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|  | SPECIFICATION FOR DESIGN OF TRANSMISSION LINE TOWER | PROJECT: 4x100 MW KOTESHWAR HEP - 400KV SWITCHYARD |
| | DOC. No. : TB-224-316-051 REV No. 00 | |

SECTION 3

PROJECT DETAILS AND GENERAL SPECIFICATIONS

3.0 PROJECT DETAILS

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| Customer | HYDRO DEVELOPMENT CORPORATION LTD., TEHRI |
| Project Title | HYDRO ELECTRIC PROJECT (4 × 100 MW), KOTESHWAR |
| Project Location | Koteshwar Dam Hydel Scheme located about 22Km d/s of Tehri, Uttranchal on the Bhagirathi river is an integral part of a balancing reservoir to impound the releases from Tehri dam during peak demand periods and as a d/s balancing reservoir for the pumped storage plant |
| Transport facilities | KOTESHWAR Metalled double lane road exists from Rishikesh to Tehri Town via Narendra Nagar and Chamba and being improved & upgraded to allow the transportation of packages upto 200MT of 10M x 4M x 4.3M (LxBxH). Though the road is an all weather road, its temporary blockade, due to hill slides during rains or and due to widening of road being in progress can not be ruled out and all weather road exists from Tehri to Koteshwar Project site which is about 22 Km long. |


3.1 SITE CONDITIONS (FOR design PURPOSES)

AMBIENT TEMPERATURE

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| i. Maximum Air Temperature (June) | 45°C |
| ii. Minimum Air Temperature (Jan.) | 2°C |
| iii. Maximum river water temperature (during June-July) | 25°C |
| iv. Cooling Water Temperature | 25°C |

RAINFALL DATA

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|---|--------|
| i. No. of months of tropical monsoon conditions | 4 |
| ii. Average annual rainfall | 774 mm |
| iii. Average no. of rainy days in a year | 120 |
| iv. Occurrence of fog conditions | Yes |
| v. Humidity | 98% |

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3.2 ALTITUDE

Less than 1000 m

3.3 SEISMIC CONDITIONS

All equipments shall be designed for operation in seismic zone IV (as defined in latest edition of IS: 1893 — Criteria of Earthquake Resistance Design of Structure) of India which is prone to severe earthquake. The equipment and part of it shall strong enough and sufficiently well-connected to resist total operating stresses to resulting from the forces in normal operation and in abnormal condition with forces superimposed due to occurrence of earthquake. Necessary provisions shall be provided looking into the seismic requirements for fixing all equipments to improve their seismic resistance. A horizontal seismic coefficient $a_h = 0.15$, a vertical seismic coefficient $a_v = 0.075$ shall be considered for calculations of seismic forces acting on the equipment during earthquakes. All equipments shall withstand the maximum design earthquakes with peak ground acceleration of 1.0 g. The reports of type tests conducted in support of the capability of the equipment to withstand earthquake forces shall be submitted before the supply of equipment.

Necessary dampers and/or supporting structures, whenever necessary will be provided with the equipment by the tenderer to cater for their operation in seismic zone.

To prevent movement of all panels and other assemblies during earthquake, suitable devices shall be provided for fixing the panels and other assemblies to the foundation. The contractor shall supply the necessary bolts for embedding in the concrete foundation. The fixing of panels and all assemblies to the foundation shall be designed to withstand the seismic events. It will also be ensured that special device as well as bolts shall not be over-stressed. The details of the device used and its adequacy shall be furnished by the supplier and shall be subject to the owner's approval.

The reports of type tests conducted in this regard would be required to be furnished by the firm before supply of equipment.

3.4 CRITERIA FOR WIND RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT

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|-----|------------------------------------|-----------------------------------|
| i. | Standard Applicable | IS 875 (Part 3) 1987 & IS 802 |
| ii. | Basic Wind speed " V_b " at 10 m | 160 KMPH above mean ground level. |


3.5 DRAWINGS / DOCUMENTS

The drawings / documents submitted shall be project and product specific and shall incorporate following details.

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| a) | Project name | : 400 kV Koteswar Substation |
| b) | Customer name | : THDC |
| c) | Contractor | : BHEL |
| d) | Customer LOA no. | : THDC/RKSH/CD-196/SUPPLY/4127 Dated: 28/02/2003 |

Six sets of drawings/documents shall be submitted for customer approval and 12 sets of all approved drawings / documents shall be provided for THDC/BHEL use.

Soft copies in CD-R of documents shall comprise

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- i) Scanned images of all approved documents, including drawings.
- ii) Editable versions (AUTO CAD 2000 or High) of all drawings viz. drawings, GTP, Manufacturing and field quality plan, type test reports, O & M instructions / manuals.