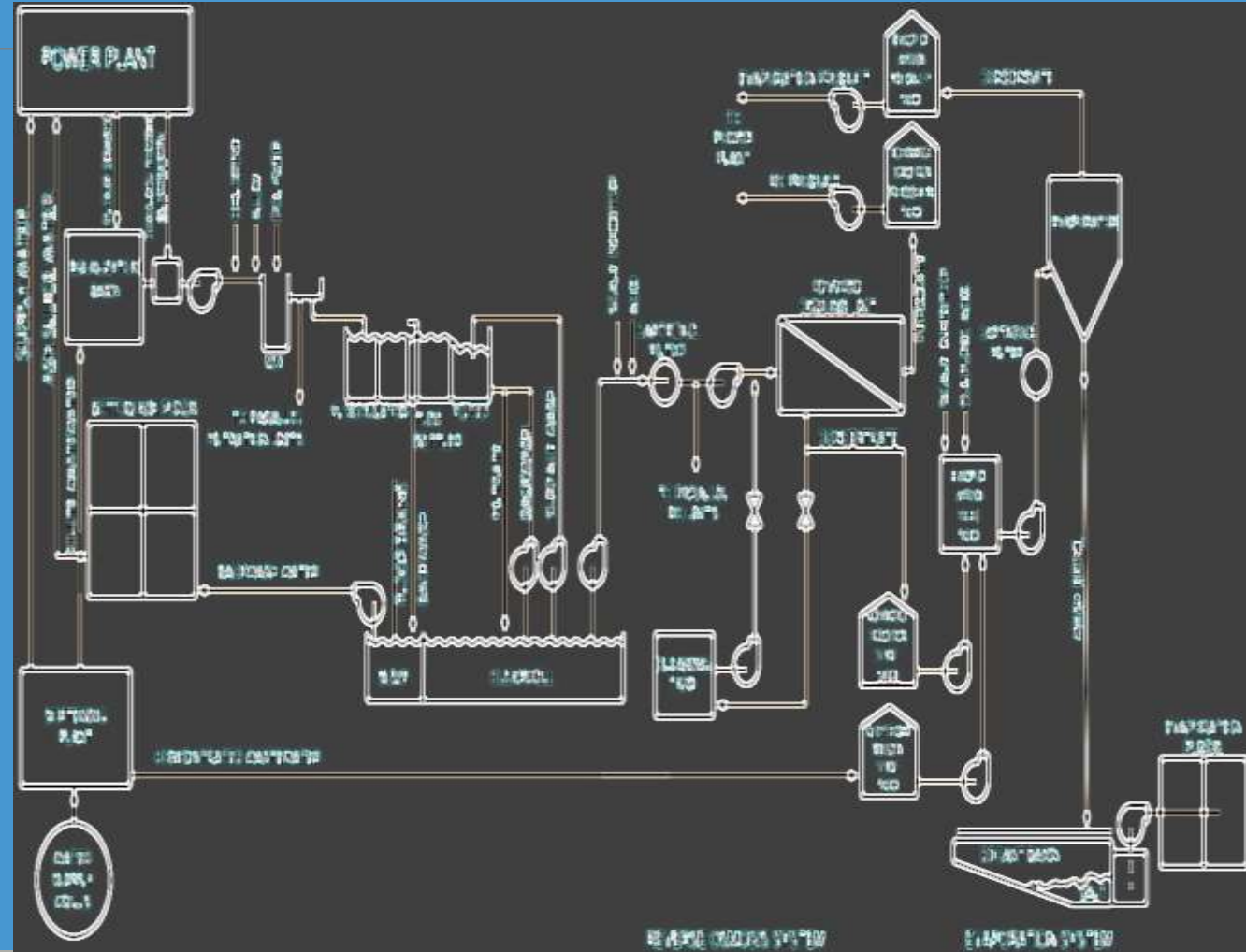


SPJ BUILDING SERVICES PVT LTD

EFFLUENT TREATMENT PLANT

ETP- ZLD



ZLD TREATMENT SCHEME

Preliminary Treatment:

- Effluent screening process.
- Oil removal process.
- Effluent mixing process.
- pH correction process.

Primary Treatment:

- Electrochemical Coagulation & Flocculation process.
- Primary sludge settling, treatment process.
- TSS, color & associated BOD/COD removal process.
- Hardness & heavy metals removal process.

Secondary Treatment:

- Biological treatment process.
- Secondary sludge settling process.
- Sludge treatment Process.
- BOD & COD removal process.

Tertiary Treatment:

- Depth filtration / Polishing process.
- Polishing of TSS, SDI, Color, Turbidity, Virus etc.

