Crude Oil Process w/EnergySteward

White Paper

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EnergySteward.com

1 Introduction

Management of oil and gas assets can present challenges.

There are many legacy systems available on the market today which do a reasonable job at managing natural gas. These same legacy systems may indicate that they fully support the crude oil process. But the reality can be quite different.

Many of these legacy systems have attempted to 'jam in' crude oil support within their system offering. This is done in an effort to leverage existing system development costs which were already spent in developing support for natural gas. However, this 'jam in' support approach can be very disruptive to clients of their systems. A significant percentage of the oil process is then managed 'outside' the system (with spreadsheets, etc.). This is solely because the existing legacy system was not designed to handle the nuances/specifics involved with the crude oil process.

Today, there are limited application system solutions, which offer native support for the crude oil process.

This white paper will describe (at a high level) the crude oil process, the challenges posed within this process, and how these challenges are addressed with the ***EnergySteward Oil and Gas Management System.***

2 Crude Oil Process

The crude oil process...

- is primarily a ticket driven process. Tickets represent the transactions against a lease/receipt point for the crude oil volumes. Tickets are NOT unique contract/deal arrangements. Tickets are simply stand alone transactions against contracts/deals.
- is highly dependent on intricate per ticket measurements (temperature, gravity, water percentages, tank gauge/meter readings, etc.).
- is highly dependent on additional non ticket assets. For example, a gauged tank ticket will reference a specific lease and tank (multiple tanks can exist for a single lease/receipt point). The tank strapping measurements assigned to that tank are then utilized when performing a net API volume calculation for the ticket. These tanks do not necessarily have linear incremental measurements and, in theory, each can have custom increment measurement bands.
- is governed by 'per ticket' pricing and cost constructs (i.e. it is not based on daily/monthly volume totals like natural gas). This means that 2+ tickets on the same day FOR THE SAME LEASE can potentially have 2+ different prices for their respective crude oil load.
- is inclusive of unique pricing mechanisms. For example, there are many new high gravity (and ultra high gravity) crude oil field discoveries. These new discoveries have necessitated contract pricing mechanisms to 'adjust' the pricing based on published or contractual custom gravity pricing tables, spin-out water thresholds, etc. Each of these price terms are 'per ticket' oriented (observed gravity and spin-out readings).
- is evolving with the new drilling techniques (fracking). There is a need to potentially offer better support of brine/waste water (transport and disposal). The process should include support for invoicing/netting of brine disposal fees back to the original producers/shippers.
- is unique in that it can contain potentially different transportation pricing/cost adjustments. With crude oil there are many methods of transportation (truck, pipeline, barge, rail, etc.). The mode of transportation can influence the per ticket pricing which ultimately gets utilized. For example, crude oil that is trucked might be assessed a higher transport fee then crude oil which is transported by pipeline. Contracts will usually define these terms and adjustments.
- is unique with various other types of 'per ticket' pricing events. There are many potential contractual pricing events which can occur on a ticket. As an example, a 'REJECT' fee may be assessed based on water spin-out content (if it exceeds a certain threshold on a given ticket). Another example, would be where a transportation ticket might offer a producer/ shipper a discount for transporting multiple loads/tickets together on a single truck for the same producer ('MULTILOAD' tickets). There can also be 'SPLIT' tickets (where a single 'load' spans multiple trucks/tickets). These events are per ticket data measurement 'events' and can be critical in supporting the crude oil process.
- is dynamic with regards to 'ticket of record' affinity. In some cases, volume calculations (ticket totals) will be sourced from an external counterparty (barge tickets, rail tickets, refinery tickets, etc.). Contractually, their ticket numbers will be what is paid on (during settlement). Therefore, the crude oil process should provide for a method to load PRE-calculated (API) external tickets as well as performing internal net API calculations. Basically, load the ticket of record based on whomever is contractually obligated to get the net API numbers.
- is evolving with today's phone/tablet technologies. This necessitates that a system offer seamless integration to various methods for capture of tickets and managing the various aspects of this process. This can include electronic integration to order and dispatch systems, accounting systems, cloud tablet systems, etc.

