	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : FIXED TYPE ONLINE & PORTABLE TYPE SILT MEASURING EQUIPMENTS	241595077	Page 1 of 3

PROJECT: MANGDECHHU HEP BHUTAN

1. SCOPE:

Sl. No.	ITEM DESCRIPTION	QTY
1	Supply of Fixed Type Online Optical Silt Measuring equipment to Indicate & Record the Silt Content of the Water Passing Through Turbine	4 Sets
2	Supply of Portable Type Online Optical Silt Measuring equipment to Indicate & Record the Silt Content of the Water Passing Through Turbine	1 Set
3	Installation & Commissioning of 4 Sets of Fixed Type Online Optical Silt Measuring Equipment and Training & Demonstration of 1 Set of Portable Type Optical Silt Measuring Equipment at Mangdechu HEP Bhutan	1 Lot

2. DESCRIPTION:

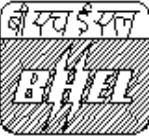
Four (4) sets of Fixed Type Online Optical Silt Measuring Equipment and One (1) set of Portable Optical Silt Measurement Instrument shall be supplied to indicate and record the Silt content of the Water passing through Tail Race. The Silt Measuring Instruments shall be capable of measuring instantaneous silt content in parts per million (ppm) by volume with error not to exceed +/- 2%. The output shall be indicated on Digital Indicator with serial output for SCADA System.

3 FEATURES:

3.1 FEATURES OF FIXED TYPE ONLINE OPTICAL SILT MEASURING EQUIPMENT:

1. The equipment shall be based on Optical Technology (Laser/Infrared).
2. The equipment shall have a measuring range of 10-8000 (ppm by Volume i.e. mg/l).
3. The equipment shall have an accuracy of +/- 2% of the reading or +/- 20 (ppm by Volume), whichever is greater.
4. The equipment should provide the output (4-20 mA) for silt measurement corresponding to measuring range.
5. The equipment shall have RS 232/RS485/Modbus/ Equivalent interface provision.
6. The equipment shall have backlit Graphical Display for indicating silt measurement.
7. The equipment shall have a working temperature range of 0 to 55 Degree Celsius.
8. The instrument shall have Automatic Self Diagnostic Facility.
9. The enclosure of the instrument should be NEMA 4X protected.

REV.NO.		DISTRIBUTION.	QTY.	APPROVED:			
PREPARED							
CHECKED		HPE	01	PREPARED	CHECKED	ISSUED	DATE
APPROVED		MM(H)	04				
DATE							

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10. As per the proposed scheme (Sketch No. HPE-GC-388), a tapping of 40 NB [EL 1002.0] on the suction header pipe of cooling water pump shall be provided for further connection with the silt measuring equipment.

The pressure range in the suction header of the cooling water shall be in the range of (-)1 kg/cm². The Pump [at EL 1002.0] accompanying the silt measuring system should have the sufficient suction head to pump the water against suction head of (-)1 kg/cm² and able to discharge water at least at 10 meters height to the installation location of silt measuring instrument.

The complete system of silt measuring equipment, pump, pipes (seamless SS) and fittings (SS) required for connecting the silt measuring equipment to the tapping of 40 NB and discharge arrangement of water after measurement shall be in vendor scope.

3.2 FEATURES OF PORTABLE TYPE ONLINE OPTICAL SILT MEASURING EQUIPMENT:

1. The equipment shall be based on Optical Technology (Laser/Infrared).
2. The equipment shall have a measuring range of 10-8000 (ppm by Volume i.e. mg/l).
3. The equipment shall have an accuracy of +/- 2% of the reading or +/- 20 (ppm by Volume), whichever is greater.
4. The equipment shall have RS 232/RS485/Modbus/ Equivalent interface with Memory Back up and data logging provision.
5. The equipment shall have backlit Graphical Display for indicating silt measurement.
6. The equipment shall have a working temperature range of 0 to 55 Degree Celsius.
7. The instrument shall have Automatic Self Diagnostic Facility.
8. The enclosure of the instrument should be NEMA 4X protected.

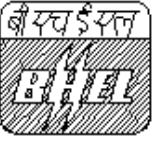
4. INSTALLATION & COMMISSIONING (OF FIXED TYPE INSTRUMENTS) AND TRAINING & DEMONSTRATION FOR PORTABLE TYPE INSTRUMENT

The Fixed Online Type Optical Silt Monitoring System is proposed to be installed at the suction Header of the Cooling Water System as per the scheme (Sketch No. HPE-GC-388) enclosed with the specification. All these conditioning devices including electrical / mechanical hardware items required for complete installation of 4 sets of Fixed Type Instruments at the designated location would be in vendor scope. The vendor would have to install and commission all 4 sets of fixed Type Silt Measuring Equipment for measuring the silt content at Mangdechu site Bhutan. Operational Training of the equipment shall be provided by the vendor to MHPA / BHEL / NHPC engineers at site.

The vendor would have to demonstrate the operation of the Portable Type Silt Monitoring instrument for measuring the silt content at Mangdechu site Bhutan. Commissioning, if any required, will have to be done by the vendor. Operational Training of the instrument shall be provided by the vendor to MHPA / BHEL / NHPC engineers at site.

The vendor shall offer Lump-sum installation, commissioning, demonstration & training charges for all four sets of fixed type Silt Measuring equipment and one set of portable type Silt Measuring instrument.

All the manpower & material required for installation has to be arranged by the vendor. The installation & commissioning charges shall include Travelling Charges, Local Stay and Conveyance, Daily Allowances of the Engineer, Visa and Airport Charges etc. Vendor shall

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build-up the cost of all the above-related heads in the commissioning offer and shall quote on lump sum basis.

Offers containing commissioning charges on per man-day basis or per visit basis etc shall not be accepted.

5. DOCUMENTATION:-

Vendor has to furnish complete catalogue / drawing / manual of the instrument showing over all dimensions, mounting details, sectional elevation, constructional details and part list etc with model code along with the offer otherwise offer will be treated as incomplete. Vendor shall also furnish complete installation scheme of the instrument with the offer.

6. GUARANTEE:

Instrument should bear supplier's guarantee for trouble free operation & good 'Workmanship for a period of 18 month from the date of dispatch or 12 months from date of commissioning. Supplier should undertake to replace free of cost any material / Components found defective in operation during guarantee period.

7. PACKAGING, HANDLING, STORAGE

Prior to shipping, the equipments shall be properly packed to avoid damage during transit, handling and storage. Any special storage/ handling instructions of the instrument may be clearly marked on the outside packing.