

High Volume Mechanical Evaporation

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High Volume Mechanical Evaporation

Efficiency increases

- Start with Water Testing
 - PH
 - TDS
 - Acid or Base Components

High Volume Mechanical Evaporation

Efficiency increases

- Nebulization Method

- Nozzle Design for High Solids Application

- Orifice size for flow

- In high Solids applications impingement ball for solid control

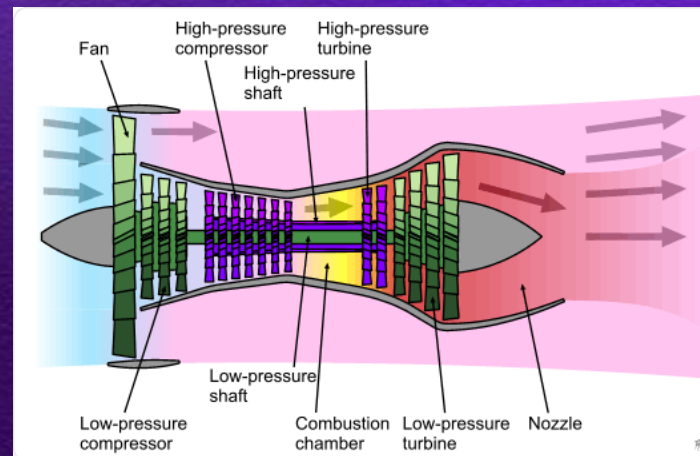
- Open ended helix nebulizer

- Saturated solutions require venturi fed atomization

High Volume Mechanical Evaporation

Efficiency increases

- Air temperature increase
 - Natural Gas Turbine Exhaust 850° F to 1250° F
 - EGT maintained through disposal water injection.
 - Nebulizer selected based on water testing



High Volume Mechanical Evaporation

Efficiency increases

- Other sources

- Electric Blower 26,000 CFM at 15 PSI
- Arid regions best
- Nebulizer selection unlimited
- Concerns with large power available
- Lowest db levels



High Volume Mechanical Evaporation

Efficiency increases

- Real Estate

- Best is over the pond
- Closed location requires drop in rates
- Lined pits for ph problems

High Volume Mechanical Evaporation

Efficiency increases

- Recovering raw materials
 - Time of flight separations
 - Preferred location in pit
 - High Berm with open ends at non prevailing wind compass points
 - Atomizer cannon spray with -100° F dry air
 - Still working on this



High Volume Mechanical Evaporation

Efficiency increases

- Evaporation Rates

- Turbine

- Uncontrolled over pond horizontal
 - 2000 barrels every 10 hours

- Vertical Stack controlled emission

- 600 barrels every 10 hours

- Venturi nebulizer

- Air cannon 26,000 SCFM
 - 350 barrels per 10 hour run

- Atomizer cannon spray with -100° F dry air

- 300 barrels per 10 hour in saturated environment

High Volume Mechanical Evaporation

Efficiency increases

- Enhancements

- Turbine

- Heat exchanger for liquid temperature increase

- Vertical Stack

- Heat Exchanger

- Multiple point injection

- Venturi nebulizer

- Heat exchanger

- Atomizer cannon spray with -100° F dry air

- Heat exchanger



● Thank you

● Questions??