

RED ROCK.

COCHRANE ARMADA GAS PROCESSING PLANT

~1984

The Cochrane operated gas processing facilities were initially installed in late 1979 to service several Cochrane owned gas wells that were contracted to TCPL. After several months of meetings with other producers, it was concluded that construction of our own system was the most feasible way of getting the gas to market. As a result, Cochrane, acting as the General Partner, formed Cochrane Oil & Gas Program 1979, a Limited Partnership with 30 Limited Partners. A plant site was selected at Lsd 1-18-17-18-W4M and a 6 5/8" sales line was built to deliver sales gas to a Nova metering station at 9-19-16-16-W4M. A 3 1/2" south leg of the gathering system was constructed from the plant site to 7-20-16-19-W4M and a north leg of the gathering line consisting of a 6 5/8" line from the plant to 9-30-17-18-W4M and a 4" line from 9-30-17-18-W4M to 7-20-18-18-W4M. The initial throughput of 1 to 2 MMCF/D of Cochrane gas was run through a dehydrator and compressed by an Ajax 230 Compressor from field delivery pressure of about 250 psi to delivery pressure of 850 - 900 psi for delivery to the Nova line at Scandia. (WELL BORE - COMPRESSOR AT 16-20)

This system was in operation until 1982 by which time Cochrane and other operators had drilled a large number of gas wells within reach of the Cochrane facilities. By early 1982, Cochrane decided to expand the facilities and contracted Flint Engineering and Construction to design and install a new compressor and dehydration equipment as well as new gathering lines to service additional reserves to the south and north of the plant.

As a result, the Limited Partnership Fund arranged for new financing from Standard Life Assurance Company (who had financed the original installation) to expand the facilities to handle up to 14 MMCF/D from the original plant capable of processing up to 4 MMCF/D. New dehydration equipment to handle 15 MMCF/D was installed as well as a 2 stage Joy WBF72XHD Compressor driven by a Waukesha L7042 gas engine. Other equipment installed was a 3 stage inlet separator and a large inlet header which allows the operator to divert incoming gas streams to specific compressors. In addition to the upgrading in the yard, a new 4" line was installed from the compressor site to 16-20-16-19-W4M. Other lines connecting to the infield laterals were installed by Canadian Superior, Landbank Minerals, Aberford Resources and Renaissance Energy.

Upgrading of the system cost Cochrane (and its partner) \$1.8 Million Dollars. The plant throughput increased to about 4 million cubic feet per day in 1983 and doubled to about 8 million cubic feet per day in 1984.

Additional drilling resulting in more gas production in the area convinced Cochrane to undertake further expansion of the system and by late 1984 (December) another new Joy Compressor driven by a Waukesha gas engine identical to the first one was installed. As well as the Compressor a 25 MMCF/D refrigeration unit (manufactured by ALCO) was also installed for hydrocarbon dewpoint control. A 1,000 barrel condensate storage tank was also installed along with upgraded automatic shutdown controls for the whole plant. Total costs for this expansion were \$1.7 Million Dollars. The 3 Compressors are capable of handling 22 MMCF/D of inlet gas at a suction pressure of 250 psi and delivering this gas to the Nova meter station at Scandia at 900 psi.

The upgraded system handled 14 - 15 MMCF/D in the first half of 1985 and about 10 - 12 MMCF/D in the latter part of the year. Deliveries have been as high as 20 MMCF/D for shorter periods of time and have been in the 15 MMCF/D range through early 1986.

Cochrane has negotiated a new contract with Corvette Resources Ltd. (Coseka) to process some 6 MMCF/D raw gas from their pools in the Majorville field in Twps. 17 and 18, Rge. 20, W4M. This gas production will average 11 - 12% CO₂ and less than 1% H₂S and about 25 barrels per MMCF condensate liquids. The processing agreement calls for Cochrane and its partner to install the gas sweetening facilities and a 12 mile 4" pipeline to bring the gas to the plant site. This expansion of the facilities will cost a total of \$1.5 Million Dollars and would result in a throughput of about 21 to 22 MCF/D at the plant and 23 to 24 MMCF/D at the Scandia station since 1 - 2 MMCF/D additional gas is injected in the sales line about 5 miles upstream of the Nova Station by Rupertsland Resources Ltd.

