1.0 PROJECT OVERVIEW

NOVA Gas Transmission Ltd. (NGTL) is proposing to construct, own and operate the Leismer East Compressor Station and Liege Lateral Loop 2 (Thornbury Section) (Project) in the Regional Municipality of Wood Buffalo, Alberta. The Project involves installation of a single 15 MW turbo-compressor unit (gas turbine and compressor) at a new greenfield site, tying into NGTL's Leismer Kettle River Crossover, Leismer Lateral and proposed Liege Lateral Loop 2 (Thornbury Section) pipelines. The proposed site is located approximately 100 km southwest of Fort McMurray, in LSD NE-33-80-13-W4M on the NGTL System.

2.0 REQUIREMENT FOR THE PROJECT

The Project is required to transport additional supply from northwest supply areas of the NGTL System to meet growing markets in the northeast demand area of the NGTL System by April 2016.

3.0 PRINCIPAL COMPONENTS OF THE LEISMER EAST COMPRESSOR STATION[1]

For the site layout, see Attachment 04b.

Based on the current preliminary design, the principal components of the Leismer East Compressor Station are as follows:

- compressor station building (see Plot Plan ID 1) containing:
  - one Solar Titan 130 gas turbine
  - one Solar C65 centrifugal compressor – electric starter, electric-driven lube oil cooler and programmable logic control
- four aerial natural gas coolers (see Plot Plan ID 10 for location)
- skid-mounted auxiliary power unit generator (APU) building (see Plot Plan ID 2). (Number of generator buildings is subject to final design and availability of utility power.)
- skid-mounted mechanical buildings (see Plot Plan ID 3 and ID 4) containing air compressors, air dryer, air receiver and glycol heating boiler system
- skid-mounted electrical building (see Plot Plan ID 5) containing:
  - control systems, electrical switchgear and Motor Control Centre (MCC)

[1] This information pertains to the compressor station portion of the Project only. Refer to the Project Description section of the Application for information about the pipeline portion of the Project.

    - uninterruptible power systems (UPS), including batteries, rectifiers and inverter
- skid-mounted personnel building (see Plot Plan ID 6) including office and washroom facilities
- heated storage building (see Plot Plan ID 7), utility gas regulation enclosure (see Plot Plan ID 8), skid-mounted drum rack (see Plot Plan ID 9) and cold recycle valve skid (see Plot Plan ID 11)
- yard piping:
    - tie-ins to pipeline suction and discharge headers
    - unit suction and discharge Nominal Pipe Size (NPS) 30 piping, including NPS 30 unit suction, discharge and discharge check valves
    - NPS 30 yard header piping
    - unit purge/load, vent, piping and valves
    - unit anti-surge recycle piping and valve
    - NPS 30yard piping
    - yard suction and discharge blowdown piping and valves
    - yard suction and discharge pressure safety relief piping and valves
    - yard suction gas scrubber with cyclone separator and above-grade storage tank
- utilities:
    - compressed air system, including air compressors, air dryer and air receiver
    - glycol heating system, including natural gas boilers, piping, circulating pumps and expansion tank
    - utility gas system, including filtering, odorizing and regulating
    - utility piping and glycol heat-traced air lines
    - overhead piping rack and electrical cable trays between buildings
    - heating, ventilation, air conditioning systems for all applicable buildings
- electrical:
    - skid-mounted APU generator building (see Plot Plan ID 2), including a proposed 300 kW generator unit (number of generator buildings and size of generators is subject to final design and availability of utility power)
    - 24 and 120 volt direct current (VDC) UPS system located in the control skid building
    - alternating current (AC) electrical three-phase power switchgear, MCC and distribution

    - electrical, control and communication wiring, lighting panel and grounding
- controls:
    - station emergency shutdown system (ESD) will be powered from the onsite 24 VDC UPS (UPS system is powered from the station electrical system designed to use both utility power in the area and an APU in the event of a utility power failure; the brief period between transfers from utility power to APU will not affect the 24 VDC UPS or the ESD system powered from it)
    - in the event of a power failure from both power sources, ESD system would continue to protect the facility by operating off the battery banks that are part of the UPS system (if the batteries are drained [minimum 4-hour period] and the voltage begins to drop, the system will detect this condition and activate the ESD to return the facility to a safe state)
    - ESD system is designed to be fail safe (if the system did not have power, it would fail to the safe state of the facility, which is to close the block valves and open the blowdown valves to depressurize the station piping; ESD system does not require power to operate)
    - each building or skid-mounted building is equipped with emergency lighting powered from either the main 120 VDC battery bank or from individual emergency lighting battery packs mounted in the building (this emergency lighting allows safe evacuation of personnel from the building in the event of a power outage)
    - safety systems will be powered by the UPS in the event of utility and auxiliary power failure to the site
    - PLC (programmable logic controller) station control
    - PLC ESD control, including fire and gas detection systems
    - remote I/O for both station and ESD functions located in the yard and compressor building
    - control system programming and interface to unit controls
    - Supervisory Control and Data Acquisition (SCADA), and Human Machine Interface (HMI) equipment and programming

Construction will include surveying, clearing, grading, piling, foundations, compressor unit and building installation, generator, auxiliary buildings and equipment installation, piping and pressure testing, electrical, instrumentation, controls, commissioning, pre-startup safety review and final site cleanup.

4.0 DESIGN

The proposed compressor station will be designed, constructed and tested in accordance with the provisions of the *National Energy Board Act*, *Onshore Pipeline Regulations*, TransCanada's specifications and the following standards:

- Canadian Standards Association (CSA) Z662-11: Oil and Gas Pipeline Systems
- American Society of Mechanical Engineers (ASME) B31.3 – 2012: Process Piping
- CSA Z245.1 – 07: Steel Line Pipe
- CSA Z245.11 – 09: Steel Fittings
- CSA Z245.12 – 09: Steel Flanges
- CSA Z245.15 – 09: Steel Valves
- Canadian Electrical Code – 2012, Part 1: Safety Standards for Electrical Installations
- CSA C22.2 No. 0-10: General Requirements – Canadian Electrical Code, Part II
- 2013 ASME Boiler and Pressure Vessel Code, Section VIII, Division 1: Pressure Vessels
- National Building Codes of Canada (NBC 2010)
- Alberta Building Code (ABC 2006)

5.0 INSPECTION AND TESTING OF EQUIPMENT

NGTL will hydrostatically pressure test all high-pressure natural gas components of the installed facilities (including the yard piping) in accordance with the requirements of CSA Z662-11, Section 8 before placing them in service.