

- Name of Work -

**EPC Contract for Providing Irrigation Water  
Facility to Filling Kelamul Village Tank by Lifting  
Water from KLBMC at Ch.8.20 km of Taluka  
Kadana, Dist. Mahisagar.**

***Tender Document***

**VOLUME II – [E]**

**Technical Specifications for Operation & Maintenance**

**Government of Gujarat  
Narmada Water Resources, Water Supply  
& Kalpsar Department**

# Index

Chapter	Title	Page
---------	-------	------

Index	1	
1.	OPERATION & MAINTENANCE	1
1.1	PREFACE	1
1.2	SCOPE OF WORK	1
1.3	ADMINISTRATIVE PROVISIONS	2
1.3.1	RISK AND OBLIGATIONS OF THE CONTRACTOR	2
1.3.2	DEFECT LIABILITY AND O & M PERIOD	3
1.3.3	INSURANCE	3
1.3.4	PERSONNEL	4
1.3.5	VEHICLE	5
1.3.6	COMPUTER / PRINTER AND ACCESSORIES	5
1.3.7	DAILY, WEEKLY AND MONTHLY STATEMENT	5
1.3.8	ASSIGNMENT	5
1.3.9	COMPLETION OF THE CONTRACT	5
1.4	TECHNICAL PROVISIONS	6
1.4.1	MAINTENANCE	6
1.4.2	GENERAL PREVENTIVE MAINTENANCE	6
1.4.3	SCHEDULED MAINTENANCE CHECKS	7
1.4.4	MECHANICAL MANDATORY SPARE PARTS, ELECTRICAL TOOLS & TEST EQUIPMENT	8
1.4.5	CONSUMABLES AND UTILITIES SERVICES, SPARE PARTS & STORES AND MISCELLANEOUS EQUIPMENT	9
1.4.6	INSPECTION	10
1.5	FINANCIAL PROVISIONS	11
1.5.1	METHOD OF INVOICING	11
1.6	LIABILITY FOR ACCIDENTS TO PERSONS	11
1.6.1	SAFETY PROCEDURES	12
1.7	ACCESS TO SITE AND WORK ONSITE:	12
1.7.1	RIGHTS OF WAYS AND FACILITIES	12
1.7.2	AVOIDANCE OF INTERFERENCE	13

1.7.3	ACCESS ROUTE _____	13
1.7.4	EXCEPT AS OTHERWISE STATED IN THE SECOND OPTIONS _____	13
2.	ACTIVITIES SHALL BE CARRIED OUT BY THE CONTRACTOR UNDER THE OPERATION AND MAINTENANCE CONTRACT MEASURING SYSTEM	14

### **List of Tables**

Table 1 - Annexure M1 : Mechanical Tools & Tackles & Test Equipment for O&M Period for pumping station _____	24
Table 2 - Annexure M2: Mechanical Mandatory Spare Parts for Pumping Station _____	25
Table 3 - Annexure E1: Electrical Tools & Test Equipment for Pumping Station _____	26
Table 4 - Annexure I1: Instrumentation Mandatory Spare Parts for Pumping Station _____	27

# 1. OPERATION & MAINTENANCE

## 1.1 PREFACE

The contractor shall operate and maintain all the works executed by him and system as a whole with due care and diligence, so as to have the intended quantity of water available at the delivery points with the required efficiency and reliability. All the man-power, machineries, plants, equipment's, vehicles and other facilities shall have to be arranged and provided by the contractor as per the provision of the contract. Terms and Conditions narrated in tender documents of this Project are also equally applicable in the Operation and Maintenance period.

## 1.2 SCOPE OF WORK

The O & M period of this contract shall be 5 years including Defect Liability Period of 3 years. During O & M period, the Contractor shall operate, maintain and upkeep the following services:

1. Pump house, panel room, pumping machinery at pumping station at site location with all other allied works.
2. Maintenance of the M.S Pipeline and H.D.P.E pipeline laid along the route to fill up village pond & all allied works along the route.
3. Operation, maintenance and up-keepnet of all civil structures, pipeline, valves, Pumps and motors, all the electrical, mechanical and instrumentation components, including Surge Control Devices, as per system requirement, so as to meet the required standard of performance.
4. Maintenance of all Buildings and all the components including switchyard, compound wall, internal road, storm water drainage, street lighting, Maintenance of the garden & fountain etc. at all H.W.s and other allied works within the Pumping station premise.
5. Management of the Pumping Station, plant, pipeline, supply and discharge arrangement, communication arrangement, reporting and record keeping. Cleaning and de-siltation of sump or intake well have to be done regularly to keep it clean.
6. Providing O & M training to the staff of department / employer.
7. All the internal Roads, approach road and functional areas shall have to be kept neat and clean.
8. For any additional work, which is not included in the scope but is required to meet operational and maintenance shall also be taken into consideration to meet the project purposes.
9. The items and consumable which are having life lesser than the O & M period of 5 years shall be replaced as and when their life ends and or as per manufacturer's recommendation to upkeep the system operations in good working conditions.
10. For Main Pipeline:
  - a. All type of rising main and gravity main including chambers shall be maintained and repaired by contractor as and when required.

- b. All sluice valves/ BF Valves/ Air Valves/ Zero velocity valves/ Air cushion valve to be kept under working condition and periodical maintenance to be conducted.
11. During Maintenance of the pipeline, if any leakage from or damage to the pipeline is found, the same shall have to be repaired / replaced within 24 hours of occurring such event. All materials, equipment and labours shall have to be employed by the agency to attend such repairs. Cleaning and de-siltation of pipe have to be done regularly by flushing, etc.
- a. At the time of such repairing, all the required materials like pipes, valves, specials or any other material shall have to be provided by the contractor. The contractor shall keep sufficient stock /inventory of all such items. Such repairing shall immediately be carried out by the contractor at his own cost including labour, excavation cutting, fitting, welding, testing, refilling etc. to complete. The contractor will be responsible for loss of any property or crop of private land owner and compensation will have to be paid by contractor. The provisions of Clause No. 13 (work on site) under section 11-Project Related Information and Conditions in standard bidding document (Volume I), regarding ROW/ ROU for O&M period shall also be applicable. If contractor fails to do so and complain is received by department then the department will make the payment to private owners and recovery will be made from contractor's bill.
  - b. In case, any type of valve or part of the valve not working properly then the contractor shall arrange either to repair or to replace the same. Cost of such repairing or replacement shall have to be borne by the contractor and no separate payment will be entertained for this work.
  - c. Contractor shall have to carry out leak detection survey (visual) along the pipeline each month and leakage observations and repairing work record shall be maintained chainage wise by contractor. MS rising main and all the valves fixed on it such as sluice valves, scour valves, air valves, air cushion valves, butterfly valves, zero velocity valves, flow meters, water meters and valve chambers shall be maintained by the contractor.
  - d. Quantity of water as pumped from head works shall reach to distribution point / delivery point (within the permissible limit of leakage losses). For any unauthorized connection from the pipeline or pumping station, taken or given by anybody, without written permission of the Engineer-in-charge, the same shall be responsibility of the contractor. Prevention and removal of unauthorized connection will be carried out by contractor and intimated to department. All type of valves including air valve and scour valve, sluice valves shall be inspected regularly by contractor. A program for inspection shall be prepared by contractor and strictly observed it. Special care shall be taken by contractor for air valves that it shall not be tampered by anybody.
  - e. Shut down: Under unavoidable circumstances, shut down shall be provided depending upon necessity and on approval of Engineer-in-charge.

