PUBLIC SERVICE COMMISSION REPORT
PU-14-853
Targa Badlands LLC.
LMGP-IV
Month/Year: NOV. 2019

Rep. Final

Pertinent and in compliance to the North Dakota Public Service Commission's, Case# PU-14-853, for Little Missouri Gas Plant-IV (LMGP-IV), below is the final construction completion report.

Civil: 100% Complete.

Structural: 100% Complete.

Mechanical: 100% Complete

Instrumentation and Electrical (I&E): 100 % Complete

Automation: 100 % Complete

OVERALL PROJECT = 100 % Complete

PROJECT COMPLETION DATE: 09/27/2019 (FINAL GRADING AND DIRT WORK FINISHED)

Pursuant to "CERTIFICATION RELATING TO ORDER PROVISIONS – ENERGY CONVERSION FACILITY SITING– CASE No. PU-14-853", item number: 30 i.e. "Company agrees to provide the Commission with both an electronic and a paper copy of the site approved by the Commission and the facility design specifications for the construction of the energy conversation facility showing the location of the energy conversion facility as built, and will provide this information within 3 months of the completion of the construction. Company also agrees to provide an electronic version of the site approved by the Commission and the facility design specifications for the construction of the energy conversation facility showing the location of the energy conversion facility as built that can be imported into ESRI GIS mapping software within 3 months of the completion of the construction. This electronic map data must be referenced to the North Dakota coordinate system of 1983, North and/or South zones US Survey feet (NAD 83) UTM Zone 13N or 14N feet (NAD 83), or geographic coordinate system (WGS 84) feet. The vertical data must be in the appropriate vertical datum for the coordinate system used. All submissions must specify the datum in which the data was developed.", we are providing the following:

1. Attachment A: Facility Design Specification
2. Attachment B: Facility Location (i.e. Plot Plan)

The As-built plot plan that can be imported into GIS mapping software shall be submitted electronically.

ATTACHMENT A

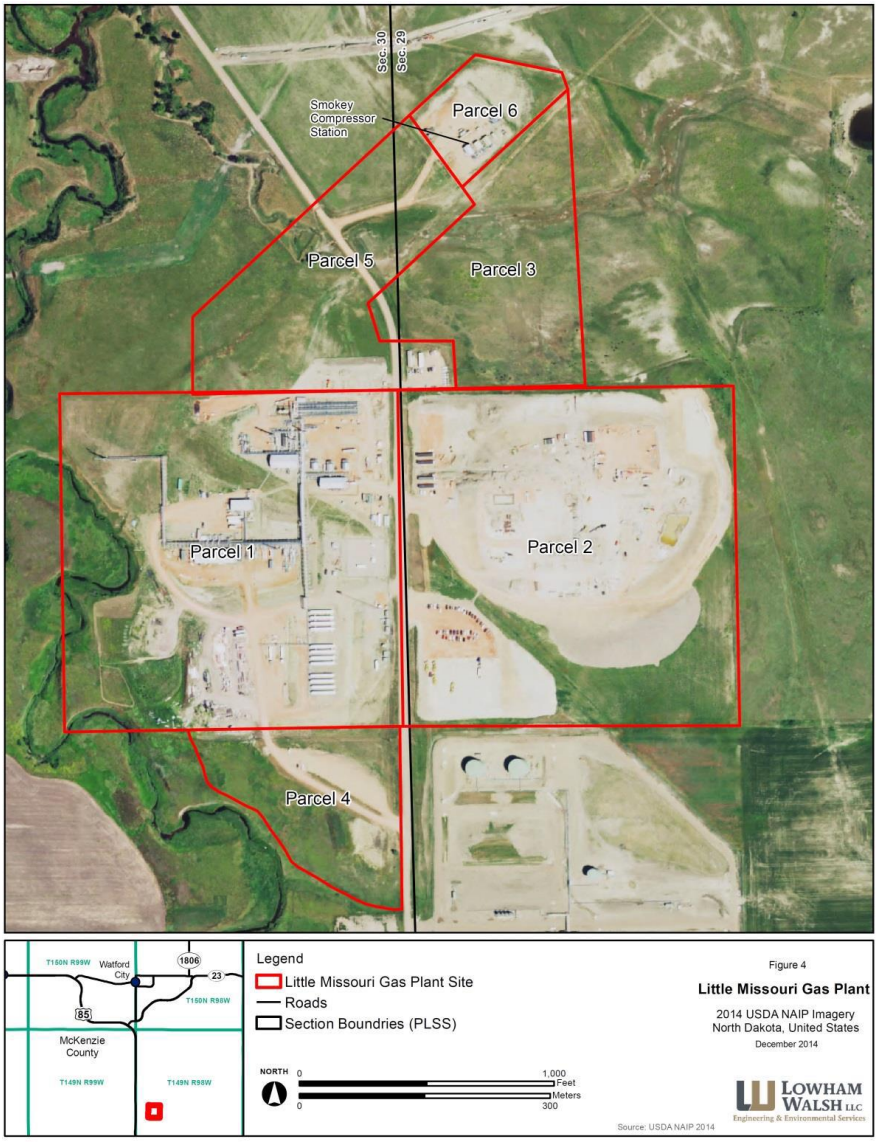
FACILITY DESIGN SPECIFICATIONS: SCOPE DOCUMENTS

a. **OVERALL SCOPE DOCUMENT – TR-LMIV-SS-001-REV-C**
b. **RESIDUE COMPRESSOR PROJECT SCOPE – TR-LM-IV-SS-002-REVA**
c. **EPF PROJECT SCOPE – TR-LMIV-SS-003-REV-A**

ATTACHMENT B

PLOT PLAN

a. **OVERALL PLOT PLAN – LITTLE MISSOURI FACILITIES – PARCELS 1-5**
b. **PLOT PLAN FOR LM-I, II, III, AND IV – PARCELS 1 AND 2**
c. **PLOT PLAN FOR LM-III, LM-IV - PARCEL 2**
d. **PLOT PLAN FOR HESS SLUG CATCHER AND SUBSTATION – PARCELS 3**
e. **PLOT PLAN FOR ONEOK METER STATION – PARCEL 4**



TARGA BADLANDS, LLC.

LITTLE MISSOURI – IV GAS PLANT

200 MMSCFD mOHR PROCESS

20,000 SBPD OF LIQUID STABILIZATION

PROJECT NUMBER: 53990

SCOPE DOCUMENT

	By	Date
Initiator	SCM	10/29/14
Company Representative	SCM	12/10/14
Contractor Representative		

TARGA

Revisions

Rev	Date	Description	By	Chk'd	App'd
A	11-11-2014	Issued for Proposal	SCM	SCM	BS
B	12-10-2014	Issued for Proposal	SCM	SCM	SCM
C	08-03-2017	Issued for Information	SCM	SCM	SCM

TABLE OF CONTENTS

1. PROJECT SCOPE

The scope document was developed by Targa Resources, herein called the 'Company' for the engineering, design and construction estimate for the Little Missouri-IV cold gas plant, here in called the 'Work'. Except as otherwise expressly provided herein, the 'Contractor' shall supply all engineering, design, supervision, consumable materials, equipment, tools, services, and each and every item of expense necessary for the completion of the Work.

The Little Missouri-IV plant is estimated to process an additional 200 MMSCFD feed capacity to the facility. This project will need installation of a 200 MMSCFD modified Ovehead Rectification/Recycle Process and will need a 20,000 SBPD stabilization system that can produce a Y-grade product. This Y-grade product will then be blended with the cold plant liquids and pumped into the ONEOK line.

The full rated capacity of 200 MMSCFD will be done in stages, and initially the Company wishes to procure residue compression that can move 120 MMSCFD of Gas at the inlet of the plant. The scope of this proposal would be to build a balance of plant for this LM-IV facility, hydrocarbon liquid stabilization and a 200 MMSCFD mOHR Cold Plant.

2. CODES, STANDARDS & SPECIFICATIONS

The codes, standards, and specifications of the following organizations shall be interpreted as the minimum requirements applicable to this specification. All codes, standards, and specifications referenced here are meant to be the latest edition and include latest addenda, issued at project initiation.

- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Civil Engineers (ASCE)
- American Society of Heating, Refrigerating, Air Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Society of Testing and Materials (ASTM)
- American Welding Society (AWS)
- GE Global Asset Protection Services (GE GAP)
- Industrial Cable Engineers Association (ICEA)
- Instrument Society of America (ISA)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electric Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Occupation Safety and Health Administration (OSHA)
- Tubular Exchanger Manufacturers Association (TEMA)
- Uniform Building Code (UBC)

- Underwriters Laboratories Inc. (UL)
- US Environmental Protection Agency (EPA)

The Contractor will also adhere to construction specifications mutually agreed with the Company. The contractor will be submitting their specifications with the proposal for initial review and approval from the Company.

The specifications will include and is not limited to the following:

- General Facility – Piping and Valves (for both ASME B31.3 and B31.8)
- General Specification – Pressure Vessels (ASME SEC VIII DIV I)
- General Specification – Heat Exchanger (ASME SEC VIII DIV I and TEMA)
- General Specification – Paint, Galvanizing, Coating and Insulation
- General Specification – Centrifugal and Reciprocating Compressors
- General Specification – Centrifugal Pumps

3. SITE CONDITIONS

Location	47.695331, -103.259976 McKenzie County, ND
Elevation Above MSL, ft	2275
Design Ambient Air Temperature, °F	120
Maximum Average Ambient Air Temperature, °F	84
Minimum Average Ambient Air Temperature, °F	2
Design Wind Speed, MPH (ASCE 7-10)	100 (ASCE 7-10)
Design Seismic Load, g (ASCE-07)	S_s = 0.094, S_1= 0.027; Site Class: B
Noise Levels, dBA (per OSHA 1926.52(d)(1))	< 90
Barometric Pressure, psia	13.53
Frost Depth, ft	5
Design Snow Load, PSF	30

4. STANDARD CONDITIONS

Pressure, PSIA	14.69
Temperature, °F	60

5. STANDARD UNITS OF MEASUREMENT

Temperature	°F
Pressure	psi
Mass Flow	lb/hr
Volumetric Gas Flow	MMSCFD, SCFH
Volumetric Liquid Flow	gpm, BPD
Density	lb/ft3
Viscosity	cP

Speed (rotational)	rpm
Velocity	ft/s
Distance	ft, in
Weight	lbs

6. FEED AND PRODUCT SPECIFICATIONS

6.1 Inlet Gas Conditions

Feed Flow Rate, MMSCFD	200
Maximum Feed Pressure, psig	1095
Operating Pressure, psig	685
Temperature, °F	60, Summer 35, Winter
Maximum Water Content (lb/MMSCF)	7.00

6.2 Feed Composition (Range)

Component	Mole %
CO2	0.80
Nitrogen	2.27
Methane	57.76
Ethane	20.74
Propane	11.32
i-Butane	1.26
n-Butane	3.80
i-Pentane	0.80
n-Pentane	0.80
Hexane	0.19
Heptane	0.23
Octane	0.02
Nonane	0.01
Decane	NIL
Total	**100**

6.3 Product Specifications

6.3.1 Y-Grade Product Specification

Maximum Delivery Pressure (MAWP), PSIG	1440
Normal Operating Pressure, psig	1350
Max Delivery Temperature, °F	90 if > 65 mol% C2
	110 if < 65 mol% C2
Max CO_2/C2 Ratio, LV%	0.35
Max CO_2, ppmw	8038
Max C1/C2 Ratio, LV%	1.5
Max C1 Content, LV% (excluding Nitrogen and CO_2)	0.5
Max Vapor Pressure @ 100°F, psig	600
Free Water at P/L Delivery Conditions (Visual Inspection)	None @ 34°F
Note: Please see Exhibit A for the detailed Oneok Bakken NGL pipeline specification.	

6.3.2 Residue Gas Specification

Maximum Delivery Pressure (MAWP), PSIG	1440
Normal Operating Pressure, psig	1350
Max Delivery Temperature, °F	120
~~Max~~ Min Gross Heating Value (HHV), BTU/SCF	967
Hydrocarbon dew point Specification	
	-5°F @ 800 PSIA
	-10°F @ 1000 PSIA
	-18°F @ 1100 PSIA
H2S, grains/100 SCF	0.30
Total Sulfur, grains/100 SCF	2.00
CO_2, mol %	2.00
Water Content, lb/MMSCF	4.00
Note: Please see Exhibit B for the detailed TransCanada Northen Borders pipeline specification.	

7. PROCESS - DETAILED DESCRIPTION OF WORK

7.1 Inlet Feed Handling

7.1.1 The company wishes to utilize the existing LM-III Slug catcher deemed adequate for 225 MMSCFD capacity of multiphase feed stream with the composition and pressure as listed in section 6.0.

7.1.2 The existing fingers on the slug catcher has room to add 3 more fingers which would give a total additional capacity of 900 barrels. The company wishes to add these fingers as part of the Work and needs the installed cost as **an adder line item** to the Cost Estimate.

7.1.3 A 16” header for gas and an 8” header for liquid from the existing slug catcher area need to be run underground towards the LM-IV area.

7.1.4 A pressure/flow control valve on this gas header will control flow/pressure to the LM-IV cold plant.

7.1.5 The stabilizer overhead compressor will tie-in downstream of this inlet control valve to reduce swings on the compressor caused due to pigging operations.

7.1.6 An inlet separator needs to be added which can handle both the feed gas supply from the slug catcher and the stabilizer overhead compressor, with liquid dropouts to be taken to the stabilization flash tank vessel. A tee-off emergency takeaway to the existing closed drain should be available on the liquid drain pipe.

7.1.7 A vortex type separator needs to be added after the inlet separator to minimize element change-outs for the downstream coalescing filter. The liquids from the vortex separator need to be tied with the liquids from the Inlet Separator.

7.1.8 An inlet gas (tube side)/hot residue gas cross exchanger is required to keep the gas 15°F above dew-point to mitigate/eliminate liquid dropout during metering and dehydration process.

7.1.9 The metering would be a senior orifice with pressure and temperature compensation and should communicate through a flow computer.

7.2 Molecular Sieve Dehydration and Regeneration System

7.2.1 Contractor to provide a molecular sieve dehydration system to dehydrate a 20lbs/MMSCF water loaded system, with a 3A sieve design.

7.2.2 The molecular sieve dehydration and regeneration system needs to be built such that residue gas can alternatively be used as regeneration gas in case there is an issue with the existing regeneration compressor.

7.2.3 The regeneration heater may need to be relocated based on spacing guidelines as listed in Section 11.1, and inter-connecting piping is required.

7.2.4 The regeneration gas cooler will need to have recirculation/body louvers for cold climate performance and a hot oil tubesheet for anti-freeze purposes.

7.2.5 The liquids from the regeneration scrubber need to be routed to a pressurized drain vessel before taking to the atmospheric storage tank.

7.2.6 The contractor will be responsible for loading the molecular sieve material and constructing the pre-fabricated ladder and support assembly. The molecular sieve materials will be by the Company.

7.2.7 Contractor to include the regeneration gas compressor in an enclosed building with temperature controlled ventilation fans and catalytic heaters.

7.3 mOHR Cold Plant

7.3.1 Contractor to provide a 200MMSCFD (inlet of slug catcher) cold gas plant which can meet the specifications on both residue and y-grade takeaway.

7.3.2 The technology selected is a modified Overhead Recycle/Rectification process for achiwveing deep ethane rejection (5LV% in product) or 55%+ ethane recovery.

7.4 Refrigeration Skid

7.4.1 The contractor would provide Atlas Copco integral gear refrigeration compressor for this project.

7.4.2 The total refrigeration load will be divided into a minimum two units (2x 60%).

7.5 Product Handling

7.5.1 Contractor to provide metering skid for the total product from stabilizer and cold plant as per Company specifications

7.6 Heat Medium Unit

7.6.1 The heat medium unit will utilize the WHRUs from the residue compression to heat the hot oil.

7.6.2 Hot oil to be utilized will be Therminol-59.

7.6.3 Hot oil will be hot enough to regenerate the molecular sieve beds.

7.7 Residue Handling

7.7.1 Residue Compression needs to be handled in phases to achieve the 200 MMSCFD rated capacity for the plant.

7.7.2 The Company intends to add (2) Centrifugal Compressors, Solar Centaur 50 with Solonox, Contractor to include installation cost in their estimate.

7.7.3 The residue compressor inter and after cooler need to be specified such that the final sales gas meets the temperature specification per Section 6.3.2.

7.7.4 Horizontal (preferred) or Vertical coalescing filter downstream of the compressor needs to be provided for lube oil coalescing before the residue gas goes for metering.

7.7.5 The metering would be a senior orifice with pressure and temperature compensation and should communicate through a flow computer.

7.7.6 The residue gas line will need to tie into existing Northern Borders pipeline.

7.7.7 The compressor does not come with suction and inter-stage scrubbers; the contractor needs to provide that in consultation with Solar Turbines.

7.8 Waste Heat Recovery Unit

7.8.1 Solar turbine exhausts need to be duct per the requirement/recommendation of the Solar vendor.

7.8.2 WHRU to provide heat for the maximum rated duty that can be generated from the 2 Solar units and should have exhaust diverting valves for controlling the hot oil temperature.

7.8.3 Contractor to have a plan on connecting the third solar unit exhaust to the WHRU when it is installed later.

7.9 Stabilization System

7.9.1 A stabilization system has to handle 20,000 BPD of liquids and need to be designed to meet product specifications per Section 6.3.

7.9.2 The stabilization system needs to have the following (see attached go-by simulation from the Company):

7.9.2.1 2 x 100% OR 3 x 50% particulate filters designed for 1170 PSIG MAWP.

