	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : FIXED TYPE ONLINE SILT/SUSPENDED SOLID CONTENT MEASURING EQUIPMENTS	241506351-1	Page 1 of 2

1. SCOPE:

Sl. No.	ITEM DESCRIPTION
1	Supply of Fixed Type Online silt/suspended solid content Measuring equipment to Indicate & Record the silt/suspended solid Content of the water Passing Through hydro Turbine
2	Installation , Commissioning & training of Fixed Type Online silt/suspended solid content Measuring Equipment at Mangdechhu HEP site, Bhutan

2. DESCRIPTION:

Fixed Type online silt/suspended solid content Measuring Equipment shall be supplied to indicate and record the silt/suspended solid content of the water passing through tail race of machine.

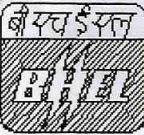
3 FEATURES:

3.1 FEATURES OF FIXED TYPE ONLINE SILT/ SUSPENDED SOLID CONTENT MEASURING EQUIPMENT:

1. The equipment shall be based on Optical Technology (Laser/Infrared).
2. The equipment shall measure silt / suspended solids in mg/l.
3. The silt / suspended solid contents in the water at site, that instrument will have to measure, shall be up to 10,000 mg/l. However, if the instrument can measure contents above 10,000 mg/l, the same shall also be acceptable.
4. The equipment shall have an accuracy of +/- 5% of reading or +/- 300 mg/l (whichever is greater).
5. The equipment should provide the output (4-20 mA) for silt/suspended solid content measurement corresponding to measuring range for SCADA system.
6. The equipment shall have RS 232/RS485/Modbus/ Equivalent interface
7. The equipment shall have backlit Graphical Display for indicating silt / suspended solid content measurement
8. The equipment shall have a working temperature range of 0 to 55 Degree Celsius.
9. Controller should be suitable for power supply of 230 VAC.
10. As per the proposed scheme (Sketch No. HPE-GC-401), a tapping of 50 NB [EL 1002.0] on the suction header pipe of cooling water pump shall be provided for further connection with the silt /suspended solid content 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/suspended solid content 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/suspended solid content measuring instrument.

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

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : FIXED TYPE ONLINE SILT/SUSPENDED SOLID CONTENT MEASURING EQUIPMENTS	241506351-1	Page 2 of 2

The complete system of silt/suspended solid content measuring equipment, pump, flowmeter, pressure gauge, controller, pipes (seamless SS) and fittings (SS) required for connecting the silt/suspended solid content measuring equipment to the tapping of 50 NB shall be in vendor scope as per Sketch No. HPE-GC-401. If any additional item required for the successful commissioning & proper functioning shall also be in vendor scope.

4. INSTALLATION, COMMISSIONING, TRAINING & DEMONSTRATION

The Fixed Online Type silt/suspended solid content measuring System is proposed to be installed at the suction Header of the Cooling Water System as per the scheme (Sketch No. HPE-GC-401) enclosed with the specification. All these conditioning devices including electrical / mechanical hardware items required for complete installation of Fixed Type Instruments at the designated location shall be in vendor scope. The vendor will have to install and commission all sets of fixed Type silt/suspended solid content Measuring Equipment for measuring the silt/suspended solid content. Operational Training of the equipment shall be provided by the vendor to BHEL & END Customer engineers at Mangdechhu HEP (Bhutan) site.

The vendor shall offer Lump-sum charges for installation, commissioning, demonstration & training for all sets of fixed type silt/ suspended solid content Measuring equipment.

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 (if applicable) and Airport Charges etc. Vendor shall 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.

SITE ADDRESS: MANGDECHHU HEP, TRONGSA, BHUTAN.

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.

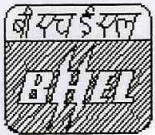
7. PACKAGING, HANDLING, STORAGE

Prior to shipping, the equipment's 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.



NOTE : 1. ALL PIPES SHOULD BE OF SEAMLESS STAINLESS STEEL TYPE AND PIPE FITTINGS SHALL BE OF SS MATERIAL.

