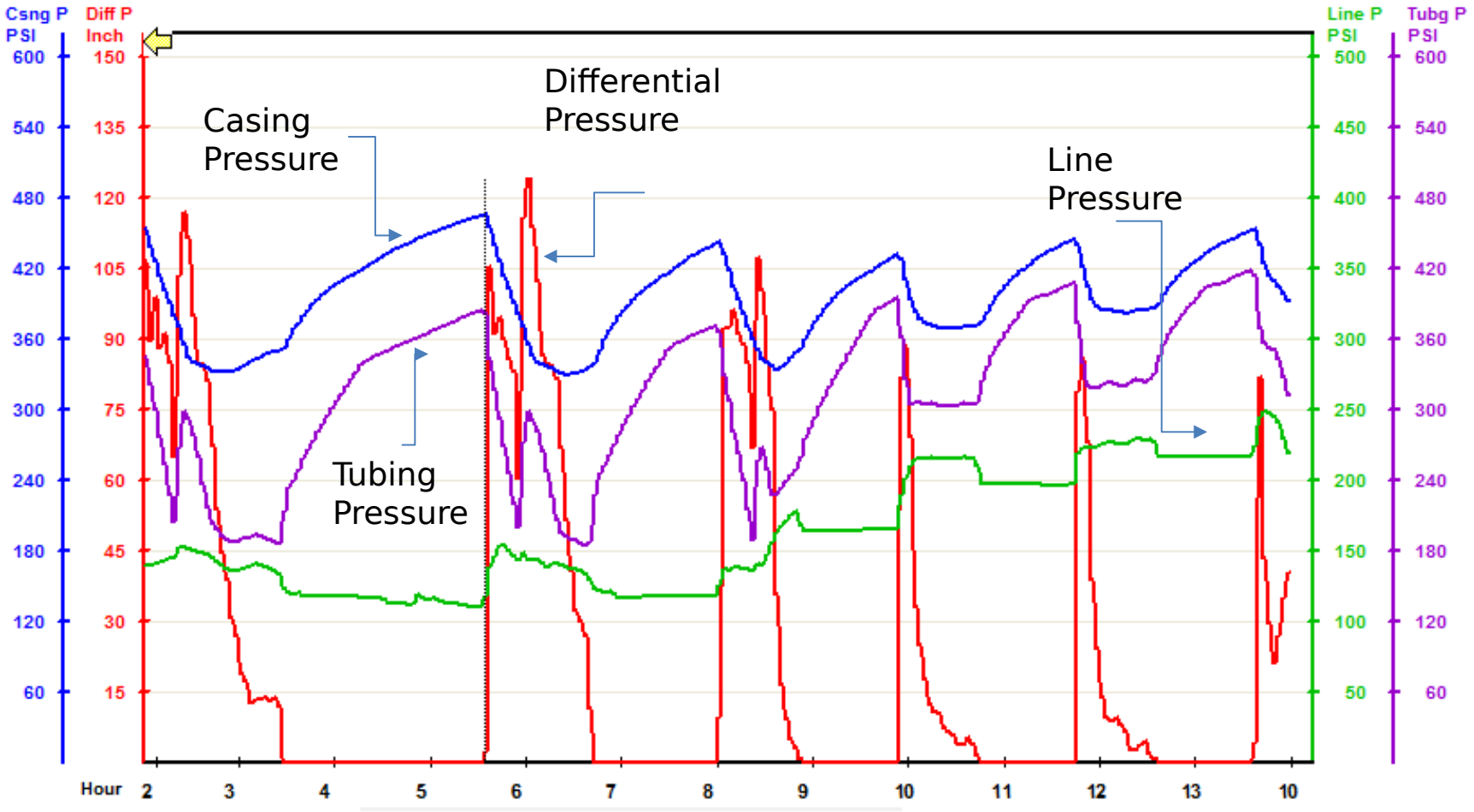
UWA

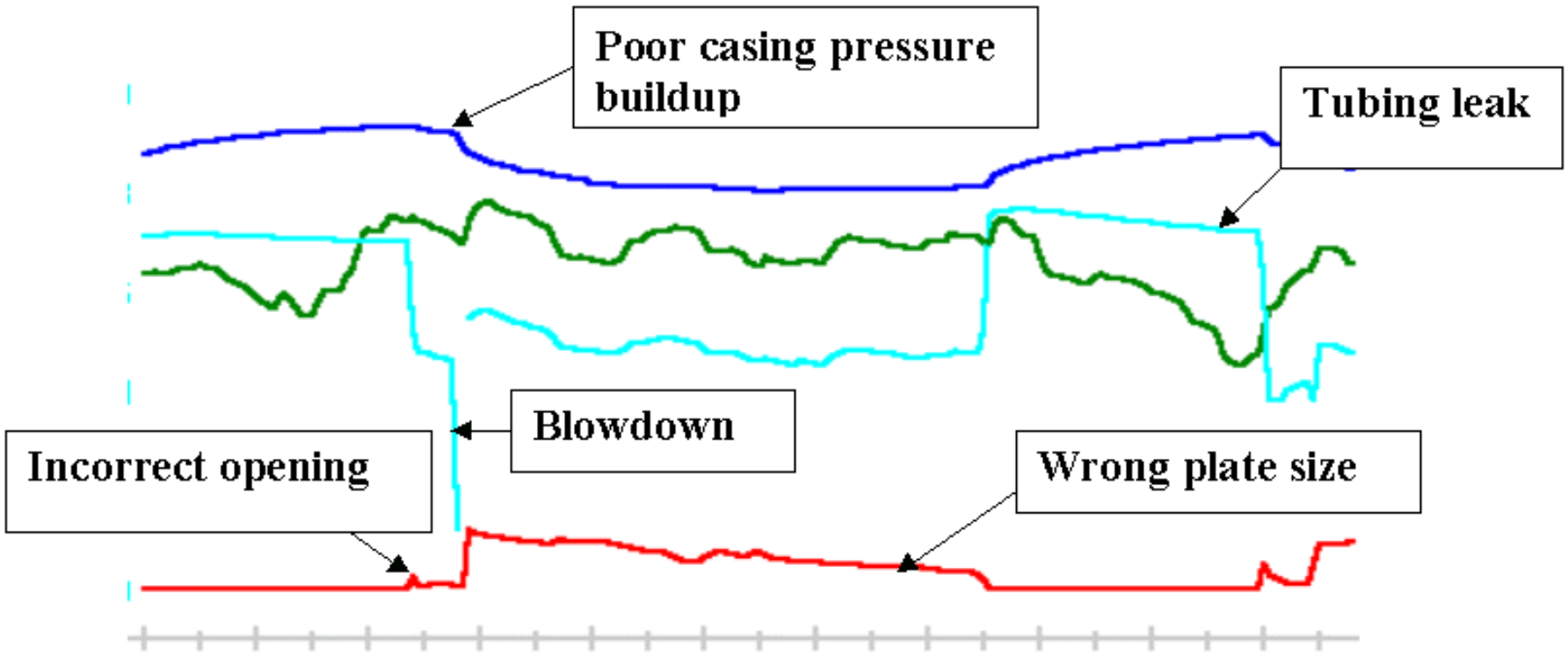
Universal Wellhead Automation

