Himachal Pradesh
Jal Shakti Vibhag

No. JSV-SE (P&I-I)-D-I-Technical Committee-2023-24- 661-71 **Dated:-** 28/4/2023

To

The Engineer-in-Chief (Project),
Jal Shakti Vibhag, Mandi

The Engineer-in Chief,
Irrigation and Flood Control,
Dharamshala

The Chief Engineer,
Hamirpur Zone, Shimla Zone,
Mandi Zone, WSSO & PMU

Subject: **Minutes of 2nd meeting of State Level Technical Committee for the year 2023-24.**

Enclosed please find herewith the minutes of 2nd State Level Technical Committee meeting for the year 2023-24 held on 24.04.2023 at Jal Shakti Bhawan, for your kind information and necessary action.

DA: As above

Engineer-in-Chief,
Jal Shakti Vibhag,
Jal Shakti Bhawan, Shimla-05.

Copy to:

1. The Secretary (JSV) to the Govt. of Himachal Pradesh Shimla-02 for information please.
2. The Chief Engineer (D&M), Jal Shakti Vibhag, Jal Shakti Bhawan, Shimla-05 for information please.
3. The Superintending Engineer (Works), Jal Shakti Vibhag, Jal Shakti Bhawan, Shimla-05 for information please.
4. The Controller (F&A), Jal Shakti Vibhag, Jal Shakti Bhawan, Shimla-05 for information please.

Engineer-in-Chief,
Jal Shakti Vibhag,
Jal Shakti Bhawan, Shimla-05.

Minutes of 2nd meeting of State Level Technical Committee for the year 2023-24 held on 24.04.2023 at Jal Shakti Bhawan Shimla-05.

2nd meeting of the State Level Technical Committee to deliberation upon the technical suggestions received from the officers of the department was held at Jal Shakti Bhawan and through Video Conference on 24.04.2023.

At the outset, the Superintending Engineer (P&I-I) welcomed the Chairman and all members to the 2nd meeting of SLTC for FY 2023-24.

List of Participants is as per Annexure "A" attached.

Accordingly, agenda items were taken up for discussion one by one as detailed below:

A. <u>Internal Discussion</u>

1. **Draft Guidelines for 24x7 Rural Water Supply Systems:** The Draft guidelines for conversion of Rural Water Supply Schemes into 24X7 water system were discussed during the 1st meeting of SLTC held on 18.04.2023 wherein it was decided to circulate the amended Draft Guidelines to all the members for perusal as well necessary comments thereon. The matter was again deliberated during the 2nd meeting of SLTC held on 24.04.2023 and the guidelines have been finalized as under:

Guidelines for Rural Water Supply Schemes (Designed at 70LPCD at consumer end) for conversion into 24X7 Water Supply System.

1. Identified schemes should have adequate discharge at source and need to be mandatorily associated with due consent/willingness of beneficiary villagers in the shape of a resolution passed by the General House of concerned Gram Panchayat.
2. The existing infrastructure of the scheme should be used as far as, practicable to effect economy.
3. Design rate of water supply shall be at least 70 LPCD at consumer end + 15% conveyance losses and should be based on the theme "**Drink from Tap**".
4. Capacity of Store Reservoir for the Operational Zone should be at least 33% of the ultimate demand. However, the capacity of Main Balancing Reservoir should be based on [mass balance calculations+ 15% of water supplied +3 % Fire demand].
5. Minimum residual head shall be 12m at consumer end at ground level.
6. Staging height of the Elevated Service Reservoir (ESR) in the 24X7 **Operational** Zone be kept so as to maintain a minimum residual head of 12 m at each household at ground level.
7. Each household shall be metered.
8. Scheme be provided with all necessary valves as per requirement at site i.e. Isolation Valves, Bulk Flow meter, Pressure regulating Valves.
9. Water quality and disinfection protocol be followed as notified by GoHP (copy attached).

10. 24x7 Water System should be implemented with incremental Block tariff for which Tarrif structure shall be submitted to GoHP for approval.
11. A detailed survey of the 24X7 Operational Zone is mandatory for planning an efficient 24x7 water supply system.
12. The draft design parameters to be adopted for 24X7 water supply system are enumerated as under:-

Design Methodology for 24 x7 WSS:

- **Design period :**

  Design period for water supply system is considered as 20 years + construction period. However, different components of water supply system should be designed to work satisfactorily for different periods as below:

  (a) Headworks should be designed for the forecasted demand of 30 years + Construction Period as it is not possible to construct additional head work in the submergence of the dam/water bodies. Moreover it will act as sustainability in the scheme.

  (b) Water treatment plants, clear water reservoirs, balancing and service reservoirs should be designed for a period of 20 years + construction period.

