NuReSys
Process Description
Tres Rios Solution

- Selected Two (2) tank proposal of Digestate system, to produce Struvite (M.A.P)
- Reduced electrical demand by reducing the size of the vessel requiring aeration.
- Convertible to recover struvite at high rates for use as a standalone product
Design Solution

➢ Process specifications:
  ❖ 300 gpm (400 GPM peak)
  ❖ 2.7% DS
  ❖ 280 mg/l PO4-P in
  ❖ 40 mg/l PO4-P out

➢ Performance specs required:
  ❖ Maximum power usage
  ❖ Maximum reagent usage
  ❖ Orthophosphate reduction
  ❖ Polymer reduction
Operational Considerations
Operational Considerations

- **CO2 Release Tanks**
  - Purpose: Strip CO₂ with aeration, raising pH for controlled struvite formation
  - Two tanks, 200 gpm flow capacity each (typically both online)
  - One blower per tank
  - Spray system with antifoam chemical available if needed

- **Flow Path**
  - Motorized valves to equally split feed
  - Gravity flow to Crystallization Reactor
  - Underflow pumps operate periodically to remove settled solids

- **Instruments**
  - pH
  - Two level instruments (for foam monitoring)
Operational Considerations

- **Crystallization Reactor**
  - Purpose: Mix sludge with magnesium chloride to form struvite
  - Top-entry mixer
  - Connections for future struvite harvesting

- **Flow Path**
  - Underflow pump operates continuously, discharging all sludge to holding tanks

- **Instruments**
  - pH
  - Two level instruments (for pump speed control)
Operational Considerations

- Magnesium chloride dosed proportionally to phosphorus in digested sludge feed:
  - Digestate flow rate (online flow meter)
  - Digestate soluble phosphorus (lab analysis)
  - Operator entered Mg-to-P ratio
- Note that struvite formation consumes alkalinity
  - Less impact compared to using ferric chloride
  - However alkalinity must be considered for sidestream nitrogen removal process
Process Commissioning
Before Startup, Commissioning, and Performance Testing

- Startup Plan
  - How much flow through what piping
  - Testing required to establish proper magnesium chloride dose
  - Affect on other processes
  - How to test equipment
  - How to complete performance test

- Training Plan
  - Vendor Training
  - HDR process training
  - Show and Tell Training
During Startup, Commissioning, and Performance Testing

- **Construction Testing**
  - COPI reports from vendors provides permission to operate equipment
  - Loop Testing validates the physical wiring
  - SCADA verification

- **Perform Training**

- **Execute Startup Plan**
  - Coordination meetings during startup so operators know what is needed