

**TALISMAN**

E N E R G Y

MUSKEG GAS GATHERING SYSTEM

DRY GAS GATHERING SYSTEM

*Producers Tie-In Specifications*

Talisman Energy Canada.  
January 04, 2005  
Revision #1.1

<b>PROCESS INFORMATION</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Gas	No deleterious substances.	Incl. mud, dust, gum, acid, O <sub>2</sub> , S <sub>x</sub> .
Hydrocarbon Liquids	No free liquids.	Removed at the wellsite.
Water	< 0.032 kg / 10 <sup>3</sup> m <sup>3</sup> (2 lbs / mmscfd)	Dehydrated gas only, water must be in gas phase at operating pressures.
Hydrogen Sulfide	Not exceeding current AEUB pipeline approvals:  • 27.3 mol / kmol (2.73%)	Producer to provide periodic gas sampling – as a minimum will be done twice yearly. Any new wells tied in will need samples provided prior to tie-in. A Re-Combination gas analysis is also required for all wells.  Pipeline Licence (AEUB)
Mercaptans	0 mg/m <sup>3</sup> (0 grains / 100 scf)	
Temperature	0 C < Temperature < 35 C	Yellow Jacket limitations
Pressure	Not exceeding current AEUB pipeline approvals: • M.O.P. = 9,930 Kpa (1440 psi)	

<b>DATA ACQUISITION REQUIREMENTS</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Microwave System	TEC uses microwave towers at these locations:  • <b>Edson</b> - LSD 8-11-53-18 W5M	Confirm frequencies & other details with TEC.  Producer is solely responsible for own bandwidth access. TEC will not accept any 3rd party request for Tower access.
Radio Terminal Unit	Bristol Babcock, FloBoss or similar • Standardized programs & algorithms	Programs reviewed and approved by TEC.
Protocol	• Primary: Bristol BSAP or similar • Secondary: Modbus RTU	
Polling Requirements	TEC RTU as master and Producer as slave.	
Coverage Area	Average 24 km from pipeline R.O.W.	Path study required.
UPS Requirements	35 days Autonomy.	Back up power source for 24 hrs
Process Information	TEC requires the following data: • Delivery Flow, Pressure and Temperature • Meter Information (factor, orifice, S.G., Z,) • Time Stamp • Gas Composition • Dew Point Analyzer Reading • Calculated H <sub>2</sub> S Concentration • ESD Valves Position (open / close) • Compressor Status	Confirm data lists with TEC. (TEC reserves the right to collect more data as required.)
Remote Commands	TEC requires remote control for the following: • Pipeline ESD Valves • Water Dew Point Analyzer Bypass	

<b>PIPING &amp; INSTRUMENTATION SYSTEMS</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Process Tie-In Connection	TEC will provide a manual block valve to connect new pipelines into the Gathering System at the Producers cost (material and labour).	By TEC. (Ownership limits.)
Utility Tie-In Connections	TEC will provide connections for fuel gas, instrument air / gas, drain and flare if available at the Producers cost (material and labour).	By TEC. (Ownership limits.)
Piping / Mechanical Requirements	Install immediately upstream of acceptance point: <ul style="list-style-type: none"> <li>• A spectacle blind</li> <li>• A check valve</li> <li>• A pipeline ESD valve</li> <li>• A cathodic protection insulating kit</li> <li>• An inline corrosion pot c/w coupon holder</li> <li>• High and low sampling connections</li> </ul>	By Producer.  * See spec below  * see attached drawing
Pipeline ESD Valve	Fire safe to API 604 and equipped with: <ul style="list-style-type: none"> <li>• Fail closed actuator</li> <li>• Manual reset latch</li> <li>• Solenoid valve</li> <li>• Open and closed limit switches</li> <li>• High / Low pressure pilot</li> </ul>	By Producer.  * Remote operation by TEC * Signal to TEC control center * Confirm set points with TEC
Temperature Instruments	Measuring acceptance temperature: <ul style="list-style-type: none"> <li>• Electronic transmitter (4-20 mA).</li> <li>• Local indicator.</li> </ul>	By Producer. * Based on pipeline design * Required
Pressure Instruments	Measuring acceptance pressure: <ul style="list-style-type: none"> <li>• Electronic transmitter (4-20 mA)</li> <li>• Local indicator.</li> </ul>	By Producer. * Based on pipeline design * Required
Gas Metering	Measuring flow from each well: <ul style="list-style-type: none"> <li>• Industry-approved meter run</li> <li>• Flow, pressure &amp; temperature transmitter(s)</li> </ul>	By Producer. * Dry Flow meter preferred. * Signal to TEC control center.
Liquid Metering	Measuring hydrocarbon liquid to tank: <ul style="list-style-type: none"> <li>• Industry-approved turbine or P.D. meter.</li> <li>• Local totalizer(s) c/w flow transmitter(s)</li> </ul>	By Producer. (Recommend installing meter prover connections.)
Line Heater	Equipped with the following devices: <ul style="list-style-type: none"> <li>• Inlet &amp; Outlet temperature transmitter</li> <li>• Flame detection (burner status)</li> <li>• Fuel gas ESD valve c/w solenoid valve</li> </ul>	By Producer * Signal to TEC control center * Signal to TEC control center * Remote operation by TLM
Water Dew Point Control	Install dew point analyzer downstream of each dehydrator (Panametrics or TEC approved equal).	By Producer. * TEC to approve installation and set points.
Pipeline Blowdown	Mechanism to de-pressure the pipeline at both ends .	By Producer. Use TEC's facilities if available.

