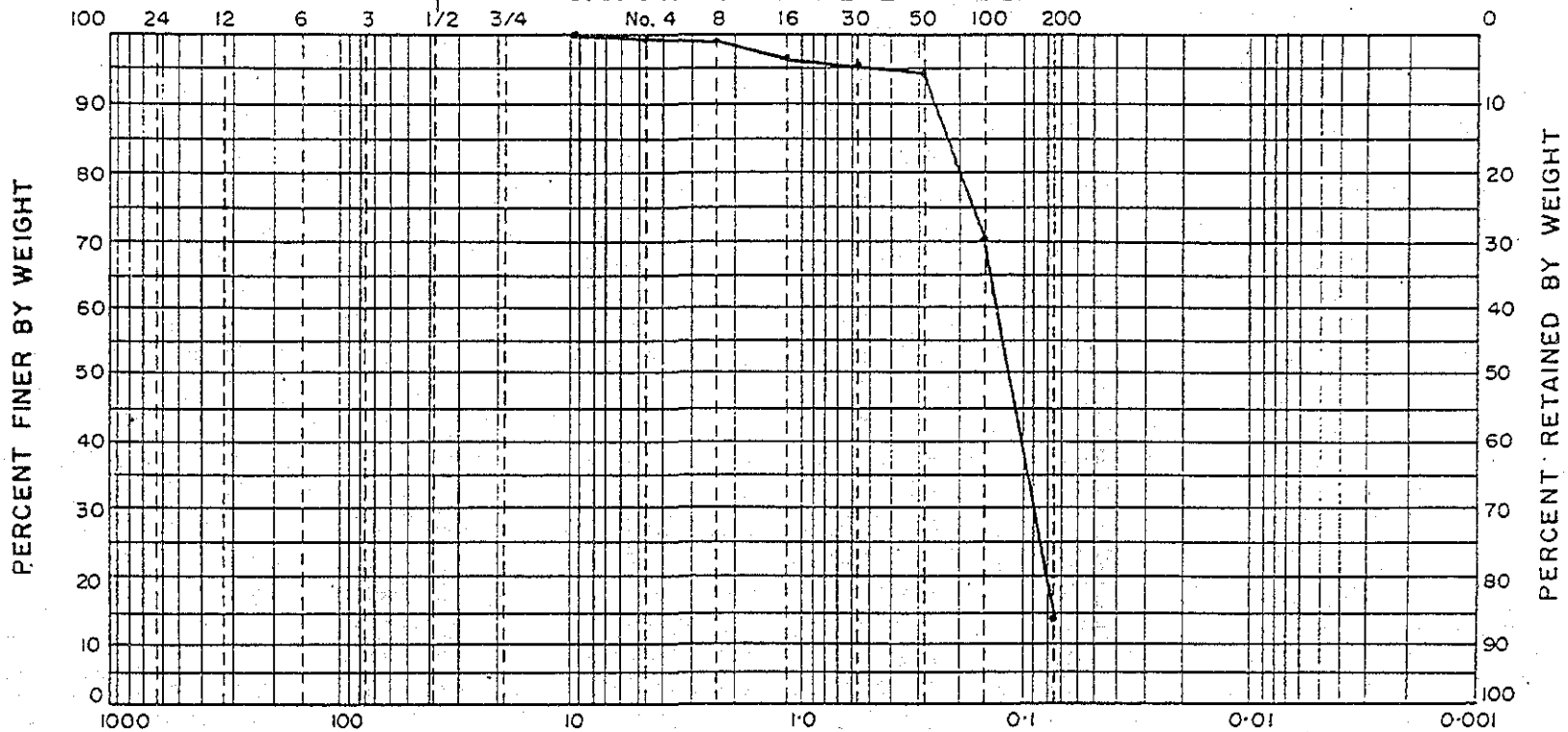
PGEL
PEMCON GEO-ENGINEERING (PVT.) LTD.
9 Sunny Side Road, Civil Lines,
P.O. Box No: 3969, KARACHI-4