- contains settlement activities (crude oil and brine) which involve providing TICKET LEVEL support/backup (run statements/details, with volumes and dollars, etc.).

- requires support for many different types of contractual agreements (Buy, Sale, Storage, Transport, Disposal, etc.). When a ticket gets processed, it must ultimately identify and support existing contractual business agreement(s). These contractual agreement(s) define counterparties, price terms, other cost/adjustment terms, leases/receipt points, tanks, delivery points, etc. Prior to processing a single ticket, a prerequisite exists to predefine the contractual rules/terms that govern the tickets. The contractual terms within a system MUST SUPPORT ticket level constructs.

- requires historical access in order to make available the ticket level details to support settlement and division of interest concerns. In addition, prior period adjustments (PPA's) should be able to be processed and incorporated against these historical tickets.

There are many different types of agreements which require support in the crude oil process. This particular white paper will show examples of a 'Buy and Sale' (back-to-back) and 'Transport' tickets.

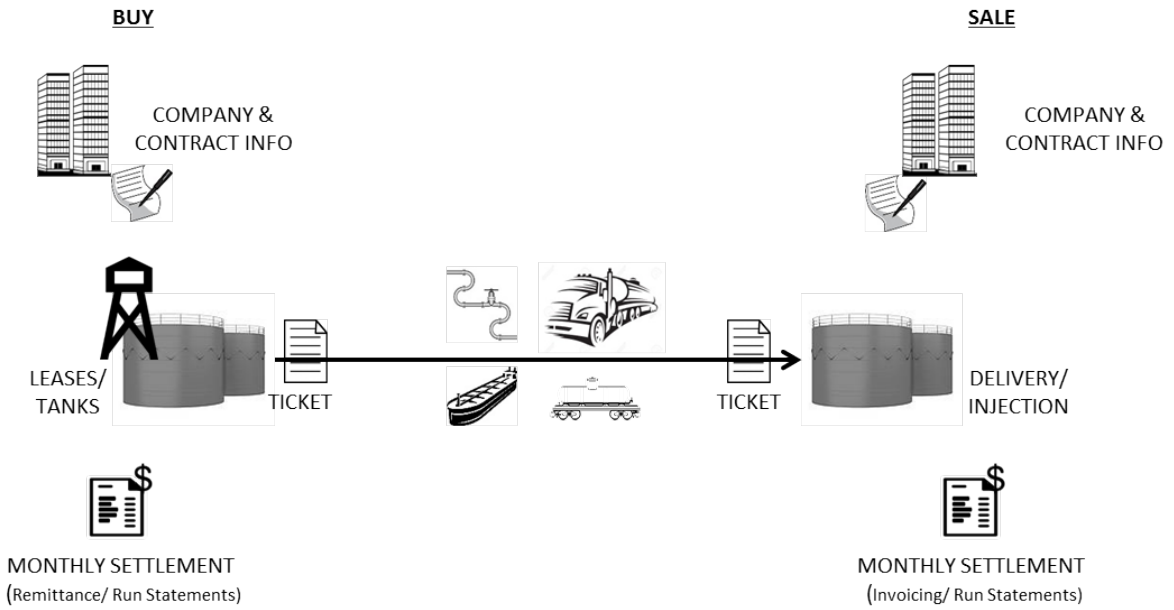
2.1 Buy and Sale Tickets

'Buy and Sale' tickets are usually associated with marketing endeavors. **Both the title and custody of the crude oil is taken (on a buy portion of a ticket) then the title and custody is transferred to yet another party on the sale side.** A 'Buy and Sale' can be done 'back-to-back' (both custody/title transfers at a specific lease/terminal). Or, the 'Sale' can be done at a different delivery/injection point (requiring transport (truck,pipeline,barge, rail, etc.).