  (c) Electric motors and pumps should be designed for a period of 10 years + construction period for the forecasted population of intermediate stage and land should be kept available for ultimate stage and for future expansion.

  (d) All pipelines including raw and treated water transmission mains and distribution should be designed for forecasted demand of ultimate stage (20 years +CP) pump house and pipe connections to several treatment units and other small appurtenances.

- **Land Required for Water Supply Infrastructure:**

  Department should earmark the land required for water supply infrastructure and its expansion of ultimate stage for next 20 years or more (only for new schemes to be designed on 24X7 pattern).

- **Population forecast:**

  Ward wise forecast of population and population density or decadal growth (1.25% per annum) finalized by JSV department for rural area. Not only total population of village/ gram panchayat but its ward wise distribution and computation of ward wise future population density based on equivalent area may be adopted

- **Per capita supply of domestic / non-domestic for design:**

  Domestic Supply at consumer end for village should be 70 LPCD excluding conveyance losses. Non-domestic demand, bulk supply etc. should be computed as per actual consumer survey. The non-domestic demand should be assigned to the respective demand nodes. Fire demand should be added

to domestic demand proportionately. The institutional water demands like school, hospitals and other offices in the village shall be adopted as per prevailing defined norms.

- **Total demand :**

  In addition to domestic demand, commercial demands (hotels, lodges, hospitals, market etc.) and institutional demand (schools, colleges, offices theatres etc.) duly extrapolated for different stages should be added as point loads to the respective nodes in distribution system. Total demand should be computed by adding following losses: Total losses in the system should not exceed 20%. Indicative, break up of losses is as below: (a) Head work to inlet of WTP should not be more than 1% (b) In WTP losses should not be more than 3% (c) Outlet of WTP to various storage reservoirs- losses should not be more than 1% (d) In distribution system losses should not be more than 15%.

- **GIS Mapping**:

  It is necessary to use GIS system. GIS mapping of the entire existing, proposed and executed infrastructure is required. GIS simulating modelling should be adopted. Existing laid pipelines shall be identified by pipe alignment survey. Trial pits shall be dug at suitable intervals to know pipe material, diameters etc.

- **Supply Hours and Peak Factor:**

  For gravity WSS:

  (a) The transmission system for both raw water and treated water including all pipelines up to Storage reservoirs should be designed for 24 hours of supply.

  (b) Distribution system should be designed for a peak factor of 2.5 irrespective of population.

  For Lift Water Supply Scheme:

  (a) The rising main transmission for both raw water and treated water including all pipelines up to Storage reservoirs should be designed for 8 hours of supply preferably upto 1MLD ultimate water demand and 16 hours for more than 1MLD ultimate water demand (in case of new water supply schemes designed as 24X7 system).

  (b)Distribution system should be designed for a peak factor of 2.5 irrespective of population.

- **Water Treatment Plant :**

  It shall be provided as per requirement.

- **Disinfection System:**

  It shall be provided as per the minutes of SLTC dated 04.02.2023 (**Copy attached**).

- **Minimum Diameter of Pipe for water main and distribution :**

  Minimum 50 mm dia for gravity main and 32 mm for distribution system shall be provided.

  Minimum residual head at consumer end :

  It is recommended to consider a minimum residual head of 12 m at the consumer end at ground level.

- **Capacity of Storage reservoirs/ GSRs:**

  Capacity should be determined by mass balance calculations. However, minimum capacity should be 8 hours storage of the total demand of the operational zone (OZ) of that ESR.

- **Fire Demand**:

  Fire demand may be taken as 3% of the ultimate water demand of Operational Zone to be taken as dead storage in the balancing reservoir.

- **Consumer meters , Water tariff and Bulk metering:**

  Distributing water with 100% consumer metering is the need of the hour. Hence, consumer metering is necessary. Water supply to a house begins with connection of the service pipe with water supply mains. The internal plumbing shall be the responsibility of the consumers. Suitable bulk metering system shall be provided.

- **Hydraulic Modelling**:

  Hydraulic modelling is the basic tool in designing of operational zones (OZs) and District Metering Areas (DMAs) required for 24x7 water supply system. GIS based hydraulic model should be adopted. A GIS enabled water supply system is more effective in O&M also. Values of elevations and demands must be given to each node using software tools. Only two hydraulic models should be prepared for entire village area- (i) for entire distribution system and (ii) for raw/ treated transmission mains. If the village is exceptionally large and is divided into excessively big zones, then the two models as above should be prepared each for the respective big zone.