A SCADA or RTU with one-second resolution DATA LOGGER

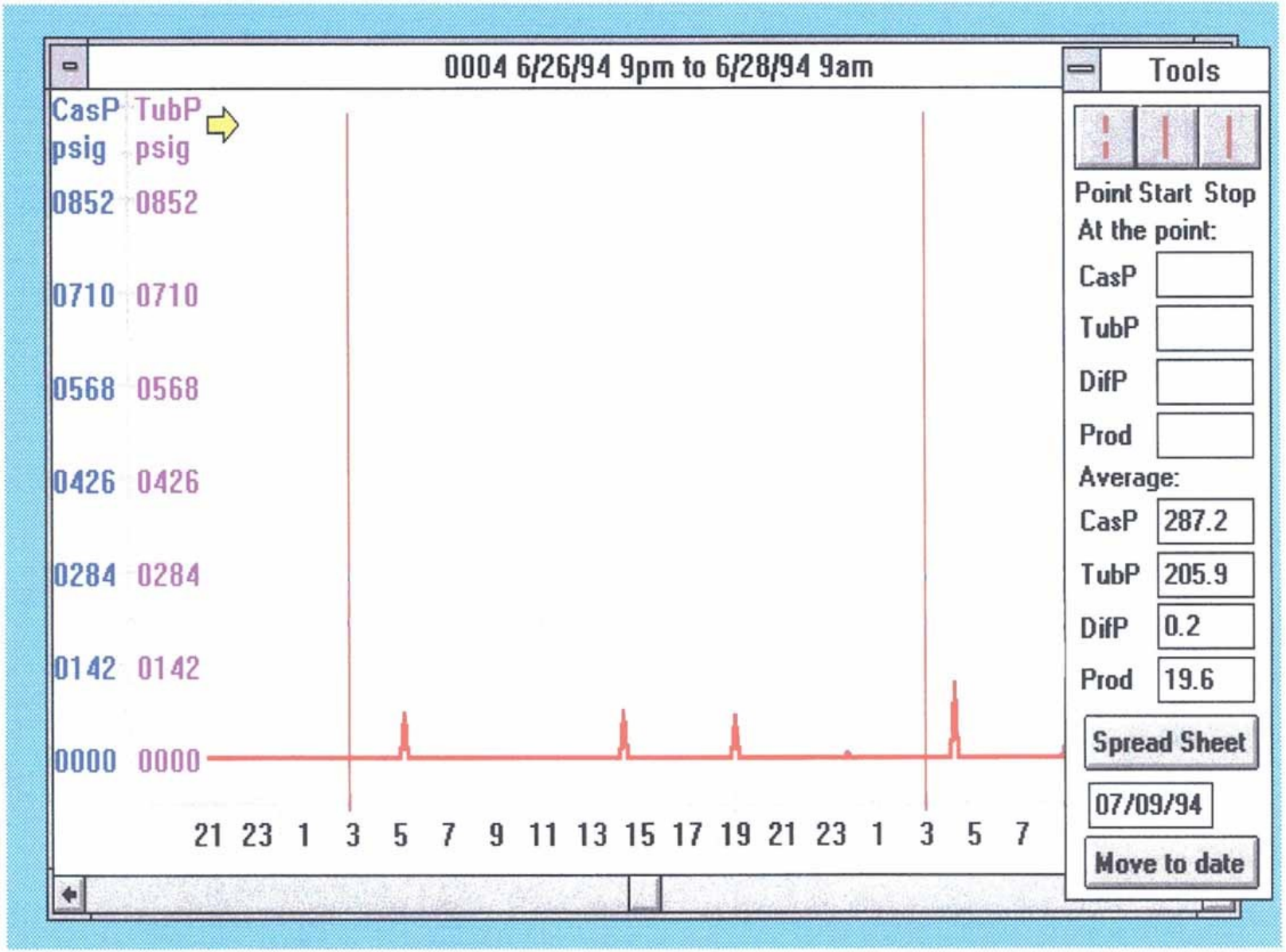