### 1.3 ADMINISTRATIVE PROVISIONS

#### 1.3.1 RISK AND OBLIGATIONS OF THE CONTRACTOR

The Contractor shall take full responsibility for the care of the facility (or) any part thereof (or)

materials and plant from the date of issue of Interim Certificate (Phase I) from the department for the whole of the Works, to the date of completion of the Operation and Maintenance period.

In the case of risks causing loss (or) damage any such determination shall take into account of the responsibility of the Contractor.

If any loss or damage happens to the facility (or) any part thereof (or) materials and Plant for incorporation therein, during the O & M period for which the Contractor is responsible for the care thereof, or from any cause whatsoever, the Contractor shall, at his own cost, rectify such loss (or) damage so that the facility (or) any part thereof (or) materials and Plant conform in every respect with the provisions of the Contract to the satisfaction of the Department. The Contractor shall also be liable for any loss or damage to the works in the course of O & M carried out by him for the purpose of complying with his obligation under this Clause.

### 1.3.2 DEFECT LIABILITY AND O & M PERIOD

The O & M Period shall commence from the issue of Commissioning Certificate (Phase-II) for a period of five (05) years as per clause 33 of quality control in chapter Conditions of Contract of Standard Bid Document (Volume I), including defect liability period. In case of foreclosure of O & M for any reason, the defect liability period shall continue for three (3) years.

If the Department wishes to go with an extension to the present O & M Period, then the department will give 180 days prior notice of its intention to exercise such option to the contractor. The decision of the Government / department shall be final whether to extend or not the O & M period.

### 1.3.3 INSURANCE

The Contractor shall, without limiting his or the Employer's obligations and responsibilities insure The Works, together with materials and Plant for incorporation therein, to the full replacement cost.

The Contractor's Equipment and other things brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

The insurance detailed above shall be in the joint names of the Contractor and the Employer at the Contractor's cost and shall cover the Employer and the Contractor against all loss or damage from whatsoever cause arising, from the start of the operation and maintenance to the date of completion of operation and maintenance period.

Any amounts not insured or not recovered from the insurers shall be borne by the Contractor in accordance with their responsibilities under this chapter.

The Contractor shall also, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of: death of or injury to any person, or loss of or damage to any property (other than the Works)

Which may arise out of in consequent of the Operation and Maintenance of the facility and the remedying of any defects therein, and against all claim's proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

The insurance policy shall include across liability clause such that the insurance shall apply to the

Contractor and to the Employer as separate insurers.

The Employer shall not liable for or in respect of any damages or compensation payable to any workmen or other person in the employment of the Contractor or any Sub-contractor. The Contractor shall indemnify and keep indemnified the employer against all such damages and compensation, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

In the event that the contractor fails to comply with the above provisions, the Engineer-in-charge shall take necessary actions to get the insurance with the above coverage and all the costs thereof shall be recovered from the amount payable to the contractor.

#### 1.3.4 PERSONNEL

All Contractors' personnel employed at the plant at any time during the period covered by the present Contract will be provided by him. The Employer is not liable for personnel in any way and cannot be held responsible in the event of litigation of any sort between the Contractor and members of plant personnel or their representatives.

All decisions related to staff numbers, timing and qualifications should be got approved from the Engineer-in-charge.

The Contractor undertakes to comply with applicable legislation and the codes of labour laws, occupational and safety hazards preventive measures on matters of health, hygiene and safety, and shall assume responsibility for works required in the event of any change in applicable regulations.

The Contractor will provide the minimum following personnel for the full term of operation and maintenance period. Details of qualifications and experience required shall be as under for each pumping station:

Sr. No.	Category of Staff	No. of Person Required	Educational Qualification Required	Minimum Experience Required
1	Electrical Supervisor	0	B.E. (Electrical)	5 Years in similar capacity
2	Mechanical Supervisor	0	B.E. (Mechanical)	5 Years in similar capacity
3	Electrician	1	Diploma (Electrical)	2 Years in similar capacity
4	Pump Operator	1	ITI Electrician	3 Years
5	Fitters	1	ITI (Fitter)	2 Years
6	Helper	1	ITI (Mechanic)	2 Years
7	Line man	0	Basic Knowledge of pipeline and valve operation and safety	-
8	Security	2	Std. 7 Pass (minimum)	-
9	Gardener	0	-	-

10	Sweeper	0	-	-
----	---------	---	---	---

All staff is to be deployed for 365/366 days for each year. The staff shall have to be deployed in three (3) working shifts at Head Works and also along the pipeline. Accordingly, deployment schedule to be adapted.

Above staff requirement is minimum, additional staff required for smooth and efficient operation of the system is to be deployed by the contractor as per requirement for which no extra payment will be admissible.

**For the non-compliance of employment of key personnel:** If the successful bidder does not recruit / depute the key personnel identified as per schedule, then the department shall arrange for such manpower. All the cost and consequences in this regard shall be borne by the contractor for each pumping station.

#### 1.3.5 VEHICLE

The contractor shall refer Clause-34 of Special Conditions of Contract in Standard Bid Document (Volume I).

#### 1.3.6 COMPUTER / PRINTER AND ACCESSORIES

The contractor has to provide at site two (2) nos. of Computers with internet connection, one (1) printer, scanner & copier, consumables and all required stationeries with all peripherals and all licensed software's (updated from time to time) to keep and maintain all the records, data maintenance schedules in soft and hard copies for each pumping station.

#### 1.3.7 DAILY, WEEKLY AND MONTHLY STATEMENT

Daily, weekly and monthly statements for electricity consumed, total hours of pump operation, total qty. of pumping, average power factor and monthly consumable & repair maintenance during the month shall be furnished by the contractor to Engineer-in-charge.

#### 1.3.8 ASSIGNMENT

The Contractor will not be entitled to sub-contract any part of his obligation to any third party without prior approval of the Employer.

#### 1.3.9 COMPLETION OF THE CONTRACT

On the date of Contract Completion or if the Contract is terminated, all the installations, works and equipment placed under the Contractor's responsibility shall be handed over to the Employer, at no cost, in good working condition, except for normal wear and tear. The Employer may perform any inspections, tests or expert appraisals he shall consider necessary with a view to checking that the property is in good working order.

At the end of O & M period, the contractor shall be entitled to receive the final Certificate within 1 month, as per the Clause 40 of Project Related Information and Conditions, section 11 in standard bidding document (volume I).



## 1.4 TECHNICAL PROVISIONS

### 1.4.1 MAINTENANCE

The Contractor shall be responsible for preventive and corrective maintenance of civil, structural, mechanical, electrical and computing equipment as well as miscellaneous equipment as described in the tender document.

The Contractor shall ensure that measurement systems operated correctly with the required degree of precision at all times.

#### 1.4.1.1 Performance Standards

It is the Contractor's responsibility to ensure that plant systems are at all times able to operate at duty conditions.

The Contractor shall operate the plant strictly within the operating ranges and shall manage the operation of the plant to achieve optimum performance as far as possible.

#### 1.4.1.2 Meter Reading

All water conveyed by the Contractor shall be measured through the meters installed at pumping station and at the end of the pipeline. The meters shall be inspected and certified as to its accuracy jointly by the Employer and the Contractor.

