Mint Farm Generating Facility (1200 Prudential Blvd, Longview, WA 98632)

Ron Roberts, Director of Thermal Resources

Nancy Atwood

Mark Carlson, Plant Manager

General Discussion

* Fredonia 1 & 2 went into service in early 80’s
* Fredonia 3 & 4 went in to service in 2001, jet engine units, not a frame built unit, ARROW unit starts faster which puts more stress on the equipment
* Fredrickson 1 & 2 went into service in 1981, load following when wind dies down, goes from 0-75 MW in 10 minutes
* Whitehorn 1 into service in 1981
* Colstrip 1 & 2 the coal is delivered by truck from an older mine where the coal is harder to extract so the coal is higher cost than Colstrip 3 & 4
* Colstrip 3 & 4 the coal is delivered by conveyor from mine which is a newer mine so coal is easier to access
* Some of PSE Generating Units (but not all) are part of the California ISO Energy and Balance Market (EIM), PSE must first cover own load before selling power on market
* In 2014 which was a high Hydro year, Coal supplied 35% of power, Hydro supplied 36%, Natural Gas supplied 24%, 3% supplied by wind, and 1% by nuclear and other
* Depreciation study amounts are PSE portion only, not total investment

Mint Farm

* Planned maintenance shut down until June 2017
* 180 MW to 304 MW, 10 MW/min ramp up
* SCR reduction, CO reduction to CO2, controlling NOX to water and nitrogen (no slag)
* Well water is feed water
* Wastewater to river through treatment with warehouse across street
* Water treatment on site for steam water
* 60 miles south of service territory, 18 kv simple cycle, 13 kv steam cycle
* Company doing maintenance is Intermech EMCOR
* Boiler will get ammonia salt build up, every 3-4 years use dry ice to clean up
* Simple cycle turbine in 3 sections with different size blades
* Boiler heats at three levels for high pressure, intermediate pressure, and low pressure
* Steam turbine has HP and IP on same section, LP on a different section of turbine
* Uses reverse osmosis to clean water
* Pulls 1200 gal/min from well while running and discharges 500 gal/min

Jackson Prairie Gas Storage Facility (239 Zandeki Road, Chehalis, WA 98532)

Ron Roberts, Director of Thermal Resources

Nancy Atwood

Mark Anders, Rescue & Operations Manager

Pat Haworth, Manager

Ruth Pierce, Administrator did safety training

* PSE owns 1/3 and manages site, Avista owns 1/3, and Williams owns 1/3
* History in 1958 tried to drill for oil but found a dry well, 1963 started drilling wells, injected gas Jan 22, 1964
* Two main expansions 1999 and 2008
* The area is a salt water reservoir, drill hold in sandstone, gas floats on saltwater, shale keeps gas in the reservoir
* Moves 30-40 billion cubic feet per year
* Zone 1, 1000 ft, has 10% of low pressure gas
* Zone 2, 2000 ft, has 80% of gas
* Zone 9, 3000 ft, has 10% of high pressure gas, gas has to be heated so it won’t ice other gas, the Zone 9 gas heater will be replaced soon
* Over 100 wells
* At each well a pump adds methanol to keep gas from icing
* In 1999 expansion added a natural gas generator
* 2 Tarus compressors; 8500 horsepower can compression 350 mil per day, 10,500 horsepower can compression 550 mil per day
* A lot of pneumatic equipment on site
* Compressed gas is cooled to 100 degrees before being put on pipeline due to pipeline coating
* Gas brought from storage goes through pipes so water and debris falls
* Pipeline has four 14 in, 16 in, 20 in, 24 in, uses different pipes depending on pressure
* 2 centaur compressors upgraded to 4500 horsepower around 1999 can compress 200 mil per day
* 3 saturn compressors, rebuilt in 2008, 1600 horsepower, can compress 80 mil per day
* 1 saturn compressor, rebuilt in 1999, 1300 horsepower can compress 50 mil per day, must be manually turned on, cannot be controlled from control room
* V12 wakasha 500 horsepower with Worthington Compressor for Zone 9 high pressure gas, must be manually turned on, cannot be controlled from control room
* Gas goes through dehumidifier after compressor, since needs to be dry before going into pipeline
* Both the 1999 and 2008 expansion added 300 mil/day capacity
* Zone 2 gas rises to Zone 1 and needs to be recirculated
* Williams controls the flow on the pipeline from Salt Lake City
* Williams pipeline transport to PSE
* 400-800 lbs/sq inch in field pressure, Zone 9 is 1300-1800 lbs/sq inch
* 650-750 lbs/sq inch pipeline pressure
* Williams has Solar Contractor that maintains turbines for compressors
* Uses a California contractor for wells
* Owns a lot of the land
* Leases $500/year for well sites
* Pays per acre other acres of just storage