7.9.2.2 Feed/Overhead exchanger to integrate and pre-heat the feed liquids.

7.9.2.3 Three Phase condensate flash drum for 500 PSIG MAWP, to remove water and separate the gas and liquid phases. This will allow only liquids to enter the stabilizer tower and reduce the column diameter and heat requirement. The separated gas will bypass the tower and is compressed into the cold plant.

7.9.2.4 2 x 100% OR 3 x 50% liquid/liquid coalescing filters designed for 350 PSIG MAWP.

7.9.2.5 Feed/Product exchanger to integrate and pre-heat the feed liquids.

7.9.2.6 Stabilizer tower with packed internals designed for 350 PSIG MAWP.

7.9.2.7 Stabilizer reboiler with heat medium oil is needed to meet the product specification.

7.9.2.8 Stabilizer surge drum with 350PSIG MAWP and to hold GPA recommended residence time at NLL of 30%.

7.9.2.9 3 x 50 % or 2 x 100% API-610 pipeline pumps to meet the pipeline MAOP per section 6.3.

7.9.2.10 2 x 50 % stabilizer overhead compressor.

7.9.2.11 2 x 50% OR 1 x 100% Product particulate filters designed for 1440 PSIG MAWP.

7.9.2.12 The product needs to tie-in with the Cold plant liquids before entering Product Metering.

7.9.3 An alternate liquid take-away from the stabilization system to existing bullet tanks needs to be provided. Contractor to estimate incorporating one more bullet tank for off-spec product.

7.9.4 Waste Heat Recovery Unit on residue compression will provide heat for the stabilizer reboiler

7.10 Balance of Plant

7.10.1 Instrument Air Compressor

7.10.1.1 Instrument air compressor needs to be provided for the requirement identified on the Work. The instrument air compressor needs to be housed in a building and should come with a lead/lag unit with filters, bottles and desiccant beds.

7.10.1.2 Dry air need to be provided to all instrument air requirement and needs a volume bottle to provide a 30 min buffer time for controlled shutdown in case of power loss to the instrument air compressor.

7.10.1.3 Volume Bottle/s needs to be provided for compressor startup with 2 cold cranks and 6 warm cranks for starting each compressor.

7.10.2 Methanol Vessel and Pump

7.10.2.1 Methanol storage tote/vessel based on the requirement calculation needs to be provided.

7.10.2.2 Methanol multi-stage electric driven pump needs to be provided for various injection locations.

7.10.3 Refrigerant Storage and Make-Up Pump

7.10.3.1 A 1,500 Gallon Propane Storage Drum MAWP of 250 PSIG needs to be provided to meet the make-up requirements for refrigeration system.

7.10.3.2 A positive displacement pump (Blackmer or equal) needs to move refrigerant from the Storage Drum to the Accumulator.

7.10.4 Lube Oil Tank and Double Diaphragm Pump

7.10.4.1 90 BBL UL-142 or Double walled atmospheric tank is required to meet the lube oil demands for the compressors.

7.10.4.2 Double diaphragm pneumatic pumps need to be added to supply lube oil from storage tank to the gravity feeding day tanks.

7.10.4.3 Tanks to be heat traced and insulated for cold climate service.

7.10.5 Engine Jacket Water and Double Diaphragm Pump

7.10.5.1 90 BBL API-12F or UL-58 double wall underground atmospheric tank is required to meet the jacket water demands for the compressors.

7.10.5.2 Double diaphragm pneumatic pumps need to be added to supply jacket water from storage tank to the gravity feeding day tanks.

7.10.6 Spent Oil/Jacket Water Tank

7.10.6.1 90 BBL UL-142 or double walled atmospheric tank is required to store and dispose the spent oil from the compressors.

7.10.6.2 Piping on jacket water pump to be designed to have two-way flow to feed into the spent oil tank.

7.10.6.3 Tanks to be heat traced and insulated for cold climate service.

7.10.7 Production Water Tank

7.10.7.1 Contractor to provide 2 x 500 BBL API-12F tanks insulated and heat traced with 12" Enardro EPRV-2000 thief hatch to meet API-2000 emergency venting requirements.

7.10.7.2 All tanks to be heat traced and insulated for cold climate service; contractor to determine if external recirculation heaters are required for this service.

7.10.8 Closed Drain and Flare

7.10.8.1 Company plans on utilizing the existing closed drain system and flare knockout drums for the Work.

7.10.8.2 Contractor to tie new reliefs into the existing closed drain drum (pseudo Flare KOD).

7.10.8.3 The existing flare is only rated for a design of 40 MMSCFD of relief; and hence needs to be upgraded to 225 MMSCFD flare with a minimum of 15 PSIG stack base pressure to work with the existing 12" flare header that runs between the close drain drum, flare knockout drum and the flare. Flare to be air-assisted (if possible) and smokeless for non-emergency flaring.

7.10.9 Generators

7.10.9.1 Company will provide permanent generator with ATS to drive. Contractor's responsibility to do the electrical completion on the generator system. Generator to be located in the compressor building.

- One IA compressor, 85% loading, softstart
- One flare blower, 85% loading, VFD
- Both flare ko pump motors
- One flare blower, 85% loading, VFD
- Plant lighting (15 amps total)
- AC units (Main PDC, VFD PDC, control building)
- 15kVA Plant UPS, 75% loaded (preliminary estimates indicate 15kVA is good, but this is preliminary)
- Plant PLC & fire/gas detection, beacons, alarms are fed by this UPS

- Heat trace (six 45kVA transformers, loaded to 20kVA each)
- Water well (assume a 10HP motor)

7.10.10 Compressor Building

7.10.10.1 Buildings to be completely enclosed with temperature controlled ventilation fans.

7.10.10.2 Catalytic heaters to maintain temperature around the compressors.

7.10.10.3 Fire eyes between compressor units.

7.10.10.4 Gas detection on both top (for methane) and bottom (for propane) levels of the compressor.

7.10.10.5 All compressors which includes and not limited to stabilizer overhead, residue compressor, refrigerant compressor, instrument air compressor to be house in the building.

7.10.10.6 The building will also need a **25 ton dual** girder crane with an electric winch with radio control (OMI Crane or equal) which covers the entire span of the building.

7.10.11 PDC (Power Distribution Center) Building

7.10.11.1 PDC Building will be of standard manufacturer's construction in accordance with site condition, should house all the relevant equipment identified for the Work.

7.10.11.2 Contractor to do all electrical pulls from the secondary side of the main transformer.

7.10.11.3 Primary side of the main transformer will be handled by the local electric company.

7.10.12 Sumps

7.10.12.1 Contractor to provide UL-58 double walled underground sump tank to handle all drains from the compressor building.

7.10.12.2 Double diaphragm pump to move liquids from the sump to the production water tank.

7.10.12.3 Contractor to provide interstitial level alarm to check if primary containment is breached.

7.10.13 General

7.10.13.1 Cathodic protection and/or insulation kit to be provided for all underground lines before they tie into the above ground lines.

7.10.13.2 All heat traced lines going underground shall be heat traced and insulated until the frost depth per site specifications Section 3.0.

7.10.13.3 Space heaters sized for the ambient conditions will be provided on all motors (> 10hP) that are outside the building.

7.10.13.4 The contractor shall provide an Allen Bradley PLC with ControlLogix for the process control and communications for this Work.

7.10.13.5 The contractor shall also develop and implement an instrumentation controls report that fully defines a system capable of communicating (alarms, etc.) with the existing plant's control system (Allen Bradley PLC).

7.10.13.6 All insulation needs to have mold protection available integral to the material of the insulation. Polyurethane/polyisocyanurate is the preferred insulation material for the project.

7.10.14 Analyzers

7.10.14.1 The contractor will have to provide for a 5 stream analyzer with heated sample probes

to analyze:

7.10.14.1.1 Inlet gas to the cold plant

7.10.14.1.2 Residue gas to the pipeline

7.10.14.1.3 Stabilizer overhead gas

7.10.14.1.4 cold plant liquids

7.10.14.1.5 Stabilizer plant liquids

7.10.14.2 A crude sampler i.e. Welker LS-7 or LS-14 type needs to be provided to analyze:

7.10.14.2.1 Slug catcher liquids

7.10.14.2.2 Stabilizer liquids inlet

7.10.14.3 The contractor needs to program recovery calculations on the Wonderware system calculating:

7.10.14.3.1 Recovery Calculation for the cold plant

7.10.14.3.2 Recovery Calculation for the overall plant

7.10.14.3.3 Dew-Point calculation on the residue gas

7.10.14.3.4 CO_2/C2 and C1/C2 liquid volume ratio for cold plant, stabilizer plant and overall plant liquids.

7.10.14.3.5 CO_2 ppmw for cold plant, stabilizer plant and overall plant liquids.

8. CIVIL STRUCTURAL

8.1 General

8.1.1 Contractor will perform all hydro-vac services and checks for all foundation/ground work.

8.1.2 Contractor will provide foundation plans for all skids and off skid items.

8.1.3 Contractor will provide for ground work and foundations for every skid and off skid equipment.

8.1.4 Steel and skid design shall be in accordance with site specification in Section 3.0 and the industry standards/codes as applicable in Section 2.0.

8.1.5 Skid package vendors shall design skid to install on piers when possible.

8.1.6 Skids to be designed with operability and easy access in mind.

9. ELECTRICAL

9.1 General

9.1.1 Electrical design shall follow NFPA 70 (NEC) and API 500.

9.1.2 Electrical design will be based on Incoming Utility power of 4160V and 480V, 3-phase, 60Hz. Power to be supplied by others at the incoming terminals on the primary side of the Main Facility Transformer.

9.1.3 On-skid grounding will be installed per NEC guidelines.

9.2 Electrical Guidelines

9.2.1 Utility (Convenience receptacles, task lighting, etc.) 120V, 1 Phase, 60 Hz

9.2.2 Motors < 450 HP 460V, 3 Phase, 60 Hz

9.2.3 Motors > 450 HP 4000V, 3 Phase, 60 Hz

Note: Contractor will consult with equipment vendor/company for acceptable voltage, phase, switchgears, soft starts and VFD requirements.

9.3 Power, Control and Instrument Cable

9.3.1 Cable installation design shall be based on Okonite or equal, Type TC Tray cable.

9.4 Cable Tray

9.4.1 Cable tray design shall be based on B-Line aluminum cable tray

10. INSTRUMENTATION

10.1 General

10.1.1 Instruments shall be in accordance with applicable environmental conditions stated in paragraph 1.0 and the industry standards/codes below:

- Instrument Society of America. (ISA)
- Institute of Electrical and Electronic Engineers. (IEEE)
- Underwriters Laboratories Inc. (UL)

10.1.2 Instruments shall be provided by Company preferred suppliers.

10.1.3 Instrumentation used for process measurement and alarm/shutdown shall be analog 4-20 mA with HART protocol wherever possible.

10.1.4 Local pneumatic control can be used in non-critical control loops.

10.1.5 All electronic instruments, regardless of whether they are in hazardous service, shall be rated for the area classification, but as a minimum are suitable for Class I, Division 2, group C and D hazardous locations.

10.1.6 All instruments shall terminate in separate control and safety system junction boxes located at skid edge.

10.1.7 Power for instrumentation shall be 24 VDC unless otherwise approved by Company. Where possible, instruments shall be two-wire, loop-powered.

10.1.8 The minimum wire gage for instrument signal wiring shall be 16 AWG.

10.1.9 All analog transmitters, connected to a PLC, shall wire to terminals immediately before wiring to the PLC. The positive wire's terminal shall have a built-in diode such that a low-resistance ammeter placed across the terminal will display the loop current.

10.1.10 All discrete I/O shall be individually fused at the closest terminal strip to the PLC card.

10.2 Level

10.2.1 Level controls will be based on magno-restrictive transmitters mounted to external cages. These cages will have Venetian blind-type indicators rather than the single point indicator type.

10.2.2 Where a second (redundant) level transmitter is required for safety, a differential pressure

transmitter shall be used.

10.2.3 All level gauge glasses shall be armored type. The pressure rating for the largest available glass length, for the selected model, shall be greater than the maximum design pressure of the measured equipment and shall be installed with offset gauge cocks so that the gauge can be rodded out in place. Gauge cocks shall have integral ball checks.

10.2.4 Level gauge insulation would be a solid insulation with sealed acrylic covers. Jackets on level gauges won't be acceptable.

10.3 Pressure

10.3.1 Field mounted pressure gauges shall have a minimum of 4" diameter face. All pressure gauges shall be provided with safety glass and a blowout back.

10.3.2 Pressure transmitters for process control shall be locally mounted to a gauge valve and shall be Rosemount model 3051 or equal.

10.4 Temperature

10.4.1 Thermowells are required for all temperature measuring devices used in flammable, toxic, or otherwise hazardous pressurized or vacuum systems.

10.4.2 Temperature gauges shall have a minimum 4" diameter face. They shall be bimetallic with adjustable angle mounting.

10.4.3 Temperature measurements for monitoring (indication only) shall be by means of thermocouples. The type of thermocouple used will be dependent on the application temperature but shall generally be type "J" for temperatures between 32 deg F and 1200 deg F and Type "T" for cold applications below 32 deg F.

10.4.4 Temperature measurements for control and/or interlock purposes shall be with the use of RTD's or Thermocouple direct inputs.

10.4.5 Temperature transmitters shall be Rosemount model 3144 or equal.

10.5 Flow

10.5.1 Gas flow measurement (excluding of custody metering) shall be by orifice meters using Rosemount 3051CD transmitters (or equal) and 5-valve manifolds.

10.5.2 Sales meters for gases shall use senior orifice fittings and meter runs and shall meet or exceed API Chapter 14, Section 3, Part 2 (14.3/AGA 3) requirements.

10.6 Quarter-Turn Actuated Valves

10.6.1 All ¼ turn actuated valves shall comply with the relevant piping specification with regards to pressure rating, end connections, body and trim materials, and soft goods.

10.6.2 All instrumentation and tubing associated with the valve and actuator shall be 316 or 304 stainless steel seamless with 0.035" wall thickness whenever possible, and shall be suitable for long time service.

10.6.3 Actuators on SDV's shall be sized based on 80 PSIG instrument air. Actuators shall be sized such that the torque, at the beginning of the air stroke, with 80 PSIG air is greater than 1.5 times the published valve break torque at the maximum pressure differential for the ANSI class of the valve

flanges; and the spring end torque shall be 1.25 times the published valve seating torque.

10.6.4 Actuator speed control, when required, shall be accomplished with a fixed orifice. The vent point for actuation air should be protected with a "bug excluder".

10.6.5 Where specified, actuators shall come equipped with electrical components. These shall be suitable for the area classification. The valve and actuator shall be supplied such that a single electrical cable connection can service all electrical components.

10.7 Control Valves

10.7.1 Control valves should be Fisher sliding stem valves or equal with the manufacturer's standard trim, where possible unless otherwise approved by Company.

10.7.2 Throttling valves shall be supplied with electro/pneumatic transducer and positioner.

10.7.3 The noise level of control valves should not exceed site specification under normal operating conditions.

10.8 Relief Valves

10.8.1 Rupture disks shall NOT be used for relief applications.

10.8.2 Anderson-Greenwood, Crosby, Pentair, Farris and Mercer relief valves are acceptable brand of relief valves for this Work.

10.8.3 Conventional, direct spring loaded type relief valves will be used for services in which the back pressure does not exceed 10% of the set pressure. As a general guideline, the contractor can provide a conventional PSV for set pressures > than 400 PSIG; unless otherwise indicated by the back pressure calculation.

10.8.4 Pilot type relief valves will be used for set pressures < than 400 PSIG or when the back pressure exceeds 10% of set pressure.

10.8.5 All heavier than air, cold, and multi-phase reliefs shall not be vented to the atmosphere and will be piped to the relief header.

10.8.6 All relief valves vented to atmosphere shall be vented to safe location and will have a snow cap on the outlet of the tail pipes.

10.8.7 All ASME stamped vessels (shell side of exchangers included) will have their own individual relief valves sized for appropriate scenario.

10.8.8 Contractor will use 2,500 sq. ft. fire zone recommendation per API-521 5.20.2.2 (a) for flare design which involves multiple PSV relieving condition. Contractor will also indicate fire zones on a separate plot plan during detailed phase of the project.

10.8.9 All fire case scenario sized PSVs will be connected to the flare even if the reliefs are lighter than air.

10.8.10 The Cold Plant will have a cold drain system, and will need the SS tail pipes and SS sub header from cold reliefs tied into the cold drain drum.

10.9 Instrument Enclosures

10.9.1 All control panels and junction boxes that are not inside buildings shall be stainless steel NEMA 4X at a minimum.

10.9.2 If possible, all cable/conduit connections shall be on the bottom of the enclosure. No penetrations

through the top of the enclosures are permitted.

10.9.3 All field-mounted operator interface LCD's or operator interface screens, if used, shall be completely enclosed by a gasketed 316 stainless steel door with a transparent shatterproof window unless otherwise approved by Company.

10.9.4 Components located inside an enclosure shall be permanently labeled with tag number and function.

10.9.5 Basic Process Control wiring and Safety System wiring shall be on separate terminal strips.

10.10 Wiring Methods

10.10.1 Aluminum Cable Tray shall be used for all wiring where practical.

10.10.2 Single and/or multipair/triad Instrument cables shall be, minimum 16 AWG Twisted Pair with individual and overall shields, 300 volt, TC tray cable (Okonite or equal). Conductors for pairs shall be black and white. Conductors for triads shall be red, black, and white.

11. MECHANICAL/PIPING

11.1 General

11.1.1 Equipment spacing shall be in accordance with GE GAP Guidelines 2.5.2 or see section 2.0 on Company's Construction Specification Standards. In case of conflict in information between the two sources mutually agreed spacing requirements will be considered.