- **Creation of operational zone**:

  The main principle of decentralised planning is that each service reservoir should have one operational zone (OZ) and each OZ to receive water from only single reservoir. These OZs are further sub divided in DMAs. Each OZ and each DMA should be hydraulically discrete. Such OZs should be created for entire village by following proposed hydraulic parameters of residual head and the respective peak factor.

- **Maximum size of OZ**:

  OZ should be designed for a population preferably not more than 500 connections /families. For very hilly areas, maximum connection/household per OZ can be preferably about 200 or less as per population of OZ.

- **Design of DMA, its boundary, and Maximum size**:

  Number of DMAs in one OZ should not be more than 4 and each DMA should be hydraulically discrete. Each DMA should have house service connections (HSC) preferably not more than 500. However, the size of an individual DMA may vary, depending on number of local factors and system characteristics. All DMAs should be fed by exclusive pipeline from outlet of ESR in OZ with branches and from these pipelines consumer connections should not be given. Each DMA should have only one inlet. By this arrangement and by limiting the size and boundary of DMAs equitable distribution of water as per designed nodal demands with designed residual head can be achieved.

  Bulk meters shall be installed at head work, inlet, and outlet of WTP and at entry of each DMA.

- **Control valves (i) PRVs (ii) FCVs:**

  (i)PRVs are needed in hilly areas. PRVs are also needed when some of the DMAs are situated on lower elevations. (ii) FCVs with Solenoid at entry of DMA shall be provided.

- **Isolation valves:**

  For enabling effective break down maintenance of leaky pipes in distribution system, adequate number of isolation valves should be provided to isolate the network.

- **Flow Computation:**

  Flow can be computed using Hazen William method or Darcy-Weisbach method.

- **NRW control measures (Leakage program)**:

  Since bulk meter at entry of DMAs and 100% consumer meters are to be installed, Active leakage management program is essential. The NRW values can be computed by (a) knowing quantity of water entering DMA and consumption in DMA); (b) conducting Step tests. (3) NRW should be brought down to at least 15%.

- **Water quality**:

  Water quality should be monitored as per IS 17482:2020

- **Supervisory Control and Data Acquisition (SCADA)** :

  SCADA system is essential to monitor the flow and functioning of the water supply systems including night flow and leakages.

2. **Specifications for liquid Chlorine Sodium Hypo Chlorite (NaClO) Dosing System and Specifications for Gaseous Chlorine Dosing System (Vacuum Feed type)**

   During the meeting, the Specifications for liquid Chlorine Sodium Hypo Chlorite (NaClO) Dosing System and Specification for Gaseous Chlorine Dosing System (Vacuum Feed type) were put forth before the Committee and after deliberation the following specifications for disinfection of water supply scheme in the State have been finalized as under:

SPECIFICATIONS FOR GASEOUS CHLORINE DOSING SYSTEM (VACUUM FEED TYPE)

TECHNICAL SPECIFICATIONS

Gas chlorinator having capacity upto 2000 gm/hr for continuous disinfection through chlorine (Cl2) in water consisting of: -

a) 1 Nos. Full vacuum chlorination system in all respect consisting of

   (i) Regulator

   (ii) Measuring Glass Tube

   (iii) Injector

   (iv) PF Tubing

Operating Procedures: -

Vacuum-operated gas chlorination system should be compatible with the existing system designed to ensure disinfection even when the system is unattended.

Technical Specifications: -

A. Gas Chlorinator having capacity of 2000 gm/hr.: -

1. Vacuum Regulator: -

(i) Constructed using fiberglass reinforced polyester/ rigid PVC.

(ii) Main Regulator Diaphragm should be of teflon silver, or bronze or steel backed with silver or teflon foil.

(iii) Nuts, bolts and brackets should be of chromium plated brass or cadium plated mild steel.

(iv) Loss Of Chlorine Supply indicator/pressure gauge.

2. Measuring Tube: -

Manual control of chlorine gas dosage through control of gas upto 20th part of maximum dose.

(i) Visible markings on the measuring tube for visual checkingand setting of chlorine gas dosage being injected into water.

(ii) Constructed using using fiberglass reinforced polyester/ rigid PVC

(iii) Variable area precision Borosilicate glass tube with Pyrex glass indicating float with English and Metric graduations.

3. Injector : -

(i) Fixed throat type/adjustable throat type/anti syphon fixed throat type.

(ii) Should be of chlorine resistant PVC, bronze, hard rubber in cast iron or ebonite body with renewable nozzle and throat.

(iii) Maximum Back Pressure Resistance of the ejector - 200 PSI(pound per square inch)/ 13.78 Kg/cm2.

(iv) Dual check valve for High/Low Back Pressure.