When doing a 'Buy and Sale' ticket there is a remittance required to the producer (whom you are buying the volume from) and an invoice required to the purchaser (whom you are selling the volume). Both the 'Buy' and the 'Sale' will normally have different ticket pricing constructs (difference between the two is typically your gross profit margin). As evidenced by the illustration below, contractual agreements would be required for the buyer and seller PRIOR to processing a ticket.

There are situations where a 'Buy Only' ticket (with transport to a storage facility) is required. It is also possible to only have a 'Sale Only' ticket (where a sale is from a storage tank or terminal facility). In those situations you only would need to setup the respective contract (buy or sale) as is needed to support the tickets involved in the business arrangement.

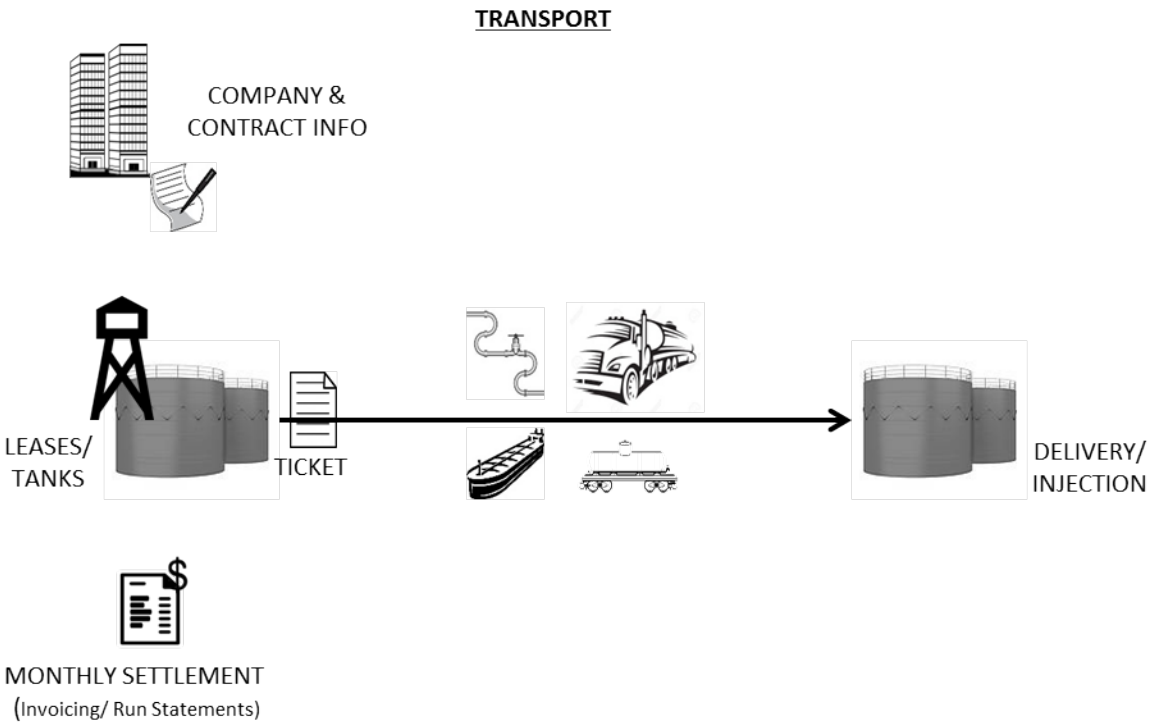
The process defined below illustrates a simple buy and sale marketing scenario.



2.2 Transport Tickets

These tickets usually are associated with transport/gathering type agreements. **The custody of the crude oil is taken (at a lease/receipt) but the title of the crude will still belong to the party at the lease/receipt (typically the producer)**. Transport tickets can also be created to manage movement of volumes between various storage tanks/facilities. These tickets represent custody/volume movements only, title transfers are not involved.

