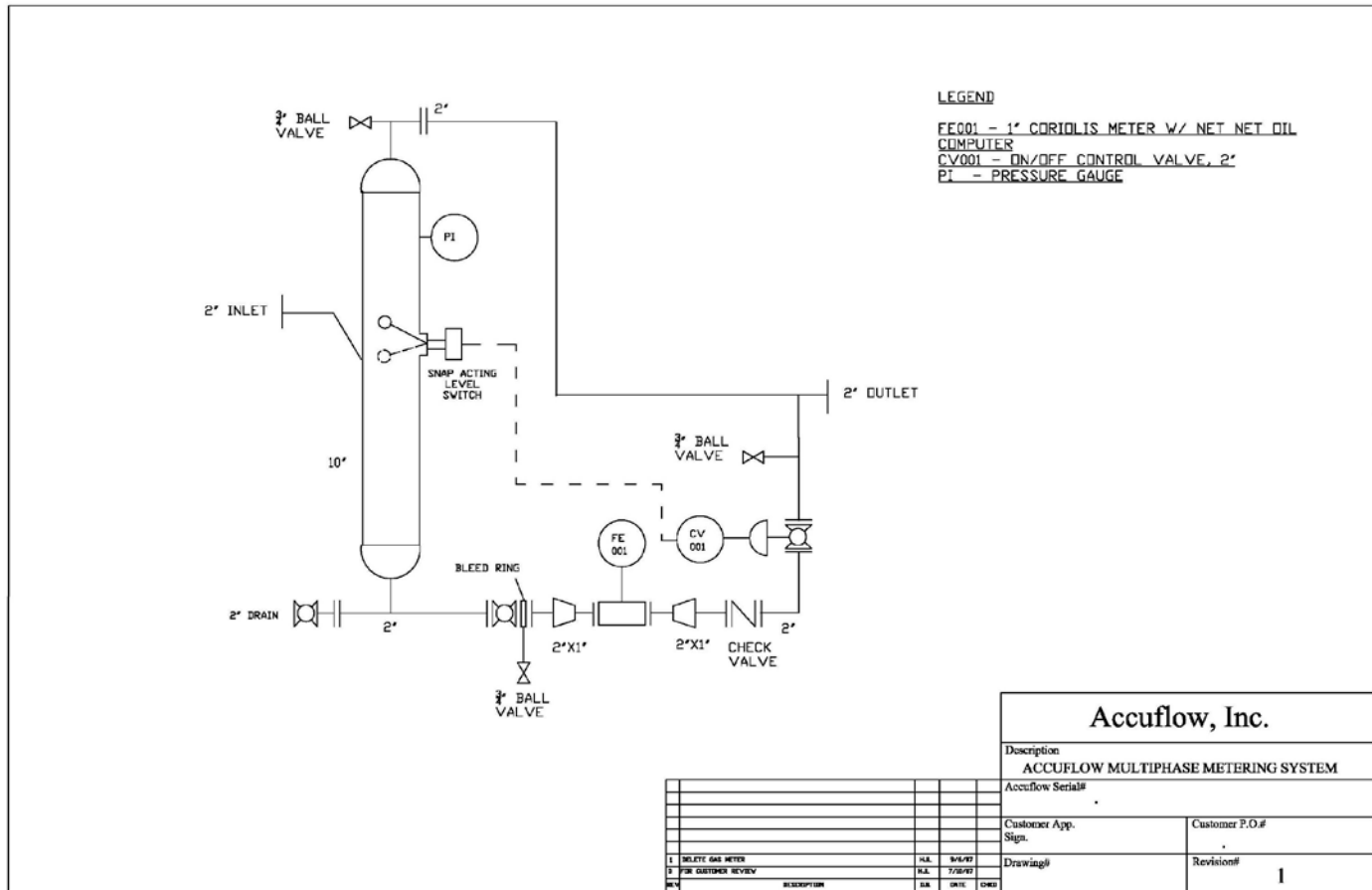


# **Purpose-Fit Portable Multi-Phase Production Measurement System**

Presentation created by James Cron  
Ward Williston Oil Company



# Conception



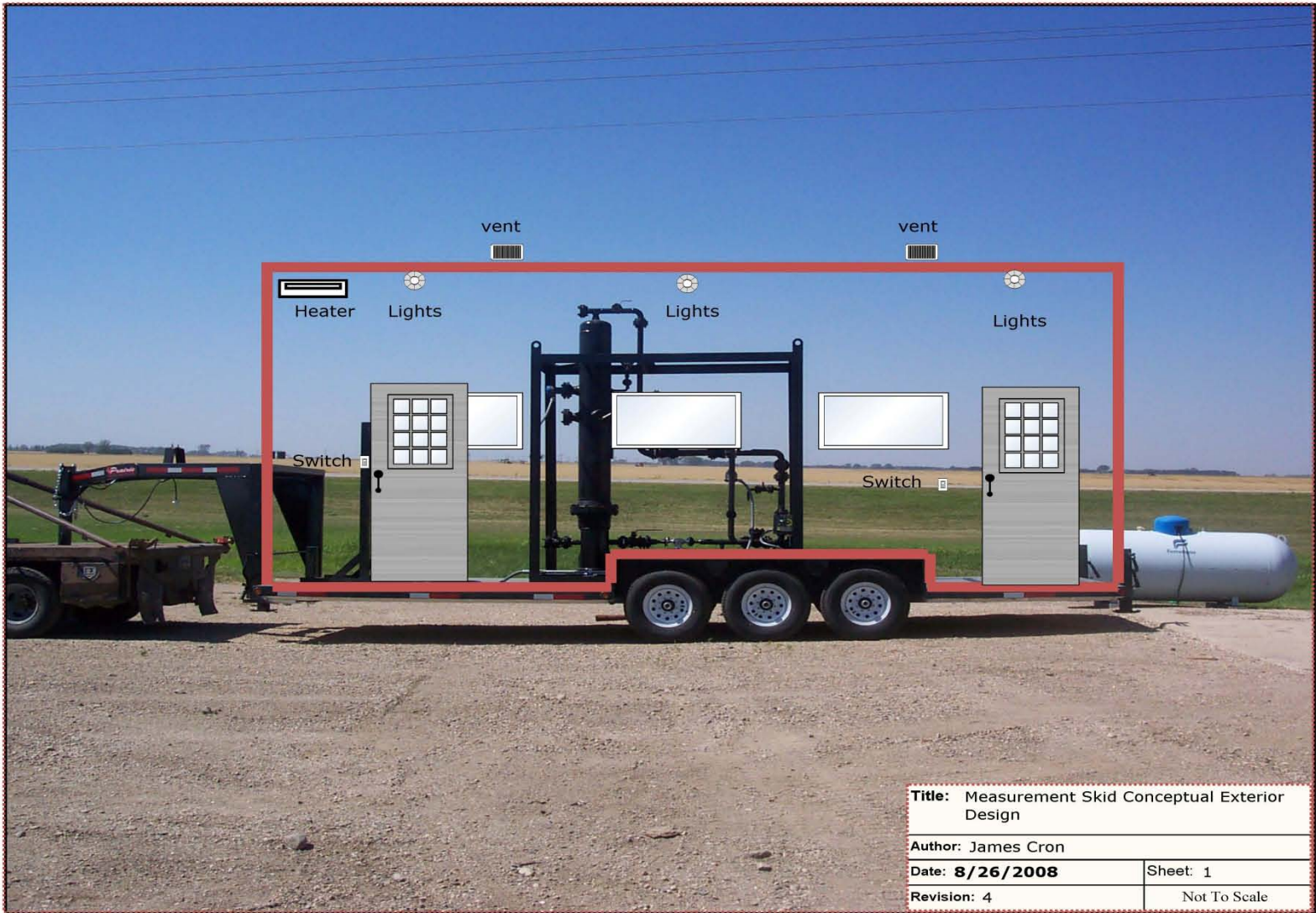
# Key Points

- Measurement system design occurred over several iterations.
- Design influence due to engagement with a vendor with past ND experience (KT Liu, Accuflow)
- Final design and modifications and for the measurement skid were made with delivery in summer 2008.
- **Key vessel indices:**
  - **Design/Welding code:** Per ASME B31.3 design code, w/ 10% X-ray radiography of welds
  - **Coating:** Vessel and Piping will be internally coated.
- **Separating System**

Accuflow Jr. multiphase metering system, consisting of:

  - 10" diameter pipe separator
  - 2" diameter gas flow line
  - 1" diameter liquid flow line





**Title:** Measurement Skid Conceptual Exterior Design

**Author:** James Cron

**Date:** 8/26/2008

**Revision:** 4

Sheet: 1

Not To Scale



# Key Points

- Trailer custom made by Prairie Trailer in Minot, ND.
- Measurement skid was mounted on trailer and positioned at Ward Williston's facility.
- Software was used to mock up the outside building, position of windows, etc.
- Final design was reviewed by the builder, electrician and Ward Williston Safety Coordinator, and WW Operations VP.



# Construction



# Key Points

- Building construction was the source of largest delay due to resources.
- Building and electrical labor and materials both sourced locally (Ron Gustafson Builder, Bottineau Lumber and Northland Electric).