PROJECT	4x10 MW MANDECHURU REP	
CUSTOMER		
	MHPA, BHUTAN MHPA BRS. NO. 	
CONTRACTANT	NHEC LIMITED (A GOVERNMENT OF NEPAL ENTERPRISE)	
CONTRACT NO.	BHADRA HEAVY ELECTRICALS LTD. BHADRA	
DATE	15.08.2018	15.08.2018
TIME	15.08.2018	15.08.2018
ITEM	SCHEMATIC DIAGRAM FOR FIXED TYPE SOLID CONTACT MEASURING EQUIPMENT	
NO.	1	1
DATE	15.08.2018	15.08.2018

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : FIXED TYPE ONLINE SILT/SUSPENDED SOLID CONTENT MEASURING EQUIPMENTS	241506351-2	Page 1 of 2

1. SCOPE:

Sl. No.	ITEM DESCRIPTION
1	Supply of Fixed Type Online silt/suspended solid content Measuring equipment to Indicate & Record the silt/suspended solid Content of the water Passing Through hydro Turbine
2	Installation , Commissioning & training of Fixed Type Online silt/suspended solid content Measuring Equipment at Bairasuil HEP site, Himachal Pradesh(India)

2. DESCRIPTION:

Fixed Type online silt/suspended solid content Measuring Equipment shall be supplied to indicate and record the silt/suspended solid content of the water passing through tail race of machine.

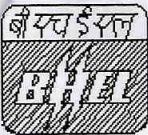
3 FEATURES:

3.1 FEATURES OF FIXED TYPE ONLINE SILT/ SUSPENDED SOLID CONTENT MEASURING EQUIPMENT:

- The equipment shall be based on Optical Technology (Laser/Infrared).
- The equipment shall measure silt / suspended solids in mg/l.
- The silt / suspended solid contents in the water at site, that instrument will have to measure, shall be up to 10,000 mg/l. However, if the instrument can measure contents above 10,000 mg/l, the same shall also be acceptable.
- The equipment shall have an accuracy of +/- 5% of reading or +/- 300 mg/l (whichever is greater).
- The equipment should provide the output, (4-20 mA) for silt/suspended solid content measurement corresponding to measuring range for SCADA system.
- The equipment shall have RS 232/RS485/Modbus/ Equivalent interface
- The equipment shall have backlit Graphical Display for indicating silt / suspended solid content measurement
- The equipment shall have a working temperature range of 0 to 55 Degree Celsius.
- Controller should be suitable for power supply of 230 VAC.
- As per the proposed scheme (Sketch No. HPE-GC-405), a tapping of 50 NB [EL 834.0] on the suction header pipe of cooling water pump shall be provided for further connection with the silt /suspended solid content 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 834.0] accompanying the silt/suspended solid content 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/suspended solid content measuring instrument.

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

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : FIXED TYPE ONLINE SILT/SUSPENDED SOLID CONTENT MEASURING EQUIPMENTS	241506351-2	Page 2 of 2

The complete system of silt/suspended solid content measuring equipment, pump, flow meter, pressure gauge, controller, pipes (seamless SS) and fittings (SS) required for connecting the silt/suspended solid content measuring equipment to the tapping of 50 NB shall be in vendor scope as per Sketch No. HPE-GC-405. Any additional item required for the successful commissioning & proper functioning shall also be in vendor scope.

4. INSTALLATION, COMMISSIONING, TRAINING & DEMONSTRATION

The Fixed Online Type silt/suspended solid content measuring System is proposed to be installed at the suction Header of the Cooling Water System as per the scheme (Sketch No. HPE-GC-405) enclosed with the specification. All these conditioning devices including electrical / mechanical hardware items required for complete installation of Fixed Type Instruments at the designated location shall be in vendor scope. The vendor will have to install and commission all sets of fixed Type silt/suspended solid content Measuring Equipment for measuring the silt/suspended solid content. Operational Training of the equipment shall be provided by the vendor to BHEL & END Customer engineers at Bairasiul HEP (Himachal Pradesh) site, India.