Environmental and Operational Requirements:

(i) Operating voltage 220 VAC

(ii) Maximum Inlet Pressure of water: 200 PSI (pound per squareinch)/ 13.78 Kg/cm2

(iii) Operating temperature: 0° C to 50° C

(iv) Operating humidity: 0 to 95% non-condensing relative humidity

B. ONLINE WATER ANALYZER FOR RESIDUAL CHLORINE ANDTURBIDITY

(for schemes with capacity > 5mld)-Optional

Online residual chlorine and turbidity analyzer for continuous and online monitoring of drinking water.

Operating Procedures: -

(i) The method of measuring residual chlorine will becolorimetric or sensor based.

(ii) The low range online turbidity-meter consisting of white light source and 360° x 90° detection system consisting of a minimum of four nos. sensors with predictive diagnostics designed to continuously monitor turbidity in a sample stream.

Technical Specifications: -

I. Performance Requirements for residual chlorine: -

(i) Measurement range: 0 to 10 mg/L (ppm) available chlorine

(ii) Accuracy: ± 5% of reading or ± 0.1 mg/L (ppm), whichever is greater from 0 to 5 mg/L (ppm) as Cl2 and ± 10% of reading from 5 to 10 mg/L(ppm) (as Cl2

(iii) Resolution: 0.1 mg/L (ppm)

(iv) Repeatability: 5% of reading or 0.1 mg/L (ppm), whichever is greater

(v) Configurable Cycle Time: 2.5 minutes to 10 minutes

II. Performance Requirements for turbidity

(i) Detection Limit: 0.1 NTU

(ii) Accuracy: ± 5% of reading ± 0.1 NTU from 0 to 10 NTU based on formazin primary standard at 25°C

(iii) Resolution: 0.1 NTU

(iv) Repeatability: 5% of reading or 0.1 NTU, whichever is greater based on formazin primary standard at 25°C

(v) Configurable Cycle Time: 30 seconds to 10 minutes

III. Operational Requirements for online water analyzer for residual **chlorine and turbidity:**

Connects to a cloud-based standard controller and is capable of providing remote monitoring of measurement and instrument data on a web-enabled device. Auto-transmission of these data to an IT platform through Cellular (GSM, GPRS,4G/LTE,5G, NB-IoT), LoRa or other RF technology.

IV. Environmental Requirements for analyzer

(i) Sample flow rate: 20 to 100 mL/minute through the analyzer

(ii) Operating voltage: 220 VAC

(iii) Sample temperature: 5 °C to 50 °C

(iv) Operating temperature: 0 °C to 50 °C

(v) Operating humidity: 0 to 95% non-condensing relativehumidity

C. MATERIALS FOR GASEOUS CHLORINE DOSING SYSTEM (VACUUM FEED TYPE)

(i) All the metal parts inside the main body coming in contact with chlorine shall be made of corrosion resistant material, such as silver plated brass, monel, nickel or silver.

(ii) The pipeline for carrying dry chlorine or liquid chlorine under pressure should be either phosphorus dioxide non-arsenical copper conforming to IS : 191 (Part 8)-1980 phosphorous dioxide arsenical copper conforming .to IS : 191 (Part 10)-1980 or carbon steel conforming to IS : 1030-1974.

(iii) Minimum wall thickness & Tolerances for tubes shall be as per IS 10553 (part 2)-reaffirmed 2021

(iv) For carrying moist chlorine, the pipelines should be made of silver, platinum, corrosion resistance alloy steel conforming to grade 19 of IS : 3444-1978, HDEP conforming to IS : 4984-1978 or UPVC conforming to IS : 4985-1981.

(v) Diaphragm of gauges should be of silver and body should be of cast iron alloy, finished in enamel, brass or aluminum alloy. The dial and the pointer should be of anodized aluminium.

(vi) Diaphragm of valves should be of teflon silver, or bronze or steel backed with silver or teflon foil.

(vii) Filter for retaining impurities of chlorine gas should be of monel, silvered metal with renewable glass wool insert.

(viii) Flow meter tube should be of borosilicate glass.

(ix) Nuts, bolts and brackets should be of chromium plated brass or cadium plated mild steel.

(x) Gaskets and packings should be of bonded asbestos fibre or antimony lead (with 2 to 3 percent antimony).

E. OPERATION:

(i) With the start of water supply the entire system shall come under vacuum.

(ii) The built up valve in the main unit shall be able to reduce pressure.

(iii) Only after the system comes under vacuum the valve of the chlorine cylinder shall be opened slowly and then the rate of flow control valve in the unit shall be adjusted.

(iv) At the point of injection the chlorine water concentrate line should dip to about 1.5 m in the receiving tank.

F. INSTALLATION AND SAFETY

(i) The system shall be installed preferably at MDT (Main Delivery Tank) or at suitable location near the pump house .