The Contractor shall be entitled to appoint a representative who shall together with Employer's representative on the last day of each fortnight or if such day is not a working day on the following day, jointly carry out a reading of water meters and jointly certify the record of such readings.

The contractor is responsible to keep update the calibration of measuring equipment as per standard methods / requirements.

### 1.4.2 GENERAL PREVENTIVE MAINTENANCE

General routine preventive maintenance shall be covering the following aspects. The list given below is indicative and not exhaustive. All additional measures shall have to be taken by the contractor to achieve the performance of the system as directed by Engineer-in-charge.

Sr. No	Description	Frequency of Maintenance
1	General cleaning of all equipment and building. Watering of plants and tree daily.	Daily
2	Cleaning of sump and strainer of each pump at regular intervals.	As required
3	Replacement of gland packing for the pump, sluice valves etc. whenever required.	As required
4	Greasing of bearing and lubricating all moving parts as per the schedule.	Monthly
5	Tightening of all loose nut-bolts and other fasteners.	Weekly
6	Lubricating and test operation of the valves.	Monthly
	If it is observed that power consumption of water pumped is increased, the contractor has to trace out the fault and rectify the same to bring to the	Daily

7	standard value.	
8	De-weeding and cleaning of the Transformer yard and other places.	Monthly
9	Drying and refilling of silica gel in the breather of the transformer Regular watering on the earth-pits.	Monthly
10	Check for any oil leak in the transformer and intimating and repairing of the same.	Weekly
11	Air blowing of motors, H.T. & L.T. panel etc.	Quarterly
12	Check for any loose connection in all electrical equipment and rectification of same.	Monthly
13	Checking and replacement of bulbs, tubes, chokes, starters, switches, control etc. throughout the plant and including street and overhead lights.	Weekly

### 1.4.3 SCHEDULED MAINTENANCE CHECKS

The contractor shall carry out the following scheduled maintenance activities. The list given below is indicative and not exhaustive. All additional measures shall have to be taken by the contractor to achieve the performance of the system as directed by Engineer-in-charge. All the civil components of pump house, other steel components and structural members and other components shall be repaired /strengthen if required and painted regularly at the interval of 2 years.

#### 1.4.3.1 Checks to be performed Daily

- a. Supply of electricity
- b. Volume of water as per requirement
- c. Vibration in the pump sets, moving assemblies etc.
- d. Tightness of all the equipment
- e. Rise in temperature of bearings in motor, in moving parts and other units etc.
- f. Working of gauges and other measuring devices
- g. Operation of stop log gates / Valves.

#### 1.4.3.2 Checks to be Performed Weekly

- a. Supply of electricity
- b. Tightness of all electrical connections
- c. Tightness of all cable connections
- d. Temperature rises due to lose connections
- e. Watering of earth pits
- f. Operation of all sluice and butterfly valves, scour and pressure relief valves, gates and air valves
- g. Current and voltages in all electrical equipment
- h. Observations on water quality
- i. All parts of the machinery and electrical equipment liable to wear and tear shall be

replaced by the contractor every 6 months

#### 1.4.3.3 Checks to be Performed Monthly

- a. Gland packing
- b. Wear and tear of moving parts
- c. Adoption of electrical energy conservation method and energy consumption.
- d. Electrical contacts
- e. Motors
- f. Metering of electrical equipment
- g. Contractor shall be equipped with dewatering pump of capacity of pumping water equal to
- h. Km. length of pipeline in 24 hours. The unit shall also consist of power generating set

#### 1.4.3.4 Checks to be Performed Quarterly

- a. Relay testing and calibration, if possible, of meters, gauges instruments, flow meters and temperature scanner panel and flow indicator unit
- b. Speed of motors
- c. Level gauges and flow meters signals

#### 1.4.3.5 Checks to be Performed Half Yearly

- a. Cleaning, checking/tightening of HT and LT circuit/panel
- b. Tightening of PMCC
- c. Auxiliary DB, Capacitor bank
- d. Battery and Battery charger

#### 1.4.3.6 Checks to be Performed Annually

- a. Overhauling requirement of all equipment
- b. Improvement required if any in operation of plant
- c. Testing and calibration of all instruments
- d. 33 /and 11 KV VCB cleaning, testing.
- e. Transformer cleaning, checking silica gel, oil checking filtering/replacing

### 1.4.4 MECHANICAL MANDATORY SPARE PARTS, ELECTRICAL TOOLS & TEST EQUIPMENT

All the mandatory spare parts/ tools/test equipment etc. are meant for use by the department after O&M period. However, those shall hand over to department on commissioning of the project. Such mandatory spares shall be procured from Original Equipment Manufacture – whose equipment are already used for this project and shall be replaceable in place of the original one.

The contractor shall construct the separate store in the pumping station premise for storage of these mandatory items. All these items shall be properly tagged and kept in bins / racks / cupboards

etc. with proper records. The contractor shall be solely responsible for the safety and security of this store.

The commissioning certificate shall be issued only after receipt of the above mandatory items by the department in quantity and quality.

#### 1.4.5 CONSUMABLES AND UTILITIES SERVICES, SPARE PARTS & STORES AND MISCELLANEOUS EQUIPMENT

In addition to the Clause No. 1.4.4 above, the contractor shall keep adequate spare parts/consumables etc. on their own apart from the spares handed over to the department for trouble free O&M of 5 years.

##### 1.4.5.1 Consumables and Utilities Services

Unless stipulated otherwise elsewhere in the document, for the duration of the O&M period, the Contractor shall be responsible for the supply and control of lubricants, spare parts and consumable materials excluding electrical power and water, necessary for the continuous operation of the works.

The Contractor will manage the consumables and utilities services to ensure their most economic consumption and to minimize wastage.

The quantities of all the unutilized spare parts and consumable materials will be fully handed-over to the Employer at the end of the O&M period.

##### 1.4.5.2 Spare Parts and Stores

The store's inventory, the issuing and recording of spare parts will be the responsibility of the Contractor.

The Contractor is also responsible for providing spare parts and material required for the operation and maintenance period, and shall be are the cost for the same, including the cost of storing and safeguarding.

The Contractor will make all necessary arrangements to ensure the continuous supply of spare parts and material for the works and the rate of supply of these materials shall be in such quantities and amounts as would ensure uninterrupted operation.

Spare parts shall be supplied by the Contractor and the same will be used during 5 years operation and maintenance period. Any spare parts used during the O&M period shall be replaced by purchasing new spare parts and total set of spare parts shall be handed over to the employer after completion of 5 years O&M period / extended O&M period.

##### 1.4.5.3 Miscellaneous Equipment

Workshop Equipment: All the necessary and required workshop equipment for the proposed project shall be supplied by the Contractor under this Contract. Contractor shall give a comprehensive list of the same.

Housing Complexes: Cost of maintenance and housekeeping including domestic water supply and drainage, roads, gardens, electrical installations, etc. will be borne by the contractor.

#### 1.4.6 INSPECTION

##### 1.4.6.1 GENERAL provisions

The Employer shall check the operation of the plant or design at end organization of his choice to carryout inspections regularly. The Employer or the organization appointed by him shall check that the Contractor is performing the tasks for which he is responsible with due diligence. The Contractor shall at his cost provide all the assistance the Employer requires to complete these inspections.

