CANLIN ENERGY CORPORATION	New Well Tie-In: Specifications	ORIGINAL DATE:	February 28, 2018	ORIGINAL BY:	TC
		REVISION	2	REVISION BY:	TC
		APPROVAL DATE:	May 22, 2018	APPROVED BY:	EW

Suggested Third Party Distribution	
Corporate:	Joint Venture, Facilities Engineer
Field:	Field Foreman, Field Measurement Coordinator

1.0 Work Flow

1.1 Suggested Third Party Tie In Work Flow

A. Third party to complete “New Well Request Form” and email to Canlin Joint Venture representative.

B. Canlin Joint Venture to distribute “New Well Tie-In: Specifications” document to Third party representative. Refer to suggested Third party distribution above.

C. Canlin will assign a project owner.

D. Canlin representative in charge of tie in to contact Third party to begin project planning.

2.0 Measurement Equipment (For Receipt Points Only)

2.1 Gas Metering Specifications

Table 1: Gas Metering Specifications

Item	Specification	Notes
1	Orifice with certified flange tapped meter run with senior type changer	
2	Install in compliance latest revision of AGA 3. Straightening veins should not be used unless they are of sales gas quality.	
3	Prefer installation in vertical orientation	
4	Thermowell downstream of orifice (1-5 pipe dia);	As per AGA design
5	Sensing lines shall have a minimum diameter of 0.375”; shall not exceed 1 meter in length and shall be sloped (1:12) toward the primary measuring device;	If second meter is installed in parallel with EFM, sensing lines shall not be connected to the same taps as the EFM.
6	Static pressure sense point to be taken off of the **downstream** side.	
7	Main isolation valves to the manifold shall be full port and have a nominal diameter consistent with the sensing lines	
8	Manifold shall be 5 valve type with hard seat valves; (ie: PGI 5-way manifold)	
9	Orifice Plate to be selected to provide a *Beta* ratio within the range of 0.10 to 0.7.	
10	Optimum Beta ratio should be between 0.45→0.55	
11	Turbine or Displacement meters may only be used with Canlin Energy approval.	

2.2 Liquid Metering Specifications

Table 2: Liquid Metering Specification

Item	Specification	Notes
1	Turbine, vortex or positive displacement type with pulse pick up	All items by producer
2	Installed in accordance with applicable AER and API requirements	
3	Install strainer upstream of meter	
4	A minimum of 10 pipe diameters and 5 diameters of straight pipe shall be installed upstream and downstream of the meter respectively	
5	Include proving taps, same size as line size; double block and bleed or cavity vented valves must be used between proving taps.	

2.3 Fuel Gas Metering Specifications

Table 3: Fuel Gas Metering Specification

Item	Specification	Notes
1	If site is self-fueled, gas is to be taken off on the upstream side of the meter run.	All items by producer

2.4 Transmitters

Table 4: Transmitter Specification

Item	Specification	Notes
1	All calibrations may be witnessed by a Canlin Energy rep. *The Canlin Energy rep must have 48 hrs advance notice of the calibration date.*	All items by producer
2	Individual electronic with 4-20 mA output. All receipt point calibrations must be done by personnel approved Canlin Energy.	
3	Rosemount transmitters are recommended.	
4	Required transmitter accuracy: Differential Pressure: +/- 0.25% Static Pressure: +/- 0.5% Temperature: +/- 1.0%	