Recycle Treatment:

- Salts / Total dissolved solids / TDS removal process.
- Salts / Total dissolved solids / TDS final polishing process

Salt Crystallization:

- Salts / Total dissolved solids / TDS concentration Process.
- Salt crystallization process.

LOWER GENERATION OF INTERNAL ZLD WASTEWATER

A ZLD system has no ETP to discharge into! Hence it is important to integrate technologies such that the purpose is achieved with minimum internal wastages, which needs to get recycled and treated in the system.

OPTIMAL USE OF TECHNOLOGY

Use of technologies like MBR (Membrane bioreactor) and EDR (Electrode Dialysis Reversal) for maximizing recoveries with suitable Pre-treatment options. While DAF and Lime Soda ensures consistent higher recoveries thus reducing the final rejects to the evaporation stage.

MAXIMUM WATER RECOVERY

The multi-effect evaporator (MEE) or the mechanical vapor recompresses (MVR) are both highly cost sensitive with respect to fixed and operating costs.

Therefore, maximized recovery of water in a consistent manner employing systems mentioned above ensures the techno-commercial feasibility of the ZLD.

Zero liquid discharge system – ZLD- ETP

What's included in a basic ZLD treatment system?

The exact components of a ZLD treatment system will largely depend on the volume of dissolved material present in the waste, the system's required flow rate what specific contaminants are present. But in general, a basic ZLD treatment system typically includes some type of:

Clarifier And/or Reactor To Precipitate Out Metals, Hardness, And Silica

Chemical Feed To Help Facilitate The Precipitation, Flocculation, Or Coagulation Of Any Metals And Suspended Solids

Filter Press To Concentrate Secondary Solid Waste After Pre-Treatment Or Alongside An Evaporator

Ultrafiltration (UF) To Remove All The Leftover Trace Amounts Of Suspended Solids And Prevent Fouling, Scaling, And /Or Corrosion Down The Line Of Treatment

Reverse Osmosis (RO) To Remove The Bulk Of Dissolved Solids From The Water Stream In The Primary Phases Of Concentration

Brine Concentrators To Further Concentrate The Reject RO Stream Or Reject From Electrodialysis To Further Reduce Waste Volume

Evaporator For Vaporizing Access Water In The Final Phases Of Waste Concentration Before Crystallizer.

Crystallizer To Boil Off Any Remaining Liquid, Leaving You With A Dry, Solid Cake For Disposal

ZLD -ETP

Zero Liquid Discharge (ZLD) is a water treatment process with a goal of recirculation of all of the possible water back to the process with zero liquid waste. The ultimate treatment process has zero or nearly zero adverse impact on the environment.

Pre-treatment - reducing TSS, COD, Turbidity to filter out particle impurities or precipitation of sparingly soluble compounds to allow additional treatment.

Concentration of dissolved solids - by membrane technologies, either by a combination of reverse osmosis (RO) with electrodialysis (EDR). The way of concentrating RO brine by EDR. Or single step electrodialysis. Using these technologies to concentrate the stream we can achieve more than 98 % of recovery.

Thermal treatment - the last step is usually consisting of Evaporator/Crystallizer to generate solids. Final evaporation of remaining water for re-use together with precipitation of solid waste for disposal in a controlled landfill or to be sold as a valuable product (pure NaCl Na₂SO₄ etc.)