LABORATORY RESULTS

GES

SIZE - INCHES

U.S. STANDARD SIEVE NUMBER



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-1	SPT-4	4.00m				

PROJECT COOLING WATER WAY
THERMAL POWER PLANT

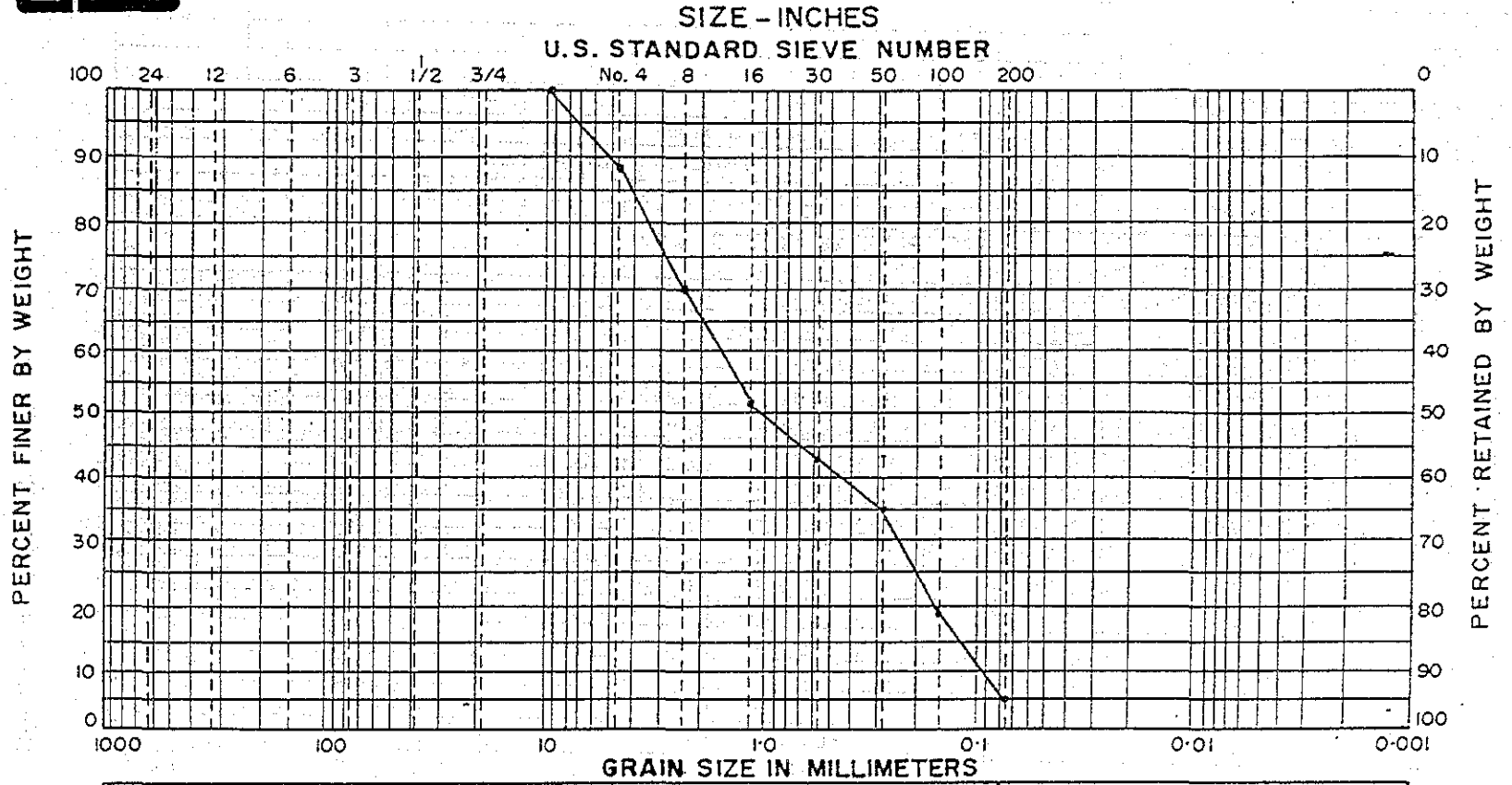