11.1.2 All piping to follow latest version of ASME B31.3 piping code for all facility piping.

11.1.3 Supports should be located to limit maximum weight deflection to 1".

12. BID PACKAGE SPECIFICATIONS:

12.1 Cost Estimate

12.1.1 As part of the total installed cost estimate, the company would like to have a firm pricing on all major equipment, as defined by Section 12.2.1, for the project. The contingency variance of ± 20% required by the FEL-3 estimate from the Contractor would be built solely in the construction and installation effort.

12.2 Equipment Purchase

12.2.1 All major equipment on skid and off skid would be purchased directly by the Company; this includes (as applicable) air coolers, blowers, compressors, engines, exchangers, generators, heaters, flares, meters, motors, pressure vessels, pumps, regulators, storage tanks, sumps, tower & tower internals, turbines, and waste heat recovery system. All major equipment supplier need to provide mill test reports (MTR) identifying the source of material utilized.

12.2.2 All design specification sheets would need to have been checked by the Company before going out for bidding process. The Contractor would select a minimum of 3 vendors for bidding on individual RFQ packages. In case of vendors no-bidding for an item/s on a RFQ package a minimum of two quotes would be needed on each item for vendor determination. An RFQ package that has more than $ 50,000/- monetary value would require a bid evaluation from the Contractor. Contractor

will request all vendors to submit firm pricing with NET 60 day validity and performance guarantees. All vendor T&Cs, payment milestones will be in agreement with the Company's procurement division.

12.3 Vendor Selection Order

12.3.1 Meet specifications laid by the RFQ package. Any exceptions against specification need to be brought to the Company and Contractor's attention.

12.3.2 Meet the lead time mutually determined by the Contractor and the Company, based on Section 16.0 and Contractor fabrication schedule.

12.3.3 Vendor history and performance.

12.3.4 Lowest bid pricing and payment milestones.

13. DELIVERABLES

The contractor will provide the company the following deliverables:

13.1 Documents

13.1.1 Project Cost Estimate (hard and electronic copy). This estimate will be considered as Contractor's lump sum bid for all detailed engineering, procurement (as defined by section 12.2), and construction activity.

13.1.2 Equipment Specification Sheets and RFQ packages.

13.1.3 Bids from all vendors and identify 'No bids'. (electronic copy/emails only)

13.1.4 Soils Report. (order on behalf of the Company, hard and electronic copy)

13.1.5 Weekly progress report (electronic copy only) by 8:30 AM each Monday during the construction phase.

13.1.6 Weekly updated actions items list for Contractor & Company communication. (electronic copy only)

13.1.7 Biweekly updated project schedule. (electronic and native file copy)

13.1.8 Design Basis Memorandum. (hard and electronic copy)

13.1.9 Written Scope of Work for EPC Bid Packages. (electronic copy)

13.1.10 Sign-off on this scope document.

13.1.11 EPC Bid Packages, including process description, specifications, standards, drawings, OSHA PSM documents (PHA, relief system calculations, operating procedures, etc.), EPA RMP Compliance Plan documents and complete list of project deliverables. (hard and electronic copy)

13.1.12 Contractor to support Company with site specific Title V Permit Application efforts. (electronic and native file copy)

13.2 Drawings (hard, electronic and native file copies)

13.2.1 Process flow diagram (PFD) with Heat and Material Balance (HMB)

13.2.2 Preliminary plot plan with 100' axis grids

13.2.3 Preliminary Area classification drawing (Issued for approval – REV A)

13.2.4 Tie-In list and location plan (Issued for approval – REV A)

13.2.5 Preliminary P&IDs (Issued for approval – REV A)

13.2.6 Electrical One Line Diagram

13.3 LISTS (hard, electronic and native file copies)

13.3.1 Major Equipment List

13.3.2 Utility and Fuel Consumption Summary List

13.3.3 Preliminary Line List (during detailed phase)

13.3.4 Instrument Air Requirement List

14. PLANT MATERIAL, EQUIPMENT OR SERVICES FURNISHED BY COMPANY

14.1.1 The Company shall furnish installed residue compression units with their Waste Heat Recovery system

14.1.2 The Company shall provide equipment specification sheets, job books, 3D models as required by the contractor.

14.1.3 All first fills which includes molecular sieve material, hot oil, spare filters, refrigerant grade propane, various lube oils, jacket water, start-up strainers, etc. will be provided by the company

14.1.4 Existing plot plan and shared system P&IDs.

15. CONSTRUCTION ACTIVITY

15.1.1 Wash down slabs drained to a central sump and oil/water separator shall be included under each skid.

15.1.2 Finished plant will include paved sidewalks from the control room to the major equipment skids.

15.1.3 Contractor will be responsible for site security during construction, including monitoring traffic to/from the facility.

15.1.4 The contractor will be responsible for all material and construction management activities.

15.1.5 The contractor will be responsible scheduling, managing and monitoring all sub-contracted activities.

15.1.6 Nomex FRC's and protective gear will be required at all times during construction for both contractor and sub-contractors.

15.1.7 Contractor will be responsible for all lodging, boarding, travel and other expenses for their employees.

15.1.8 Safety will be a top priority at all times, all safety related incidents should be promptly brought to the Company's attention.

15.1.9 Contractor will have safety supervisors for all construction activities and expect the same from sub-contractors.

16. IMPORTANT DATES

16.1.1 Notice to Proceed will be issued by the Company once Contractor and Company mutually accepts the Scope Document in its entirety. Contractor has 3 business days to raise issues and concerns with the Company.

16.1.2 Start: Within 3 business days from Notice to Proceed.

16.1.3 Finish: 8 weeks from Notice to Proceed Date.

16.1.4 The company currently has a tentative first gas to the new facility projected at **start Q4/18**. The contractor needs to have a contingency of 30 days from first gas for all mechanical completion and orange tagging activity.

16.1.5 Contractor needs to make Company proactively aware if any of these dates are to slip.

17. COMPANY REPRESENTATIVE

17.1.1 All project correspondence will be directed to Mr. Shirish Mehta, (713-584-1472, smehta@targaresources.com), who will be the acting Project/Engineering Manager for this work.

EXHIBIT – A

BAKKEN NGL PIPELINE
Product Specification Sheet

Product: Demethanized Mix – Y-Grade
Specification Number: BKNNGL-RF

Date Originally Issued: 11/20/2012
Revision Date:
Revision Number: 0

Specification Points	Test Method	Maximum	Minimum
Composition			
Carbon Dioxide, Maximum	GPA 2177	(See Note 1)	(See Note 1)
Methane, Maximum	GPA 2177	(See Note 2)	(See Note 2)
Aromatics, Maximum	GPA 2186	10.00 LV%	
Olefins, Maximum	GPA 2186	(See Note 3)	(See Note 3)
COS, by wt of C3 component	ASTM D5623 or GPA	15 ppmw	
Vapor Pressure – psig @ 100° F			
psig @ 100° F, Maximum	GPA 2177, Appendix B	600	
Corrosiveness			
Copper Strip @ 100 F	ASTM D 1838	No. 1	
Volatile Sulfur, by weight			
PPM by Weight, Maximum	ASTM D 6667	1200 ppm	
Hydrogen Sulfide	ASTM D 2420	Pass	
Distillation			
End Point @ 14.7 psia, °F, Max	ASTM D 86	375° F	
Color			
Saybolt Number, Minimum	ASTM D 156	+27	
Dryness			
Free Water	Inspection	None @34° F	
Product Temperature			
Product containing 65 mole % or more Ethane, °F, Maximum		90° F	
Product containing less than 65 mole % Ethane, °F, Maximum		110° F	

Notes:
1. Carbon Dioxide Maximum is 0.35 L.V.% (8038 ppmw) of the Ethane.
2. Methane Maximum is 0.5 L.V.% of the total components excluding N2 and CO2 and 1.5 L.V.% of the Ethane
3. Olefin Maximum is 1.0 L.V.% (10,000 ppmw) of the total stream, C4 Olefin Maximum is 0.1 L.V.% (1,000 ppmw) of the Normal Butane
4. Distillation and Color to be run on that portion of the mixture having a boiling point of 70° F and above at atmospheric pressure.
5. Demethanized Mix shall be merchantable, commercially free from sand, entrained water, nitrogen, amine, particulates, brine, olefins, dust, gums, gum-producing substances, oil, glycol, inhibitors, amine, any other contaminants, or any compound added to the Demethanized Mix to enhance the ability to meet these specifications, and other impurities which may be injurious to the pipeline, fractionator, measurement facilities, or storage facilities or the property of third parties, or may interfere with its transmission through the pipeline, fractionator or storage facilities.

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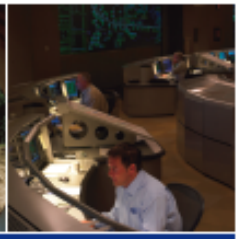
EXHIBIT – B

Gas Quality Specifications

TransCanada and other pipelines



US Pipelines

Specs	Alliance USA	Empire	GLGT	Iroquois	Northern Border
Hydrogen Sulphide	Max. 1 grains/Ccf	Max. 1 grains/Ccf	Max. 1/4 grains/Ccf	Max. 1/4 grains/Ccf	Max. 0.3 grains/Ccf
Total Sulphur	Max. 5 grains/Ccf	Max. 20 grains/Ccf	Max. 20 grains/Ccf	Max. 1.25 grains/Ccf	Max. 2 grains/Ccf, (0.3 grains mercaptan/Ccf)
Carbon Dioxide	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume
Oxygen	Max. 0.4% by volume	Max. 1% by volume	Max. 1% by volume	Max. 0.2% by volume	Max. 0.4% by volume
Nitrogen	Not specified	Not specified	Max. 3% by volume	Max. 2.75% N_2+O2 4% N_2+ CO_2	Not specified
Temperature	Max. 122°F	Max. 120°F, Min. 40°F	Max. 120°F, Min. 20°F	Max. 120°F	Min. 32°F Max. 120°F
Heating Value	Min. 962 BTU/ft³	Min. 950 BTU/ft³ Max. 1200 BTU/ft³	Min. 967 BTU/ft³ Max. 1069 BTU/ft³	Min. 967 BTU/ft³ Max. 1110 BTU/ft³	Min. 967 BTU/ft³
Water	Max. 4 lbs/MMcf	Max. 7 lbs/MMcf	Max. 4 lbs/MMcf	Max. 4 lbs/MMcf at 14.73 psi & 60°F	Max. 4 lbs/MMcf
Hydrocarbon Dewpoint	Max. 14°F at opt. pres.	Not specified	Not specified	Max. 15°F or less	Max. -5°F (800psia), -10°F (1000 psia), -18°F at (1100 psia)
Interchangeability	Not specified	Not specified	Not specified	See Iroquois Tariff	Not specified
Specs	**NWP**	**PNGTS**	**SOCAL**	**Tennessee GP**	**Viking**
Hydrogen Sulphide	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 1/4 grains/Ccf
Total Sulphur	Max. Non Laplata Facilities 5 grains/Ccf, Laplata Facilities 0.75 grains/Ccf, 0.3 grains mercaptan/Ccf	Max. 20 grains/Ccf	Max. 0.75 grains/Ccf (0.3 grains mercaptan/Ccf)	Max. 10 grains/Ccf	Max. 20 grains/Ccf
Carbon Dioxide	Max. 2% by volume	Max. 3% by volume	Max. 3% by volume	Max. 3% by volume	Max. 3% by volume
Oxygen	Max 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume
Nitrogen	Max. 3% incl. O_2, CO_2	Max. 4% incl. CO_2	Max. 4% incl. O_2, CO_2 and inerts	Max. 4% incl. CO_2, O_2 Max 2.75% N_2 + CO_2	Max. 4% incl. CO_2
Temperature	Non Laplata Facilities Max. 120°F Laplata Min. 40°F, Max. 120°F	Max. 120°F	Min. 50°F, Max. 105°F	Max. 120°F	Max. 120°F
Heating Value	Min. 985 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³	Min. 990 BTU/ft³ Max. 1150 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³
Water	Max. 7 lbs/MMcf	Max. 7 lbs/MMcf	Max. 7 lbs/MMcf at <800psi or < 20°F at > 800psi	Max. 7 lbs/MMcf at 14.73psi at 60°F	Max. 7 lbs/MMcf at 14.73psi at 60°F
Hydrocarbon Dewpoint	Max. 15°F (100-1000psia)	Not specified	See SOCAL Tariff	Max. 15°F	Not specified
Interchangeability	Not Specified	Not Specified	See SOCAL Tariff	See Tennessee GP Tariff	Not Specified

The Gas Quality Specifications tables are intended to be used for planning purposes only and although TransCanada endeavours to maintain the information in such a way that is accurate and current, it may not provide accurate results. Use of this information is at user's sole risk and TransCanada shall not be liable for user's, or any party's, use of or reliance on any results obtained from it.

Website: http://www.transcanada.com/customerexpress/index.html
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The Pipeline: 403.920.PIPE (7473)
November 2016

TransCanada
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TARGA BADLANDS, LLC.

LITTLE MISSOURI – IV GAS PLANT

RESIDUE COMPRESSION INSTALLATION

PROJECT NUMBER: 53990

SCOPE DOCUMENT

	By	Date
Initiator	**SCM**	**09/11/17**
Company Representative	**SCM**	**09/11/17**
Contractor Representative		

Revisions

Rev	Date	Description	By	Chk'd	App'd
A	11-11-2014	Issued for Proposal	SCM	SCM	SCM

TABLE OF CONTENTS

1. PROJECT SCOPE

The scope document was developed by Targa Resources, herein called the 'Company' for the engineering, design and construction estimate for the Little Missouri-IV cold gas plant, here in called the 'Work'. Except as otherwise expressly provided herein, the 'Contractor' shall supply all engineering, design, supervision, consumable materials, equipment, tools, services, and each and every item of expense necessary for the completion of the Work.

The Little Missouri-IV plant is estimated to process an additional 200 MMSCFD feed capacity to the facility. This project will need (3) Solar Centaur 50S compressors to move the residue gas volume associated with the 200 MMSCFD cold plant. The compressors will be procured and provided by the Company. The project will include installation of a new building which can house (3) three such compressors, however, the company plans to install only (2) two of those compressors currently, leaving room for (1) one in the future.

2. CODES, STANDARDS & SPECIFICATIONS

The codes, standards, and specifications of the following organizations shall be interpreted as the minimum requirements applicable to this specification. All codes, standards, and specifications referenced here are meant to be the latest edition and include latest addenda, issued at project initiation.

- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- American Society of Testing and Materials (ASTM)
- American Welding Society (AWS)
- Industrial Cable Engineers Association (ICEA)
- Instrument Society of America (ISA)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electric Code (NEC)
- National Fire Protection Association (NFPA)
- Occupation Safety and Health Administration (OSHA)
- Tubular Exchanger Manufacturers Association (TEMA)
- Uniform Building Code (UBC)
- Underwriters Laboratories Inc. (UL)
- US Environmental Protection Agency (EPA)

The Contractor will also adhere to construction specifications mutually agreed with the Company. The contractor will be submitting their specifications with the proposal for initial review and approval from the Company.

The specifications will include and is not limited to the following:

- General Facility – Piping and Valves (for both ASME B31.3 and B31.8)
- General Specification – Pressure Vessels (ASME SEC VIII DIV I)
- General Specification – Heat Exchanger (ASME SEC VIII DIV I and TEMA)
- General Specification – Paint, Galvanizing, Coating and Insulation

- General Specification – Centrifugal and Reciprocating Compressors
- General Specification – Compressor Pad Grouting

3. SITE CONDITIONS

Location	47.695331, -103.259976 McKenzie County, ND
Elevation Above MSL, ft.	2275
Design Ambient Air Temperature, °F	120
Maximum Average Ambient Air Temperature, °F	84
Minimum Average Ambient Air Temperature, °F	2
Design Wind Speed, MPH (ASCE 7-10)	100 (ASCE 7-10)
Design Seismic Load, g (ASCE-07)	S_s = 0.094, S_1= 0.027; Site Class: B
Noise Levels, dBA (per OSHA 1926.52(d)(1))	< 90
Barometric Pressure, psia	13.53
Frost Depth, ft.	5
Design Snow Load, PSF	30

4. STANDARD CONDITIONS

Pressure, PSIA	14.69
Temperature, °F	60

5. STANDARD UNITS OF MEASUREMENT

Temperature	°F
Pressure	psi
Mass Flow	lb./hr.
Volumetric Gas Flow	MMSCFD, SCFH
Volumetric Liquid Flow	gpm, BPD
Density	lb./ft3
Viscosity	cP
Speed (rotational)	rpm
Velocity	ft./s
Distance	ft., in
Weight	lbs.

6. DETAILED DESCRIPTION OF WORK

6.1 Building

6.1.1 The company wishes to install a new building 65’ W x 115’ L, with the roof matching the existing roof of the current compressor building. The drawings of the current building are shown in Attachment A.

6.1.2 The building will match the width, the height, and the roof slope and elevation of the existing building to be able to faux panel the area between the buildings and prevent any snow build up.

6.1.3 The building will also need a **25 ton dual** girder crane with an electric winch with radio control (OMI Crane or equal) which covers the entire span of the building.

6.1.4 The overhead hoist will be controlled by a 5 button controller. Contractor to make sure the full access of the hoist is available inside the building.

6.1.5 The contractor will install fire-eye on either side of the compressors, so there will be (4) fire-eyes for the building.

6.1.6 The contractor will install gas detection inside the building, since the potential of any release on this compressors is lighter than air, such detectors will be elevated and located near the ceiling.

6.1.7 The contractor will also install catalytic heaters inside the building which would conform to Class I Div II area classification.

6.1.8 The contractor will take the paint sample of the existing building and match the pain color for the exterior of the building.

