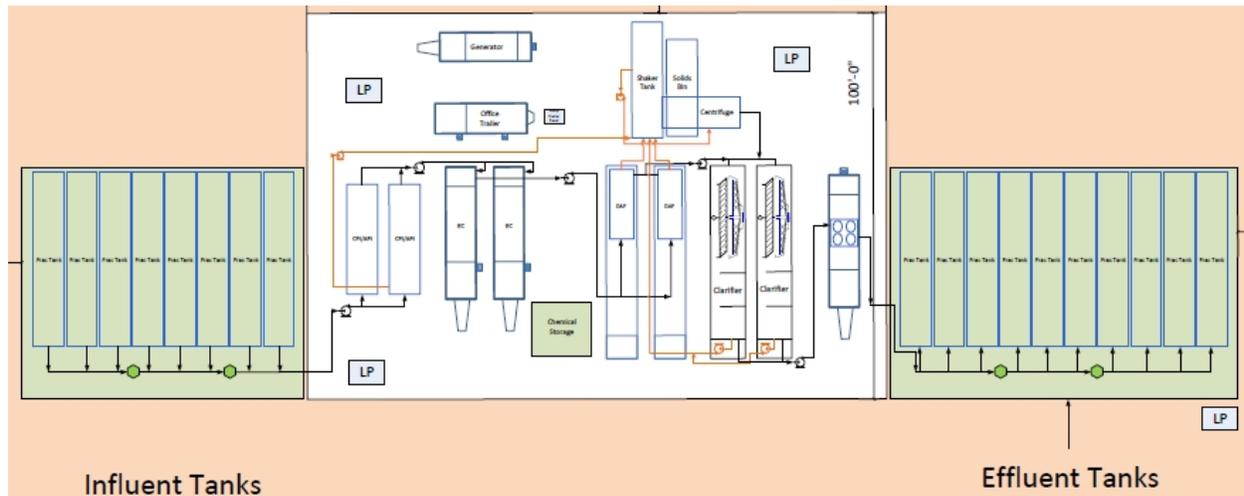


Recycling Facility Process Description



Process Explanation

All equipment described in this process is designed, maintained and utilized in its intended mobile capacity. Influent liquid, consisting of both flowback and produced waters, is transported to the location via registered brine haulers, and offloaded into eight manifolded 500 bbl tanks. Conductive hoses and proper grounding are used for all offloading and loading of influent and effluent liquids.

Influent water from storage is first pumped into two API separators to recover any free hydrocarbons prior to the recycling process. These vessels each have a process rate of 275 gpm and have a capacity of 120 bbls.

Next, the fluid is pumped through two electrocoagulation units. Electrocoagulation destabilizes solids and heavy metals for separation and removal. Each unit has a process rate of 250 gpm and an onboard fluid capacity of 750 gallons. The pH is adjusted as needed prior to the electrocoagulation process.

Following electrocoagulation, two dissolved air flotation units separate the now destabilized solids. The dissolved air flotation units that each have a process rate of 250 gpm and onboard capacity of less than 100 bbls. Separated solids are skimmed, decanted, and properly disposed in accordance with current regulation. Flocculation occurs, as needed, prior to the dissolved air flotation units.

After electrocoagulation, the fluid is sent to two – 400 bbl clarifiers for further retention time and any necessary polishing. From the clarifiers the fluid is passed through a 25-micron filtration system and sent to ten manifolded 500 bbl tanks for effluent storage.

There are five electric pumps in the main process flow, with a variable rate of 50-600 gpm. Three pumps are in use as needed at solids collection points. Two generators totaling 500 kW are utilized on location, along with one 1,000 gallon diesel tank.

Within this process, multiple points exist for solids capture and processing. Solids extraction lines are connected to the API separators, dissolved air flotation system, as well each clarifier. Generated slurry is sent to a shaker system to decant any large solids, while the underflow is sent to a centrifuge for further dewatering in order to meet solid waste disposal requirements. Any free liquid recovered from the centrifuge is returned to the clarifiers.

Secondary Containment

Being situated on a pad for future horizontal well development, the pad's 40" perimeter berm serves as an ultimate level of tertiary containment. All other secondary containment is designed to meet or exceed SPCC requirements. The manifolded influent and effluent tank batteries each have secondary containment. The approximately 100'x150' area which contains the process equipment is lined with an 8" berm, with each piece of equipment individually contained with an 18" berm. Additionally, secondary containment captures any potential loss at the loading/unloading connection points.

Chemicals Utilized

Sodium Hydroxide: 25% caustic solution to be used for pH adjustment. Four – 330g totes stored on location inside containment for application and reserves.

Hydrochloric Acid: 15% acid solution to be used for pH adjustment. Three – 330g totes stored on location inside containment for application and reserves.

Spectrafloc 875: Polymer based flocculant aid used to pull together solids for easier separation. Two – 330g totes stored on location inside containment for application and reserves.

Anticipated Volume

In the current configuration, maximum processing capacity is 10,000 bbls/day, with an anticipated volume of 5,000 – 10,000 bbls/day. Accordingly, monthly and annual anticipated volume would be 150,000 – 300,000 bbls and 1,800,000 – 3,600,000 bbls, respectively.

Tracking and Documentation

All brine (flowback and produced water) is tracked in CHK's water tracking system from the well of origin to the recycling facility, as well as from the recycling facility to the reuse destination (completion operation). All brine and recycled water is transported via registered brine haulers and all applicable information generated through CHK's water tracking systems and trucking manifests is reported according to the Division's requirements.

Any solids generated at the facility are disposed of according to DOGRM, OEPA DMWM and ODH standards. As needed, solids are stored in steel roll-offs or water-tight containers on location pending analytical results. This process includes meeting liquid content restrictions and proper manifesting.