36-hr trend plotting of 3-minute average of one-second data
Liquid loaded gas well with plunger lift



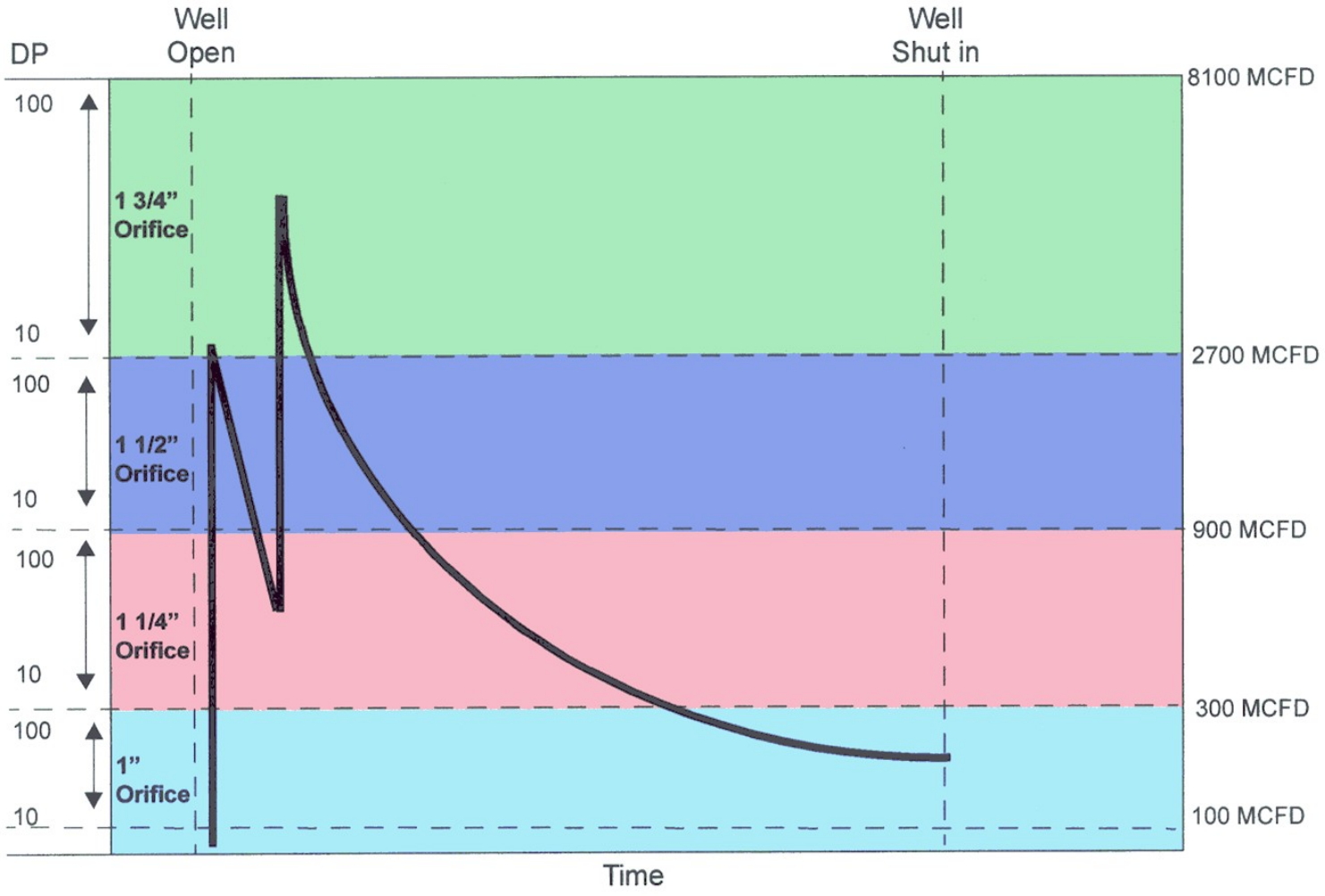
Trend analysis



Common detected trend data