6.1.9 The contractor will also keep the style of foundation of the new building similar to the existing building.

6.1.10 The lighting inside the building would be all LED and would conform to Class I Div II area classification.

6.1.11 The compressors will be grouted per the grout specifications in Attachment B.

6.1.12 The lighting outside the building will also be LED Ballast and would work a photocell. The lighting coverage will include the scrubbers, air cooler, WHRU, etc.

6.1.13 All conduit inside the building would need proper seal offs. All seal offs will be done prior to startup and after successful commissioning.

6.2 Solar Compressor and Turbine Package

6.2.1 The 200MMSCFD cold plant would require at least (3) residue compression units to move that gas out of the plant. The company wishes to handle this in phases to achieve the 200 MMSCFD rated capacity for the plant, and hence intends to install only two (2) Centrifugal Compressors, Solar Centaur 50 with Solonox. Contractor to include the room for the installation of the third unit later.

6.2.2 The compressor detail general arrangement drawings, the internal P&IDs, the product information literature (PIL), the bill of materials, etc. is provided in Attachment C. The contractor will make sure all predation, installation, and fabrication is performed in accordance with the documents available in Attachment C.

6.2.3 Contractor to install the ancillary Solar turbine provided equipment, which includes and not limited to Inlet air intake duct, lube oil cooler, seal system, fuel system, cleaning system, etc. is installed in accordance to attachment C.

6.3 Suction and Interstage Scrubbers

6.3.1 The company will provide the suction scrubbers and interstage scrubbers for this project.

6.3.2 The company will perform the settleout study and make sure the MAWP/Design of these vessels are such that it does not over pressurize or lift the relief valves on these vessels.

6.3.3 The scrubbers will include a schoepentoeter inlet design, followed with a horizontal flow mesh/vane pack to make sure there is no liquid carryover to the compressor. The company will provide the scrubbers with those internals.

6.3.4 The company will provide dedicated LSHH on each scrubber to shut the compressor down in case there is a High High level in any compressor.

6.4 Interstage and After Coolers

6.4.1 The company would provide the interstage and after coolers for this scope. The interstage and after cooler for each unit will be on one air-cooler bay, and as such there should be (2) such coolers for (2) such compressors.

6.4.2 There interstage section of the cooler bay will have a manual louver, where as the after cooler will have an automatic louver. This will allow temperature control on the residue going to the pipeline. The company will provide this cooler and louver control, the contractor will write the logic control.

6.4.3 All fan motors will be VFD compatible; however only the central fan motor on the bay will have a VFD control.

6.4.4 The contractor will provide the GA drawings for the scrubber so that proper nozzle orientations are considered.

6.5 Exhaust Design

6.5.1 Solar turbine exhausts need to be duct per the requirement/recommendation of the Solar vendor.

6.5.2 The contractor will install company provided diverter valve, exhaust duct, and silencer. The silencer will be installed over the diverter valve. The contractor will provide the supports for the silencer, exhaust and all duct work.

6.5.3 The duct will have an internal castable refractory; however because the internal casting cannot lower the outside temperature of the duct below 185F, external personnel protection insulation will be provided by the contractor.

6.5.4 The contractor will provide access to the inspection ports on the exhaust tip via ladder and platform.

6.6 Waste Heat Recovery Unit

6.6.1 The company wish to utilize the hot exhaust gas to provide process heat in the form of a Waste Heat Recovery Unit (WHRU). There will be (1) one WHRU per Solar compressor and this will provide heat for the maximum rated duty that can be generated. The diverter valves will be utilized to control the temperature of the hot oil.

6.6.2 Hot oil to be utilized will be Therminol-59.

6.6.3 As part of this work, only the WHRU units will be installed and the diverter valve will remain in the fail open position i.e. to vent hot exhaust off the silencer.

6.7 Residue Gas Lube Oil Coalescer

6.7.1 The company will provide a horizontal coalescing filter downstream of the compressor. This will coalescer any carryover lube oil coalescing in the residue gas before going to the metering.

6.7.2 The metering would be a senior orifice with pressure and temperature compensation and should communicate through a flow computer.

6.7.3 The contractor will install the high integrity pressure protection system provided by the company.

6.8 Fuel Gas Scrubber

6.8.1 The company will provide a fuel gas scrubber that will pull for fuel on the inlet of the suction of the residue compressor.

6.8.2 The fuel will be metered with a senior orifice and metered using a total flow computer.

6.9 Balance of Plant

6.9.1 Closed Drain System

6.9.1.1 The company will connect all drains to the existing LP closed drain system.

6.9.1.2 Provisions will be made to connect these drains to HP closed drain system once LM-IV plant is constructed.

6.9.1.3 The LP closed drain header will drain to the existing closed drain vessel.

6.9.2 Closed Drain and Flare

6.9.2.1 Company plans on utilizing the existing closed drain system and flare knockout drums for the Work.

6.9.2.2 Contractor to tie new reliefs into the existing closed drain drum (pseudo Flare KOD).

6.9.3 Sumps

6.9.3.1 Contractor to provide UL-58 double walled underground sump tank to handle all drains from the compressor building.

6.9.3.2 Double diaphragm pump to move liquids from the sump to the production water tank.

6.9.3.3 Contractor to provide interstitial level alarm to check if primary containment is breached.

6.9.4 General

6.9.4.1 Cathodic protection and/or insulation kit to be provided for all underground lines before they tie into the above ground lines.

6.9.4.2 All heat traced lines going underground shall be heat traced and insulated until the frost depth per site specifications Section 3.0.

6.9.4.3 Space heaters sized for the ambient conditions will be provided on all motors (> 10hP) that are outside the building.

6.9.4.4 The contractor shall provide an Allen Bradley PLC with ControlLogix for the process control and communications for this Work.

6.9.4.5 The contractor shall provide an Allen Bradley PLC with ControlLogix for the safety control system for this Work.

6.9.4.6 All insulation needs to have mold protection available integral to the material of the insulation. Polyurethane/polyisocyanurate is the preferred insulation material for the project.

7. CIVIL STRUCTURAL

7.1 General

7.1.1 Contractor will perform all hydro-vac services and checks for all foundation/ground work. The perimeter check hydro-vac check will be done around all new equipment and will be checked for a minimum of four (4) feet depth.

7.1.2 Contractor will provide foundation plans for all skids and off skid items.

7.1.3 Contractor will provide for ground work and foundations for every skid and off skid equipment.

7.1.4 Steel and skid design shall be in accordance with site specification in Section 3.0 and the industry standards/codes as applicable in Section 2.0.

8. ELECTRICAL

8.1 General

8.1.1 Electrical design shall follow NFPA 70 (NEC) and API 500.

8.1.2 Electrical design will be based on Incoming Utility power of 4160V and 480V, 3-phase, 60Hz. Power to be supplied by others at the incoming terminals on the primary side of the Main Facility Transformer.

8.1.3 On-skid grounding will be installed per NEC guidelines.

8.2 Electrical Guidelines

8.2.1	Utility (Convenience receptacles, task lighting, etc.)	120V, 1 Phase, 60 Hz
8.2.2	Motors < 450 HP	460V, 3 Phase, 60 Hz
8.2.3	Motors > 450 HP	4000V, 3 Phase, 60 Hz

Note: Contractor will consult with equipment vendor/company for acceptable voltage, phase, switchgears, soft starts and VFD requirements.

8.3 Power, Control and Instrument Cable

8.3.1 Cable installation design shall be based on Okonite or equal, Type TC Tray cable.

8.4 Cable Tray

8.4.1 Cable tray design shall be based on B-Line aluminum cable tray

9. INSTRUMENTATION

9.1 General

9.1.1 Instruments shall be in accordance with applicable environmental conditions stated in paragraph 1.0 and the industry standards/codes below:

- Instrument Society of America. (ISA)
- Institute of Electrical and Electronic Engineers. (IEEE)
- Underwriters Laboratories Inc. (UL)

9.1.2 Instruments shall be provided by Company preferred suppliers.

9.1.3 Instrumentation used for process measurement and alarm/shutdown shall be analog 4-20 mA with HART protocol wherever possible.

9.1.4 All electronic instruments, regardless of whether they are in hazardous service, shall be rated for the area classification, but as a minimum are suitable for Class I, Division 2, group C and D hazardous locations.

9.1.5 All instruments shall terminate in separate control and safety system modules in the same junction boxes located at skid edge.

9.1.6 Power for instrumentation shall be 24 VDC unless otherwise approved by Company. Where possible, instruments shall be two-wire, loop-powered.

9.1.7 The minimum wire gage for instrument signal wiring shall be 16 AWG.

9.1.8 All analog transmitters, connected to a PLC, shall wire to terminals immediately before wiring to the PLC. The positive wire's terminal shall have a built-in diode such that a low-resistance ammeter placed across the terminal will display the loop current.

9.1.9 All discrete I/O shall be individually fused at the closest terminal strip to the PLC card.

9.2 Level

9.2.1 Level controls will be based on magno-restrictive transmitters mounted to external cages. These cages will have Venetian blind-type indicators rather than the single point indicator type.

9.2.2 Where a second (redundant) level transmitter is required for safety, a differential pressure transmitter shall be used.

9.2.3 All level gauge glasses shall be armored type. The pressure rating for the largest available glass length, for the selected model, shall be greater than the maximum design pressure of the measured equipment and shall be installed with offset gauge cocks so that the gauge can be rodded out in place. Gauge cocks shall have integral ball checks.

9.2.4 Level gauge insulation would be a solid insulation with sealed acrylic covers. Jackets on level gauges won't be acceptable.

9.3 Pressure

9.3.1 Field mounted pressure gauges shall have a minimum of 4" diameter face. All pressure gauges shall be provided with safety glass and a blowout back.

9.3.2 Pressure transmitters for process control shall be locally mounted to a gauge valve and shall be

Rosemount model 3051 or equal.

9.4 Temperature

9.4.1 Thermowells are required for all temperature measuring devices used in flammable, toxic, or otherwise hazardous pressurized or vacuum systems.

9.4.2 Temperature gauges shall have a minimum 4" diameter face. They shall be bimetallic with adjustable angle mounting.

9.4.3 Temperature measurements for monitoring (indication only) shall be by means of thermocouples. The type of thermocouple used will be dependent on the application temperature but shall generally be type "J" for temperatures between 32 deg F and 1200 deg F and Type "T" for cold applications below 32 deg F.

9.4.4 Temperature measurements for control and/or interlock purposes shall be with the use of RTD's or Thermocouple direct inputs.

9.4.5 Temperature transmitters shall be Rosemount model 3144 or equal.

9.5 Flow

9.5.1 Gas flow measurement (excluding of custody metering) shall be by orifice meters using Rosemount 3051CD transmitters (or equal) and 5-valve manifolds.

9.5.2 Sales meters for gases shall use senior orifice fittings and meter runs and shall meet or exceed API Chapter 14, Section 3, Part 2 (14.3/AGA 3) requirements.

9.6 Quarter-Turn Actuated Valves

9.6.1 All ¼ turn actuated valves shall comply with the relevant piping specification with regards to pressure rating, end connections, body and trim materials, and soft goods.

9.6.2 All instrumentation and tubing associated with the valve and actuator shall be 316 or 304 stainless steel seamless with 0.035" wall thickness whenever possible, and shall be suitable for long time service.

9.6.3 Actuators on SDV's shall be sized based on 80 PSIG instrument air. Actuators shall be sized such that the torque, at the beginning of the air stroke, with 80 PSIG air is greater than 1.5 times the published valve break torque at the maximum pressure differential for the ANSI class of the valve flanges; and the spring end torque shall be 1.25 times the published valve seating torque.

9.6.4 Actuator speed control, when required, shall be accomplished with a fixed orifice. The vent point for actuation air should be protected with a "bug excluder".

9.6.5 Where specified, actuators shall come equipped with electrical components. These shall be suitable for the area classification. The valve and actuator shall be supplied such that a single electrical cable connection can service all electrical components.

9.7 Control Valves

9.7.1 Control valves should be Fisher sliding stem valves or equal with the manufacturer's standard trim, where possible unless otherwise approved by Company.

9.7.2 Throttling valves shall be supplied with electro/pneumatic transducer and positioner.

9.7.3 The noise level of control valves should not exceed site specification under normal operating conditions.

9.8 Relief Valves

9.8.1 Rupture disks shall NOT be used for relief applications.

9.8.2 Anderson-Greenwood, Crosby, Pentair, Farris and Mercer relief valves are acceptable brand of relief

valves for this Work.

9.8.3 Conventional, direct spring loaded type relief valves will be used for services in which the back pressure does not exceed 10% of the set pressure. As a general guideline, the contractor can provide a conventional PSV for set pressures > than 400 PSIG; unless otherwise indicated by the back pressure calculation.

9.8.4 Pilot type relief valves will be used for set pressures < than 400 PSIG or when the back pressure exceeds 10% of set pressure.

9.8.5 All heavier than air, cold, and multi-phase reliefs shall not be vented to the atmosphere and will be piped to the relief header.

9.8.6 All relief valves vented to atmosphere shall be vented to safe location and will have a snow cap on the outlet of the tail pipes.

9.8.7 All ASME stamped vessels (shell side of exchangers included) will have their own individual relief valves sized for appropriate scenario.

9.8.8 Contractor will use 2,500 sq. ft. fire zone recommendation per API-521 5.20.2.2 (a) for flare design which involves multiple PSV relieving condition. Contractor will also indicate fire zones on a separate plot plan during detailed phase of the project.

9.8.9 All fire case scenario sized PSVs will be connected to the flare even if the reliefs are lighter than air.

9.8.10 The Cold Plant will have a cold drain system, and will need the SS tail pipes and SS sub header from cold reliefs tied into the cold drain drum.

9.9 Instrument Enclosures

9.9.1 All control panels and junction boxes that are not inside buildings shall be stainless steel NEMA 4X at a minimum.

9.9.2 If possible, all cable/conduit connections shall be on the bottom of the enclosure. No penetrations through the top of the enclosures are permitted.

9.9.3 All field-mounted operator interface LCD's or operator interface screens, if used, shall be completely enclosed by a gasketed 316 stainless steel door with a transparent shatterproof window unless otherwise approved by Company.

9.9.4 Components located inside an enclosure shall be permanently labeled with tag number and function.

9.9.5 Basic Process Control wiring and Safety System wiring shall be on separate terminal strips.

9.10Wiring Methods

9.10.1 Aluminum Cable Tray shall be used for all wiring where practical.

9.10.2 Single and/or multipair/triad Instrument cables shall be, minimum 16 AWG Twisted Pair with individual and overall shields, 300 volt, TC tray cable (Okonite or equal). Conductors for pairs shall be black and white. Conductors for triads shall be red, black, and white.

10. MECHANICAL/PIPING

10.1 General

10.1.1 All piping to follow latest version of ASME B31.3 piping code for all facility piping.

10.1.2 Supports should be located to limit maximum weight deflection to 1".

11. DELIVERABLES

The contractor will provide the company the following deliverables:

11.1 Documents

11.1.1 Project Cost Estimate (hard and electronic copy). This estimate will be considered as Contractor's lump sum bid for all detailed engineering, procurement (as defined by section 12.2), and construction activity.

11.1.2 Weekly progress report (electronic copy only) by 8:30 AM each Monday during the construction phase.

11.1.3 Weekly updated actions items list for Contractor & Company communication. (electronic copy only)

11.1.4 Biweekly updated project schedule. (electronic and native file copy)

11.1.5 Sign-off on this scope document.

11.2 Drawings (hard, electronic and native file copies)

11.2.1 Preliminary plot plan with 100' axis grids

11.2.2 Preliminary Area classification drawing (Issued for approval – REV A)

11.2.3 Tie-In list and location plan (Issued for approval – REV A)

11.2.4 Preliminary P&IDs (Issued for approval – REV A)

11.2.5 Electrical One Line Diagram

11.3 LISTS (hard, electronic and native file copies)

11.3.1 Major Equipment List

11.3.2 Utility and Fuel Consumption Summary List

11.3.3 Preliminary Line List (during detailed phase)

12. PLANT MATERIAL, EQUIPMENT OR SERVICES FURNISHED BY COMPANY

12.1.1 The Company shall furnish all major equipment and instrumentation.

12.1.2 The Company shall provide equipment specification sheets, job books, 3D models as required by the contractor.

12.1.3 Existing plot plan and shared system P&IDs.

13. CONSTRUCTION ACTIVITY

13.1.1 Wash down slabs drained to a central sump and oil/water separator shall be included under each skid.

13.1.2 Finished plant will include paved sidewalks from the control room to the major equipment skids.

13.1.3 Contractor will be responsible for site security during construction, including monitoring traffic to/from the facility.

13.1.4 The contractor will be responsible for all material and construction management activities.

13.1.5 The contractor will be responsible scheduling, managing and monitoring all sub-contracted activities.

13.1.6 Nomex FRC's and protective gear will be required at all times during construction for both contractor and sub-contractors.

13.1.7 Contractor will be responsible for all lodging, boarding, travel and other expenses for their employees.

13.1.8 Safety will be a top priority at all times, all safety related incidents should be promptly brought to the Company's attention.

13.1.9 Contractor will have safety supervisors for all construction activities and expect the same from sub-contractors.

14. IMPORTANT DATES

14.1.1 Notice to Proceed will be issued by the Company once Contractor and Company mutually accepts the Scope Document in its entirety. Contractor has 3 business days to raise issues and concerns with the Company.

14.1.2 Start: Within 3 business days from Notice to Proceed.

14.1.3 Finish: 8 weeks from Notice to Proceed Date.

14.1.4 The company currently has a tentative startup projected at **start Q4/17**. The contractor needs to have a contingency of 30 days from first gas for all mechanical completion and orange tagging activity.

14.1.5 Contractor needs to make Company proactively aware if any of these dates are to slip.

15. COMPANY REPRESENTATIVE

15.1.1 All project correspondence will be directed to Mr. Shirish Mehta, (713-584-1472, smehta@targaresources.com), who will be the acting Project/Engineering Manager for this work.

