OIL AND GAS PIPELINES / PRESSURE MONITORING AND METERING

APPLICATION BACKGROUND

Public gas distribution utilities have a need to monitor the performance of their pipe networks to ensure the correct delivery of gas, and to ensure pressures and flows are maintained for safety and other compliance reasons.

They also need to meter gas which is sold to customers.

Oil companies have very long pipelines which traverse often very remote regions. Pressures, temperature and other parameters along these pipelines need to be monitored regularly.

APPLICATION DETAIL

Gas networks operate different pressure and flow pipelines, in a similar way as electricity utilities have different levels of high voltage and lower voltage electricity towers and transmission systems.

Pressure sensors attached to pipelines typically have 0-5V or 4-20mA outputs. Sensor readings can be collected by Neon Remote Logger routinely, say every 5, 10 or 15 minutes and transmitted via the cell phone or a satellite network to a Neon server.

More complex flow meters / flow computers are often installed at various points in the network and these may have outputs and inputs using Modbus protocol. The system can be set up so that Neon Remote System acts as Modbus Master that collects and presents Modbus Slaves' (sensors) data or that it acts as Modbus Slave that collects and presents sensor data as Modbus TCP for SCADA Modbus Master ingestion.

Metering information is also important to keep track of, especially for high use customers. While low use customers may have a manual gas meter read quarterly by a meter reading person, high use customers typically have larger meters with pulse outputs for every unit of gas delivered. In these circumstances, the metering pulses can be fed into a Neon Remote Logger and totaled up, so that total gas usage per day, total gas usage per hour and perhaps gas usage in peak and off peak times can be recorded. This data can be stored locally in the Neon Remote Logger and sent to the Neon Server, perhaps daily, so that that data can be used for billing purposes.
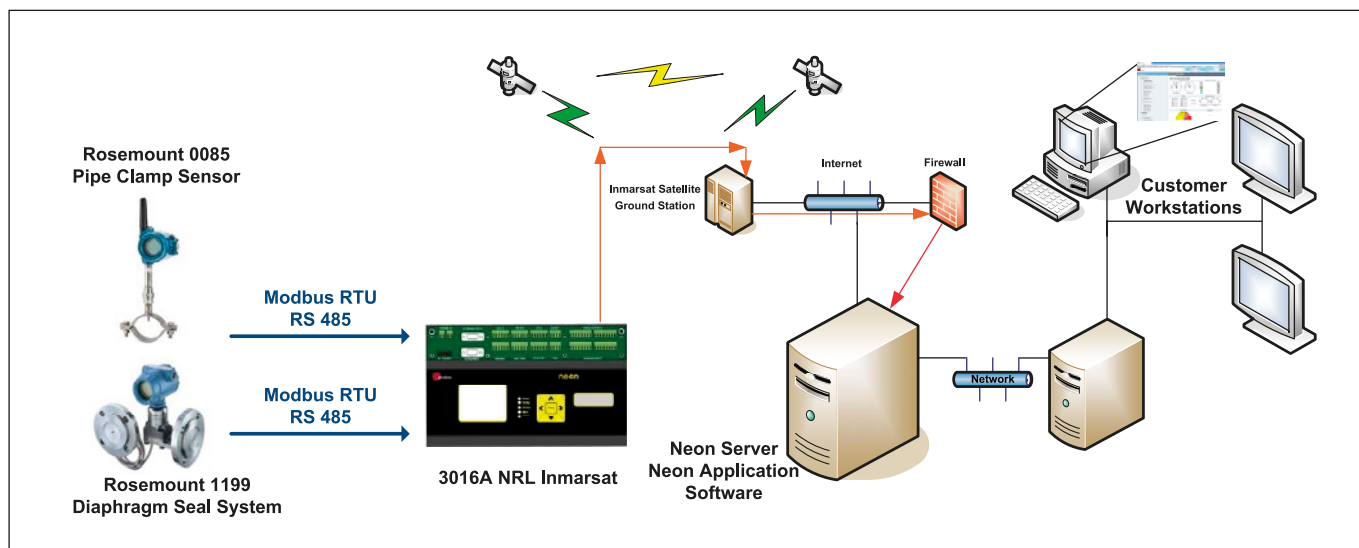
For very remote pipelines a Neon Remote Logger Satellite can be used to measure and report pressures at various points as it is unlikely that there would be any cellular coverage in remote areas. Such systems would be independently powered as there would be no mains power in remote areas.
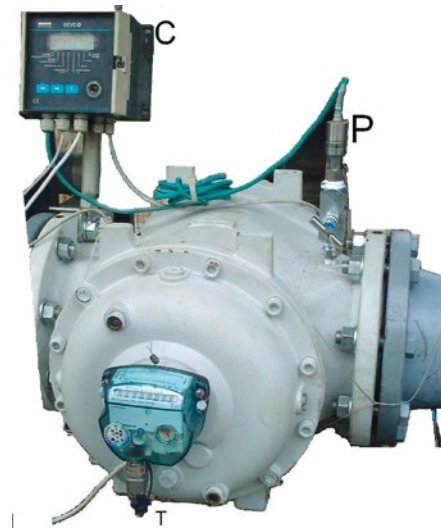
Oil pipelines would typically have Rosemount or other brands of pressure and temperature sensors, at regular points, along pipelines. Very often oil pipelines have pumping stations that are strategically located to boost internal pipeline pressure and flow. Electrically driven pumping units are typically controlled by industrial RTUs utilising Modbus protocol. Neon Remote Logger can be set up to read Modbus registers regularly, perhaps every 5 minutes and to routinely transmit that data to a Neon Server every 10 or 15 minutes. The measured data for all of these applications would be shown on a Neon Application, using a web browser and is accessible from anywhere in the world.