(ii) For installation of the chlorination plant including handling, storage and safety of Chlorine, chlorine cylinder and drums IS 4263, IS: 10553 (Part 1) may be followed.

(iii) Chlorine gas cylinder shall confirm to IS 3196-Part 4.

(iv) Chlorine shall confirm to IS 646.

(v) The cylinder shall be fitted with ISI marked valves confirming to IS 3224.

The key safety measures mentioned in IS 10553(Part I) are reiterated as under:

(vi) The Chlorine gas cylinder should be accompanied by test certificate from Petroleum and Explosive Safety Organization ,GoI.

(vii) All operating and storing rooms for chlorine gas appliances and containers shall be fire proof.

(viii) Chlorine storage rooms should preferably be provided with chlorine gas alarm device which gives out an acoustic or an optical signal when the chlorine gas concentration is reached, the set value for which is 1·0 mg chlorine per cubic meter of air in case of a person working in the room and 20 mg chlorine per cubic meter of air when no human being is inside the room.

(ix) The sensor for alarm device shall be placed not higher than 300 mm above the floors of the room.

(x) A bottle of ammonia is essential to detect leaks, etc, in case alarm device is not provided.

(xi) Cylinder as well as chlorine shall be tested at every shift period for leaks, first by trying to detect the sharp irritating smell of chlorine, then by passing over each cylinder and around each valve and pipe connections, a rod with a small cotton-wool swab tied on the end, dipped in an aqueous solution of ammonia. If chlorine is present in the air, the swab will appear to smoke due to formation of white cloud of ammonium chlorine. If the leak appears to be heavy, all persons not directly concerned should leave the area and the operator should put on his mask and make a thorough search of the leak. In tracing a leak, always work down-stream that is start at the cylinder and work down along the line of flow until the leak is found.

(xii) Safety equipment like gas masks, rubber gloves, aprons shall be housed in easily accessible (unlocked) cupboard placed outside the chlorination room. Faulty gas mask is worse than none at all. Hence these shall be tested frequently and canisters shall be changed at proper intervals.

(xiii) First aid box and eye wash fountain shall be provided outside chlorinator room.

(xiv) The provisions shall be made for emergency disposal of chlorine from leaking containers. The proportions of alkali and water (in alkali pit) recommended for this purpose is as under:

Recommended Alkaline Solution for absorbing Chlorine						
Container Capacity	**Caustic Soda (100%)**		**Soda Ash**		**Hydrated lime***	
(kg)	**kg**	**Water in ltrs**	**(kg)**	**Water in ltrs**	**(kg)**	**Water in ltrs**
45	57	180	136	450	57	570
67	85	275	204	680	85	850
1000	115	3640	2272	9090	115	1150
Note-When chlorine is to be absorbed in hydrated lime, the solution should be continuously and vigorously agitated.*						

(xv) Water shall never be applied to the chlorine leak to stop it, as it will only make it worse.

(xvi) When a chlorine leak occurs, the ventilation system should be operated immediately before any person enters the chlorination room. Ventilation system should be controlled from outside.

(xvii) In case of fire, the cylinders and drums containing chlorine shall be protected by spraying with water since the containers can burst at temperatures of over 70°C. Source of pressurized water shall be provided adjacent to the chlorination room.

(xviii) Fusible plug, a safety device, shall be provided over all cylinders and containers designed to melt or soften between 70 to 75°C to preclude a buildup of hydrostatic pressure resulting from thermal expansion due to fire and other hazardous conditions.

(xix) Before disconnecting the flexible leads from containers to gas headers, the cylinder valves should be closed first and then the gas under pressure should be drawn from the header and flexible leads before the header valve is closed.

(xx) Solvents such as petroleum, hydrocarbons or alcohols should not be used for cleaning parts which come in contact with chlorine. The safe solvents are chloroform or carbon tetrachloride. Grease should never be used where it comes in contact with chlorine.

(xxi) No direct flame should be applied to the chlorine cylinder when heating becomes necessary.

(xxii) The protective hood over the valve should always be kept in place except when the cylinders are in use.