TARGA BADLANDS, LLC.

LITTLE MISSOURI – IV GAS PLANT

200 MMSCFD mOHR PROCESS

20,000 SBPD OF LIQUID STABILIZATION

PROJECT NUMBER: 53990

ENGINEERING PROCUREMENT AND FABRICATION

EPF SCOPE DOCUMENT

	By	Date
Initiator	SCM	01/16/18
Company Representative	SCM	01/16/18
Contractor Representative		

TARGA

Revisions

Rev	Date	Description	By	Chk'd	App'd
A	01/16/18	Issued for Proposal	SCM	SCM	BS

TABLE OF CONTENTS

1. PROJECT SCOPE

The scope document was developed by Targa Resources, herein called the 'Company' for the engineering, design and fabrication estimate for the Little Missouri-IV cold gas plant, here in called the 'Work'. Except as otherwise expressly provided herein, the 'Contractor' shall supply all engineering, design, supervision, consumable materials, equipment, tools, services, and each and every item of expense necessary for the completion of the Work.

The Little Missouri-IV plant is estimated to process an additional 200 MMSCFD feed capacity to the facility. This project will need installation of a 200 MMSCFD modified Overhead Rectification/Recycle Process and will need a 20,000 SBPD stabilization system (feed to the tower) that can produce a Y-grade product. This Y-grade product will then be blended with the cold plant liquids and pumped into the ONEOK line.

The full rated capacity of 200 MMSCFD will be done in stages, and initially the Company wishes to procure residue compression that can move 120 MMSCFD of Gas at the inlet of the plant. The scope of this proposal would be to engineer, procure and build a completely modularized process system which include hydrocarbon liquid stabilization and a 200 MMSCFD mOHR Cold Plant, modularized pipe rack, interconnecting piping, turn-key electrical including bulks and accessories, and engineering the balance of plant for this LM-IV facility.

2. CODES, STANDARDS & SPECIFICATIONS

The codes, standards, and specifications of the following organizations shall be interpreted as the minimum requirements applicable to this specification. All codes, standards, and specifications referenced here are meant to be the latest edition and include latest addenda, issued at project initiation.

- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Civil Engineers (ASCE)
- American Society of Heating, Refrigerating, Air Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Society of Testing and Materials (ASTM)
- American Welding Society (AWS)
- GE Global Asset Protection Services (GE GAP)
- Industrial Cable Engineers Association (ICEA)
- Instrument Society of America (ISA)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electric Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Occupation Safety and Health Administration (OSHA)

- Tubular Exchanger Manufacturers Association (TEMA)
- Uniform Building Code (UBC)
- Underwriters Laboratories Inc. (UL)
- US Environmental Protection Agency (EPA)

The Contractor will also adhere to construction specifications mutually agreed with the Company. The contractor will be submitting their specifications with the proposal for initial review and approval from the Company.

The specifications will include and is not limited to the following:

- General Facility – Piping and Valves (for both ASME B31.3 and B31.8)
- General Specification – Pressure Vessels (ASME SEC VIII DIV I)
- General Specification – Heat Exchanger (ASME SEC VIII DIV I and TEMA)
- General Specification – Paint, Galvanizing, Coating and Insulation
- General Specification – Centrifugal and Reciprocating Compressors
- General Specification – Centrifugal Pumps

3. SITE CONDITIONS

Location	47.695374, -103.25900 McKenzie County, ND
Elevation Above MSL, ft	2275
Design Ambient Air Temperature, °F	120
Max. Average Ambient Air Temperature (Record High), °F	84 (100)
Min. Average Ambient Air Temperature (Record Low), °F	2 (-40)
Design Wind Speed, MPH (ASCE 7-10)	100 (ASCE 7-10)
Design Seismic Load, g (ASCE-07)	S_s = 0.094, S_1= 0.027; Site Class: B
Noise Levels, dBA (per OSHA 1926.52(d)(1))	< 90
Barometric Pressure, psia	13.53
Frost Depth, ft	5
Design Snow Load, PSF	30

4. STANDARD CONDITIONS

Pressure, PSIA	14.69
Temperature, °F	60

5. STANDARD UNITS OF MEASUREMENT

Temperature	°F
Pressure	psi
Mass Flow	lb/hr
Volumetric Gas Flow	MMSCFD, SCFH
Volumetric Liquid Flow	gpm, BPD

Density	lb/ft3
Viscosity	cP
Speed (rotational)	rpm
Velocity	ft/s
Distance	ft, in
Weight	lbs

6. FEED AND PRODUCT SPECIFICATIONS

6.1 INLET GAS CONDITIONS

Feed Flow Rate, MMSCFD	200
Maximum Feed Pressure, psig	1095
Operating Pressure, psig	685
Temperature, °F	60, Summer 15, Winter
Maximum Water Content (lb/MMSCF)	7.00

6.2 FEED COMPOSITION (RANGE)

Component	Mole %
CO2	0.80
Nitrogen	2.27
Methane	57.76
Ethane	20.74
Propane	11.32
i-Butane	1.26
n-Butane	3.80
i-Pentane	0.80
n-Pentane	0.80
Hexane	0.19
Heptane	0.23
Octane	0.02
Nonane	0.01
Decane	NIL
Total	**100**

6.3 PRODUCT SPECIFICATIONS

6.3.1 Y-Grade Product Specification

Maximum Delivery Pressure (MAWP), PSIG	1440
Normal Operating Pressure, psig	1350
Max Delivery Temperature, °F	90 if > 65 mol% C2
	110 if < 65 mol% C2
Max CO_2/C2 Ratio, LV%	0.35
Max CO_2, ppmw	8038
Max C1/C2 Ratio, LV%	1.5
Max C1 Content, LV% (excluding Nitrogen and CO_2)	0.5
Max Vapor Pressure @ 100°F, psig	600
Free Water at P/L Delivery Conditions (Visual Inspection)	None @ 34°F
Note: Please see Exhibit A for the detailed Oneok Bakken NGL pipeline specification.	

6.3.2 Residue Gas Specification

Maximum Delivery Pressure (MAWP), PSIG	1440
Normal Operating Pressure, psig	1350
Max Delivery Temperature, °F	120
Min Gross Heating Value (HHV), BTU/SCF	967
Hydrocarbon dew point Specification	
	-5°F @ 800 PSIA
	-10°F @ 1000 PSIA
	-18°F @ 1100 PSIA
H2S, grains/100 SCF	0.30
Total Sulfur, grains/100 SCF	2.00
CO_2, mol %	2.00
Water Content, lb/MMSCF	4.00
Note: Please see Exhibit B for the detailed TransCanada Northern Borders pipeline specification.	

7. DETAILED DESCRIPTION OF WORK – GENERAL RULE

7.1.1 All skid framework will be a minimum of W12x53 (length) and W8x18 (width) with trunnion style lifting method. All on-skid support will be a minimum of W8x31. Any variance will have to be conveyed to company prior to design.

7.1.2 All skid foundations will be drilled piers. All non vaporizing (at ambient conditions) liquid filled skids will have a concrete slab containment below the skid, i.e. hot oil skid, stabilization skid/s, pipeline pump skid, etc.

7.1.3 All skids will have fiberglass grating and will be painted to Targa Badlands coating specifications.

7.1.4 All pipes, valves, and fittings (PVF) will be bought to Targa's pipe specifications. Pipe and fittings from Argentina, Brazil, China, Eastern Europe (Russia, Czech, Slovakia, Croatia, Slovenia, Hungary, Romania, Serbia, Bosnia, Montenegro, Kosovo, Macedonia, Albania,

Lithuania, Latvia, Estonia, Belarus, Ukraine, and Moldova) and India will not be acceptable. Valves from China and India are acceptable, but with prior approval. All PVF will require the heat numbers (mill test reports), conformance reports, pressure test reports before shipping receives it. Any PVF without these documentations would be rejected from use on contractors expense.

7.1.5 The contractor will produce a valve list based off Targa PVF specification, and purchase as required per the isometrics developed for the P&IDs.

7.1.6 All fabricated piping isometrics will detail the heat numbers, weld maps, and welder qualification and then drafted back on the isometrics as As-builts.

7.1.7 Targa will have multiple CWI inspectors and Targa personnel visiting the shop from time to time to check for quality and schedule validation.

7.1.8 3D model update on the projects will be delivered to Targa every Wednesday of every week until the 90% review stage.

7.1.9 Every individual skid (stacked or unstacked) will have it's on oversized Junction Box (Hoffman recommended) and Allen Bradley feed through terminal block. The PCS I/O feed through terminal blocks will be white in color, where as the SCS I/O feed through terminal blocks will be red in color.

7.1.10 The junction boxes will be located at the far end of the skid away from the main pipe rack.

7.1.11 All tubing and fittings will be either Parker or Swagelok only.

7.1.12 All electrical work will be signed off by State Licensed Master Electrician, contractor will also work towards getting a McKenzie County Electric Board certification of acceptance.

7.1.13 All major equipment which includes compressors, exchangers, coolers, vessels and filters, towers, pumps, flares, tanks and sumps, control valves, shutdown valves, relief valves will be provided by Company. Contractor will assist the specification of these equipment as requested.

7.1.14 All multiple tier skids will have an external stairway for access, L&P would not be acceptable due to work required on the upper decks.

7.1.15 All instrumentation skidded or not (except meters in custody transfer applications) will be provided by contractor for this project. Every instrument provided should be good for -40F.

7.1.15.1 Pressure:

7.1.15.1.1 Transmitter: Rosemount 3051C with Q4.

7.1.15.1.2 Gauge: Rosemount SPG

7.1.15.2 Temperature:

7.1.15.2.1 Thermowell: Rosemount 114C

7.1.15.2.2 RTD Sensor: Rosemount 214C RTD (100 ohm Pt)

7.1.15.2.3 Temperature Transmitter: Rosemount 3144P

7.1.15.3 Pressure Differential Transmitter: Rosemount 3051DP

7.1.15.4 Pressure Differential Gauge: Ashcroft 5503

7.1.15.5 Flow meters:

7.1.15.5.1 Liquid: McChrometer V-cones

7.1.15.5.2 Gas: Senior/Junior Daniel Orifice meters

7.1.15.6 Flow transmitters

7.1.15.6.1 Multivariable Transmitter: Rosemount 3051SMV with Q4.

7.1.15.6.2 Non-compensated Transmitter: Rosemount 3051DP with Q4 (with 5-way manifold)

7.1.15.7 Flow Computer:

7.1.15.7.1 ABB Total Flow for Gas

7.1.15.7.2 OMNI for Liquids

7.1.15.8 Level instrumentation on the bridle

7.1.15.8.1 Penberthy armored reflex

7.1.15.8.2 Level Transmitters: Rosemount 5300 Guided Wave Radar

7.1.15.8.3 Level Switches: Tuning Forks in chambers Rosemount 2140 (24V DC)

7.1.15.8.4 Heat Trace: Thermon Splice Kit ECA-1 and Termination Beacon DE-B.

7.1.16 Heat Trace and Space Heaters:

7.1.16.1 Thermon Three phase 208/120V across the board for all heat trace.

7.1.16.2 Single phase 240/120V for all space heaters, reclaimer heaters, etc.

7.1.16.3 All electric heaters will include SCR panels.

8. INLET FEED HANDLING

8.1.1 The company wishes to utilize the existing LM-III Slug catcher deemed adequate for 195 MMSCFD capacity of multiphase feed stream with the composition and pressure as listed in section 6.0.

8.1.2 The existing fingers on the slug catcher has room to add 3 more fingers which would give a total additional capacity of 900 barrels.

8.1.3 A 12” header for gas and an 8” header for liquid from the existing slug catcher area need to be run underground towards the LM-IV area.

8.1.4 A brand new slug catcher will be built for JV partner Hess inside the fence on North end of the LM-IV gas plant. A 12” gas line and a 8” liquid line will be pulled towards LM-IV for processing.

8.1.5 The two vapor lines from each slug catcher will combine and go to the Inlet Separator for the cold plant for processing.

8.1.6 Similarly two liquid lines will combine together and go to Stabilizer Flash drum for processing in the stabilizer.

8.1.7 A pressure/flow control valve will be individual to each slug catcher vapor line on this gas header will control flow/pressure to the LM-IV cold plant. This is out of the scope of the EPF contractor.

8.1.8 The stabilizer overhead compressor will tie-in downstream of these inlet control valve to reduce swings on the compressor caused due to pigging operations on both systems.

8.1.9 An inlet separator needs to be added which can handle both the feed gas supply from the slug catcher and the stabilizer overhead compressor, with liquid dropouts to be taken to the stabilization flash tank vessel. A tee-off emergency takeaway to the existing closed drain should be available on the liquid drain pipe.

8.1.10 An inlet gas (tube side)/hot residue gas cross exchanger is required to keep the gas 60°F in winter and 5°F above dew-point in summer to mitigate/eliminate liquid dropout during metering and dehydration process.

8.1.11 The metering would be a ultrasonic meter provided by Targa Resources with pressure and

temperature compensation and should communicate through a flow computer into a PLC and SCADA.

9. MOLECULAR SIEVE DEHYDRATION AND REGENERATION SYSTEM

9.1.1 Company would provide (3) fully insulated molecular sieve beds sized to dehydrate 20 lbs/MMSCF water loaded gas along with ladder and platforms.

9.1.2 The molecular sieve dehydration and regeneration system needs to be built such that residue gas can alternatively be used as regeneration gas in case there is an issue with the existing regeneration compressor.

9.1.3 The regeneration heat exchanger is being heated by hot oil on the entire system.

9.1.4 The regeneration gas cooler will have recirculation/body louvers for cold climate performance and a hot oil tubesheet for anti-freeze purposes.

9.1.5 The liquids from the regeneration scrubber need to be routed to a pressurized drain vessel before taking to the atmospheric storage tank.

9.1.6 The contractor will be responsible for loading the molecular sieve material and constructing the pre-fabricated ladder and support assembly. The molecular sieve materials will be by the Company.

9.1.7 Contractor to include the regeneration gas compressor in an enclosed building with temperature controlled ventilation fans and catalytic heaters.

10. MOHR COLD PLANT

10.1.1 Contractor to provide a 200MMSCFD (inlet of slug catcher) cold gas plant which can meet the specifications on both residue and y-grade takeaway.

10.1.2 The technology selected is a modified Overhead Recycle/Rectification process for achieving deep ethane rejection (5.00 LV% in product) or 55%+ ethane recovery.

10.1.3 The entire scope of the cold plant falls on the contractor as shown by the P&IDs approved after the HAZOP.

11. REFRIGERATION SKID

11.1.1 The contractor would provide Atlas Copco integral gear refrigeration compressor for this project.

11.1.2 The total refrigeration load will be divided into a minimum two units (2x 60%).

11.1.3 The entire scope of the refrigeration plant falls on the contractor as shown by the P&IDs.

12. PRODUCT HANDLING

12.1.1 Contractor to provide metering skid for the total product from stabilizer and cold plant as per Company specifications.

12.1.2 The entire scope of the product handling falls on the contractor as shown by the P&IDs.

13. HEAT MEDIUM UNIT

13.1.1 The heat medium unit will utilize the WHRUs from the residue compression to heat the hot oil.

13.1.2 Hot oil to be utilized will be Therminol-59.

13.1.3 Hot oil will be hot enough to regenerate the molecular sieve beds.

13.1.4 The Contractor will provide the hot oil pumping, expansion and filtration system.

14. STABILIZATION SYSTEM

14.1.1 A stabilization system has to handle 20,000 BPD of liquids to the tower and need to be designed to meet product specifications per Section 6.3.

14.1.2 The stabilization system needs to have the following (see attached go-by simulation from the Company):

14.1.2.1 2 x 100% particulate filters designed for 1170 PSIG MAWP.

14.1.2.2 Feed/Overhead exchanger to integrate and pre-heat the feed liquids.

14.1.2.3 Three Phase condensate flash drum for 500 PSIG MAWP, to remove water and separate the gas and liquid phases. This will allow only liquids to enter the stabilizer tower and reduce the column diameter and heat requirement. The separated gas will bypass the tower and is compressed into the cold plant.

14.1.2.4 2 x 100% OR 3 x 50% liquid/liquid coalescing filters designed for 350 PSIG MAWP.

14.1.2.5 Feed/Product exchanger to integrate and pre-heat the feed liquids.

14.1.2.6 Stabilizer tower with packed internals designed for 350 PSIG MAWP.

14.1.2.7 Stabilizer reboiler with heat medium oil is needed to meet the product specification.

14.1.2.8 Stabilizer surge drum with 350PSIG MAWP and to hold GPA recommended residence time at NLL of 30%.

14.1.2.9 3 x 50 % or 2 x 100% API-610 pipeline pumps to meet the pipeline MAOP per section 6.3.

14.1.2.10 2 x 50 % stabilizer overhead compressor.

14.1.2.11 2 x 50% OR 1 x 100% Product particulate filters designed for 1440 PSIG MAWP.

14.1.2.12 The product needs to tie-in with the Cold plant liquids before entering Product Metering.

14.1.3 An alternate liquid take-away from the stabilization system to existing bullet tanks needs to be provided. Contractor to estimate incorporating one more bullet tank for off-spec product.

14.1.4 Waste Heat Recovery Unit on residue compression will provide heat for the stabilizer reboiler

15. BALANCE OF PLANT

15.1.1 Instrument Air Compressor

15.1.1.1 Instrument air compressor needs to be provided for the requirement identified on the Work. The instrument air compressor needs to be housed in a building and should come with a lead/lag unit with filters, bottles and desiccant beds.

15.1.1.2 Dry air need to be provided to all instrument air requirement and needs a volume bottle to provide a 30 min buffer time for controlled shutdown in case of power loss to the instrument air compressor.