<b>PROJECT MANAGEMENT</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Facilities Design	<ul style="list-style-type: none"> <li>• TEC reserves the right to review and approve the design of all facilities connecting into the gas gathering system.</li> <li>• Producer could be requested to a HAZOP study with TEC prior to final design.</li> </ul>	By Producer & TEC.
Drawings	Producer shall submit the following drawings to TEC: <ul style="list-style-type: none"> <li>• Process &amp; Instrumentation Diagrams.</li> <li>• Shutdown Key.</li> <li>• Pipeline Survey Plans.</li> </ul>	By Producer.
Schedule	Keep TEC informed of the project schedule to prevent any delays in start-up & commissioning of the new facilities.	By Producer. (Preferably weekly status reports.)

<b>CONSTRUCTION REQUIREMENTS</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Site Access	All Producer representatives and contractors shall participate in a safety indoctrination prior to accessing any TEC sites or facilities.	May be arranged with TEC Operations. Contact Adam Klaric: Phone: (780) 723-9804
Site Construction	All Producer representatives and contractors shall have a daily permit and all necessary regulatory permits prior to conducting any work on TEC sites. Notification shall be given 72 hours in advance of any construction commencement. Work on TEC Lease or ROW will be carried out strictly by TEC Representatives.	Daily permits may be obtained from TEC Edson Control Center Phone: (780) 723-9732 / 9734 Fax: (780) 723-9538
Inspection	During construction, Producer shall give access to TEC representatives for inspection and approval of facilities installation.	As a minimum, TEC shall witness the facilities functional check prior to start-up. Producer to notify.

<b>OPERATIONS</b>		
<b>DESCRIPTION</b>	<b>SPECIFICATIONS</b>	<b>NOTES</b>
Well Testing	All wells shall be cleaned of any drilling and completion fluids prior to flowing into the gas gathering system. TEC recommends a test separator be installed and the well be tested for a period of 2 weeks.	TEC reserves the right to verify analyses of flow samples prior to accepting gas from the Producer.
Chemical Injection	Requires TEC approval. In general: <ul style="list-style-type: none"> <li>• Continuous injection of methanol shall not be allowed in the gas gathering system.</li> <li>• Inhibited Methanol injection shall only be allowed during process upsets (e.g. hydrate, ...).</li> <li>• TEC uses a Baker Petrolite product as inhibitor for the Gathering System.</li> <li>• Producer shall ensure their chemical product is compatible with that of the gas gathering system.</li> </ul>	By Producer  Producer to obtain TEC approval prior to addition of any methanol.
Pigging Activities	Shall be coordinated with TEC Operations.	
Metering	<ul style="list-style-type: none"> <li>• Meter factors shall be updated twice yearly.</li> <li>• Gas analyses shall be updated twice yearly.</li> </ul>	By Producer
Emergency Response Plan	Shall meet all regulatory requirements and be in place prior to commencement of flow.	Shall be developed in conjunction with TEC.

