



from  
**Design** to  
**Delivery**

Leak Detection, Facility Balance,  
and Beyond

# Overview

- Technical Challenges
- Instrumentation Considerations
- Alarming
- Operational Advantages
- Recent Experience

# Overview (cont)

- Batch Tracking and Facility Balance
- Batch Scheduling and Facility Balance
- Interfacing to Accounting
- Beyond Facility Balance

# Technical Challenges

- Traditionally, Leak Detection
  - Monitors the pipeline only
  - Does not care or know about the facility
  - Did not consider the world beyond the pipeline in the initial design and implementation

# Technical Challenges

- What this means
  - Many instruments in the facility are untelemetered and are not available in SCADA
  - The Leak Detection owner may not own some of the required instruments
  - Parts of the facility may not be controlled from the same control center as the pipeline

# Instrumentation Considerations

- Some of the instrumentation that may be required but not available are
  - Flow in AND out of all tanks
  - Tank level
  - Valve alignment within the facility
  - Rail car loading flow rate
  - Truck rack flow rate
  - Flow to third party facilities
  - Flow to other owned facilities

# Instrumentation Considerations

- Flow into a tank farm is usually available. Flow out may be owned by a third party
- Tank level measurement systems vary significantly in accuracy and may be manual
- Facilities can be large and spread out so it is expensive to telemeter all valves and tanks

# Instrumentation Considerations

- Often other facilities fed by the pipeline are not telemetered or are telemetered in a separate SCADA or DCS system
  - Rail Car Loading
  - Truck Racks
  - Refineries
  - Chemical Plants
  - ...

# Alarming and SCADA

- Alarms should be returned to SCADA
- Typically the system should provide
  - Balance alarm for each tank
  - Overall facility balance alarms
  - Data quality alarms for all facility instrumentation
  - Balance quality/status for each tank
  - Balance quality and status for the overall facility
  - Tank over/under alarms

# Alarming and SCADA

- Additional alarms may include
  - Grouped tank balance alarms and status and quality
  - Product mismatch in tank alarms
  - Contamination alarms

# Operational Advantages

- Additional telemetry aids operators in monitoring the operation of the facility
- All data in SCADA adds a level of scrutiny in real time
- Data to accounting can be archived and kept in a historian

# Recent Experiences

- Customers have considered wireless SCADA to access remote instruments
- Customers have discovered operational shortcomings by having data in one place
- Customers are now reporting data to accounting in near real time

# Spectra Energy

- Currently Implementing a complete system balance including the pipeline, storage facilities, third party receipt and delivery locations and truck and rail receipt facilities.
- Their system includes a 500 mile Propane and Butane line, tanks, caverns, truck terminals, rail loading terminals, multiple destinations and injections locations, reverse flow and much more

# Spectra Energy

- Currently Spectra Energy is undertaking to enhance and automate their system wide system balance
- In 2005 they conducted a measurement audit and are implementing those recommendations.
- This includes installing flow measurements where product left the system but was not measured in real time

# Spectra Energy

- Phase one is understanding their operations and business processes and making sure it is valid, reporting is correct and complete and identify gaps in these areas
- At the same time, they are doing a manual reconciliation using their historian to ensure that a balance can be done with the information and processes they have now.

# Spectra Energy

- Phase two is real time facility balance using their existing leak detection software
- Here the pipeline is balanced along with the various storage and receipt and delivery locations
- This includes tanks, caverns and truck and rail receipt facilities

# Spectra Energy

- Phase three is implementing recommendations from the previous phases
- Phase four is implementing the full system balance with interfacing to scheduling, accounting and operations
- Includes inventory reporting, batch tracking and accounting and batch scheduling
- May include an upgrade of the existing leak detection and batch tracking system

# Batch Tracking

- Need a consistent view of a batch
- Can track batches through tanks
- Allows customers to do 'inventory accounting'
- Provides a history of where product came from and where it ended up (Batch Accounting)
- As opposed to balance by product

# Batch Scheduling

- Can schedule tank to pipeline transfers
- Provide actual tank ID's in pumping orders
- Can reconcile scheduled against actual deliveries and receipts

# Interfacing to Accounting

- We have found Accounting would like much of this data in real time but doesn't believe it is available
- Accounting typically does a balance by product for product inventory
- Accounting would benefit from tank grouping by product
- Requires end to end concept of a batch

# Beyond Facility Balance

- Contaminant tracking
- Sulfur tracking
- DRA Tracking
  - We have found that DRA tracking really requires DRA content to be included in transfers from shipper to shipper
  - A batch could travel through up to 5 system on it's journey, each injecting DRA and resetting the amount when it is received