15.1.1.3 Volume Bottle/s needs to be provided for compressor startup with 2 cold cranks and 6 warm cranks for starting each compressor.

15.1.2 Methanol Vessel and Pump

15.1.2.1 Methanol storage tote/vessel based on the requirement calculation needs to be provided.

15.1.2.2 Methanol multi-stage electric driven pump needs to be provided for various injection

locations.

15.1.3 Refrigerant Storage and Make-Up Pump

15.1.3.1 A 1,500 Gallon Propane Storage Drum MAWP of 250 PSIG needs to be provided to meet the make-up requirements for refrigeration system.

15.1.3.2 A positive displacement pump (Blackmer or equal) needs to move refrigerant from the Storage Drum to the Accumulator.

15.1.4 Lube Oil Tank and Double Diaphragm Pump

15.1.4.1 90 BBL UL-142 or Double walled atmospheric tank is required to meet the lube oil demands for the compressors.

15.1.4.2 Double diaphragm pneumatic pumps need to be added to supply lube oil from storage tank to the gravity feeding day tanks.

15.1.4.3 Tanks to be heat traced and insulated for cold climate service.

15.1.5 Engine Jacket Water and Double Diaphragm Pump

15.1.5.1 90 BBL API-12F or UL-58 double wall underground atmospheric tank is required to meet the jacket water demands for the compressors.

15.1.5.2 Double diaphragm pneumatic pumps need to be added to supply jacket water from storage tank to the gravity feeding day tanks.

15.1.6 Spent Oil/Jacket Water Tank

15.1.6.1 90 BBL UL-142 or double walled atmospheric tank is required to store and dispose the spent oil from the compressors.

15.1.6.2 Piping on jacket water pump to be designed to have two-way flow to feed into the spent oil tank.

15.1.6.3 Tanks to be heat traced and insulated for cold climate service.

15.1.7 Production Water Tank

15.1.7.1 Contractor to provide 2 x 500 BBL API-12F tanks insulated and heat traced with 12” Enardo EPRV-2000 thief hatch to meet API-2000 emergency venting requirements.

15.1.7.2 All tanks to be heat traced and insulated for cold climate service; contractor to determine if external recirculation heaters are required for this service.

15.1.8 Closed Drain and Flare

15.1.8.1 Company plans on utilizing the existing closed drain system and flare knockout drums for the Work.

15.1.8.2 Contractor to tie new reliefs into the existing closed drain drum (pseudo Flare KOD).

15.1.8.3 The existing flare is only rated for a design of 40 MMSCFD of relief; and hence needs to be upgraded to 225 MMSCFD flare with a minimum of 15 PSIG stack base pressure to work with the existing 12” flare header that runs between the close drain drum, flare knockout drum and the flare. Flare to be air-assisted (if possible) and smokeless for non-emergency flaring.

15.1.9 Generators

15.1.9.1 Company will provide permanent generator with ATS to drive. Contractor’s responsibility to do the electrical completion on the generator system. Generator to be in the compressor

building.

- One IA compressor, 85% loading, soft start
- One flare blower, 85% loading, VFD
- Both flare ko pump motors
- One flare blower, 85% loading, VFD
- Plant lighting (15 amps total)
- AC units (Main PDC, VFD PDC, control building)
- 15kVA Plant UPS, 75% loaded (preliminary estimates indicate 15kVA is good, but this is preliminary)
- Plant PLC & fire/gas detection, beacons, alarms are fed by this UPS
- Heat trace (six 45kVA transformers, loaded to 20kVA each)
- Water well (assume a 10HP motor)

15.1.10 Compressor Building

15.1.10.1 Buildings to be completely enclosed with temperature controlled ventilation fans.

15.1.10.2 Catalytic heaters to maintain temperature around the compressors.

15.1.10.3 Fire eyes between compressor units.

15.1.10.4 Gas detection on both top (for methane) and bottom (for propane) levels of the compressor.

15.1.10.5 All compressors which includes and not limited to stabilizer overhead, residue compressor, refrigerant compressor, instrument air compressor to be house in the building.

15.1.10.6 The building will also need a **25 ton dual** girder crane with an electric winch with radio control (OMI Crane or equal) which covers the entire span of the building.

15.1.11 PDC (Power Distribution Center) Building

15.1.11.1 PDC Building will be of standard manufacturer's construction in accordance with site condition, should house all the relevant equipment identified for the Work.

15.1.11.2 Contractor to do all electrical pulls from the secondary side of the main transformer.

15.1.11.3 Primary side of the main transformer will be handled by the local electric company.

15.1.12 Sumps

15.1.12.1 Contractor to provide UL-58 double walled underground sump tank to handle all drains from the compressor building.

15.1.12.2 Double diaphragm pump to move liquids from the sump to the production water tank.

15.1.12.3 Contractor to provide interstitial level alarm to check if primary containment is breached.

15.1.13 General

15.1.13.1 Cathodic protection and/or insulation kit to be provided for all underground lines before they tie into the above ground lines.

15.1.13.2 All heat traced lines going underground shall be heat traced and insulated until the frost

depth per site specifications Section 3.0.

15.1.13.3 Space heaters sized for the ambient conditions will be provided on all motors (> 10hP) that are outside the building.

15.1.13.4 The contractor shall provide an Allen Bradley PLC with ControlLogix for the process control and communications for this Work.

15.1.13.5 The contractor shall also develop and implement an instrumentation controls report that fully defines a system capable of communicating (alarms, etc.) with the existing plant's control system (Allen Bradley PLC).

15.1.13.6 All insulation needs to have mold protection available integral to the material of the insulation. Polyurethane/polyisocyanurate is the preferred insulation material for the project.

15.1.14 Analyzers

15.1.14.1 The contractor will have to provide for a 6 stream analyzer with heated sample probes to analyze:

15.1.14.1.1 Inlet gas to the cold plant

15.1.14.1.2 Residue gas to the pipeline

15.1.14.1.3 Stabilizer overhead gas

15.1.14.1.4 Cold plant liquids

15.1.14.1.5 Stabilizer plant liquids

15.1.14.1.6 Y-Grade liquids to pipeline

15.1.14.2 A crude sampler i.e. Welker LS-7 or LS-14 type needs to be provided to analyze:

15.1.14.2.1 Slug catcher liquids

15.1.14.2.2 Stabilizer liquids inlet

15.1.14.3 The contractor needs to program recovery calculations on the Wonderware system calculating:

15.1.14.3.1 Recovery Calculation for the cold plant

15.1.14.3.2 Recovery Calculation for the overall plant

15.1.14.3.3 Dew-Point calculation on the residue gas

15.1.14.3.4 CO_2/C2 and C1/C2 liquid volume ratio for cold plant, stabilizer plant and overall plant liquids.

15.1.14.3.5 CO_2 ppmw for cold plant, stabilizer plant and overall plant liquids.

16. CIVIL STRUCTURAL

17. GENERAL

17.1.1 Contractor will perform all hydro-vac services and checks for all foundation/ground work.

17.1.2 Contractor will provide foundation plans for all skids and off skid items.

17.1.3 Contractor will provide for ground work and foundations for every skid and off skid equipment.

17.1.4 Steel and skid design shall be in accordance with site specification in Section 3.0 and the industry standards/codes as applicable in Section 2.0.

17.1.5 Skid package vendors shall design skid to install on piers when possible.

17.1.6 Skids to be designed with operability and easy access in mind.

18. ELECTRICAL

19. GENERAL

19.1.1 Electrical design shall follow NFPA 70 (NEC) and API 500.

19.1.2 Electrical design will be based on Incoming Utility power of 4160V and 480V, 3-phase, 60Hz. Power to be supplied by others at the incoming terminals on the primary side of the Main Facility Transformer.

19.1.3 On-skid grounding will be installed per NEC guidelines.

20. ELECTRICAL GUIDELINES

20.1.1	Utility (Convenience receptacles, task lighting, etc.)	120V, 1 Phase, 60 Hz
20.1.2	Motors < 450 HP	460V, 3 Phase, 60 Hz
20.1.3	Motors > 450 HP	4000V, 3 Phase, 60 Hz

Note: Contractor will consult with equipment vendor/company for acceptable voltage, phase, switchgears, soft starts and VFD requirements.

21. POWER, CONTROL AND INSTRUMENT CABLE

21.1.1 Cable installation design shall be based on Okonite or equal, Type TC Tray cable.

22. CABLE TRAY

22.1.1 Cable tray design shall be based on B-Line aluminum cable tray

23. INSTRUMENTATION

24. GENERAL

24.1.1 Instruments shall be in accordance with applicable environmental conditions stated in paragraph 1.0 and the industry standards/codes below:

- Instrument Society of America. (ISA)
- Institute of Electrical and Electronic Engineers. (IEEE)
- Underwriters Laboratories Inc. (UL)

24.1.2 Instruments shall be provided by Company preferred suppliers.

24.1.3 Instrumentation used for process measurement and alarm/shutdown shall be analog 4-20 mA with HART protocol wherever possible.

24.1.4 Local pneumatic control can be used in non-critical control loops.

24.1.5 All electronic instruments, regardless of whether they are in hazardous service, shall be rated for the area classification, but as a minimum are suitable for Class I, Division 2, group C and D hazardous locations.

24.1.6 All instruments shall terminate in separate control and safety system junction boxes located at skid

edge.

24.1.7 Power for instrumentation shall be 24 VDC unless otherwise approved by Company. Where possible, instruments shall be two-wire, loop-powered.

24.1.8 The minimum wire gage for instrument signal wiring shall be 16 AWG.

24.1.9 All analog transmitters, connected to a PLC, shall wire to terminals immediately before wiring to the PLC. The positive wire's terminal shall have a built-in diode such that a low-resistance ammeter placed across the terminal will display the loop current.

24.1.10 All discrete I/O shall be individually fused at the closest terminal strip to the PLC card.

25. LEVEL

25.1.1 Level controls will be based on magno-restrictive transmitters mounted to external cages. These cages will have Venetian blind-type indicators rather than the single point indicator type.

25.1.2 Where a second (redundant) level transmitter is required for safety, a differential pressure transmitter shall be used.

25.1.3 All level gauge glasses shall be armored type. The pressure rating for the largest available glass length, for the selected model, shall be greater than the maximum design pressure of the measured equipment and shall be installed with offset gauge cocks so that the gauge can be rodded out in place. Gauge cocks shall have integral ball checks.

25.1.4 Level gauge insulation would be a solid insulation with sealed acrylic covers. Jackets on level gauges won't be acceptable.

26. PRESSURE

26.1.1 Field mounted pressure gauges shall have a minimum of 4" diameter face. All pressure gauges shall be provided with safety glass and a blowout back.

26.1.2 Pressure transmitters for process control shall be locally mounted to a gauge valve and shall be Rosemount model 3051 or equal.

27. TEMPERATURE

27.1.1 Thermowells are required for all temperature measuring devices used in flammable, toxic, or otherwise hazardous pressurized or vacuum systems.

27.1.2 Temperature gauges shall have a minimum 4" diameter face. They shall be bimetallic with adjustable angle mounting.

27.1.3 Temperature measurements for monitoring (indication only) shall be by means of thermocouples. The type of thermocouple used will be dependent on the application temperature but shall generally be type "J" for temperatures between 32 deg F and 1200 deg F and Type "T" for cold applications below 32 deg F.

27.1.4 Temperature measurements for control and/or interlock purposes shall be with the use of RTD's or Thermocouple direct inputs.

27.1.5 Temperature transmitters shall be Rosemount model 3144 or equal.

28. FLOW

28.1.1 Gas flow measurement (excluding of custody metering) shall be by orifice meters using Rosemount

3051CD transmitters (or equal) and 5-valve manifolds.

28.1.2 Sales meters for gases shall use senior orifice fittings and meter runs and shall meet or exceed API Chapter 14, Section 3, Part 2 (14.3/AGA 3) requirements.

29. QUARTER-TURN ACTUATED VALVES

29.1.1 All ¼ turn actuated valves shall comply with the relevant piping specification with regards to pressure rating, end connections, body and trim materials, and soft goods.

29.1.2 All instrumentation and tubing associated with the valve and actuator shall be 316 or 304 stainless steel seamless with 0.035" wall thickness whenever possible, and shall be suitable for long time service.

29.1.3 Actuators on SDV's shall be sized based on 80 PSIG instrument air. Actuators shall be sized such that the torque, at the beginning of the air stroke, with 80 PSIG air is greater than 1.5 times the published valve break torque at the maximum pressure differential for the ANSI class of the valve flanges; and the spring end torque shall be 1.25 times the published valve seating torque.

29.1.4 Actuator speed control, when required, shall be accomplished with a fixed orifice. The vent point for actuation air should be protected with a "bug excluder".

29.1.5 Where specified, actuators shall come equipped with electrical components. These shall be suitable for the area classification. The valve and actuator shall be supplied such that a single electrical cable connection can service all electrical components.

30. CONTROL VALVES

30.1.1 Control valves should be Fisher sliding stem valves or equal with the manufacturer's standard trim, where possible unless otherwise approved by Company.

30.1.2 Throttling valves shall be supplied with electro/pneumatic transducer and positioner.

30.1.3 The noise level of control valves should not exceed site specification under normal operating conditions.

31. RELIEF VALVES

31.1.1 Rupture disks shall NOT be used for relief applications.

31.1.2 Anderson-Greenwood, Crosby, Pentair, Farris and Mercer relief valves are acceptable brand of relief valves for this Work.

31.1.3 Conventional, direct spring loaded type relief valves will be used for services in which the back pressure does not exceed 10% of the set pressure. As a general guideline, the contractor can provide a conventional PSV for set pressures > than 400 PSIG; unless otherwise indicated by the back pressure calculation.

31.1.4 Pilot type relief valves will be used for set pressures < than 400 PSIG or when the back pressure exceeds 10% of set pressure.

31.1.5 All heavier than air, cold, and multi-phase reliefs shall not be vented to the atmosphere and will be piped to the relief header.

31.1.6 All relief valves vented to atmosphere shall be vented to safe location and will have a snow cap on the outlet of the tail pipes.

31.1.7 All ASME stamped vessels (shell side of exchangers included) will have their own individual relief

valves sized for appropriate scenario.

31.1.8 Contractor will use 2,500 sq. ft. fire zone recommendation per API-521 5.20.2.2 (a) for flare design which involves multiple PSV relieving condition. Contractor will also indicate fire zones on a separate plot plan during detailed phase of the project.

31.1.9 All fire case scenario sized PSVs will be connected to the flare even if the reliefs are lighter than air.

31.1.10 The Cold Plant will have a cold drain system, and will need the SS tail pipes and SS sub header from cold reliefs tied into the cold drain drum.

32. INSTRUMENT ENCLOSURES

32.1.1 All control panels and junction boxes that are not inside buildings shall be stainless steel NEMA 4X at a minimum.

32.1.2 If possible, all cable/conduit connections shall be on the bottom of the enclosure. No penetrations through the top of the enclosures are permitted.

32.1.3 All field-mounted operator interface LCD's or operator interface screens, if used, shall be completely enclosed by a gasketed 316 stainless steel door with a transparent shatterproof window unless otherwise approved by Company.

32.1.4 Components located inside an enclosure shall be permanently labeled with tag number and function.

32.1.5 Basic Process Control wiring and Safety System wiring shall be on separate terminal strips.

33. WIRING METHODS

33.1.1 Aluminum Cable Tray shall be used for all wiring where practical.

33.1.2 Single and/or multipair/triad Instrument cables shall be, minimum 16 AWG Twisted Pair with individual and overall shields, 300 volt, TC tray cable (Okonite or equal). Conductors for pairs shall be black and white. Conductors for triads shall be red, black, and white.

34. MECHANICAL/PIPING

35. GENERAL

35.1.1 Equipment spacing shall be in accordance with GE GAP Guidelines 2.5.2 or see section 2.0 on Company's Construction Specification Standards. In case of conflict in information between the two sources mutually agreed spacing requirements will be considered.

35.1.2 All piping to follow latest version of ASME B31.3 piping code for all facility piping.

35.1.3 Supports should be located to limit maximum weight deflection to 1".

36. BID PACKAGE SPECIFICATIONS:

37. COST ESTIMATE

37.1.1 As part of the total installed cost estimate, the company would like to have a firm pricing on all major equipment, as defined by Section 12.2.1, for the project. The contingency variance of ± 20% required by the FEL-3 estimate from the Contractor would be built solely in the construction and installation effort.

38. EQUIPMENT PURCHASE

38.1.1 All major equipment on skid and off skid would be purchased directly by the Company; this includes (as applicable) air coolers, blowers, compressors, engines, exchangers, generators, heaters, flares, meters, motors, pressure vessels, pumps, regulators, storage tanks, sumps, tower & tower internals, turbines, and waste heat recovery system. All major equipment supplier need to provide mill test reports (MTR) identifying the source of material utilized.

38.1.2 All design specification sheets would need to have been checked by the Company before going out for bidding process. The Contractor would select a minimum of 3 vendors for bidding on individual RFQ packages. In case of vendors no-bidding for an item/s on a RFQ package a minimum of two quotes would be needed on each item for vendor determination. An RFQ package that has more than $ 50,000/- monetary value would require a bid evaluation from the Contractor. Contractor will request all vendors to submit firm pricing with NET 60 day validity and performance guarantees. All vendor T&Cs, payment milestones will be in agreement with the Company's procurement division.

39. VENDOR SELECTION ORDER

39.1.1 Meet specifications laid by the RFQ package. Any exceptions against specification need to be brought to the Company and Contractor's attention.

39.1.2 Meet the lead time mutually determined by the Contractor and the Company, based on Section 16.0 and Contractor fabrication schedule.