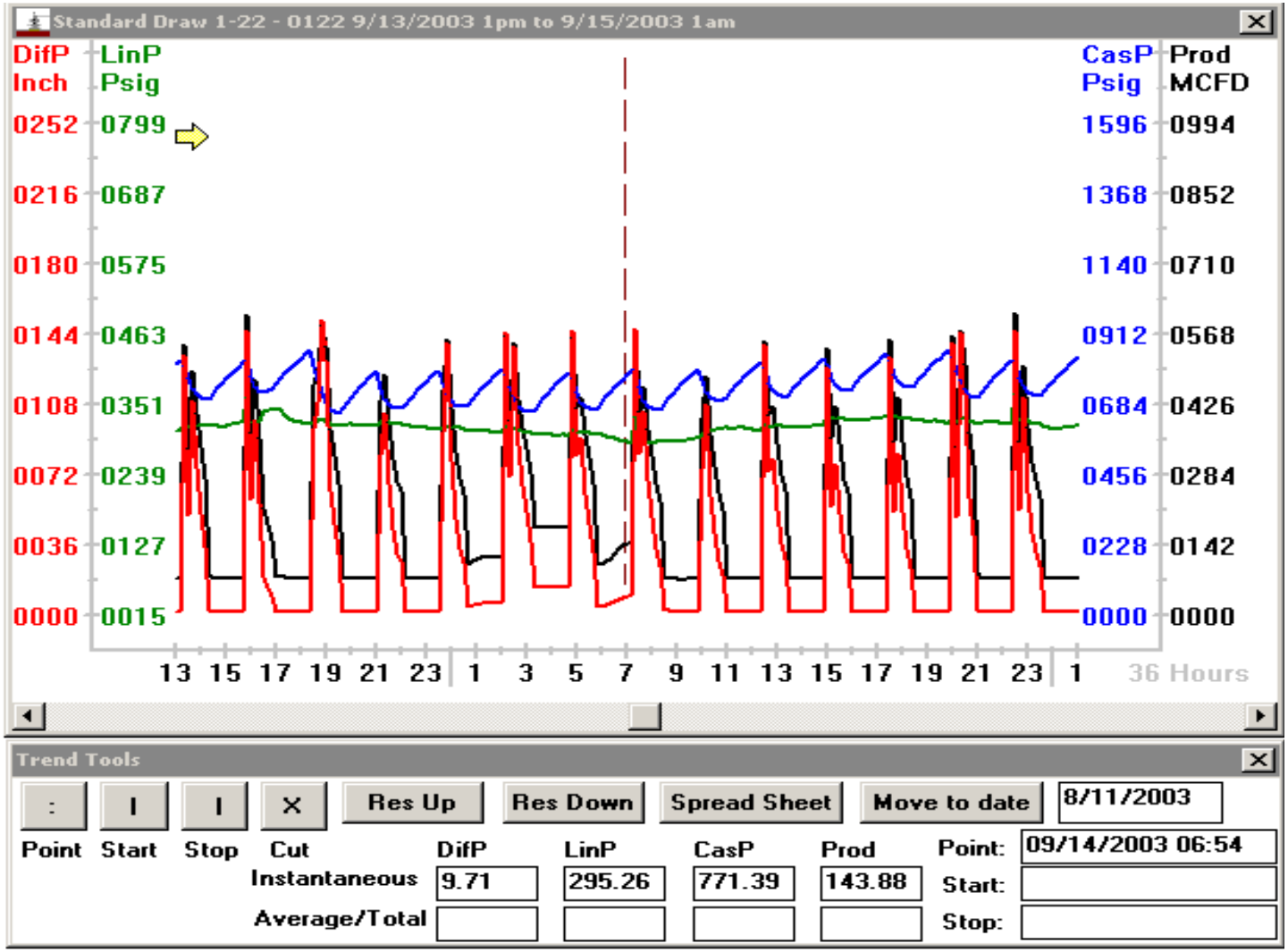


Analysis of the orifice meter with a 3-to-1 turndown ratio

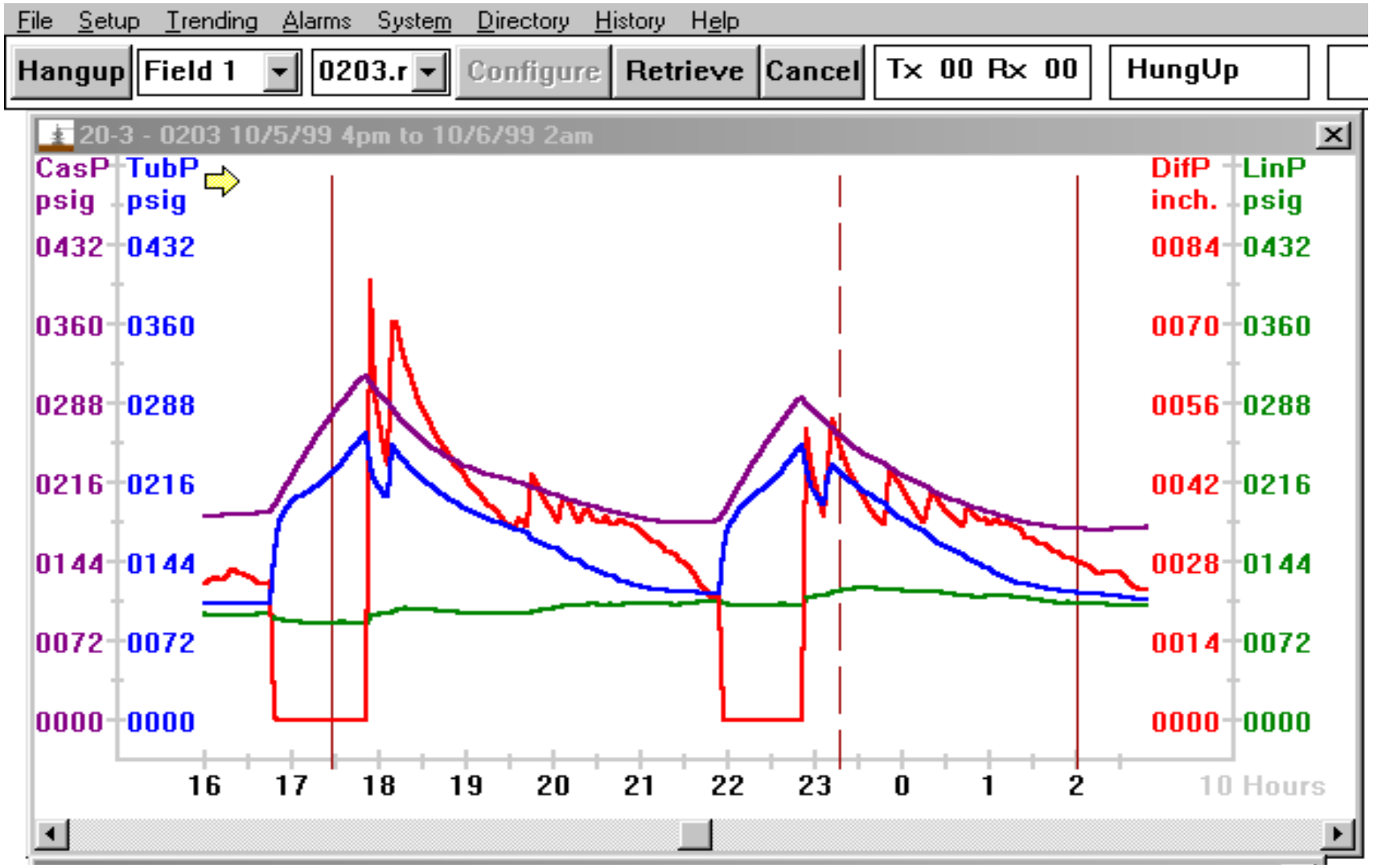


Note: Flow ranges are approximate and are shown to illustrate 3:1 turndown rations.