Transport companies will leverage a crude oil process, like this, to generate transport invoices to their producers/shippers. There are situations where crude oil might be transported thru multiple gathering storage facilities. The process defined below illustrates a simple transport scenario where a single delivery point is defined.



3 Crude Oil Process Challenges

There are several unique challenges inherent in the process of crude oil, as previously listed in the 'Crude Oil Process'[4] section.

These challenges can be categorized into three general areas:

1. Contractual Prerequisites
2. Tickets
3. Settlement

3.1 Contractual Prerequisites

There are several aspects of the business environment which must be known and accounted for prior to processing a ticket. These are typically contractual in nature and relate to the specific agreements between companies on buying/selling/transporting crude oil. Therefore, prior to attempting to process a ticket the following should be known and setup:

Company & Contract Information

- Setup of Applicable Companies/Counterparties (contract parties)
- Identification of Key Contact Individuals at Companies
- Inclusion of Settlement Instructions (Wire/Check Information, etc.)
- Contract/Deal Setup (Buy, Sale, Delivery, etc.)
- Contract Pricing Formulas (Ticket Level)
- Contract Other Cost/Adj. Formulas (Taxes, etc.)
- Contract Volume Adjustment Formulas (if applicable)
- Lease/Delivery Point Associations In the Contract
- Route Associations In the Contract (Lease-to-Delivery Rules, Per Contract)
- Price Index Publications Setup (Custom and Published)
- Gravity Adjustment Table Setup (Custom and Published)

Leases/Tanks/Injection/Delivery Points

- Setup of Specific Leases/Terminals (Per Contract)
- Setup of Specific Tanks (Per Lease)
- Tank Measurement Strapping Setup (for gauged tanks where net API ticket calcs required)
- Setup of Specific Delivery/Injection Points (Per Contract)

3.2 Tickets

As mentioned previously, the ticket represents the core transaction artifact involved with processing crude oil. The following represents ...

Tickets

- Manual Entry AND/OR Automated Imports
- Support for Net API Calculations
- Ability To Enter/Import PRE-Calculated (Net API)
- Multiple Ticket Types (Buy Only, Sale Only, Buy and Sale, Transport, etc.)
- Crude Oil and Brine/Water (Disposal) Support
- Metered OR Gauged Volume Measurement Readings
- Identification of Custody Points (Specific Lease w/Tank and Delivery Points)
- Identification of Counterparties Involved (Supplier, Purchaser, Transporter, etc.)
- Capture of Observed Gravity Readings
- Capture of Observed Temperature Readings
- Capture of Observed BS&W Readings (spin-out)
- Capture of Seal On/Off Information
- Capture of Other Transaction Information (Driver, Unit, Truck, Odometer Start/End, Transport Method, etc.)
- Should Include Common Validation Procedures
- All Ticket Detail Should Be Historically Available
- All Calculations Should Be Ticket Level (supporting contractual price rules)
- All Ticket Details Should Be Available For Reporting
- Manual/Imported Ticket Corrections Should Automatically Handled
- Contract/Deal Ticket Level Drilldown and Summarys Should Be Available

3.3 Settlement

The settlement process typically happens monthly. The summary of all tickets across all contracts, for the month are used to produce remittance and invoice reports, with accompanying ticket run statement detail. More specifically, the settlement activities for crude oil should include the following:

Monthly Settlement

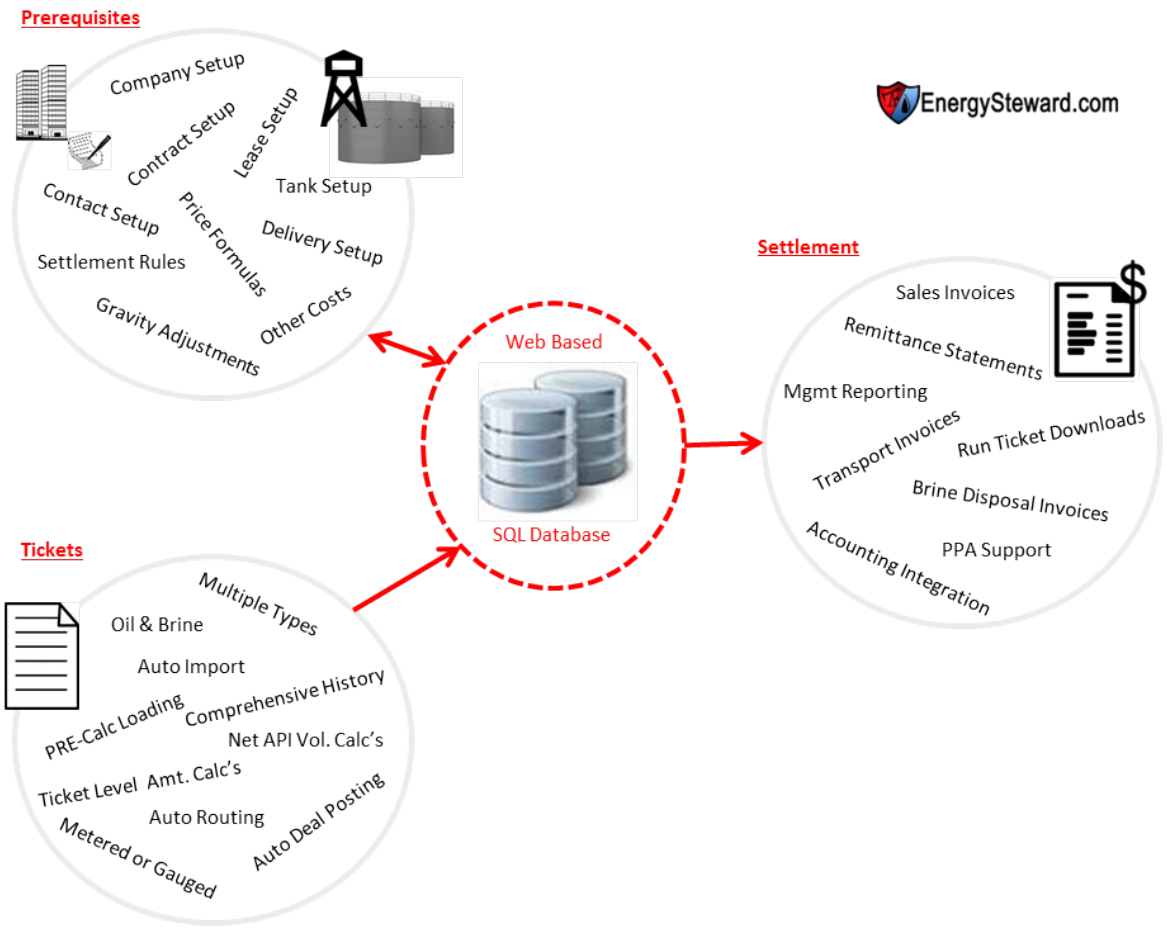
- Generation of Remittance Reports / Downloads (Ticket Level)
- Generation of Invoice Reports / Downloads (Ticket Level)
- Support Brine/Water Disposal Invoicing/Netting
- Accounting System Integration
- Potential Support Division Order Processing (either via external feed or natively)
- Support for Prior Period Adjustment (PPA's)

4 EnergySteward

EnergySteward is a native web application for managing oil and gas contracts and deals. It is an application that is capable of managing upstream, midstream and downstream contractual relationships and transactions. The development on ***EnergySteward*** began in 2003 utilizing the most modern software development tools and databases. ***EnergySteward*** is owned and developed by **Software Experts, Inc.** (an Oklahoma Corporation, established in 1997).

EnergySteward has been built with native support for the crude oil ticket process and FULLY addresses the entire crude oil process[4] .

Crude Oil Process (***EnergySteward***)



4.1 Contractual Prerequisites

EnergySteward fully supports the contractual prerequisite requirements for the crude oil process. Items identified in [*red italics*] below indicate level of support within ***EnergySteward***.