3.0 Measurement and Sampling (For Receipt Points Only)

Table 5: Measurement Data

Item	Specification	Notes
Accuracy	Per Gathering and Processing Agreement but in any circumstances not to be less than: Gas: +/- 2.0 % Liquids: +/- 1.5% Equilibrium	- Volume adjustments must be made if accuracy changes greater than the relevant percentage.
Gas Meter Calibration Frequency	Every 6 months or as agreed to by Canlin Energy/Producer > 10 $10^3 m^3/d$ – once every 6 months < 10 $10^3 m^3/d$ – once every 12 months	- By approved personnel. May be witnessed by Canlin Energy. - Copies of the proving calibration reports must be submitted within 48 hrs of the work occurring.
Liquid Meter Proving Frequency	Every 6 months or as agreed to by Canlin Energy/Producer < 2 m^3/d – once every 12 month > 2 and < 50 m^3/d – once every 6 months > 50 m^3/d – once every 3 months	
Sampling Frequency	- New wells and facilities not less than once / 6 months. - Established wells once / 12 months. - Facilities must be resampled if new wells are tied in.	- By approved personnel. May be witnessed by Canlin Energy - All analysis must be submitted to Canlin through Protrend (equivalent submission method). - Verification of an update in the EFM must be supplied within 24 hrs of the change.
Sample point Connection	Gas – Upstream of pressure valve and penetrate through the side of the pipe. Liquids – Downstream of turbine and upstream of dump valve and penetrate through the side of the pipe.	
Analysis Methodology	Gas – ASTM Liquids – ASTM	
Fixed Data Changes	By Producer or reps	All data changes or hardware changes in EFM or driflow may be witnessed by Canlin Energy.

4.0 SCADA

Table 6: SCADA Requirements

Item	Specification	Notes
Radio	Ferrier uses a 10-foot mast, however towers could be required. *Remote ESD must be connected*	Confirm frequencies with Canlin
RTU	EChart/ScadaPak (for control and wellsite measurement) Lufkin or DrSCADA Wellhead Manager (for artificial lift monitoring)	Note that ECharts are manufactured by Dynamic Flow Computers
Protocol	Modbus	
Polling	RTU as Slave. Canlin as Host	
UPS	Producers discretion	
Process Information	The following is required: • Delivery Flow, Pressure and Temperature • Meter Information (factor, orifice, S.G., Z, etc) • Time stamp of any changes (eg: orifice, analysis) • Gas Composition	
Remote Commands	Canlin requires remote control of the following: • Wellhead ESD & Pipeline ESD Valves	
Historical Data	Canlin requires the capability to retrieve production data from the previous calendar month	

5.0 Engineering

Table 7: Engineering Requirements

Item	Specification	Notes
Drawings	Third Party to provide the following documents for review to Canlin Engineering: • P.Eng. stamped Piping and Instrument Diagrams (P&IDs) • Shut Down Key (if applicable) • Pipeline Survey Plans (if applicable) • Isometrics of any Canlin piping to be changed	Drawings must be reviewed and accepted prior to construction.
Control Valves	Pipeline ESD Valve – To be reviewed by Canlin Engineering Flow Control Valve – To be reviewed by Canlin Engineering *Set points to be confirmed with Canlin*	By Producer; Canlin may require: 1. Ability to Operate 2. Signal to Canlin Control Room

6.0 General

Table 8: General

Item	Specification	Notes
Well Testing	All wells shall be cleaned of any drilling and completion fluids prior to flowing into the pipeline system. Canlin Energy recommends a test separator be installed and the well tested until the concentration of contaminants are reduced to acceptable levels.	
Chemical Inj	Requires Canlin approval. In general: • Producer to inform Canlin of any continuous injection of methanol into the Canlin pipeline system • Only oxygen inhibited methanol shall be injected into a Canlin pipeline system. • All process chemicals must be compatible with chemicals that Canlin is currently using in system directly downstream of the tie-in point and at the Ferrier Gas Plant. Provide list of chemicals prior to commencement of delivery.	
Product Quality	Prior to commencement of delivery the producer shall provide: • Gas analysis (to C10) • Liquid hydrocarbon analysis (to C30) o Includes paraffins, wax and ashphaltene content • Water analysis including: o pH level o ions, total dissolved solids, total suspended solids. o Sulphate reducing bacteria o Scaling tendencies • Trace sulphur analysis (COS, CS_2, H_2S, mercaptans) • Confirmation that C5+ has been separated and tanked at start-up until well is flowing free of impurities. • Millipore test shall be done after 2 days to test for ashphaltenes and iron sulphides. Provide millipore results to Canlin Energy.	Provide data to Midstream Superintendent