ELECTRICAL LIQUID CHLORINE SODIUM HYPO CHLORITE (NACIO)/ BLEACHING POWDER ($Ca(ClO)_2$) DOSING SYSTEM

Technical Specifications:

1) Electrical Metering Pump:-

a) (Preferably with a digital display) using solenoid, controlled by an internal circuit to drive reciprocating diaphragm for delivering 0.5 to 6 liters of Sodium Hypo chlorite solution/Bleaching powder solution per hour.

b) Maximum delivery pressure range from 4 kg/cm^2 to 12 kg/cm^2 (delivery pressure to be decided as per the pumping requirement of water supply scheme).

c) Suction lift less than 1.5 meter.

d) The pump should be designed for floor/ tank mounting or wall mounting horizontally.

e) Various components will be as bellow:-

i. **Body:-** ABS/ Nylon / PP & stiff enough to bear the vibrations of the pump designed for mounting

ii. **Pump Head:-** Preferably PP/ PVC having engineering properties, compatibility with strong chlorine solution, high strength requirements suitable for injecting against high pressure, having Ceramic/PVC/ Glass ball valves for suction and discharge, having proper out gassing/ Air Release Valve to prime the pump without touching the chemical, provided with suitable rings to seal the chemical leakage.

iii. **Suction & Discharge Valves:-** Ceramic/PVC/ borosilicate ball and double ball non-return valves, moulded in PP/PVC, threaded type & ring seals made of high quality rubber.

iv. **Diaphragm**:- Made of Teflon, having outside threading, fit for proper screwing on to the piston/ plunger end.

v. **Drive:-** Consist of electronic solenoid/ pulsar **to** run on 230 volts AC supply 50 Cycles per second (Hz) single phase. The solenoid/ pulsar should be provided with On/ Off switch, speed control & neon lamp/ digital display indicating that pump is electrically on. In case of pump with Digital Display, the parameters to be displayed should include but not limited to Pump Capacity, voltage & Strokes Per Minute in percentage. Be capable of continuous duty, provided with inside fuse protection against voltage fluctuations, & having inbuilt stabilizing system workable on 190v to 250v.

vi. **Drive Transmission:-** Consist of well designed electromagnet powered by electronic circuit to give the necessary push to the piston & diaphragm. Magnet body should be properly plated against corrosion due to moisture & should have arrangement for being attached with pump body and design head. The maximum power consumption at peak output should not exceed 30 W & temperature should not exceed 5^{0o} c at peak summer outdoor temperature, on continuous duty.

vii. **Electrical Control & Protection:-** Isolation & inbuilt switch to control the pump independently of tube well pump, neon indicator or Digital Display, and suitable glass fuse should be provided with the pump.

viii. **Control for Seating Dosage Capacity:-** Speed control should be designed to adjust the quantity of solution being pumped from 0 to 100% for accurate dosing.

ix. **Strainer For Foot Valve:-** Moulded in PP / PVC having proper mesh to check the micro sized particles from entering into the pump head. It should have sufficient self weight and should not float in the liquid solution.

x. **Anti-Siphons Injection Valve:-** Threaded type made of PP / PVC with Ceramic/PVC valve or glass ball valve & provided with non-corrosive stainless steel or any non corrosive alloy based spring having enough strength to prevent siphoning & back pressure from injection point to pump.

xi. **Air Release Valve:-** Pump should be equipped with air release valve from tubing with separate discharge point to prevent chemical spillage.

xii. **Tubing:-** Suction & discharge tubing should be Translucent/Transparent PP / LDPE . Injection tubing should be flexible, suitable for high pressure, made of such material suitable for chlorine solution.

xiii. However, where there is no power supply , the possibility of installing Solar Power based dosing system may be explored since the power supply requirement is very less i.e. 30W.

xiv. **Warranty:-**The material should be warranted for period of 3years from the date of installation

2) Dosing Media Container:-

i. Material : HDPE/LDPE

ii. Safe against storage of Sodium Hypochlorite or solution of bleaching powder with fully air tight lid. Minimum thickness of the wall & base of the container should be 3mm. The tank should be provided with easily rechargeable Sodium Hypochlorite, long life, mountable on tank, designed for the quick dissipation of appropriate quantity of chlorine without lime getting in to the water or in the tank. The capacity of container shall be preferably as under:

- WSS upto 1.00lac litre -50litres
- WSS from 1.00 lac to 2lac litre - 100litres
- WSS > 2 lac litre - 200litres

iii. **Warranty:-**The material should be warranted for period of 3 years from the date of installation

3) Measuring Jar:- One liter graduated measuring jar, mouth type, with handle made of material suitable to handle bleaching power solution/ Sodium Hypochlorite solution.

4) <u>Spares:-</u> The following operational spares should be supplied along with the pump:-

i) Glass fuses/

ii) Glass/ Ceramic balls.

iii) 5 Amp Plug.

iv) Anti-siphon spring 1 no.

v) Ring seals 5 nos. each size.

vi) Translucent & opaque tubing 3 mtr. each.

vii) Tubing connectors 5 nos. each size.

5. FOR AUTOMATIC DOSING REGULATION AS PER PRE SET VALUE FOLLOWING IOT BASED SYSTEM COMPONENTS MAY BE INCORPORATED IN ABOVE SYSTEM.