Company & Contract Information

- Setup of Applicable Companies/Counterparties (contract parties)
  [Unlimited Companies]
- Identification of Key Contact Individuals at Companies
  [Unlimited Contacts With Process Responsibility Assignments]
- Inclusion of Settlement Instructions (Wire/Check Information, etc.)
  [Contract Specific Settlement Options Available]
- Contract/Deal Setup (Buy, Sale, Delivery, etc.)
  [Support for All Contract/Deal Types]
- Contract Pricing Formulas (Ticket Level)
  [Ticket Level Price Formula With All Oil Constructs Supported]
- Contract Other Cost/Adj. Formulas (Taxes, etc.)
  [Ticket Level Adjustment With All Oil Constructs Supported]
- Contract Volume Adjustment Formulas (if applicable)
  [Ability to Recognize Optional Volume Deducts]
- Lease/Delivery Point Associations In the Contract
  [Unlimited Lease/Delivery Assignment Per Contract]
- Route Associations In the Contract (Lease-to-Delivery Rules, Per Contract)
  [Unlimited Routes Per Contract]
- Price Index Publications Setup (Custom and Published)
  [Unlimited Publications with Auto Feed Capability]
- Gravity Adjustment Table Setup (Custom and Published)
  [Unlimited Custom/Published Gravity Adjustment Tables]

Leases/Tanks/Injection/Delivery Points

- Setup of Specific Leases/Terminals (Per Contract)
  [Unlimited Leases/Receipt Terminals]
- Setup of Specific Tanks (Per Lease)
  [Unlimited Tanks]
- Tank Measurement Strapping Setup (for gauged tanks where net API ticket calcs required)
  [Custom and Standard Tank Strap Support]
- Setup of Specific Delivery/Injection Points (Per Contract)
  [Unlimited Delivery Points]

4.2 Tickets

EnergySteward fully supports the complex ticket data requirements and relationships within the crude oil process. Items identified in [*red italics*] below indicate level of support within ***EnergySteward***.

Tickets

- Manual Entry AND/OR Automated Imports
  [Spreadsheet and 3rd Party Electronic Import Support With Manual Available]
- Support for Net API Calculations
  [Support for net API Calculations Metered and Gauged Tickets]
- Ability To Enter/Import PRE-Calculated (Net API)
  [Spreadsheet, 3rd Party Electonic and Manual of PRE-Calculated Tickets Available]
- Multiple Ticket Types (Buy Only, Sale Only, Buy and Sale, Transport, etc.)
  [All Ticket Types Supported]
- Crude Oil and Brine/Water (Disposal) Support
  [Automated Per Ticket Posting/Calculations to Oil and Brine Contract Deals]
- Metered OR Gauged Volume Measurement Readings
  [Support for Both Ticket Measurement Methods]
- Identification of Custody Points (Specific Lease w/Tank and Delivery Points)
  [Ticket Data Support for Specific Custody Point(s)]
- Identification of Counterparties Involved (Supplier, Purchaser, Transporter, etc.)
  [Ticket Data Supports All Counterparty Identification]
- Capture of Observed Gravity Readings
  [Available and Utilized in Both Volume and Dollar Calculations]
- Capture of Observed Temperature Readings
  [Available and Utilized in Volume Calculations]
- Capture of Observed BS&W Readings (spin-out)
  [Available and Utilized in Volume and Amount Calculations]
- Capture of Seal On/Off Information
  [Available For Audit Tracking Tank Access]
- Capture of Other Transaction Information (Driver, Unit, Truck, Odometer Start/End, Transport Method, etc.)
  [Available for Reporting/Queries]
- Should Include Common Validation Procedures
  [Included With Auto RE-Validations On Ticket Corrections]
- All Ticket Detail Should Be Historically Available
  [Unlimited Historical Ticket Access (for Reporting, Queries, Research, Audits, etc.)]
- All Calculations Should Be Ticket Level (supporting contractual price rules)
  [Full Ticket Level Support for All Price/Costs]
- All Ticket Details Should Be Available For Reporting