Because the sales line is only a 6 5/8" diameter line, it would appear that some looping of the downstream section (below Rupertsland) with a 4" line may be required to alleviate the excessive pressure drop and required extra compression horsepower to achieve the expected throughput expected when the Corvette gas comes on stream. Several other producers have also expressed a desire to nominate for 2 MMCF/D up to

an additional 8 - 10 MMCF/D in the Cochrane system. If these producers enter into formal contracts with Cochrane, an additional 1,000 HP of compression will be required at the plant site plus attendant upgrading of auxillary systems. This would definitely require the looping of at least $\frac{1}{2}$ of the sales line and probably the installation of additional dehydration or refrigeration equipment at the plant site to compliment the existing refrigeration equipment. The new compression facilities would cost about \$850,000 while the sales line looping would cost about \$300,000. The whole new upgraded system would then be capable of removing over 300 barrels per day of hydrocarbon liquids from the incoming gas streams.

Pipeline & Plant Inventory

1. **Pipelines** - installed by Cochrane and forming part of rate base facilities (length of lines is only approximate).
 - (a) 13 miles of 6 5/8" OD Residue Gas Transmission line originally built to Nova specifications (from Plant Site 1-18-17-18 W4M to 9-16-18-18 W4M).
 - (b) Infield gathering lines - 3 miles 6 5/8" gathering line
 - 11 miles 4" gathering lines
 - 15 miles 3 1/2" gathering lines
 - (c) Other infield gathering lines were installed by producers to service their own wells and tie-in to Cochrane infield lateral lines.

2. Plant Inventory

The main components installed on approximately 6.5 acres of land with perimeter guard fencing; remote control access gate and condensate loading dock with pumping facilities.

(a) Compressors

Two Joy Model WBF 72 X HD, two stage, compressors driven by Waukesha L7042, gas fired, 12 cylinder engines, naturally aspirated, and rated at 850 BHP each. Skid mounted and bolted and grouted to steel reinforced cement pads. Double radiator (engine and interstage compressor) fan coolers; full automatic shutdown control panels with gas and fire detectors and remote control panels and alarms. Three stage inlet-line separators and engine skid mounted first and second stage scrubbers. First stage cylinders 10 1/2" diameter, and 6 1/2" diameter second stage cylinders with 1500 psi pressure rating.

Compressor and engine housed in insulated metal buildings with closed-in breather stacks and muffler support stacks to conform to environment agency standards.

One Ajax Model 230, two 11" cylinders opposed engine-compressor with adjustable pockets to convert the compressor from single to four stage; rated at 230 BHP

at 360 RPM and capable as a two stage unit to deliver up to 4 MMCF/D at 900 psi with a 400 psi suction pressure. Normally operates at a 250 psi suction pressure with about a 3 MMCF/D output at 900 psi; three stage inlet separator and interstage fan cooler; gas and fire detectors and control panel with remote automatic shutdown panel. This unit is housed in a metal building tied onto one of the Joy-Waukesha unit buildings.

- (b) Refrigeration Unit - New unit fabricated by Alco (in Edmonton in 1984) consisting of:
- (i) 36" O.D. x 13 $\frac{1}{4}$ " 3 phase separator
 - (ii) 2 - 24" OD x 44'1" Gas/Gas Exchanger
 - (iii) 12 3/4" OD x 24" OD x 20' Gas Chiller
 - (iv) 30" OD x 7'7" Horizontal Cold Separator
 - (v) 8 5/8" x 28' Stabilizer
 - (vi) 16" x 7'6" Propane Scrubber
 - (vii) 24" x 6' Horizontal Surge
 - (viii) 8 5/8" x 2'10" Oil Separator
 - (ix) Mycom P6B Gas Compressor
 - (x) Cat #G3306 Natural Gas Engine driving the Mycom Compressor
 - (xi) Air cooled condensers with hydraulic drive fans.

The above noted major components are housed in two metal buildings with the condensers located outside. The gas processing facility is designed to process inlet gas at 350 psig and 30°F and deliver up to 25 MMCF/D at a maximum pressure of 584 psig of sales gas with a 15°F Hydrocarbon Dew Point, 4 lbs. per MMCF water vapour and separate 14 psi stabilized NGL liquids at a maximum temperature of 120°F.

- (c) Other facilities in the plant yard consist of a multi-valve inlet header whereby all incoming gas streams can be directed to specific compressors; inlet gas measuring facilities and emergency shutdown valves and flare stack; sales gas measuring equipment consisting of a meter building equipped with hydrocarbon dew point testing facilities; 1,000 bbl. condensate storage tank with truck loading dock; fire fighting and control equipment; 10 x 45 office building with water and sewage facilities; remote control panel in office for all operating equipment on the plant site. The yard is perimeter fenced with a 6 foot chain link fence and the main gate is opened and closed by remote control to maintain total plant site security. Main operator living quarters are located approximately 2.0 miles east of the plant site and is connected by emergency shutdown phone alarm system to plant

and standby phone answering service in Brooks. The plant site is located on secondary Highway No. 539 and is approximately 35 miles southwest of Brooks.