LOCATION WEST WHARF

TC-43

251

TC-44

GES



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-1	SPT-11	12.00m				

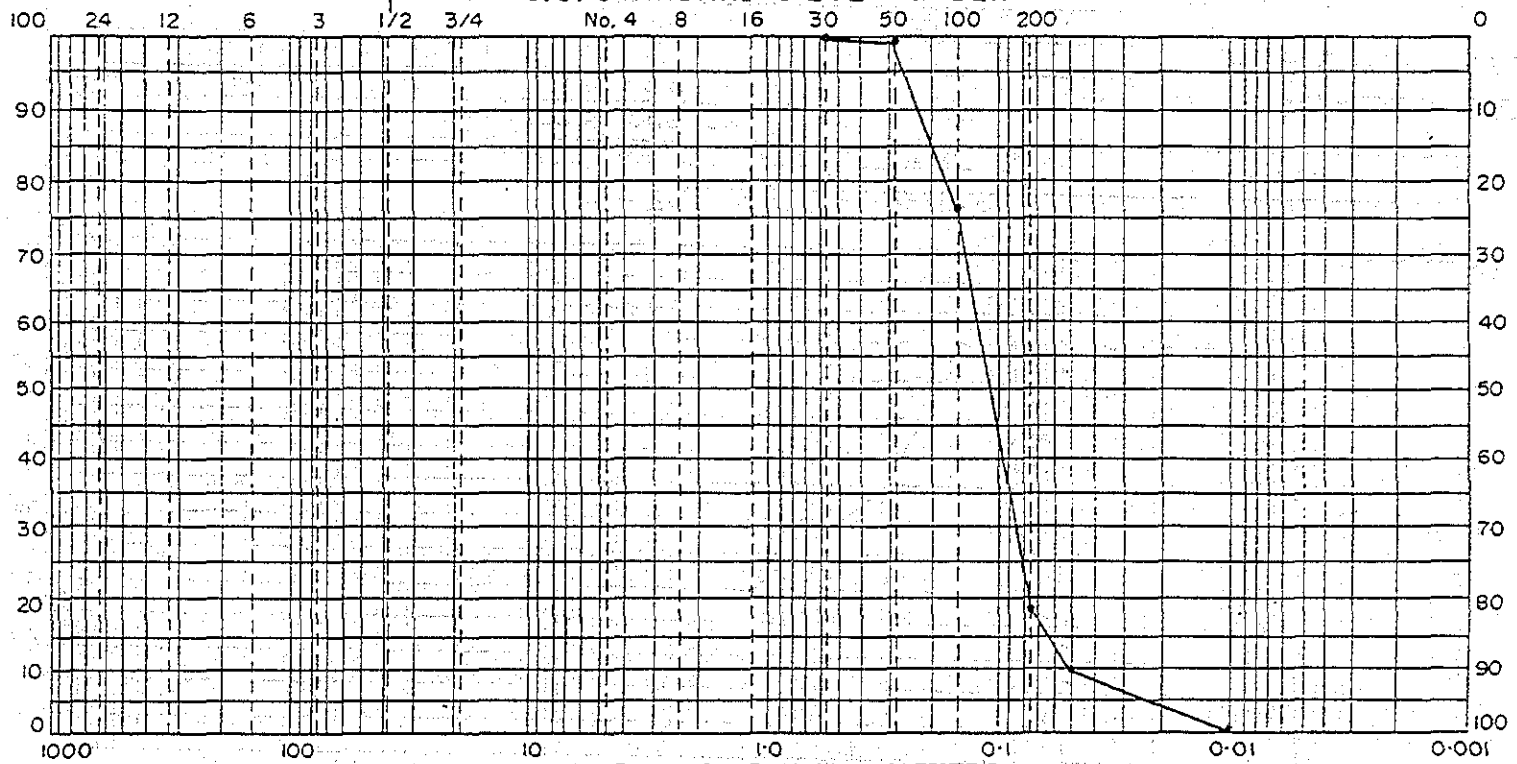
PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

