Salem Unit History

- Field discovered 1938
- Unitized in 1950s
- Earliest large waterflood in USA
- Operated by Texaco until 1998
- Produces from 5 zones
- 1,670 BOPD & 90,000 BWPD
- All gas previously flared
Casinghead gas flares x 234 wells = approx. 700 MCFPD
Salem Unit

New Gas Plant

38 Mi. Gas Gathering System
Electric drive used to minimize downtime.
PLC monitoring used to maintain a constant vacuum on the wells.
HyBon Vapor Recovery Unit – an AC 4CC rotary vane compressor package capturing approx 30 mcfd of tank vapors from oil processing facilities.
North Battery Hybrid VRU
**Salem Gas Plant**

- **700 MCFPD** Incoming Sour Gas (40,000 ppm H₂S) → Bio-Desulfurization Plant (50 psig)
- **Plant Compressor**
- **340 MCFPD** Residue Gas
- **4500 gals/day** NGLs
- **27 BPD** Drip Trap Condensate → Oil Stock Tank → LACT → Oil Sales → City of Salem Gas Sales
- **Flare Stack**

- Sweet Gas (>4 ppm H₂S)
- Mechanical Refrigeration Unit (400 psig & -20 °F) → NGLs Storage
**PROCESS**

- Sour Gas contacted with an aqueous soda solution in Contactor Tower.
- H2S absorbed by soda. Sweet gas less than 4 ppm H2S
- H2S removed from soda by biological conversion to elemental sulfur, using air in Bioreactor
- Regenerated soda returned to Contactor Tower
- Sulfur disposal required
Thiobacillus excreting sulfur crystals

**Optimum Conditions**

- **PH**: 8
- **Cond.**: 55 mS/cm
- **Redox**: -365 mV
- **Temp**: 95 deg F
- **Solids**: 5 g/l
555 MMCF Sour Gas Processed
98% Uptime
Sulfur
Plant Compressor
Mechanical Refrigeration Unit
To Date
301 Truck Loads
or
2.7 million gals
(64,300 bbls)
Stranded
340 MCFPD Residue Gas
Burn Test Demo for City of Salem
Pipeline provides 25% of Salem’s Annual Gas Use

SALES GAS PIPELINE to CITY of SALEM
Todate
103 MMCF Sold

Tie-in Connection
City of Salem
Conclusions

• Capturing this stranded gas is good business.

• Bio-desulfurization works very well (< 4ppm H2S).

• Sales gas deal is win/win for Citation & Salem.

• Infrastructure now available for more gas and profit (Additional Trenton Zone wells drilled).

• 1,200 tons/year SO2 eliminated from air @ Salem Unit.