- Heated hoses, major valves procured from Jasper Engineering from Bismarck.
- Minor materials procured from Eng Hardware of Sherwood and various oil field supply stores in Mohall and Westhope.
- Pulling vehicle purchased from Theel Motors in Bottineau.
- Foam applied to bottom of trailer for insulation (Foam Express-Sherwood).
- Live oil samples were collected and analyzed (Core Lab).



# Completion





# Key Points

- First test in December of 2008.
- Shake out lasted several months.
- Trailer snowed in for nearly two months.
- Total of 13 wells have been tested over various time periods (24 hours to two weeks ).
- Overall results very good. Field people have acclimated well and testing cycle time and hookup have been reduced via field input.



# Project Observations

- Overall design works well; using the coriolis meter offers repeatable results.
- Results have offered significant insights (individual well production and oil cuts) that have impacted development plans.
- Opportunity exists to standardize and reduce costs for other skids.
- Change opportunities exist due to heated hose performance and gas metering accuracy. Both have resulted in lessons learned for hose procurement and measurement facility design.



# Thank You

- ND Oil and Gas Research Council.
- Ward Williston Executive Management (Tom and Laurie Cunnington, Rodney Conway) and Field Personnel (Steve Heath, James Johnson, Al McGuire and Roger Gilseth).
- KT Liu at Accuflow.
- Ron Gustafson Builder, Bottineau Lumber and Northland Electric, Jasper Engineering, Foam Express.
- Dave Fischer.
- Karlene Fine, NDIC.



Thank You