Before any inspection, the Employer shall give prior written notice of three days to the Contractor, indicating the name(s) of the person(s) empowered to carry out such inspection in the name of the Employer. The contractor shall cover the cost of such action.

##### 1.4.6.2 Measurement and Analysis

The Employer has the right to perform any analysis or inspection he deems necessary. Before any inspection, the Employer shall give a prior written notice of three days to the Contractor and shall cover the costs of such action. The water quantity shall be measured by flow meters installed at the pump house and also at the end of pipeline section.

The flow meters shall be inspected and certified upon their availability by the Employer and the Contractor. Thereafter, the said meters shall be tested and their accuracy verified once in every six (6) months by the Employer and the Contractor. After each inspection, the flow meters shall both be sealed in the presence of representatives of Employer and the Contractor in a manner that is adequate to prevent the tampering of said meters by any person. All such calibration charges shall be borne by the contractor.

The Contractor shall be responsible for the security and protection of flow meters at the design at end point. If there is any malfunctioning of the meters, it should be replaced at the Contractor's cost.

##### 1.4.6.3 Plant Complex Visits

At the end of each month, or at the initiative of the Employer, a visit shall be organized so that both parties can check the condition of the installations at the plant complexes.

A report shall be drawn-up to record the opinions of both parties. The Employer reserves the right to call in equipment manufacturers or specialized technicians for these visits.

These visits shall provide an opportunity for examining maintenance programs and operating procedures.

##### 1.4.6.4 Documents to be provided by the Contractor

Operation Logbook: The Contractor shall keep a permanent record of plant operation (logbook). This logbook shall be kept at the site and shall be presented on request to agents approved by the Employer.

- Daily Report: On a daily basis, the following information shall be recorded in the logbook:
  - a. Reading from the different meters, indicators and recorders (including but not limited to consumption of energy, volume of water conveyed, operating times of the different items of equipment)

- b. Computer documents and tapes/CDs produced by monitoring and surveillance equipment which shall be attached to the logbook,
  - c. Report of visits by persons other than those of the Employer and the Contractor to the Facility
  - d. The Contractor shall also indicate any significant modifications to the set-up characteristics of the installation, shut-downs, anomalies, or incidents that have occurred with respect to operation.
- Monthly Report: The monthly report shall include but not be limited to:
    - a. Volume of water conveyed
    - b. Electricity consumed totally
    - c. All the problem areas in the facility
    - d. The status and progress of the training programs
  - Semi Annual Report: The Contractor shall provide the Employer by March 31 of the particular year(n) with an annual report for the preceding year(n-1). This report shall include
    - a. All technical statistics related to plant operation as supplied by the operation
    - b. A statement of works carried out during the preceding year n-1 in connection with the Contractor's maintenance obligation

## 1.5 FINANCIAL PROVISIONS

### 1.5.1 METHOD OF INVOICING

The contractor shall prepare and submit to the Employer an invoice each month with all documents supporting its calculations for the preceding month. The invoice shall be submitted between the first and fifth day of the month.

The Employer shall pay to the contractor after verifications and due deductions as provided in the contract.

## 1.6 LIABILITY FOR ACCIDENTS TO PERSONS

Responsibilities and liability of the contractor under "Workmen's Compensation Act" shall be applicable under O & M period also.

In addition, following provisions shall also apply.

- a. On the occurrence of an accident which results in death of work men employed by the contractor, or which is serious as likely or result in death of any such work or injured seriously, the contractor shall within 24 hours happening of such accident intimate in writing to Engineer-in-charge the facts of such accident. The contractor shall indemnify Government against a loss or damage sustained by the Government resulting directly or indirectly from his failure to give intimation in the matter aforesaid including the penalties or fines, if any, payable by Government due to such lapse, the contractor shall be fully responsible for Government's failure to give notice under the Workmen's Compensation Act otherwise/to conform to the

provision of the said act in regard to such accidents.

- b. In case of an accident in respect of which compensation may be come payable under Workmen's Compensation Act whether by the contractor or by Government as principal employer, it Shall be lawful for the Engineer-in-charge to retain out money due and payable to the contractor such sum or sums of money as may in the opinion of the Engineer-in-charge be sufficient to meet the liability. The opinion of the Engineer-in- charge shall be final in regard to all matters arising under this clause.
- c. The contractor shall be bound to provide in writing the details of employments, emoluments paid, and status of the work men concerned as may be required under the act to the Engineer-in-charge. The safety equipment for person clause shall be followed in addition the following shall also apply.

#### 1.6.1 SAFETY PROCEDURES

The contractor shall:

- a. Comply with all applicable safety regulations.
- b. Take care for the safety of all persons entitled to be on the site.
- c. Use reasonable efforts to keep the site and works clear of unnecessary obstruction so as to avoid danger to these persons.
- d. Provide fencing, lighting, guarding and watching of the works until completion and taking over and,
- e. Provide any temporary works (including roadways, footways, guards and fences) which may be necessary because of the execution of the works for the use and protection of the public and of owners and occupiers of adjacent land.

#### 1.7 ACCESS TO SITE AND WORK ONSITE:

The Engineer-in-charge may, if he considers fit from time to time enter upon any lands which maybe in possession of the contractor under the O&M period for the purpose of executing any work not included in the O&M work and may execute such by agents or by other contractors a this option and the contractor shall in accordance with requirements of the Engineer-in-charge afford all reasonable facilities for execution of the works including occupation of the lands by structure or otherwise for any workmen or for the workmen of the Government who may be employed in the execution on or near the site of the work not included in the contractor of any contract in connection with or ancillary to the work, and in default, the contractor shall be answerable to Government for any delay or expense in cured by reasons of such default.

##### 1.7.1 RIGHTS OF WAYS AND FACILITIES

The contractor shall bear all costs and charges for special and / or temporary rights-of- way which he may require including those for access to the site. The contractor shall also obtain, at this risk and cost, any additional facilities outside the site which he may require for the purposes of the works.

### 1.7.2 AVOIDANCE OF INTERFERENCE

The contractor shall not interfere unnecessarily or improperly with:

- (a) The convenience of the public, or
- (b) The access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the employer or of others.

The contractor shall indemnify and hold the employer harmless against and from as damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

### 1.7.3 ACCESS ROUTE

The contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the site. The contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the contractor's traffic or by the contractor's personnel. These efforts shall include the proper use of appropriate vehicles and routes.

### 1.7.4 EXCEPT AS OTHERWISE STATED IN THE SECOND OPTIONS

- a. The contractor shall (as between the parties) be responsible for any maintenance which may be required for his use of access routes.
- b. The contractor shall provide all necessary signs or directions along access routes and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs, and directions.
- c. The employer shall not be responsible for any claims which may arise from the use or otherwise of any access route.
- d. The employer does not guarantee the suitability or availability of particular access routes.
- e. Costs due to non-suitability or non-availability for the site required by the contractor, of access routes shall be borne by the contractor.