The vendor shall offer Lump-sum charges for installation, commissioning, demonstration & training for all sets of fixed type silt/ suspended solid content Measuring equipment.

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 (if applicable) and Airport Charges etc. Vendor shall 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.

SITE ADDRESS: BAIRASUIL POWER STATION, NHPC, P.O. SURANGANI, DISTT. CHAMBA, HIMACHAL PRADESH(India).

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 equipment's 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.

ENCLOSURE FOR INDICATOR CUM CONTROLLER
AND ITS REQUIRED ACCESSORIES

INDICATOR CUM
CONTROLLER

[SENSOR]

[PRESSURE GAUGE WITH ISOLATING VALVE]

[SENSOR MOUNTING ARRANGEMENT]

[ISOLATING VALVE (FULLY S.S.)]

MOUNTING ELEVATION
(EL. 235.00)

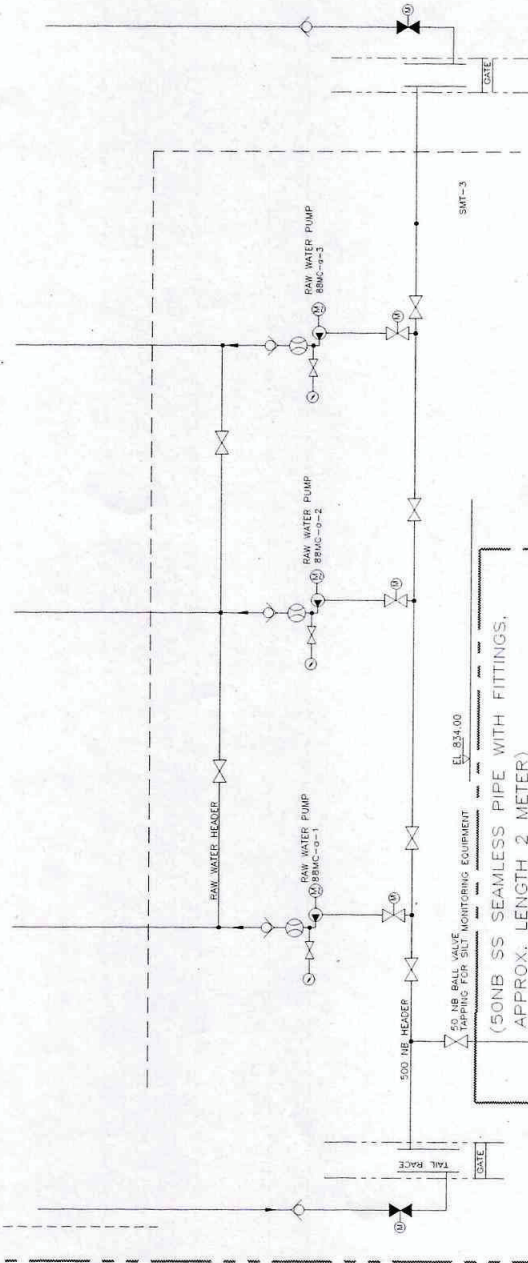
ROTARY FLOWMETER
WITH LOCAL INDICATION

(40 NB SS SEAMLESS PIPE WITH FITTINGS,
APPROX. LENGTH 20 METER)

(TO DRAIN)

VENDOR SCOPE OF SUPPLY
(DETAILS OF 1 SET OF FIXED TYPE SOLID CONTENT MEASURING EQUIPMENT)

TO COOLING WATER SYSTEM



NOTE : 1. ALL PIPES SHOULD BE OF SEAMLESS STEEL TYPE
AND PIPE FITTINGS SHALL BE OF SS MATERIAL.

BIRASUL HEP

NIPC LIMITED
IN CONJUNCTION WITH

CONTRACTOR
BHARAT HEAVY ELECTRICALS LTD.
BIRPAL

PROJECT NO. 50P-30-3dH ON '080
SHEET NO. 1
SCALE 1:100
DATE 15.05.2014
BY NTS
CHECKED BY NTS
APPROVED BY NTS
PROJECT MANAGER
NIPC LIMITED
BIRASUL HEP