



Date: 28.12.2023

Corrigendum No.1

Tender Reference No.: NHPC_SR-01/2023, date: 19.12.2023

Tender ID No.: 2023_NHPC_738252_1, date: 19.12.2023

Name of Work: Exploratory drilling, driving & reaming of Nx size drill holes with Diamond core drilling machine using Double Tube/ Triple Tube core barrel at Dam, Coffor Dam, Diversion Tunnel, Intake, Pressure Shaft, Power House and TRT area of Seti River-6 H. E. Project, District-Doti/ Achham, Sudur Paschim Province, Nepal (Package SR-01).

Following Corrigendum/ Addenda is hereby authorized as per Clause 8.0 of Section-II "Instruction to Bidders" of Tender Document in the above mentioned work vide Tender Reference No. referred above:

*In Section-VI "**Special Conditions of Contract& Technical Specifications**" following is added at the end in "Scope of Work & Technical Specifications":*

48 WORK PROCEDURE FOR PRESSURE GROUTING FOR GROUTABILITY TEST AT DAM SITE (Refer BoQ Item 8)

The proposed Groutability Test is to be carried out at Dam Site, Left Abutment of Seti River-6 HE Project as per the following detailed procedure:

- i) The proposed Drilling & Grouting is to be carried out at dam foundation area (3 drill holes) with low initial pressure and appropriate cement water ratio at three (3) vertices of an equilateral triangle of 6m side up to a depth of 100m in each hole. The length of each stage of grouting using single packer shall be restricted to 3.0m.
 - ii) Conducting In-situ permeability test in bed rock (Packer Test) in a stage of 3m as per BIS 5529 (Part II) to obtain pre- grouting permeability values in 3 test holes and post grouting permeability values in the check hole.
 - iii) Preparation and submission of grout efficacy report along with geological logging of all the four drill holes, water permeability tests and grouting data.
- a) Methodology:** In order to assess the acceptability of the rock mass for grout, groutability tests are carried out at dam site. Three 100m deep drill holes are to be drilled at three vertices of an equilateral triangle of side 6m (Fig.1) to assess the permeability of the bedrock. Permeability tests are performed by single packer method in bedrock progressively with drilling in accordance with BIS Code 5529 (Part-II, 1985). After completion of drilling, grouting with cement is carried out generally in ascending order, i.e., from bottom to top, in the bedrock only in accordance with BIS code 6066. However, if bedrock is poor with pockets of sheared and fractures rock mass, grouting with cement may be required in descending order or by using double packer. Installation of PVC casing/pipe shall not be required for the 03 grout holes. After completion of grouting a test hole shall be drilled at the centre of the triangle to test the efficacy of the grouting process.

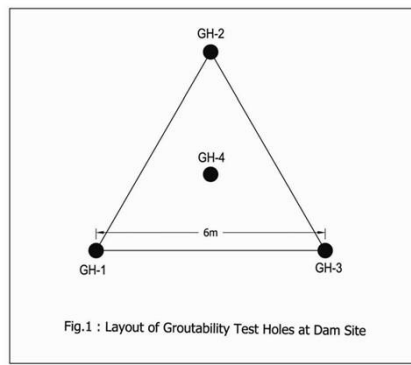


Fig.1 : Layout of Groutability Test Holes at Dam Site

Drilling & Grouting Sequence:

- i) Three numbers of holes shall be drilled in an equilateral triangular pattern having a distance of 6m from one another.
 - ii) Water pressure tests shall be carried out in each test section from top to bottom (descending order) with a single packer. The length of each test section shall be maximum of 3m. For example, if bedrock is encountered after drilling down to a depth of 5m, then the first test section shall be from depth 5m to 8m.
 - iii) Cyclic water tests shall be followed for determination of bedrock permeability in pre-grouting conditions.
 - iv) After completion of drilling of these test holes along with water pressure tests, grouting in these test holes shall be carried out in ascending order i.e from bottom to top. The length of each stage of grouting shall be maximum of 3m with a mixture of cement and water till refusal.
 - v) In general, the grouting procedure shall be started initially with low pressure and should not exceed the limiting pressure to avoid hydrofracturing of rock mass.
 - vi) After completion of the grouting in these three test holes, drilling of 4th hole shall be carried out at the centre of the equilateral triangle.
 - vii) The water pressure tests in the same procedure as done in the three test holes shall be carried out in this check hole to ascertain the bedrock permeability of the rock mass in post grouting conditions.
 - viii) The water pressure tests in this check hole (4th hole) indicates the efficacy of grout with an appreciable reduction in permeability values at each test section for the entire depth of drill hole with respect to corresponding test sections of pre-grouting permeability values recorded in the three test holes.
- b) Grout Mix:** Grouting in these test holes shall be carried out with a mixture of water and cement (PPC/OPC). While grouting, the test grouting shall begin with relatively more fluid grout with higher water cement ratio (ratios by weight of water and cement) of 5:1. If the grout intake is abnormally high at initial low pressure, the grout may be thickened with reducing the water cement ratio progressively during the same stage from 5:1 to 0.8:1. Depending up on the consumption of grout, water cement ratio may vary from 5:1 to 0.8:1.
- c) Measurement & payment:** Measurement for Pressure Grouting for groutability test shall be in terms of quantity of cement used in the Grouting operations in all the 3 grout holes. The Unit for measurement shall be Metric Tonne (MT) and payment for grouting shall be released after completion of Groutability test. However, the payment for drilling, water permeability tests etc. for the four holes under groutability test shall be paid under respective BoQ Items.

For & on behalf of NHPC LIMITED

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