## 2. ACTIVITIES SHALL BE CARRIED OUT BY THE CONTRACTOR UNDER THE OPERATION AND MAINTENANCE CONTRACT MEASURING SYSTEM

1. Contractor shall have to run, operate, maintain and repair,
  - a. All the pumps including standby pumps at Pumping station location alternatively at regular intervals as decided by the Engineer-in-charge.
  - b. Main pipeline in full length with different types of valves.
  - c. Pipelines of network for filling the tanks off taking from main pipeline with structures on it. If any addition all tanks will be joined on a later stage, the same shall be under the scope of O&M period.
  - d. Pumps, electric motors and all LED parts and equipment fitted in the pump house.
  - e. Switchyard for pump house.
  - f. Maintenance and repairs of pump house, staff quarters constructed at pumping stations.
  - g. Security of Pipeline, valves, pump house with all equipment, switchyard, quarters at pumping stations.
  - h. All the civil and electro-mechanical work of pipeline project. (All the components of pipeline project)
  - i. Contractor shall have to operate all the pumps alternatively as per pre-planning and requirements and as directed by the Engineer-in-charge.
2. All the storage structures constructed at pumping stations should be kept in fill-up condition as per requirement during the full day period (24 Hours).
3. Electric bill for running the Pumping Stations will be paid by department. The Electricity Supplier issues the electricity bill regularly as per consumption. The contractor shall have to submit the bill to concerned Sub-division office immediately after receipt. If there will be delay from contractor side and if penalty any charged by The Electricity Supplier, the same shall be borne by the contractor.
4. All the electrical and other goods material required for operation and maintenance and repair works shall be procured by contractor at his own cost. The contractor has to procure the materials like rubber packing, nut bolts, gland, all required parts of valves in pump room & transmission main etc. At his cost for operation and maintenance. The contractor has to make arrangement of skilled/unskilled labours, fitter, technicians' etc. Including pick up van, Jeep, welding machine, welding rods, tractor etc. For attending the breakage/leakage in pipeline or valves for repairing. All consumable material should be of standard quality and as per requirement of project and work and as approved by Engineer-in-charge.
5. Lighting arrangement should be kept in good condition at all pumping stations and quarters.
6. All type of rising main and gravity main including chambers should be maintained and repaired by contractor at his own cost.

7. At the time of repairing of M.S. pipes and valves required for repairing or replacement after verification by Engineer-in-charge or his representative, repair/ fitting work of pipe or valves shall be carried out by contractor at his own cost including labour, excavation cutting, fitting, welding, testing, refilling etc. complete. The Contractor shall have to made arrangement for dewatering pump of appropriate capacity and also generator set of appropriate capacity at the time of repairing work immediately as per required.
8. Repairing work shall best rated within one hour after breakage or leakage came in to notice and care shall be taken to prevent wastage of water. The contractor will be responsible for loss of any property or crop on private land and full compensation shall have to be paid by contractor to the property /landowner. If contractor fails to do so, in such a case Engineer-in-charge will make the payment and recovery will be made from contractor's bill. The decision of Engineer-in-charge shall be final and binding to the contractor in such cases.
9. Any type of valve or part of the valve not working properly after repairing and requires replacement as per opinion of Engineer-in-Charge or his representative, then required new valve will have to be procured by the contractor at his own cost and shall be replaced by the agency without any extra cost. Old valves shall be handed over at the store as directed by the Engineer-in-charge at the cost of contractor.
10. Contractor shall have to carry out the walk-through survey for leak detection survey along the pipeline regularly and if any leakage, breakage or any other defect observed shall be recorded in the register with location, survey no. and chainage.
11. MS rising main and all the valves fixed on it such as sluice valves, scour valves, air valves, air cushion valves, butterfly valves, zero velocity valves, flowmeters, water meters and valve chambers shall be maintained by contractor. Quantity of water as pumped from headworks should reach to distribution point. For any unauthorized connection taken or given by anybody, the contractor will be responsible for it. Prevention and removal of unauthorized connection shall be carried out by contractor and intimated to department. All type of valves including air valve and scour valve, sluice valves shall be inspected regularly by contractor. A program for inspection shall be prepared by contractor and strictly observed it. Special care shall be taken by contractor for air valves that it should not be tempered by anybody.
12. The contractor shall issue the identity card to the persons engaged/ employed for the operation and maintenance work. All the persons engaged /employed by the contractor for the operation and maintenance work shall be in uniform with company name/logo. No person shall be allowed by the contractor on duty for operation and maintenance without uniform and identity card.
13. During the period of contract, a person other than responsible representative of contractor or persons employed by the contractor shall not enter into the premises of the headworks site. Every care shall be taken by contractor to prevent such type of unauthorized entry or interruption in the premises or surrounding the property of pump house premises. Persons required for security of materials in the stores at headwork/ sub headwork's sites shall be deployed by contractor.
14. At any time during the visit of Engineer-in-charge or his representative, if it is observed that the operation and maintenance work is not carried out properly, water supply shall be stopped, and

contractor is responsible for it and recovery will be made at double rate of water charges as fixed at that time for that particular day as decided by the Engineer-in-charge.

15. Operation and maintenance of measuring devices (water meters) installed at head works sites shall be carried out by contractor. The hourly reading shall be made in the register regularly. If any measuring device (water meter) is not working properly it shall be repaired by contractor at his cost. If calibration required, the same shall be carried out by the contractor at his cost. The calibration shall be carried out through the registered approved agency as suggested/decided by the Engineer-in-charge.
16. If any repairing & maintenance work is not attended by the contractor during the O&M period, and also on completion of contract, the cost of repairing work will be recovered by the Engineer-in-charge from the payment due to the contractor and/ or from the security deposit. The decision of Engineer-in-charge shall be final and binding to the contractor.
17. Proper operation and maintenance of the same works/components shall be carried out by contractor and at the time of completion of O&M period, contractor shall have to give possession of all the work and components to the Engineer-in-charge in good working condition. The O&M period will not be finalized before handing over the possession to the Engineer-in-charge and the security deposit will not be refunded to contractor. In case of failure from contractor side for handing over the possession, the legal actions will be initiated by the Engineer-in-charge and the contractor shall be fully responsible for that including the expenditure if any occurred.
18. During the O & M period, for any type of dispute, decision of Engineer-in-charge will be final and binding to the Contractor.
19. The Engineer-in-charge or his representative will check the registers maintained by the contractor at any time during the O&M period. Prescribed registers as maintained by contractor during the operation and maintenance period shall be submitted to the Engineer-in-charge on completion of O&M period or at the intermediate stage as decided by the Engineer-in-charge.
20. All repairing work shall be carried by contractor at his own cost during the O&M period. All safety provision shall be made by the contractor for carrying out the operation and maintenance work under the O&M period. The Contractor shall be fully responsible for any injury /fatal accident to the person engaged/employed by him or to any public persons during execution of operation and maintenance work and shall be fully responsible for compensation for it, if any. All the required safety devices shall be provided by the contractor to the persons engaged/ employed by him. The contractor shall also aware the persons engaged/employed by him regarding the safety provisions to be followed during the execution of operation and maintenance work. The contractor shall also publish a notice board regarding the safety provisions at the work site i.e., pump house and at the place of repairing on the pipe line during the repairing work. If at time of repairing of main pipeline or network pipeline, diversion of road /nala if required shall be carried out by the agency without any extra cost. During the repair barricading shall be made for avoiding the accidents. If leakage occurred below the existing road, the agency shall have to repair the leakage and also restore the road surface in the original condition at his cost.
21. If storage or supply could not be continued due to any reasons, it shall be informed to the Engineer-in-charge immediately. Also, the required steps shall be taken immediately by contractor to solve

the problem and start the water supply. After starting the water supply, the Engineer-in-charge shall be informed accordingly.