GES

SIZE - INCHES

U.S. STANDARD SIEVE NUMBER



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-1	SPT-15	20.00m				

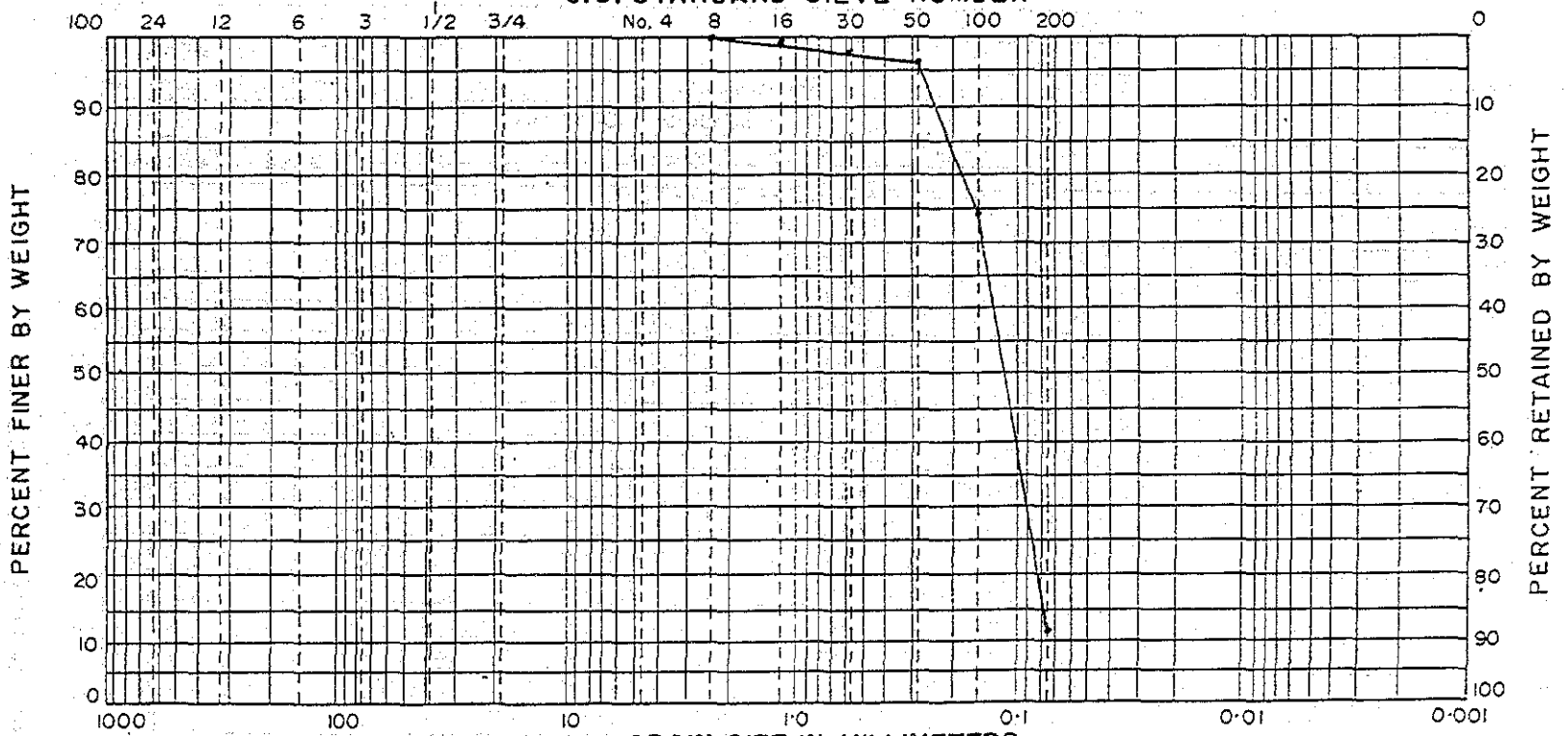
PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

TC-45

253

GES



GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-4	SPT-4	2.00m				

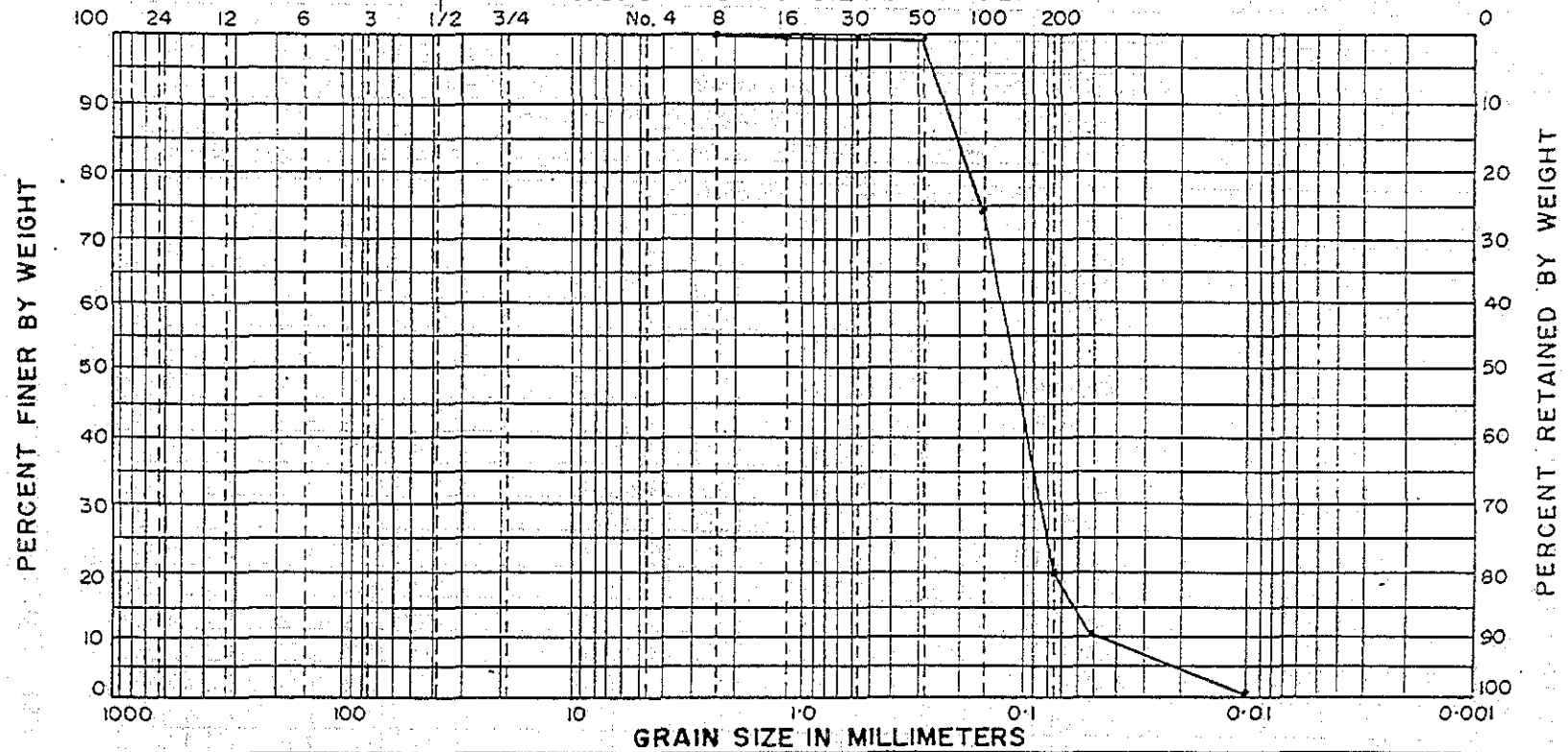
PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

