

ATCO Energy Solutions, Carbon Alberta

- GLE conducted a Debottlenecking Study for the Carbon Storage Facility which consisted of 40 BSCFD working gas capacity with 370 MMSCFD maximum injection and 550 MMSCFD maximum withdrawal for 24 storage wells. The facility major equipment items included 5 storage compressors totalling 11,800 hp, two JT plants, stabilization, and comprehensive flow control. More specifically, the Debottlenecking Study was based primarily upon enhancing injection rate and deliverability by maximizing throughput and minimizing pressure drop within the battery limits of the Carbon Facility.
- GLE was subsequently awarded additional work investigating the replacement of two compressor packages to expand capacity taking into account reservoir delta P, cushion gas pressure of the reservoir, and reservoir performance over time.
- Both of these projects involved simulation work of the facility, detailed performance review of the major process equipment packages, and, generating cost estimates for economic evaluation.

Plains Midstream Canada

Summary

Developing a sixth mixed NGL storage cavern at the existing Kerrobert NGL storage facility. This facility is a 50/50 joint ownership with Pembina.

Cavern 5 Scope of Work

The Kerrobert Storage facility Cavern 5 is planned to start washing operations in 2Q15 and start NGL operation by the end of 1Q16. It includes the following scope:

- Drilled one cavern well with an ultimate product recovery rate of 450 m³/hr (~68,000 bbls/d);
- Wash storage cavern to an initial mixed NGL working capacity of 32,000 m³ (~200,000 bbls);
- Increase storage facility fresh water supply system to 1500 m³/d, with potential upside of 2000 m³/d.



- Install cavern wash water system with a capacity of up to 1500 m³/d, with potential upside of 2000 m³/d;
- Install cavern wash water disposal system with a capacity of up to 1500 m³/d, with potential upside of 2000 m³/d;
- Tie-in Cavern 5 wellhead to the existing facility brine and NGL systems, with no expansion of the existing brine pond capacity.
- Once Cavern 5 is in service, total site working NGL storage capacity will be limited by total available cavern working volume of 88,000 m³.

Cavern 6 Scope of Work

The proposed project scope includes the following:

- Drill one cavern well with an ultimate product recovery rate of 450 m³/hr (~68,000 bbls/d);
- Wash storage cavern to an initial mixed NGL working capacity of 48,000 m³ (~300,000 bbls), bringing total site working cavern storage volume to 136,000 m³;
- Tie in new cavern wellhead to Cavern 5 fresh water and brine disposal systems;
- Tie-in new cavern wellhead to the existing facility brine and NGL systems, with no expansion of the existing brine pond capacity; limiting usable storage volume to 110,000 m³ of NGL.

The washing of Cavern #6 will take place after Cavern #5 washing is completed in Q1 2016. The washing of Cavern #6 and converting the well to an operational state is expected to take approximately 1 ½ to 2 years from after Cavern #5 is converted to NGL storage operation.

Terado Gas Storage Corp.

Gas Liquids Engineering Ltd. was engaged by Terado Gas Storage Corp. to design a facility capable of operating the Dimsdale Paddy 'A' Pool as a 2-cycle 85 BCF natural gas storage facility (a sweet multi-well gas battery).



The following challenges were addressed:

- 85 BCF, 2- cycle gas storage (with capacity to be completely filled and empty twice per year).
- 2 BCFD maximum flowrate.
- 51000 HP Turbine driven centrifugal compressors- Three Siemens SGT-400 turbines each driving two “stages” of centrifugal compressors that can be run in either series, or parallel. This is a bit unique in gas storage - most smaller operations are recips. can achieve the very high flows for cheaper in this case with the centrifugals.
- Very high grade noise suppression- landowners 1km from site.
- TEG Dehydration
- On-lease storage wells (long horizontal wells)
- Separation and well control on each well
- 30 km, 36 inch OD, 1440 psig Pipeline
- Next to airport, highway, and inside annexation limit of City of Grande Prairie- intense regulatory component

Texaco Alberta Hub

GLE was contracted to upsize the Alberta Hub Gas Storage facility from 250 MMSCFD to 500 MMSCFD. Located near Edson, Alberta, this facility is a 40 BCF 2-cycle storage facility.

Details

- The facility takes gas on and off the TCPL/Nova gas pipeline network. TCPL/Nova transports gas across Canada from east to west and through the US to the west coast, southern states and eastern seaboard through a vast intercontinental pipeline network.
- The project included an 11 km 16” 2100 psig gathering/injection line north of the facility which crossed (was bored beneath the McLeod river) and two wellsites tie-ins.



- The facility was upgraded to approximately 10,000 HP which included 3 of Caterpillar 3612 drivers each utilizing HOS6 Dresser Rand 6-throw (3 cylinders per side) single-stage reciprocating compressors.
- The reservoir was rich in hydrocarbons and EOR production techniques were employed between the north, south and central pools to maximize liquids revenue returns.
- The gas was brought on-spec during withdrawal using a choke plant.
- Condensate from the LTS was stored in LPG bullets.
- Due to the unexpected 1000bbls/day of oil from one of the northern wells a tank farm was constructed with 4 of 1000 bbl cascading oil stage tanks and one water tank.
- A 500HP recycle compressor and stabilizer were designed by GLE and installed subsequent to the expansion.
- The facility has been in trouble free operation ever since.