22. Leakage repairing shall be carried out in proper way and technically workmen like manner. Repairing by rubber tubes or by fixing wooden peg shall not be allowed. Register of leakage repairing shall be maintained with detailed reasons properly.
23. Proper care shall be taken by contractor to keep the pumphouse, quarters, stores and surrounding area neat and clean and free of dust and waste if any. Regular cleaning of exposed surface area of components fitted in the pumphouse with door, window, floor etc. Shall be made by the contractor. Floor shall be cleaned daily with floor cleaner. All the toilet blocks shall be cleaned with cleaners.
24. All the gardens and plants at headworks sites shall be supplied water and maintained properly by contractor regularly as directed by the Engineer-in-charge. No extra payment will be made on account of this work. Regular cutting of garden lawn, trees and plants as per requirement shall be made and cutting material shall be disposed of/stacked as directed by the Engineer-in-charge at suitable place. Sprinkler System for watering in garden, fountain & garden lights have to be maintained by the contractor.
25. Servicing of all the components including all types of valves, cleaning of all civil works and maintenance shall be carried out regularly by contractor and register shall be maintained with dated details.
26. History sheet shall be maintained by contractor for replacement of components, equipment and parts in pipeline, or valves, spare parts of electro-mechanical equipment.
27. All the existing civil works of projects under O&M period shall be painted with approved paint once in a 2 year during O&M period at the cost of contractor as directed by the Engineer-in-charge. The material for painting shall be of same kind and brand or equivalent as used at the time of construction. The exposed surface of electro-mechanical parts shall be painted with the approved oil pint/anti corrosive paint once in 2 years during O&M period at the cost of contractor as directed by the Engineer-in-charge. The material for painting shall be of good quality and the work shall be carried out in workman like manner. The material for painting shall be got approved from the Engineer-in-charge before use. The material shall fulfil the Indian standard requirement. Useful material if any shall best stacked and stored as directed by the Engineer-in-charge.

If the contractor not carried out the work of painting in time as directed by the Engineer- in-charge, the cost of painting will be recovered at prevailing SOR rate and also for other Items/activity not carried out by the contractor, deductions shall be made as mentioned above. In case of Item is not available in SOR, the recovery shall be made at the current market rate by preparing the Rate analysis which shall be binding to the contractor and the decision of the Engineer-in-charge shall be final. The contractor shall have to submit the photographs of painting work (Before/ during/ after) to the Engineer-in-charge.

28. The telephone/ wireless/ SMS/ e-mail messages received shall be entered in the register and action shall be initiated under the intimation of Engineer-in-charge or his representatives. If any interruption in the system, message shall be conveyed immediately to the Engineer-in-charge. The contractor shall have to procure and establish one computer with printer and internet connection forgetting the instruction by-mail and e-mail correspondence at pumping station as decided by the

Engineer-in-charge and name and contact person who look after the whole project will also be intimated in writing with e-mail address to the Engineer-in-charge.

29. The contractor shall have to engage/employ the unskilled /skilled labour, fitter, technicians with proper qualification and sufficient experience shift wise and vehicles. If due to negligence of contractor for providing sufficient staff and vehicles, water will not supply properly, required labour/staff and vehicles will be deployed by Engineer-in-charge and recovery for such expenditure shall be made from the contractor. The decision of Engineer-in-charge shall be final and binding to the contractor.
30. The contractor has to make all the arrangements required for the proper operation, maintenance and safety of all the works included in this contract at his own cost during the whole contract period. Contractor should carry out this work without disturbing the continuity of pumping, but for major repairing work, the restoration period shall be as decided by the Engineer-in-charge.
31. Continuous patrolling with Jeep and required personnel along the alignment shall be carried out by the contractor.
32. Separate register for receipt & release (pumping) of water from each pumping station shall be maintained day today with hourly record by the contractor and submitted to the Engineer-in-charge at the end of month.
33. Repairing of all electro-mechanical and civil work shall be carried out at site including valve chamber located at site without any extra cost. If any part /equipment required to be sent to manufacturer/authorized service station/outside the project area, prior approval of Engineer-in-charge shall be taken. If The Electricity Supplier suggests replacing the current transformer, the same shall be replaced by the contractor at his cost. If necessary, test in is required to be carried for the current transformer at site/ at ERDA/ at the manufacturer premise, the cost of the same shall be carried out by the contractor at his cost.
34. All the storage structures should be filled with water as per requirement & availability of water and electricity except in unavoidable circumstances. If there will be a failure in electric supply, the contractor shall immediately lodge complain to The Electricity Supplier for restoring the electric supply & intimate to the Engineer-in-charge with reasons for non- availability of electric supply.

The sump de-silting shall be carried out once in a year during O&M period. Three days closer will be given for that purpose. If closer is not available, the contractor shall have to made arrangement of mud pump sand toed-silt the sump in a day period. If sump cleaning is not carried out by the contractor, the amount will be deducted from outstanding payment to contractor/security deposit by preparing the Rate analysis for that activity. The Decision of Engineer-in-charge shall be final and binding to the contractor. The contractor shall have to submit the photographs of sump de-silting work (Before/during/after) to the Engineer-in-charge.
35. List of all the assets, pipeline and appliances, plants & machineries, all types of valves, chambers, pump houses, office building, hydraulic civil structure, spare parts, store materials, telephone, electric panels etc. Will be handed over to contractor for operation and maintenance purpose and the same shall be handed over back to the Engineer-in-charge in good working condition as soon

as the project is taken over by Engineer-in-charge or other agency as decided by the Engineer-in-charge for operation and maintenance for next contract period.

36. During the period of contract, the contractor shall have to deliver the water satisfactorily at any point of whole system as per requirement (at tank, headwork's /off take point). If the contractor fails to do so, and there as given by the contractor is not found satisfactory in the opinion of Engineer-in-charge, necessary actions including recovery of water charges at prevailing rates with penalty if any will be taken by the Engineer-in-charge against the contractor which shall be binding to the contractor.
37. Any damaged one by the mischievous element in the system, the contractor should lodge police complain/FIR immediately under intimation to Engineer in-Charge at local police station.
38. The total wastage of water due to leakage, breakage or any other reason shall not be more than 5%. If the wastage of water exceeds the prescribed quantity, recovery at the prevailing rate of water shall be made from the running bill of contractor. Quantity of water wasted will be decided by Engineer-in-Charge and decision of Engineer-in-Charge shall be final and binding to the contractor.
39. The contractor shall maintain the continuity of pumping for 24 hours for routine checking of pumping machinery and system as given in the tender. Contractor shall carry out this work without disturbing the continuity of pumping. For major repairing work, the restoration period shall be as under or as decided by the Engineer-in-Charge considering the site situation and dewatering of pipe.
  - i. Repair of M.S. Pipe- 24hours.
  - ii. Replacement of all control valves & sluice Valves- 24hours.
  - iii. Repair of air valves, scour valves, and sluice valves- 12Hours.
  - iv. Cleaning of sump (Once in a Year)–7Days.
  - v. Replacement of electro- mechanical spares of equipment -24 hours or as per requirement For major repairing shut down will be given as per requirement as decided by the Engineer-in-charge. If the major repairing period shall be more than the mentioned above and the reasons for more period shall be beyond the control of the contractor due to technical reason, in such a case the matter shall be referred to the Superintending Engineer and decision of Superintending Engineer shall be final and binding to the contractor.
40. Material consumption register in prescribed format shall be maintained by the contractor. During the visit of Engineer-in charge or his representative, if required it shall be produced.
41. Vehicles shall be maintained and to be kept ready during whole O&M period at each Pumping Station site by contractor and to be used for day today routine checking/ repairs and maintenance. If contractor fails to provide a vehicle for repairing, the department will hire the vehicle for completion of the repair and the hiring charges shall be recovered from contractor.
42. The Contractor shall operate the whole system with pumping stations and associated services, on a continuous 24 hours basis to supply water, as received from source, through pipeline up to desired point of supply with assured quantity as and when directed.