Rosemount 0085
Pipe Clamp Sensor

**Modbus RTU
RS 485**

Rosemount 1199
Diaphragm Seal System

**Modbus RTU
RS 485**

3016A NRL Inmarsat

Inmarsat Satellite
Ground Station

Internet   Firewall

Network

Neon Server
Neon Application
Software

Customer
Workstations

Intrinsically Safe Barrier

Non-Intrinsically Safe Equipment

Typically large corporations would have a SCADA system to control processes, directly interact with instruments (pumps, sensors) and record events. Having information, for example pump failure, available in real time helps alleviate system downtime. Immediately available as well as regularly collected data can be used for long term production analysis and production optimization.

Dynamic reporting system within the Neon Application, which provides output of any fresh data every minute, or custom application that directly interrogates the Neon Application SQL data base make the Neon system easy to integrate with the existing control system.

Consideration also needs to be given to hazardous area requirements. Typically oil and gas sensors need to be intrinsic safe (IS). Intrinsically safe equipment contains intrinsically safe circuits which means that any arc or spark produced under normal or specified fault conditions is not capable of igniting any flammable atmosphere that may be present.

Non-certified equipment, when connected to IS equipment, must be ether:

- low energy device which is incapable of storing, generating or releasing energy greater than 1.5V, 100 mA, or 25 mW under normal or fault conditions.

    or

- connected to IS equipment using a safety barrier that provides energy limitation to field circuits.

TYPICAL CONFIGURATION

APPLICATION SPECIFIC INSTRUMENTS/INPUTS

Options	Unidata Part Number	Description
Customised Pressure Sensors	Custom Part	Custom Pressure including Vacuum Sensors, Custom Output V, 4-20mA

NEON TELEMETRY - NRL / RTU / FIELD UNITS

Options	Unidata Part Number	Description
Ethernet	3016A-000 / 3008A-000	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G/4G	3016A-C00 / 3008A-C00	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G/4G and LoRa	3016A-CL0 / 3008A-CL0	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite-Inmarsat	3016A-00I / 3008A-00I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite-Inmarsat & 3G/4G	3016A-C0I / 3008A-C0I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Low Earth Orbit Satellite - Globalstar	3016A-00G / 3008A-00G	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Satellite - Iridium Short Burst Data	3016A-00R / 3008A-00R	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Standalone RTU/NRL - Industrial	3004A-00 / 3004A-0L	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
Cellular RTU/NRL 3G/4G - Industrial	3004AC0 / 3004A-CL	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
M – Series Standalone RTU/NRL	3004A-M000 / 3004A-M0B0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Cellular RTU/NRL 3G/4G	3004A-MC00 / 3004A-MCB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series LoRa RTU/NRL	3004A-ML00 / 3004A-MLB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Ethernet RTU/NRL	3004A-MEBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Microsatellite RTU/NRL	3004A-MHBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Iridium Short Burst Data RTU/NRL	3004A-MIBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional

NEON APPLICATION SOFTWARE - CUSTOMER SERVER

Options	Unidata Part Number	Description
Neon Applications Software	2302A	Neon Server Software Licence Incl 5 NAL
Neon Applications Software	2302A-10	Additional 10 NRT Access Licence
Neon Applications Software	2302A-20	Additional 20 NRT Access Licence
Neon Applications Software	2302A-50	Additional 50 NRT Access Licence

NEON HOSTING SERVICE - UNIDATA SERVER

Options	Unidata Part Number	Description
Neon Hosting Service	2301A	Neon Data Initial Subscription Setup Fee
Neon Hosting Service	2301A-01	Neon Data Service Fee for 1-50 NRT
Neon Hosting Service	2301A-02	Neon Data Service Fee for 51-100 NRT
Neon Hosting Service	2301A-10	Neon Data Service Fee Metering

DATALOGGER MANAGEMENT SOFTWARE

Options	Unidata Part Number	Description
Starlog V4 Management Software	6308A-AUE	STARLOG V4 Full Licence Key

AVAILABLE FROM: **Unidata Pty Ltd** | 40 Ladner Street, O'Connor, 6163 Western Australia | Tel: +61 8 9331 8600 | info@unidata.com.au

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