On Site Questionnaire for Potential AOT Installations:

Company: _____ **Date Completed:** _____

Location: _____ **Completed By:** _____

Install Description: _____

Overview:

This document is designed to collect all potentially relevant information needed to help QS Energy define and understand all aspects of an installation to streamline build-outs. The information is split up in several categories, usually relating to different engineering expertise within the customer's company.

Oil Specs	
Typical Product Type / Name	
Density	
Viscosity (Data Sheet)	
Conductivity (Data Sheet)	
Water Content	
Pump Station Infrastructure	
Pump Station Pipe Size	
Pipe Schedule	
Pump Power (Typical, Rated)	
Number of Pumps	

Typical Number of Pumps Used	
Pumps Operated in Series or Parallel	
Flow Rate/Velocity (Typical, Rated)	
Inlet/Outlet Pressure Drop (Typical and Rated)	
Turbulent or Laminar?	
Pump Efficiency	
Pipeline Infrastructure	
Pipeline Size	
Distance Between Pump Stations	
Elevation Changes	
Flowing Oil Temperature (Typical, Target, And Seasonal Ranges)	
Soil Temperature (Seasonal)	
Supplemental Heating Used	
Bulk or Trace Heating	
Heating Method (NG, Glycol Recirculation)	
Temperature Change	
Heat Frequency	
Heat Loss Rate	
Insulation on Pipeline	
Pigging Type	
Pigging Frequency	

Pigging Productivity	
Pipeline/Pump Station Map Available?	
Distance to Downstream and Upstream Valves	
Automation Status (SCADA Type)	
Repurposed Former Ng Pipeline?	
Electrical Infrastructure	
Available Power	
Location of Power	
Cost of Electricity	
Grid Power?	
Value/Efficiency	
Tariff / Tolls	
Cost per/BBL to Transport	
PLC	
Standard Units (U.S. or Metric)	
Location of PLC Connection	
PLC Signal Type (4-20ma, 0-10V, Etc.)	
PLC Connection to SCADA Digital Ready?	
RS232 / USB / or Ethernet	

Installation Specific	
Valve Isolation (3-Valve Bypass)	
Electrical Isolation (Cathodic Protection)	
Footprint Size / Location	
Header Plot / Plan	
Sample Draw Port Availability	
PP Suppressant	
Type	
Amount	
Cost	
Change in PP and WAT	
DRA Usage	
Type	
PPM Required/typical	
Cost	
Diluent Usage	
Type	
Cut Amount	
Cost (Upstream)	
Cost (Downstream)	

Cost (Total)	
LACT Viscosity Requirement	
Raw Viscosity	
Half Diluent Cut Viscosity	
Other	
Truck / Rail Heaters	
Truck / Rail Transfer Stations	
Tank Battery Heaters	
Maritime Recirculation/Heat	
Maritime Transfer Stations	

Customer Documents:

- Pipeline Map
- Detailed Pump Station Map
- Automation Sensor Map
- Common oil data sheets: conductivity, viscosity, vapor pressure, (function of temp), WAT, PP, breakdown of compounds, MSDS.

Current Problems/Solutions:

- ☐ Capacity Constraint Issues
- ☐ Bottlenecks
- ☐ Wax Deposition
- ☐ Over Pressure
- ☐ Heating or Cooling Issues
- ☐ Reid Vapor Pressure Issues
- ☐ Diluent Cuts
- ☐ WAT/PP problems
- ☐ Hydrates
- ☐ Batch Flow Balancing (Multi-phase not available at this time)
- ☐ Trucking
- ☐ Tank Battery Recirculation
- ☐ Refinery Pre-separation System Issues

Other Notes:

Thank you for your interest and cooperation.

Dr. Christopher Gallagher
VP of Engineering/Product Development

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