43. The Contractor shall operate and utilize all the control and monitoring systems, provided and if found to be necessary and if approved by the Engineer-in-charge, shall make adjustments within the operating range of the control system and equipment so that the plant operation matches the requirement.
44. The Engineer-in-charge shall directly pay the entire amount of electricity bill to The Electricity Supplier. The contractor shall require furnishing the electricity consumption in the prescribed schedules to Engineer-in-charge. Telephone bills shall have to be paid by the contractor. No reimbursement shall be made to the contractor for telephone bills. The contractor shall provide the mobile phones to the staff engaged/employed by him and the mobile phones shall be in working condition throughout the contract period and all the expenses shall be borne by the contractor. If any quarter situated in the pumping station allotted to the contractor, the electricity bill of the quarter will be borne by the contractor. Maximum two staff quarter unit will be provided at each pumping station to the contractor with a monthly rent of Rs.1500/- per each unit if available and the amount of rent shall be deducted from the bills of contractor. The rent of quarter will be increased at 5% per year during the O&M period.
45. Electric/battery operated flow meter shall be maintained by the contractor. In case failure of batteries, the same shall be replaced by contractor at his cost. Only battery-operated instruments will be considered for change of battery.
- Required vehicles, tools, testing equipment, cleaning or green keeping equipment, security and safety equipment, electrical equipment/ fixtures, mechanical equipment etc. shall be provided by the contractor at his expense for performing the activities under operation and maintenance period.
46. The contractor shall ensure the continuous operation of the raw water pumping station and the break down or deterioration in performance, under normal operating conditions of any items of plant and equipment and component-parts thereof is kept to a minimum.
47. The contractor shall adhere to the manufacturer's recommendations with respect to equipment maintenance, the type and grades of lubricants to be used. Frequency of lubrication, adjustments to be made regularly and recommended spares to be held in store.
48. Visit and Inspection register
- i. The Employer reserves the right to arrange the visits of VIP's dignitaries, public representatives, and other persons of Social or Political repute, any organization as and when necessary, to the Pumping Station. The Contractor shall provide full co-operation to the Engineer-in-charge on the occasions of every such visit.
  - ii. Inspection and instruction register shall have to be maintained by the contractor, where in inspection officers will note their instructions with dated signature and the contractor shall have to follow the instructions strictly and takes the actions as per instruction.
49. On the date of completion of O & M period, while the project with all the installations, works and equipment placed under the contractor's responsibility for operation and maintenance shall be handed over to the Engineer-in-charge or to the other agency as instructed by the Engineer-in-charge in good working condition. The Engineer-in-charge may perform any inspections, tests or

expert appraisals, he shall consider necessary with a view to checking that the property is in good working order and will certify to that effect to the contractor while taking over.

50. For smooth & efficient O&M of whole project and in case of emergency like fire, fault, accidents or for other rescues operation, the contract or must keep one four-wheeler like jeep and matador type with seating arrangement at pumping station in working condition for 24 hours of a day during whole O&M period.
51. While handing over the spares to the contractor, contractor shall have to maintain the record of spares of inventory of utilize the spares. The utilized mandatory spare parts shall be purchased by the contractor and reimbursed in the store inventory.
52. Contractor shall have submitted the O&M manual with detailed scheduling. If any change suggested by the Engineer-in-charge the same shall be made by the contractor. The O&M manual with detailed scheduling shall not be approved from the Engineer-in-charge.
53. All protective Relays testing, calibration system for service and maintenance of relay shall be carried out systematically by trained personnel specialized in power system protection, once during O&M period without any extra cost. The contractor shall get the prior approval from the Engineer-in-charge to commence of work of such special testing job. Proper testing equipment shall be used to avoid the misleading of settings & call for nuisance tripping.
54. Contractor shall have to bear the expense of annual inspection fee for electrical installation by any competent authority/TPI during the O&M period. No extra payment shall be made for such an annual inspection. Engineer-in-charge will provide basic erection & commissioning data available.
55. Contractor shall justify the power consumption, quantity of water & power factor through third party inspection agency as suggested/ approved by the Engineer-in-charge & no extra cost shall be paid for this work to the contractor.
56. If Engineer-in-charge need, repairing work shall be got checked by third party inspection agency as suggested/approved by Engineer-in-charge and charges of the same shall be borne by contractor. No extra payment shall be made to the contractor.
57. Agency shall have to obtain satisfactory working of pumps & other equipment certificate from at every three months from third party agency as suggested/ approved by the Engineer-in-charge and the discharge of pumps shall also be checked by flow meter as suggested by Engineer-in-charge.
58. Any repairing to electro-mechanical equipment's, pipeline, valves etc. shall be immediately attended and repaired satisfactory by the contractor and duly certified by third-party agency if instructed by the Engineer-in-charge.
59. Instructions for operation:

Contractor shall ensure that valve operator engaged by him having experience and sufficient know how about operating valve.

- (a) Before starting water:

Before starting valve by valve operator, scrutiny on following points shall be made:



- i. Checking leakage at any point.
- ii. Valve should open or closed slowly.
- iii. Valve should be opened as per requirement of water.

(b) Valve operator shall take care during supply in progress as shown below.

- i. To open valves slowly.
- ii. To check the delivery head pressure gauge and valve should be made throttle to regular constant flow of water and keep constant supervision on the pressure.

(c) Valve operator shall take care at the time of closing the valve.

- i. Valve should be closed not at-once but slowly and slowly.

(d) For any default noticed, it may be mentioned on notice board at headwork's site. Contractor shall bring necessary material, manpower, T & P and vehicles for repairs. Contractor shall get monthly checking of measuring instrument like water meter, pressure gauge, flow meter, water level indicator through his representative and note of it shall be made in notebook duly counter signed by departmental representative. These details shall be maintained at headwork, and it shall be produced before inspecting officer when he visits the site. The responsibility of agency for entire operation under headwork's and water supply arrangement shall be for the time prescribed under agreement. That time will be extended with the consent of both the parties. If power supply fails operator shall immediately inform the engineer-in-charge or his representative by telephone and file a complaint about it with persons concerned of Gujarat Electricity Board on Telephone. Noun authorized person shall be allowed in the premises of department. Contractor shall be responsible for the security of all the materials on distribution system and machinery under head work. During the charge of contractor, he shall be responsible for any or accident, and no compensation shall be paid by the department. During charge of contract or if any default to any implement has occurred contractor shall get it repaired and for that no extra payment shall be made.

