



A Rockwell Automation Company

Aaneen Power Inc. Ferus Gas Nitrogen Plant

The Client:

Hinz was retained by Aaneen Power to provide power engineering services for a Greenfield plant being constructed near Strathmore, Alberta. The plant is owned by Ferus Gas and will produce nitrogen gas. The facility consists of a mixture of new and old equipment. Process equipment which included most of

the motors and transformers was purchased and shipped to Alberta from three de-commissioned plants in the USA. Switchgear and motor controls were purchased new.

The Requirement:

Hinz' scope of work included integrating the old equipment with the new and providing general engineering services such as substation design, MCC design, cable schedules and layouts and system protection studies.

Documentation was provided to the site electrical

contractor to allow him to purchase and install conduit and cables as required.

Motor loads included synchronous and induction machines at 13,800 volts, 4160 volts and 480 volts. There are also a number of heater loads at 480 volts.

The Design Solution:

The first problem to be resolved was the starting of a 7000 HP, 13,800 volt synchronous motor used to drive the main compressor. The utility power line available to the site was 25kV, fed from a 25MVA, 138/25kV transformer. Fault level on the 25kV line was 142MVA. Starting the motor would result in a 13% voltage drop on the power line which was unacceptable to the utility, and, due to low starting torque, would not allow the motor to accelerate. Working closely with the switchgear vendors, a capacitor-start design was developed which would reduce the voltage drop to approximately 5%. This level was acceptable to the power utility with the proviso that the motor only be started during the hours between midnight and 5 am.

Information from the three de-commissioned plants was acquired where possible and combined with information from the new equipment vendors to provide a design solution.

An outdoor substation was designed that includes an H

-frame structure for the incoming power line, a 25kV/13.8kV transformer, a 25kV/4.16kV transformer and a building housing the motor starting capacitors.

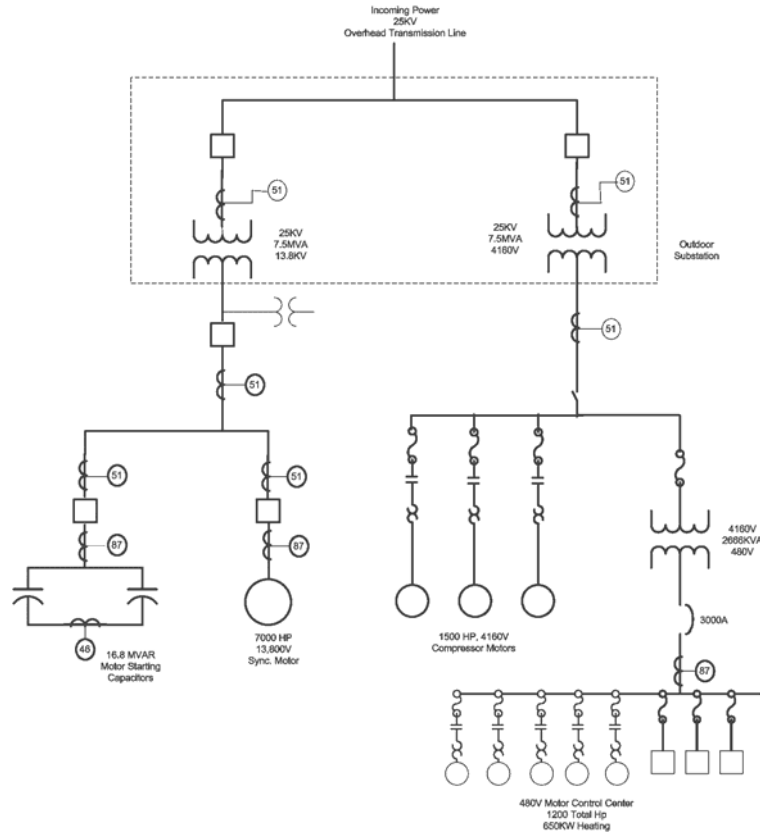
The Electrical Room houses a 4160/480V Unit Substation c/w a 22 section Cutler-Hammer MCC. All starters and VFDs are connected to the plant control system via DeviceNet. Also in this room is a 15kV metal clad switchgear lineup including transformer breakers and protection and the 7000HP motor starter and protection. Adjacent to the 15kV lineup is a 5kV lineup with the 1500HP motor starters and a load break switch for the dry type transformer.

Wherever possible, all cabling in the plant and substation yard was run in underground trenches.



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System Specifications:

- 25 KV, 142 MVA Power Utility
- 22 section, back-to-back MCC
- DeviceNet communications
- Neutral Grounding Resistors
- 7000 HP synchronous motor starter – capacitor start
- Westinghouse 150VCPW500 15KV vacuum circuit breakers
- Multilin SR469-3 protection relay for Synch. Motor.
- Basler BE851 protection relay for capacitors
- Multilin SR745 protection relay for Transformers c/w differential protection
- Allen-Bradley Bulletin 1512 starters for 1500 HP motors.
- Multilin SR469 protection relays for 1500 HP motors.
- 2666kVA Indoor dry-type 4160/480 transformer
- Westinghouse type DS632 3000A circuit breaker
- Qty 32 – 400kVAR, 15kV capacitors
- 7500 kVA, 25kV/13.8kV ONAN/ONAF transformer
- 7500kVA, 25kV/4160V transformer
- Square D PM620 Digital Metering Unit
- Multilin SPM power factor regulator for Synch. Motor
- Kearney 3 pole gang operated switch 34.5kV, 600A
- Tranquell Lightning arrestors
- S&C 1200A, 15kV Load Break Switch
- Westinghouse Type ESV 34.5kV circuit breakers

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com