39.1.3 Vendor history and performance.

39.1.4 Lowest bid pricing and payment milestones.

40. DELIVERABLES

The contractor will provide the company the following deliverables:

41. DOCUMENTS

41.1.1 Project Cost Estimate (hard and electronic copy). This estimate will be considered as Contractor's lump sum bid for all detailed engineering, procurement (as defined by section 12.2), and construction activity.

41.1.2 Equipment Specification Sheets and RFQ packages.

41.1.3 Bids from all vendors and identify 'No bids'. (electronic copy/emails only)

41.1.4 Soils Report. (order on behalf of the Company, hard and electronic copy)

41.1.5 Weekly progress report (electronic copy only) by 8:30 AM each Monday during the construction phase.

41.1.6 Weekly updated actions items list for Contractor & Company communication. (electronic copy only)

41.1.7 Biweekly updated project schedule. (electronic and native file copy)

41.1.8 Design Basis Memorandum. (hard and electronic copy)

41.1.9 Written Scope of Work for EPC Bid Packages. (electronic copy)

41.1.10 Sign-off on this scope document.

41.1.11 EPC Bid Packages, including process description, specifications, standards, drawings, OSHA PSM

documents (PHA, relief system calculations, operating procedures, etc.), EPA RMP Compliance Plan documents and complete list of project deliverables. (hard and electronic copy)

41.1.12 Contractor to support Company with site specific Title V Permit Application efforts. (electronic and native file copy)

42. DRAWINGS (HARD, ELECTRONIC AND NATIVE FILE COPIES)

42.1.1 Process flow diagram (PFD) with Heat and Material Balance (HMB)

42.1.2 Preliminary plot plan with 100' axis grids

42.1.3 Preliminary Area classification drawing (Issued for approval – REV A)

42.1.4 Tie-In list and location plan (Issued for approval – REV A)

42.1.5 Preliminary P&IDs (Issued for approval – REV A)

42.1.6 Electrical One Line Diagram

43. LISTS (HARD, ELECTRONIC AND NATIVE FILE COPIES)

43.1.1 Major Equipment List

43.1.2 Utility and Fuel Consumption Summary List

43.1.3 Preliminary Line List (during detailed phase)

43.1.4 Instrument Air Requirement List

44. PLANT MATERIAL, EQUIPMENT OR SERVICES FURNISHED BY COMPANY

44.1.1 The Company shall furnish installed residue compression units with their Waste Heat Recovery system

44.1.2 The Company shall provide equipment specification sheets, job books, 3D models as required by the contractor.

44.1.3 All first fills which includes molecular sieve material, hot oil, spare filters, refrigerant grade propane, various lube oils, jacket water, start-up strainers, etc. will be provided by the company

44.1.4 Existing plot plan and shared system P&IDs.

45. CONSTRUCTION ACTIVITY

45.1.1 Wash down slabs drained to a central sump and oil/water separator shall be included under each skid.

45.1.2 Finished plant will include paved sidewalks from the control room to the major equipment skids.

45.1.3 Contractor will be responsible for site security during construction, including monitoring traffic to/from the facility.

45.1.4 The contractor will be responsible for all material and construction management activities.

45.1.5 The contractor will be responsible scheduling, managing and monitoring all sub-contracted activities.

45.1.6 Nomex FRC's and protective gear will be required at all times during construction for both contractor and sub-contractors.

45.1.7 Contractor will be responsible for all lodging, boarding, travel and other expenses for their employees.

45.1.8 Safety will be a top priority at all times, all safety related incidents should be promptly brought to the Company's attention.

45.1.9 Contractor will have safety supervisors for all construction activities and expect the same from sub-contractors.

46. IMPORTANT DATES

46.1.1 Notice to Proceed will be issued by the Company once Contractor and Company mutually accepts the Scope Document in its entirety. Contractor has 3 business days to raise issues and concerns with the Company.

46.1.2 Start: Within 3 business days from Notice to Proceed.

46.1.3 Finish: 8 weeks from Notice to Proceed Date.

46.1.4 The company currently has a tentative first gas to the new facility projected at **start Q4/18**. The contractor needs to have a contingency of 30 days from first gas for all mechanical completion and orange tagging activity.

46.1.5 Contractor needs to make Company proactively aware if any of these dates are to slip.

47. COMPANY REPRESENTATIVE

47.1.1 All project correspondence will be directed to Mr. Shirish Mehta, (713-584-1472, smehta@targaresources.com), who will be the acting Project/Engineering Manager for this work.

EXHIBIT – A

BAKKEN NGL PIPELINE
Product Specification Sheet

Product: Demethanized Mix – Y-Grade
Specification Number: BKNNGL-RF

Date Originally Issued: 11/20/2012
Revision Date:
Revision Number: 0

Specification Points	Test Method	Maximum	Minimum
Composition			
Carbon Dioxide, Maximum	GPA 2177	(See Note 1)	(See Note 1)
Methane, Maximum	GPA 2177	(See Note 2)	(See Note 2)
Aromatics, Maximum	GPA 2186	10.00 LV%	
Olefins, Maximum	GPA 2186	(See Note 3)	(See Note 3)
COS, by wt of C3 component	ASTM D5623 or GPA	15 ppmw	
Vapor Pressure – psig @ 100° F			
psig @ 100° F, Maximum	GPA 2177, Appendix B	600	
Corrosiveness			
Copper Strip @ 100 F	ASTM D 1838	No. 1	
Volatile Sulfur, by weight			
PPM by Weight, Maximum	ASTM D 6667	1200 ppm	
Hydrogen Sulfide	ASTM D 2420	Pass	
Distillation			
End Point @ 14.7 psia, °F, Max	ASTM D 86	375° F	
Color			
Saybolt Number, Minimum	ASTM D 156	+27	
Dryness			
Free Water	Inspection	None @34° F	
Product Temperature			
Product containing 65 mole % or more Ethane, °F, Maximum		90° F	
Product containing less than 65 mole % Ethane, °F, Maximum		110° F	

Notes:
1. Carbon Dioxide Maximum is 0.35 L.V.% (8038 ppmw) of the Ethane.
2. Methane Maximum is 0.5 L.V.% of the total components excluding N2 and CO2 and 1.5 L.V.% of the Ethane
3. Olefin Maximum is 1.0 L.V.% (10,000 ppmw) of the total stream, C4 Olefin Maximum is 0.1 L.V.% (1,000 ppmw) of the Normal Butane
4. Distillation and Color to be run on that portion of the mixture having a boiling point of 70° F and above at atmospheric pressure.
5. Demethanized Mix shall be merchantable, commercially free from sand, entrained water, nitrogen, amine, particulates, brine, olefins, dust, gums, gum-producing substances, oil, glycol, inhibitors, amine, any other contaminants, or any compound added to the Demethanized Mix to enhance the ability to meet these specifications, and other impurities which may be injurious to the pipeline, fractionator, measurement facilities, or storage facilities or the property of third parties, or may interfere with its transmission through the pipeline, fractionator or storage facilities.

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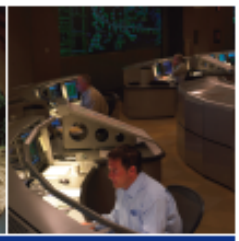
EXHIBIT – B

Gas Quality Specifications

TransCanada and other pipelines



US Pipelines

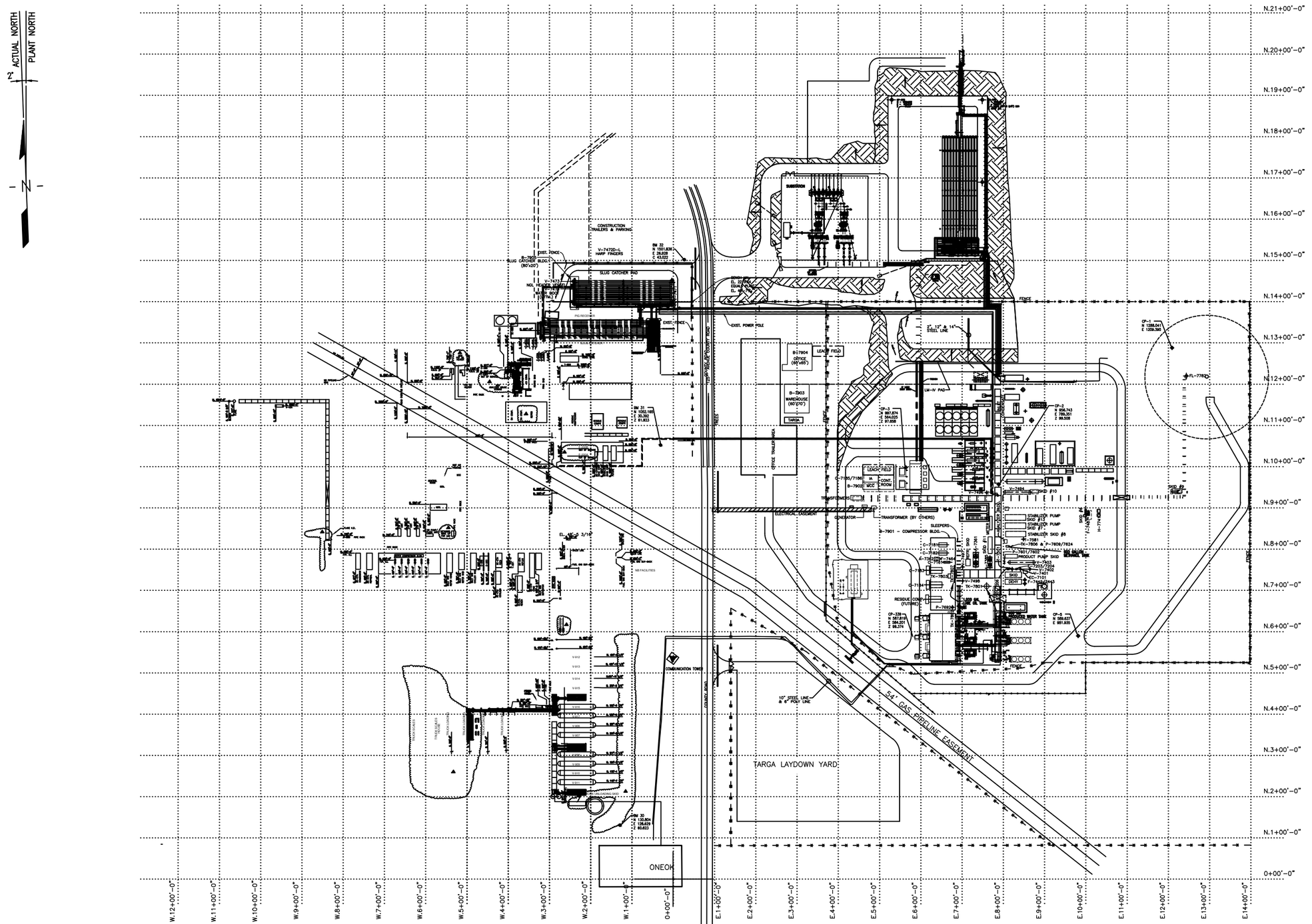
Specs	Alliance USA	Empire	GLGT	Iroquois	Northern Border
Hydrogen Sulphide	Max. 1 grains/Ccf	Max. 1 grains/Ccf	Max. 1/4 grains/Ccf	Max. 1/4 grains/Ccf	Max. 0.3 grains/Ccf
Total Sulphur	Max. 5 grains/Ccf	Max. 20 grains/Ccf	Max. 20 grains/Ccf	Max. 1.25 grains/Ccf	Max. 2 grains/Ccf, (0.3 grains mercaptan/Ccf)
Carbon Dioxide	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume	Max. 2% by volume
Oxygen	Max. 0.4% by volume	Max. 1% by volume	Max. 1% by volume	Max. 0.2% by volume	Max. 0.4% by volume
Nitrogen	Not specified	Not specified	Max. 3% by volume	Max. 2.75% N_2+O2 4% N_2+ CO_2	Not specified
Temperature	Max. 122°F	Max. 120°F, Min. 40°F	Max. 120°F, Min. 20°F	Max. 120°F	Min. 32°F Max. 120°F
Heating Value	Min. 962 BTU/ft³	Min. 950 BTU/ft³ Max. 1200 BTU/ft³	Min. 967 BTU/ft³ Max. 1069 BTU/ft³	Min. 967 BTU/ft³ Max. 1110 BTU/ft³	Min. 967 BTU/ft³
Water	Max. 4 lbs/MMcf	Max. 7 lbs/MMcf	Max. 4 lbs/MMcf	Max. 4 lbs/MMcf at 14.73 psi & 60°F	Max. 4 lbs/MMcf
Hydrocarbon Dewpoint	Max. 14°F at opt. pres.	Not specified	Not specified	Max. 15°F or less	Max. -5°F (800psia), -10°F (1000 psia), -18°F at (1100 psia)
Interchangeability	Not specified	Not specified	Not specified	See Iroquois Tariff	Not specified

Specs	NWP	PNGTS	SOCAL	Tennessee GP	Viking
Hydrogen Sulphide	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 0.25 grains/Ccf	Max. 1/4 grains/Ccf
Total Sulphur	Max. Non Laplata Facilities 5 grains/Ccf, Laplata Facilities 0.75 grains/Ccf, 0.3 grains mercaptan/Ccf	Max. 20 grains/Ccf	Max. 0.75 grains/Ccf (0.3 grains mercaptan/Ccf)	Max. 10 grains/Ccf	Max. 20 grains/Ccf
Carbon Dioxide	Max. 2% by volume	Max. 3% by volume	Max. 3% by volume	Max. 3% by volume	Max. 3% by volume
Oxygen	Max 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume	Max. 0.2% by volume
Nitrogen	Max. 3% ind. O_2, CO_2	Max. 4% ind. CO_2	Max. 4% ind. O_2, CO_2 and inerts	Max. 4% ind. CO_2, O_2 Max 2.75% N_2 + CO_2	Max. 4% incl. CO_2
Temperature	Non Laplata Facilities Max. 120°F Laplata Min. 40°F, Max. 120°F	Max. 120°F	Min. 50°F, Max. 105°F	Max. 120°F	Max. 120°F
Heating Value	Min. 985 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³	Min. 990 BTU/ft³ Max. 1150 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³	Min. 967 BTU/ft³ Max. 1100 BTU/ft³
Water	Max. 7 lbs/MMcf	Max. 7 lbs/MMcf	Max. 7 lbs/MMcf at <800psi or < 20°F at > 800psi	Max. 7 lbs/MMcf at 14.73psi at 60°F	Max. 7 lbs/MMcf at 14.73psi at 60°F
Hydrocarbon Dewpoint	Max. 15°F (100-1000psia)	Not specified	See SOCAL Tariff	Max. 15°F	Not specified
Interchangeability	Not Specified	Not Specified	See SOCAL Tariff	See Tennessee GP Tariff	Not Specified

The Gas Quality Specifications tables are intended to be used for planning purposes only and although TransCanada endeavours to maintain the information in such a way that is accurate and current, it may not provide accurate results. Use of this information is at user's sole risk and TransCanada shall not be liable for user's, or any party's, use of or reliance on any results obtained from it.

Website: http://www.transcanada.com/customerexpress/index.html
E-mail: customer_express@transcanada.com
The Pipeline: 403.920.PIPE (7473)
November 2016

TransCanada
In business to deliver



OVERALL PLOT PLAN – LITTLE MISSOURI FACILITIES – PARCELS 1-5

REFERENCE DWGS.	REV	DESCRIPTION	DWN	CHKD	DATE	REV	DESCRIPTION	DWN	CHKD	DATE
						B	ADDED BENCHMARKS	AAK	HVP	23/03/2019
						A	ISSUED FOR APPROVAL	HVP	RNB	02/01/2019

PREPARED BY: NEW HORIZONS CONSULTING ENGINEERS ,LLP

PROJECT NUMBER: 18–0083

SCALE: –	DATE
DWN BY: HVP	12/04/2018
CHKD BY: RNB	12/04/2018
FINAL CK:	
ENGR.:	
APPRV:	
APPRV:	
PLANT NAME: LITTLE MISSOURI	