#### 60. DOCUMENTS/ RECORDS/ LOGBOOK

- a. The contractor shall be responsible for keeping up to date records of documents including history card for equipment and maintaining everyday log book relating to various analysis performed and to prepare and submit a daily report of pumping station performance. The contractor shall maintain and updated logbook and details of operational parameters like pumping hours, A- meters, Flowmeter reading, HT Voltage, Power Factor, energy meter reading, pressure and other reading required are recorded in every shift at regular interval e.g. hourly.
- b. Printing of log sheets, registers and all necessary stationery required for maintaining records of operations and maintenances shall be arranged by the contractor at his cost. Format of log sheets, registers will be made available to the contractor by the Engineer-in-charge.

- c. The scope of work also includes attending of all HT & LT cable faults including end terminations of cables, changing of lugs or changing HT/LT cables.

#### 61. NOTICE BOARD /DISPLAYBOARD

The contractor shall provide a notice board/ display board at an appropriate location detailing precaution to be taken by operation and maintenance personnel in work conformity with industries and labour regulations and department of explosives.

Table 1 - Annexure M1 : Mechanical Tools &amp; Tackles &amp; Test Equipment for O&amp;M Period for pumping station

Sr. No.	Description	Quantity	Unit
1	Double open-ended Spanners 5-32 mm 32-36 mm 41-50 mm 50-56 mm	2	Set
2	Box Spanners 5-32 mm 32-36 mm 41-46 mm	1	Set
3	Single Open-ended Spanners 50mm 52 mm 56 mm	2	Set
4	Allen key Spanners: 1.5 – 16mm covering the entire range	1	Set
5	Pipe Wrenches 300 mm long 450 mm long 600 mm long	1 1 1	No. No. No.
6	Pipe Die set with wrenches BSP threads covering 12mm to 50mm range	1	Set
7	Ratchet Die set complete with threaded Chasers up to 100mm	1	Set
8	Torque Wrenches i.) up to 50 kgm ii.) up to 100 kgm	1	Set
9	Dial gauge 0.01mm accuracy with magnetic base	1	Set
10	150mm Feeler gauges 0.01mm to 1 mm	1	Set
11	Thread Gauges 10mm to 52mm covering all sizes	1	Set
12	Thread gauge for pipe threads – 12mm,20mm,25mm,32mm,40mm, and 50mm nominal bore	1	Set
13	Precision square level 0.02mm/meter for verticality checks	1	No.
14	One Set of tube cutter for tubes up to 12mm	1	Set
15	Grease Gun	2	Set
16	Coupling Puller suitable for main drive coupling.	2	Set
17	Pipe Hacksaw Frame	2	Pcs
18	Vacuum cleaner for periodical cleaning of equipment's, cleaner operating on 230 volts 50 Hz AC supply complete with cable and all standard and optional accessories	1	No

Table 2 - Annexure M2: Mechanical Mandatory Spare Parts for Pumping Station

Sr. No.	Description	Quantity	Unit
<b>1</b>	Spares for VT Pump		
a	Shaft Sleeves	2	Set
b	Bearing of pumps (all bearings) including thrust bearing as applicable.	1	Set
c	Bearing of motor (all bearings including thrust bearing as applicable)	1	Set
d	Wearing rings or equivalent for impeller (if applicable)	1	Set
e	Wearing rings or equivalent for Casing	1	Set
f	Impeller Shaft and Line Shafts with fasteners (as applicable)	1	Set
g	All Shaft Couplings with fasteners (as applicable)	1	Set
h	Coupling between pump and motor & coupling guards	1	Set
i	Bushes for the all Couplings as applicable	1	Set
j	Mechanical seal or gland packing as applicable for the pumps	1	Set
k	Thrust bearing pads	2	Set
l	All Gaskets	1	Set
m	Impeller with impeller nut	1	Set
n	Oil Seal Ring (if applicable)	2	Set
o	Deflectors (if applicable)	2	Set
<b>2</b>	Complete Assembly of Metallic Expansion joints including bolts & nuts	1	Set
<b>3</b>	All required Spares & parts for Drainage Water Pumps	1	Set
<b>4</b>	All Spares for all types of valves of sizes 800 NB and below	1	Set
<b>5</b>	Mechanical Ventilation system		
a	Supply Air Fan	1	Nos
b	Exhaust Air fan	1	Nos

Table 3 - Annexure E1: Electrical Tools &amp; Test Equipment for Pumping Station

Sr. No.	Description	Quantity	Unit
1	<b>Tools</b>		
A	Set of Spanners of size 6 mm to 32 mm width across flat		
(i)	Adjustable wrench of 36 mm jaw width	2	Nos.
(ii)	Adjustable wrench of 23 mm jaw width	2	Nos.
B	Heavy duty screw driver with full size insulated handle and blade length.		
(i)	100 mm	2	Nos.
(ii)	150 mm	2	Nos.
(iii)	200 mm	2	Nos.
2	<b>Test Equipment</b>		
A	5000 V Insulation resistance Tester/megger, motor operated	1	Nos.
B	2500 V Insulation resistance Tester/megger, motor operated	1	Nos.
C	500 V Insulation resistance Tester/megger, motor operated	1	Nos.
D	Multimeter (Battery operated) satisfying the following	2	Each
(i)	With 0 - 1mA, 0 - 100 mA, 0 - 1A and 0 – 5A, AC & DC current ranges.		
(ii)	With 0 – 100 mV, 0 – 3V, 0 - 30V, 0 – 300V and 0 -1000V AC & DC voltage ranges		
(iii)	The resistance ranges shall be at least five (0 - 100) m ohm, (0 - 1) ohm, (0 - 10) ohm, (0 - 100) ohm, (0 - 100) mega ohms		
(iv)	The input impedance shall not less than one mega ohms for voltage ranges		
E	Tong tester – ammeter range 0 to 30-, 150- and 300-amps AC and Voltmeter (0 - 600) V, class 1.0 with leads and leather case	2	Nos.
F	Clamp ON Meter for Measurement of AC &DC Current Ratings	2	Nos.
G	TAPARIA Make Tester for Checking of Supply ON/OFF	5	Nos.
H	HI-POT Kit with Transformer for Cable Hi- Pot Test	1	Nos.
I	Earth tester	1	Nos.
J	Cable fault locator	1	Nos.
K	Relay testing kit	1	Nos.
L	Circuit breaker analyzer	1	Nos.
3	<b>Crimping tools</b>	2	Nos.
A	Hand operated crimping tool with three built in dies suitable for	1	Nos.

	crimping copper & aluminium cables of sizes 1.5 mm <sup>2</sup> to 400 mm <sup>2</sup> .		
B	Hand operated portable hydraulic crimping tool with dies suitable for crimping cable of sizes 10 mm <sup>2</sup> to 400 mm <sup>2</sup>	1	Nos.

Table 4 - Annexure II: Instrumentation Mandatory Spare Parts for Pumping Station

Sr. No.	Description	Quantity	Unit
<b>1</b>	<b>Field Instruments</b>		
a	Pressure Gauges	4	Nos.
b	Ultrasonic Level Transmitter	1	Nos.
c	Float and Board type Level Gauge/ Indicator	1	Nos.
<b>2</b>	<b>All required instrumental parts for all panels i.e., push button assembly, selector switch, MCB, fuse, limit switch, SMPS, instrumentation cables, communication cables etc.</b>	1	Lot

**Note:**

Any additional spare parts required for O & M but not covered in the all above list should be arranged by the Contractor.