GS

SIZE - INCHES

U.S. STANDARD SIEVE NUMBER



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-4	SPT-11	12.00m				

PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

TC-47

255

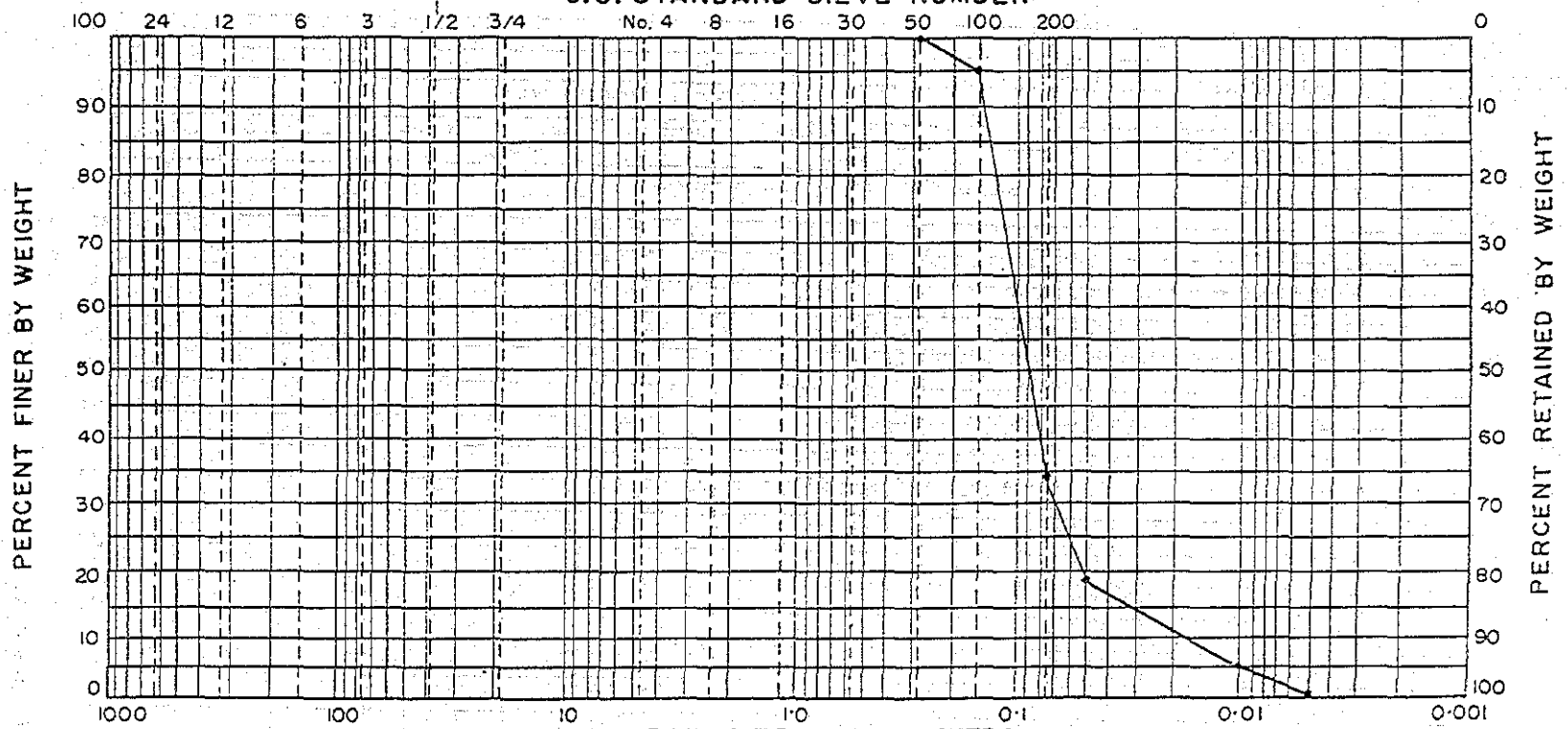
95

TC-48

GS

SIZE - INCHES

U.S. STANDARD SIEVE NUMBER



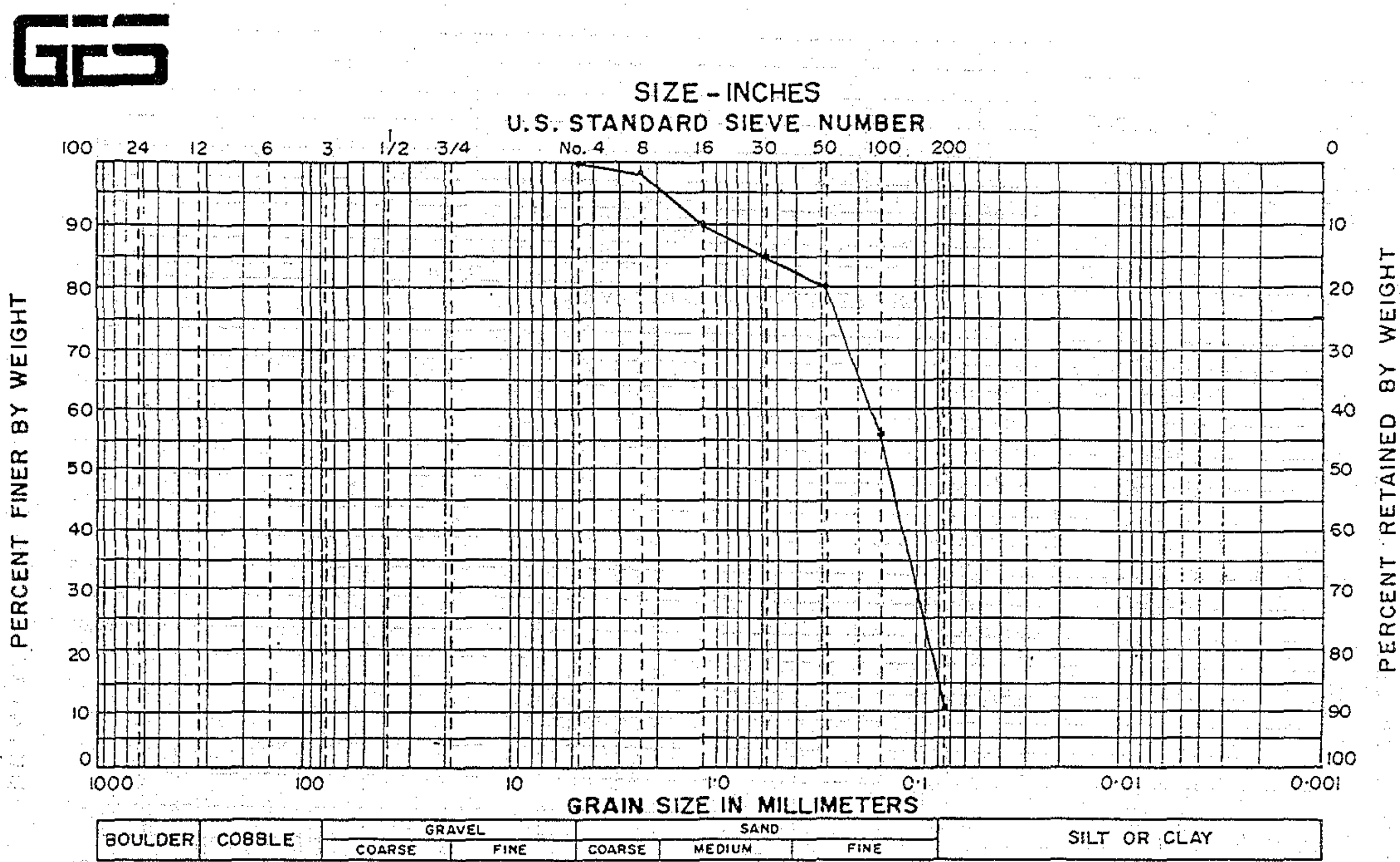
BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-4	SPT-15	20.00m				

PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF



GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-5	SPT-4	4.00m				

PROJECT COOLING WATER WAY THERMAL POWER PLANT

LOCATION WEST WHARF

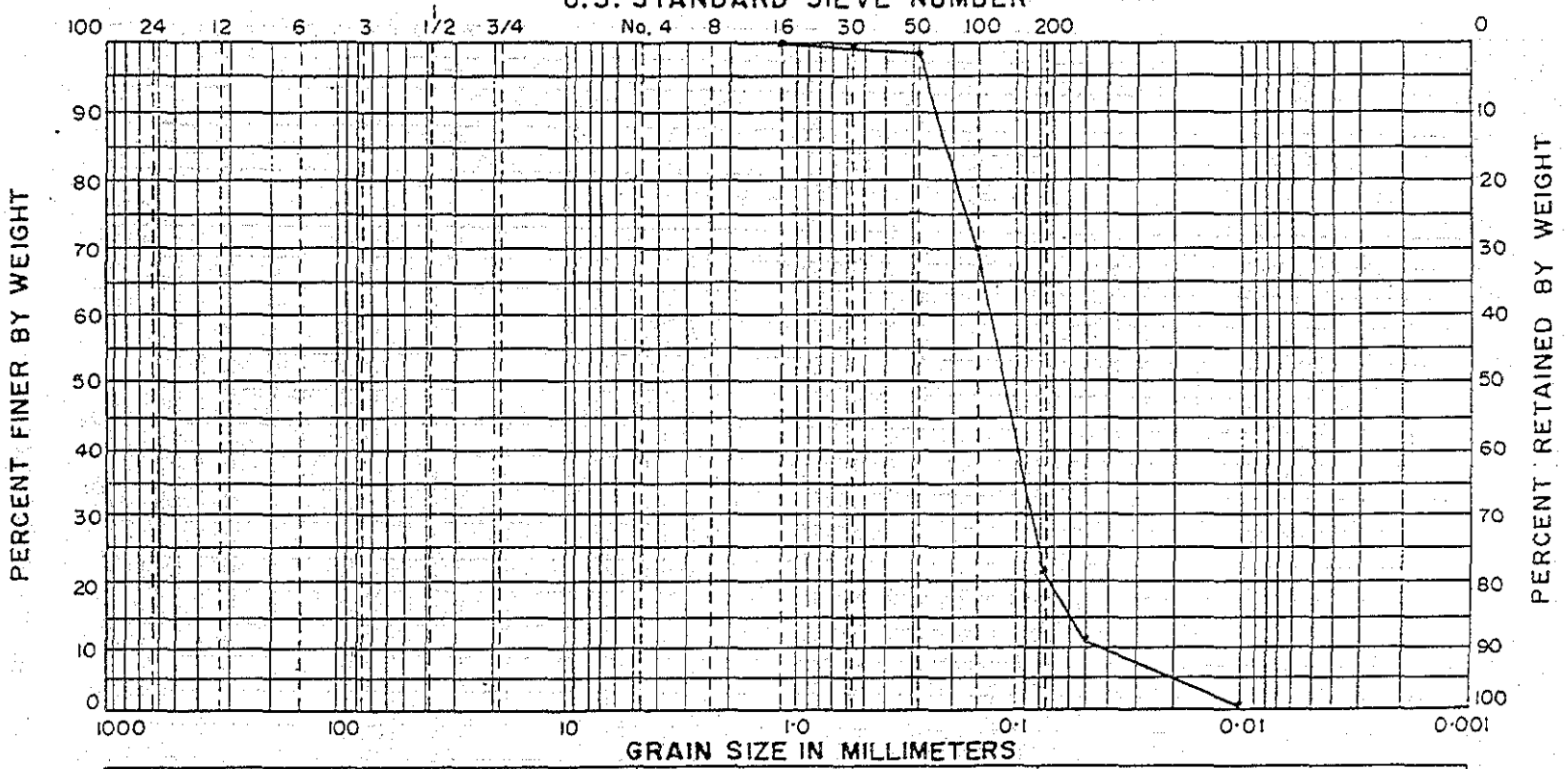
257

TC-50

GES

SIZE - INCHES

U.S. STANDARD SIEVE NUMBER



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

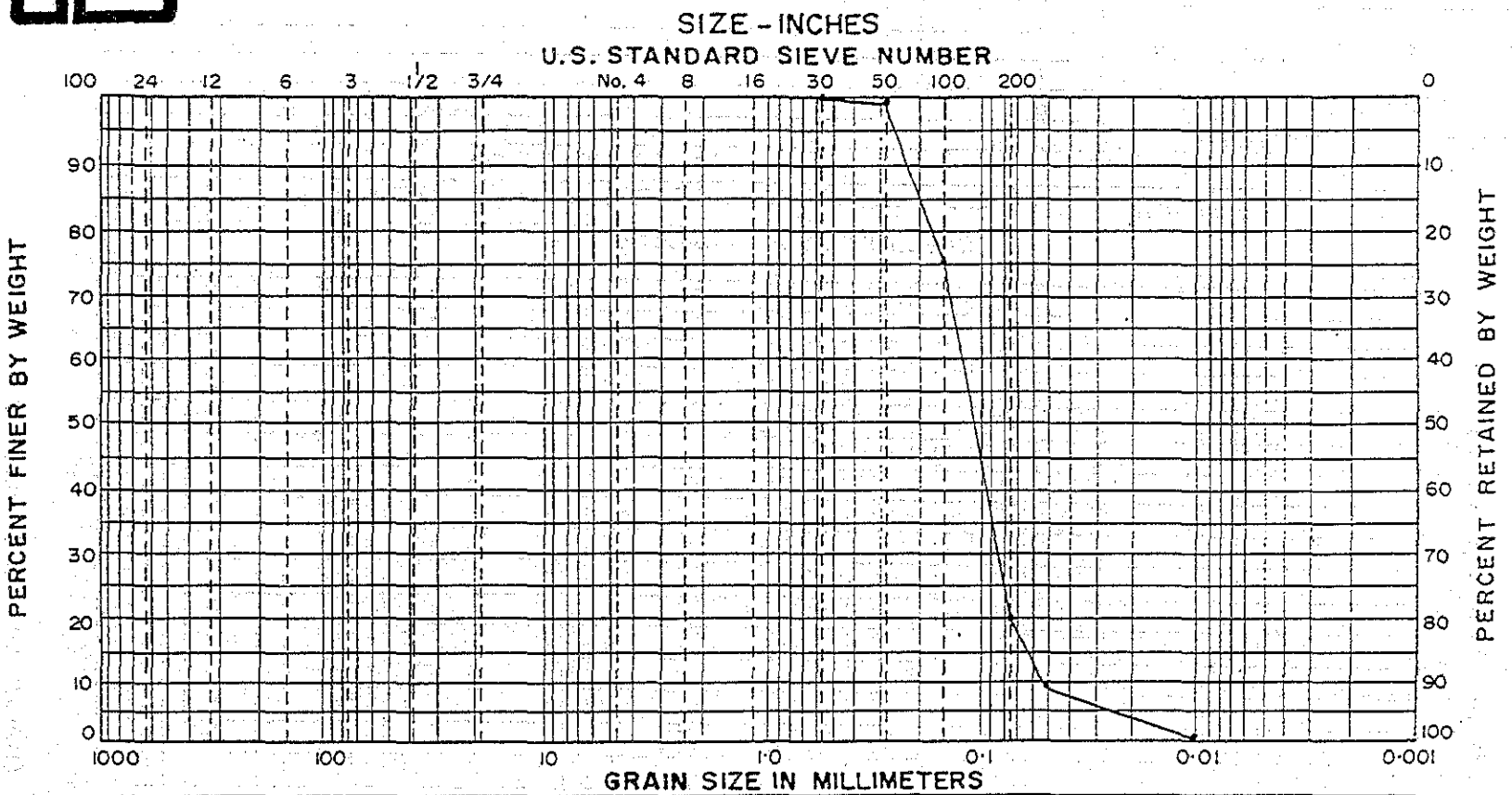
GRADATION CURVES

BORING/PIT NO.	SAMPLE NO	DEPTH	CLASSIFICATION	LL	PL	PI
BH-5	SPT-11	12.00m				

PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

GS



BOULDER	COBBLE	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION CURVES

BORING/PIT NO.	SAMPLE NO.	DEPTH	CLASSIFICATION	LL	PL	PI
BH-5	SPT-15	20.00m				

PROJECT COOLING WATER WAY
THERMAL POWER PLANT

LOCATION WEST WHARF

TC-51

259