(THIS COMPONENT IS OPTIONAL FOR VULNERABLE SCHEMES AND SCHEMES > 2MLD.)

I. Controller for auto feed of Sodium Hypo chlorite solution/Bleaching powder solution:

(i) Technical Specifications

MOC	:	MS duly powder coated
Operating Voltage	:	230V, 50HzAC, single phase
Control logic	:	PID
Digital display	:	2 Line LCD display
Data logging	:	RS 485 MODBUS RTU(optional)
Data logging	:	Remote monitoring (optional)

ii) Provided with Stroke adjustment by Knob with lockable by password the maximum stroke per minute frequency of atleast 350 SPM, Pump should have level switch interlock system with tank so that pump will turn off when tank level is low/ empty, to prevent dry run:

a) Programmable for Batch Dosing; It is used to dose a fix qty of Dosing Chemical by programmed setting the number of strokes for which pump should operate,

b) Programmable for Interval Dosing It is used to operate the pump in fixed intervals i.e. the pump can be programmed to remain "on" for certain period of time and "off" for certain period of time, after which the cycle will repeat,

iii) In case of floor/ tank mounted system it should be provided with delivery valve suitable for ½ Inch Pipe Connection, SS Nut Bolts for mounting, should have electronic standard Plug suitable for 5 AMP domestic type switch boards., which could be mount on the top of the tank properly.

iv) In case of horizontally wall mounted system, pump should be provided with a facility to fix firmly with the wall through in built self load bearing bracket system, to accommodate pump and box for electric control, which could be fitted on the wall properly.

II. IoT Based Sensor for monitoring of free residual chlorine:-

Technical Specifications:

a. Measurement range: 0 to 10 mg/L (ppm) available chlorine

b. Accuracy: ± 5% of reading or ± 0.1 mg/L (ppm), whichever is greater from 0 to 5 mg/L (ppm) as Cl2 and ± 10% of reading from 5 to 10 mg/L(ppm) (as Cl2

c. Resolution: 0.1 mg/L (ppm)

d. Repeatability: 5% of reading or 0.1 mg/L (ppm), whichever is greater

e. Configurable Cycle Time: 2.5 minutes to 10 minutes

SODIUM HYPOCHLORITE / BLEACHING POWDER SOLUTION FEEDER DISPALCEMENT TYPE CHLORINATOR

Sodium Hypochlorite /Bleaching powder solution type chlorinators for use in water treatment plants in rural water supplies for disinfection of drinking water. The essential features of Sodium Hypochlorite /bleaching powder solution feeder displacement type chlorinator as per **IS10553 (Part 5)** is as under:

CHLORINATOR CONSTRUCTION

1. The displacement type chlorinator shall consists of:

a. A fabricated mild steel pressure vessel with a removable flanged cover, drain and outlet valves and flexible plastic or rubber bag secured tight at its neck into which the Sodium Hypochlorite solution / bleaching powder solution is filled and from which it is fed to the pipeline carrying water to be chlorinated. The pressure vessel is designed for a working pressure of 0.175 N/mm^2 and is tested for 0.35 N/mm^2;

b. An orifice plate or venturi tube to produce a differential pressure in the pipeline. The differential pressure normally employed is 2 m of water head at maximum flow but can be varied, if necessary, to suit specific requirements;

c. Withdrawal injection fitting with isolating valve for insertion in the pipeline with necessary tubing to connect it with the pressure vessel. The fittings are to withstand the pressure within the doser;

d. A dose indicator and regulating valve attached to the pressure vessel; and

e. A solution preparing tank with necessary valves and pipings to enable the solution to flow by gravity into the pressure vessel(**optional**).

2. **MATERIALS:** Materials to be used in different components are as below.

S.No.	Component	Material
i.	Doser shell	steel with lining with rubber, PVC or epoxy
ii.	Bag	Natural or synthetic rubber/flexible plastic
iii.	Charging device operating wheel	Mild steel
iv.	Charging hood	Mild steel with lining inside with rubber, PVC or epoxy
v.	Air release valve	Plastic
vi.	Feed check device/ rotameter: a) Float b) Tube	Polyethylene Glass/PVC
vii.	Inlet Row operating valve	Plastic
viii.	Inlet flow regulating valve	Plastic
ix.	Drain valve	Plastic
x.	Charging device clamp	Mild steel
xi.	Air release vent pipe	PVC

xii.	Spindle for doser	Mild steel
xiii.	Drain pipe or bend	PVC
xiv.	Socket for rotameter drain, air release vent	
xv.	Orifice assembly(where provided)	Corrosion resistance steel

3. **SIZES :** The size of the chlorinator is defined based on the capacity of the plastic or rubber bags. The chlorinators shall be of the following sizes:

   a) 40 b) 80 c) 100 d) 150 e) 250

4. **SELECTION OF DOSER SIZE :** Capacity of doser is selected based on volume of bleaching powder solution required per day. Required volume of bleaching powder solution is calculated using the following formula:

   v=0.1Qx/yz

   where v = volume of bleaching powder solution in litres,

   Q= quantity of water to be disinfected per day (m3),

   x = chlorine dose to be applied (mg/l),

   y - percent strength of bleaching powder solution (percent usually 3 to 5), and

   z = available chlorine in bleaching powder expressed as a fraction (normally 0.25 to 0.3).