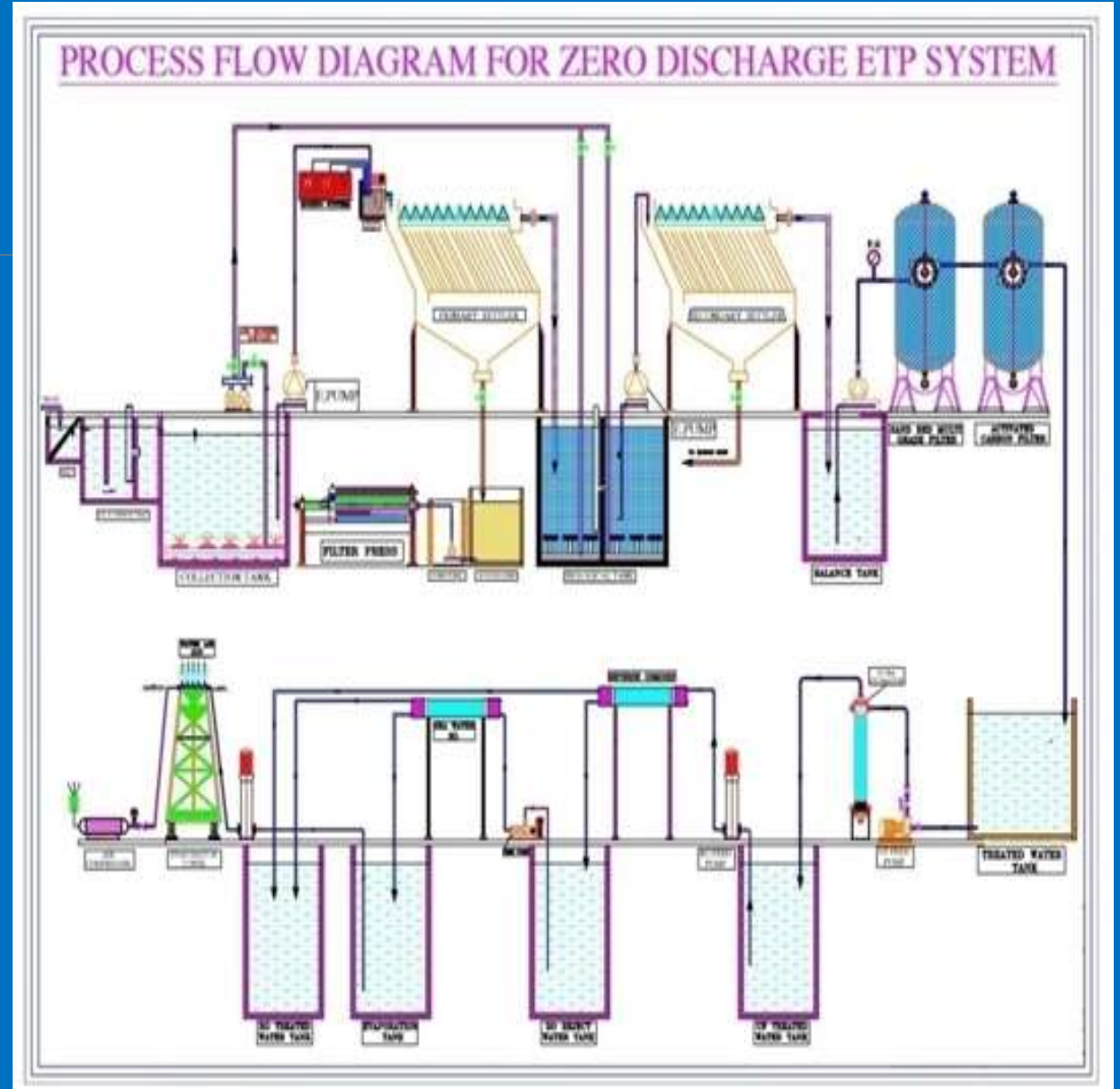
ADVANTAGE OF ZLD

Zero liquid discharge plant technology is growing globally as an important wastewater management strategy to reduce water pollution and extend water supply.

The main benefits of ZLD are:

- Minimizes Wastewater Discharge, Maximizes Water Recovery.
- Create A Valuable Product For Sale, Removing Environmental Issues.
- Reduction Of Dependence On Local Water Sources And Local Legislation.

RECOVERY SYSTEM



ZLD EVAPORATION SYSTEM

1. HYBRID FALLING FILM & FORCED CIRCULATION EVAPORATORS (MULTI EFFECT EVAPORATOR - MEE)

- a) Cost effective solution towards low salinity rejects having a feed salinity between 5 to 10%.
- b) Best steam economy.
- c) Low power costs due to first stages of falling film evaporation.
- d) Flexibility in selection of material of construction.
- e) Combination of pre-heaters and thermo vapor compressor ensures further steam economy.



2. FORCED FILM EVAPORATORS (MULTI EFFECT EVAPORATOR - MEE)

- a) Cost effective solution towards high salinity rejects.
- b) Reverse feed arrangement ensures maximum utility of motive steam.
- c) Horizontal configuration reduces space and height requirement and provides ease of monitoring and maintenance.
- d) All monitor- able parameters can be visualized at one level apart from virtual visualization on the HMI/ SCADA screen.



3. ATFD (AGITATED THIN FILM DRYER) CRYSTALLISERS (MEE)

- a) Crystallizes the final slurry to salt containing less than 10% moisture.
- b) Adjustable blade arrangement ensures flexibility to varying input quality of crystallizable salts.
- c) Minimal maintenance and extremely compact design saves on space requirements.
- d) Placed on the same platform as that of evaporator flash vessels and hence can be easily monitored at one level apart from virtual visualization on the HMI/ SCADA screen.