[Available For Spreadsheet, Reports, Screen Export PLUS Direct Database Access]

- Manual/Imported Ticket Corrections Should Automatically Handled
  [Automatic Revalidation/Calculations on Ticket Changes]
- Contract/Deal Ticket Level Drilldown and Summarys Should Be Available
  [Single Click Drilldown Available Thru Onlines]

4.3 Settlement

EnergySteward fully supports the crude oil ticket settlement process. Items identified in [*red italics*] below indicate level of support within ***EnergySteward***.

Monthly Settlement

- Generation of Remittance Reports / Downloads (Ticket Level)
  [Remittances Includes Specific Ticket Level Details, (Spreadsheet Options)]
- Generation of Invoice Reports / Downloads (Ticket Level)
  [Invoices Includes Specific Ticket Level Details, (Spreadsheet Options)]
- Support Brine/Water Disposal Invoicing/Netting
  [Automated Ticket Posting to Brine/Oil With Invoicing, (Spreadsheet Options)]
- Accounting System Integration
  [Open Architecture, Integrate with External Accounting/Distribution/Other Systems]
- Potential Support Division Order Processing (either via external feed or natively)
  [Ability to Integrate OR Include DOI Processing Module]
- Support for Prior Period Adjustment (PPA's)
  [Supports Unlimited Historical PPA Adjustment Transactions When Required]

5 Conclusion

This white paper has described (at a high level) the crude oil process. Specific challenges posed within this process have been illustrated. The ***EnergySteward Oil and Gas Management System*** was developed to natively address the issues involved with the crude oil process.

EnergySteward is a web based system. There are NO login (seat) restrictions and access is governed strictly by client requirements. ***EnergySteward*** is an open system which can be utilized via subscription, lease or purchase. Both Inhouse and hosted options are available. Inhouse solutions can include source code.

5.1 Technical Highlights

EnergySteward has been developed, from the ground up, with the latest standard tools and technologies.

- 100% Developed Using Microsoft C#
- Microsoft .NET Framework (V4.5)
- Microsoft IIS Web Server
- Microsoft SQL Server 2012+
- Service Based Architecture (SOAP WSDL Webservices)
- All Reporting via Crystal Reports (Seamless Integration With Web System)
- Source Code Managed Within Microsoft TFS
- Over 1,000,000 lines of code
- Stable System (Production Environments 10+ Years)
- Utilizes Encrypted SSL (HTTPS) Web Protocols For All Access
- Integrates with Windows Network Active Directory for Inhouse Implementations

5.2 Customers

A Few Crude Oil Customers

- Thousands of Leases,Tanks and Delivery Points
- Crude Oil and Brine Disposal Business
- Inhouse Licensing (code base customized and hosted on Enlink servers by Enlink personnel)
- Heavily Utilized For Marketing and Transport Business
- Also Utilized For Meter/Well Management and as a Pricing Database
- 10+ Year History at Enlink, 3+ Years With The Crude Oil Processing Module

- Manages Producer (Equity) Oil Volumes
- Utilizes a Hosted License
- Supports Equity Supply and Sales
- 4+ Year History (also utilized for natural gas and NGL's)
- Soon to be a part of 'Noble Energy'

A Few Other Customers include...

- Manages Natural Gas Marketing/Scheduling
- Utilizes a Hosted License
- 5+ Year History

- Formerly Quantum Resource Management
- Manages Oil and Natural Gas Contracts
- Utilizes a Hosted License
- 4+ Year History

- Utilized For Legacy System Reporting & Accounting Interface
- Utilizes an Inhouse License
- 6+ Year History

- Utilized For Legacy System Reporting & Accounting Interface
- Utilizes an Inhouse License
- 4+ Year History

5.3 Contact Information

To learn more about EnergySteward and/or to schedule a demonstration contact...

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