5. The device should have provision for locking and anchoring in slab/ground to ensure safety.
6. Should be maintenance free and minimum operational life of at least 60 months (5 years) post the date of installation on-site.
7. System should be capable of being installed anywhere in the PWS network- be it the Pump House or Intermediate Boosting Stations.
8. System should be weather resistant, capable of being installed in open without protective cover for rains and direct day light.
9. The Manufacturer/Supplier shall provide spare parts which are required frequently for at least one year maintenance period

GRAVITY FEED CHLORINATION CONTAINER WITH DRIPPING SYSTEM USING SODIUM HYPOCHLORITE (NaClO) / BLEACHING POWDER ($Ca(ClO)_2$) SOLUTION

SPECIFICATIONS:

1. The container with dripping valve including its sub components coming in direct contact with chlorine shall be made up of HDPE/LDPE/FRP/SS non-corrosive materials. Safe against storage of Sodium Hypochlorite or solution of bleaching powder with fully air tight lid. Minimum thickness of the wall & base of the container should be 3mm. The container should be provided with easily rechargeable Sodium Hypochlorite/ Bleaching powder solution, long life, mountable on tank slab, designed for appropriate quantity of chlorine dosing without lime getting in to the water or in the tank. The container should have storage capacity of filling sodium hypochlorite solution/Bleaching powder solution once in seven days for WSS upto 1lac litres and once in three days for WSS greater than 1 lac litres.
2. Should chlorinate water in accurate manner at pre set value.
3. Should run without the supply of any external power or electricity and capable of being directly installed on tanks /water supply lines.
4. The device should have provision for locking and anchoring in slab/ground to ensure safety.
5. Should be maintenance free and minimum operational life of at least 60 months (5 years) post the date of installation on-site.
6. System should be installed on slab of storage tank/ sump well as per need.
7. System should be weather resistant, capable of being installed in open without protective cover for rains and direct day light.
8. **Warranty:-**The material should be warranted for period of 5 years from the date of installation.
9. **Measuring Jar:-** One liter graduated measuring jar, mouth type, with handle made of material suitable to handle bleaching power solution/ Sodium Hypochlorite solution.

The meeting ended with thanks to the chair.

Engineer-in-Chief,
Jal Shakti Vibhag,
Jal Shakti Bhawan, Shimla-05

हिमाचल प्रदेश सरकार

Himachal Pradesh
Jal Shakti Vibhag

Attendance Sheet

List of Participants who attended the 2nd meeting of the State Level Technical Committee for the year 2023-24 held on 24.04.2023 at Jal Shakti Vibhag.

S. No.	Name and Designation	Signature
1)	Anju Sharma CE JSV	
2)	Rajesh Kashyap SE (P&I-I)	
3)	RAJEEV KUMAR SE	
04.	Ashish Rana, E.E. Nahan	
05.	Mukesh Hira SE Solan	
6	Rajesh Kanwar EE(D) HMR	
7.	Naresh Dhiman SE(JSV), VNA	
8.	Parveen Kumar Sharma EE JSV Thanedar	
9.	VIJAY KASHYAP EE (D) S/Z	
10	Rajat Garg - EE JSV S/Nagar	
11	B.S Thakur SE(D) MZ	
12.	V.K Thakur SE Kullu	
13.	Virender Thakur SE(D) Shimla	
14.	Rakesh Prashar, SE JSC D/pur	
15.	Rajesh kumar Sharma SE JSC Bilaspur	
16.	Vishal Jaswal SE WSSO	
17.	Sanjeev Kumar Soni, SE, R/Pco	
18.	Upender Nandy, C.E. MZ	
19.	Sivesh Mahajan CE PMU Mandi	
20.	J.S. Chauhan. CE (WSSO)	
21	Sunil Kaundal Enc (IFC)	
22	V.K. Dhatwalia CE CDO(M)	
23	Sanjeev Kaul -	
24	Dharmendra GM Pvt Ltd	
25	Vikas Bhushan Lalit Construction	
26.	Pratap Vaishali (EE, SWSM)	