TARGA

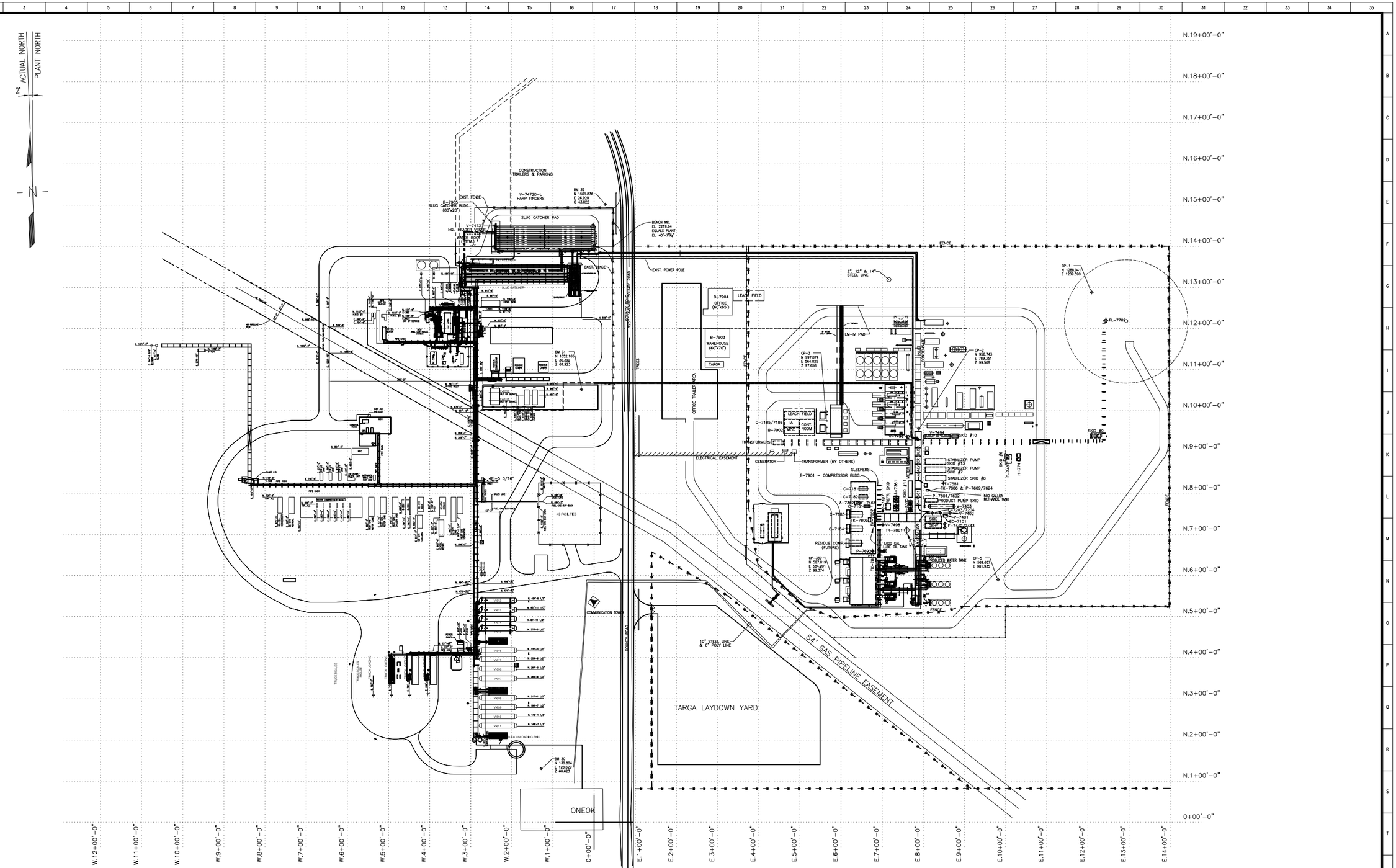
DRAWING NUMBER: 401–100–E000

CAD FILE NAME: 401–100–E000

REVISION: B

PLOT PLAN
OVERALL PLOT PLAN
LITTLE MISSOURI FACILITY

PLOT DATE: –



PLOT PLAN FOR LM-I, II, III, AND IV – PARCELS 1 AND 2

REFERENCE DWGS.	REV	DESCRIPTION	DWN	CHKD	DATE
	B	ADDED BENCHMARKS	AAK	HVP	23/03/2019
	A	ISSUED FOR APPROVAL	HVP	RNB	02/01/2019

SCALE: –	DATE
DWN BY: HVP	12/04/2018
CHKD BY: RNB	12/04/2018
FINAL CK:	
ENGR.:	
APPRV:	
APPRV:	
PLANT NAME: LITTLE MISSOURI	

PREPARED BY: NEW HORIZONS CONSULTING ENGINEERS ,LLP

PROJECT NUMBER: 18-0083

PLOT DATE: –

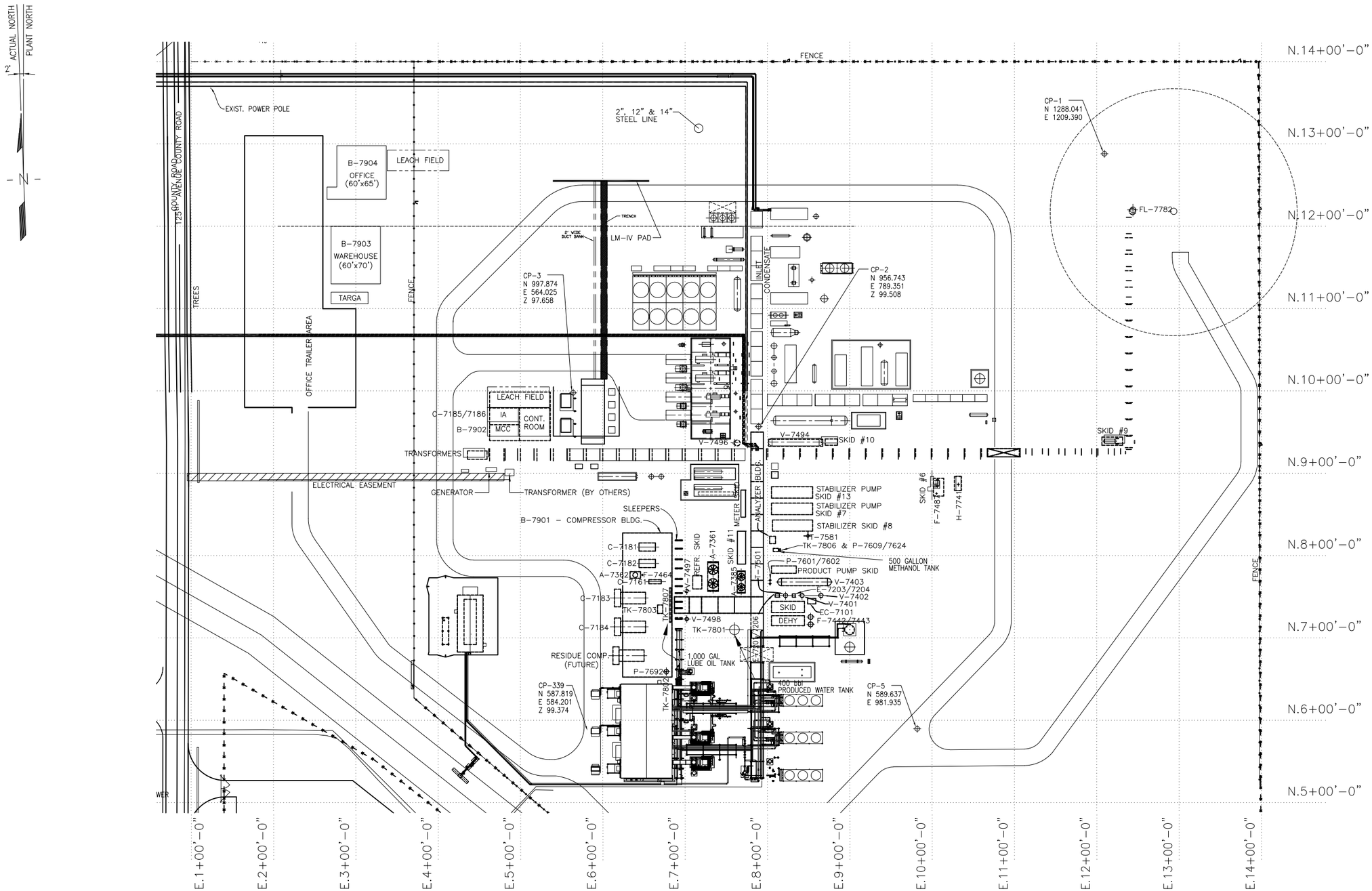
TARGA

DRAWING NUMBER: 401-100-E000

CAD FILE NAME: 401-100-E000

REVISION: B

PLOT PLAN
OVERALL PLOT PLAN
LITTLE MISSOURI FACILITY



PLOT PLAN FOR LM-III, LM-IV, TRANSCANADA SELM - PARCEL 2

REFERENCE DWGS.	REV	DESCRIPTION	DWN	CHKD	DATE

REV	DESCRIPTION	DWN	CHKD	DATE
B	ADDED BENCHMARKS	AAK	HVP	23/03/2019
A	ISSUED FOR APPROVAL	HVP	RNB	02/01/2019

PREPARED BY: NEW HORIZONS CONSULTING ENGINEERS .LLP

PROJECT NUMBER: 18-0083

	DATE
SCALE: -	
DWN BY: HVP	12/04/2018
CHKD BY: RNB	12/04/2018
FINAL CK:	
ENGR.:	
APPRV:	
APPRV:	

PLANT NAME: LITTLE MISSOURI

TARGA

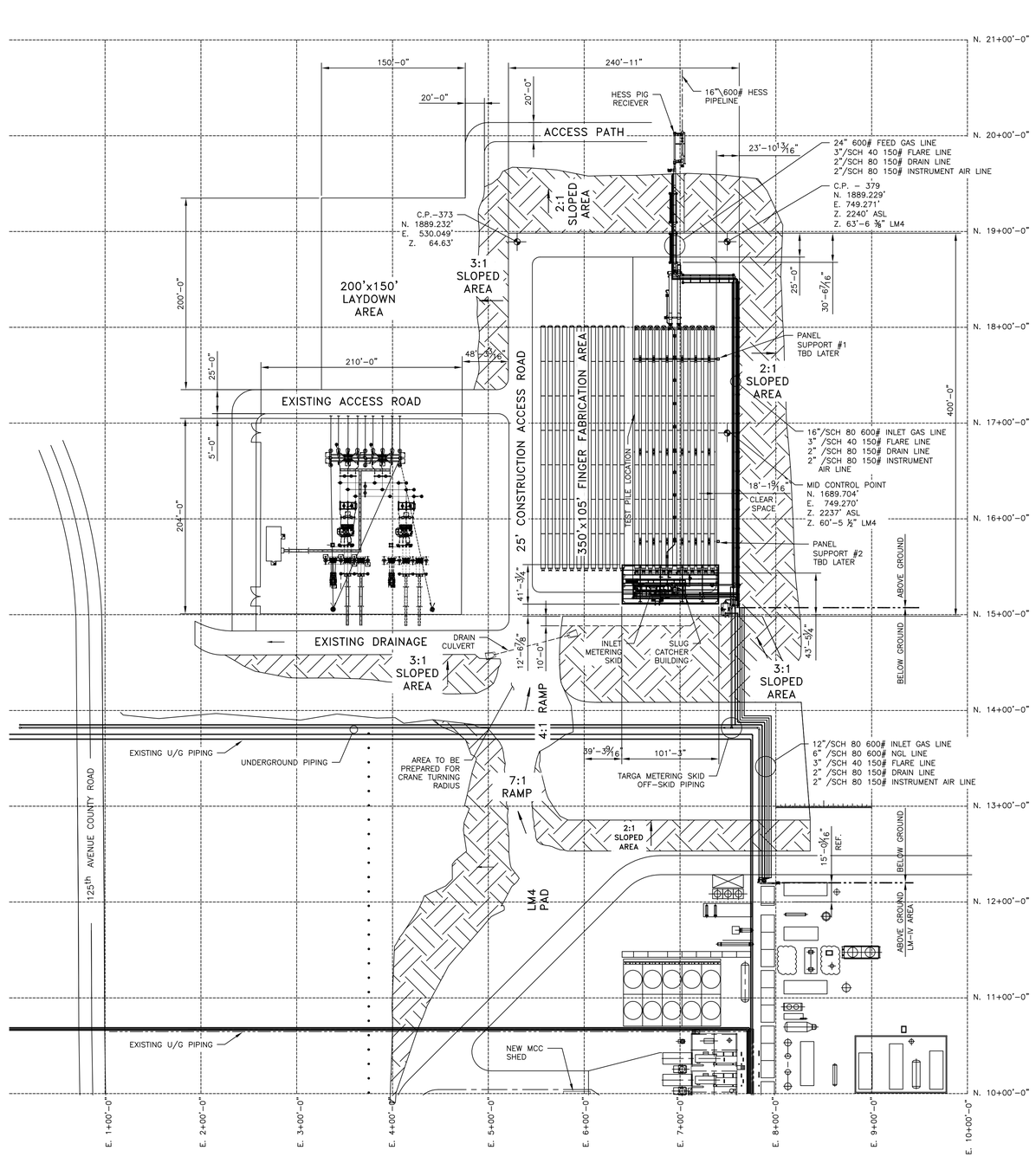
DRAWING NUMBER: 401-100-E001

CAD FILE NAME: 401-100-E001

REVISION: B

PLOT PLAN
LM3 & LM4 OVERALL PLOT PLAN
LITTLE MISSOURI FACILITY

PLOT DATE: -



PLOT PLAN FOR HESS SLUG CATCHER AND SUBSTATION – PARCELS 3

REFERENCE DWGS.	REV	DESCRIPTION	DWN	CHKD	DATE	REV	DESCRIPTION	DWN	CHKD	DATE
						A	ISSUED FOR APPROVAL	HVP	RNB	08/08/18

PREPARED BY: (COMPANY)

PROJECT NUMBER: 18-0083

SCALE: (SCALE)	DATE
DWN BY: HVP	08/08/18
CHKD BY: RNB	08/08/18
FINAL CK: PGV	08/08/18
ENGR.: –	–
APPRV: –	–
APPRV: –	–

PLANT NAME
LITTLE MISSOURI GAS PLANT
MCKENZIE COUNTY, NORTH DAKOTA

TARGA

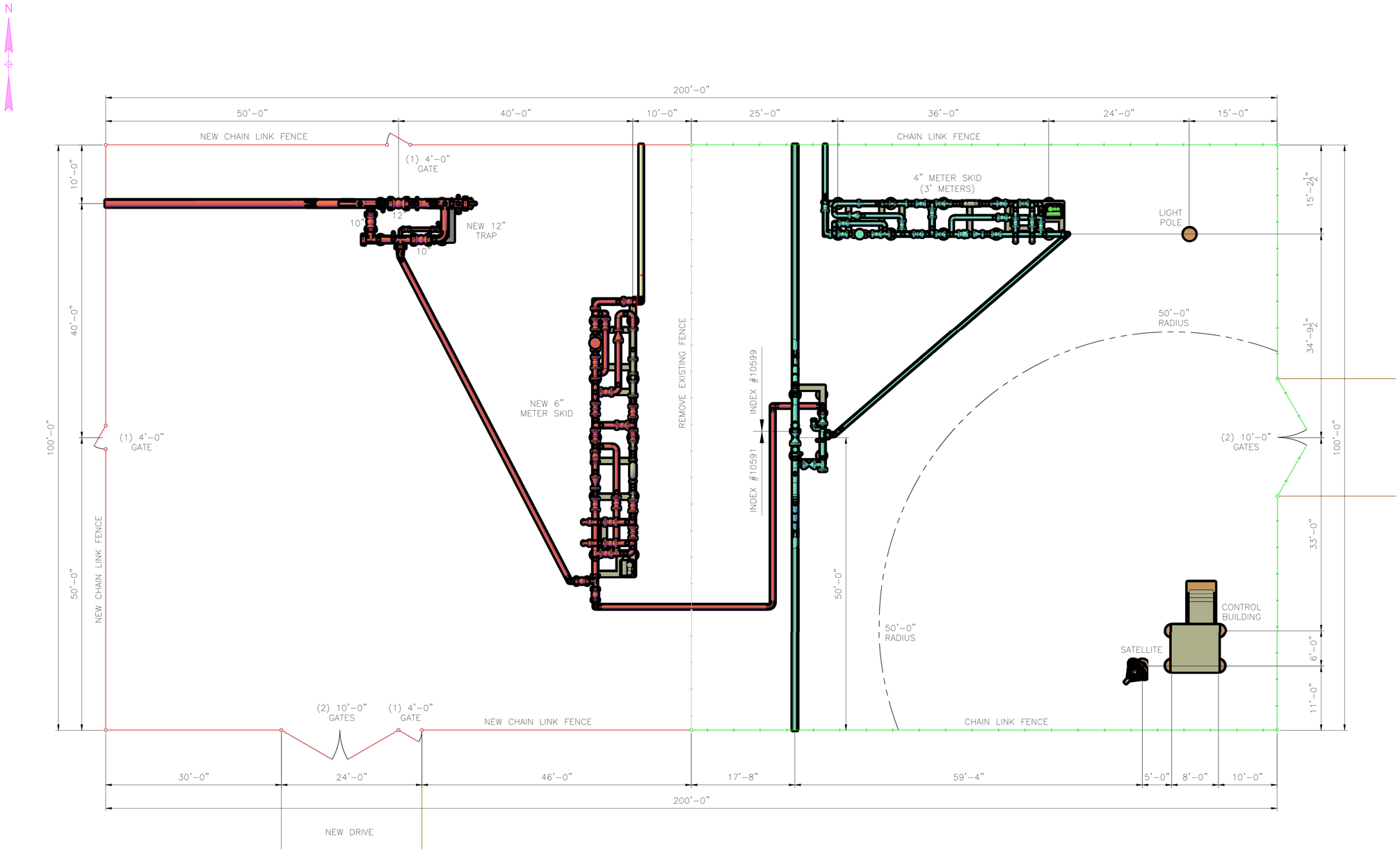
DRAWING NUMBER
18-0083_HPP

CAD FILE NAME
18-0083-HPP

REVISION
A

HESS AREA PLOT PLAN
LITTLE MISSOURI GAS PLANT

PLOT DATE: –



PLOT PLAN FOR ONEOK METER STATION – PARCEL 4

MK	DATE	REVISIONS	BY	AP.
1	7/25/14	REVISED SITE LAYOUT	MBC	
2	1/28/16	CONVERTED TRAP TO MAIN LINE SETTING	MBC	TDS
3	2/1/16	ADDED INDEX NUMBERS	TDS	
4	9/14/18	ADDED 12" TRAP & 6" METER	MBC	TDS
5				
6				
7				

MK	DATE	REVISIONS	BY	AP.
8				
9				
10				
11				
12				
13				
14				

DWG. NO.	REFERENCE DRAWINGS

ONEOK
NGL PIPELINE, L.P.
P.O. BOX 29
MEDFORD, OK 73759

ONEOK TARGA SADDLE BUTTE SITE# 649
OVERALL SITE LAYOUT

DES.:	AFE#:	DATE: 5/24/18	
DR.: MBC		DWG. NO.: 649-0-001	REV. 4
CH.:	SCALE: 1/8"=1'		
AP.:	CAD#: 649-0-001		