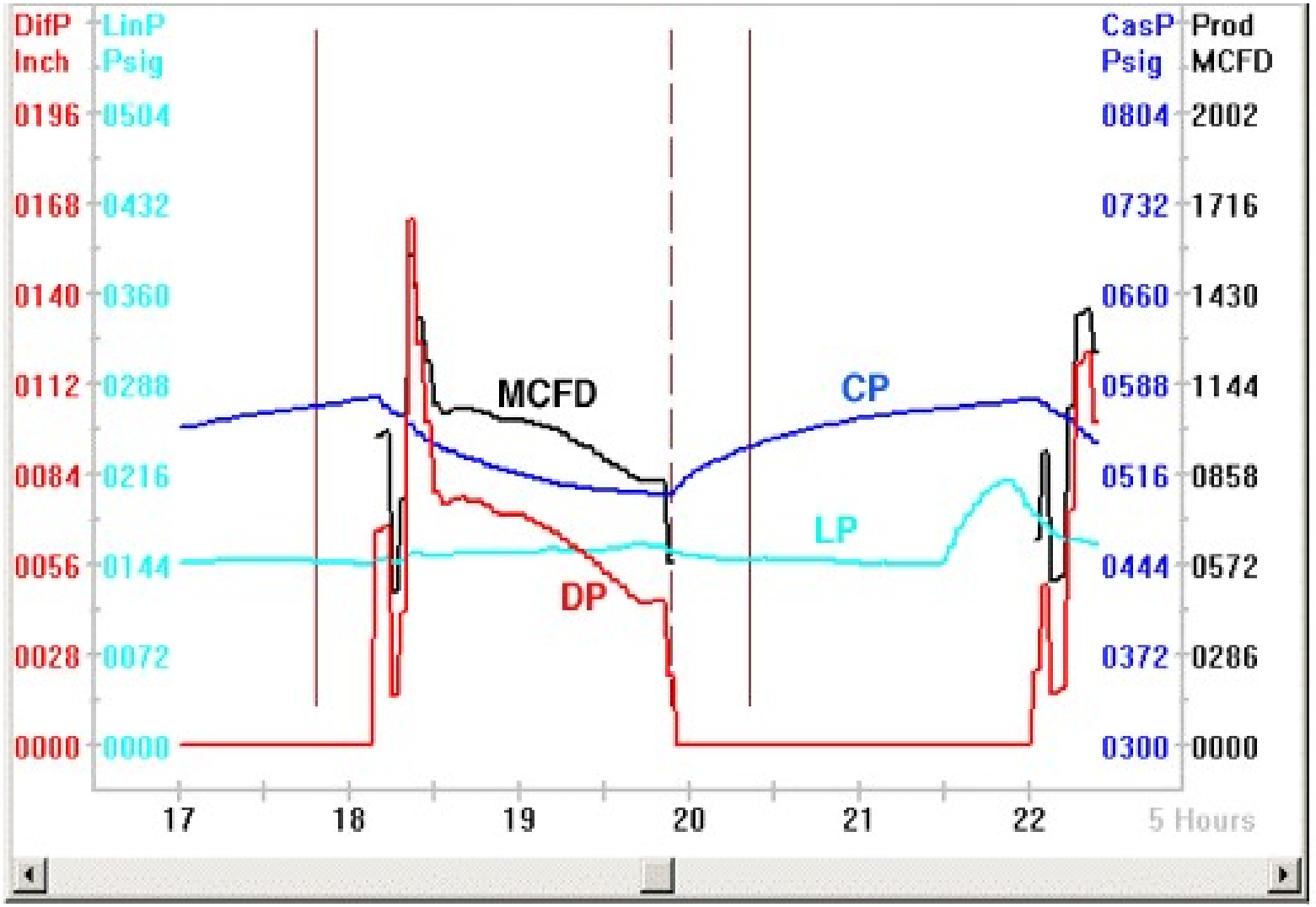
Zero shifting of differential pressure transducer



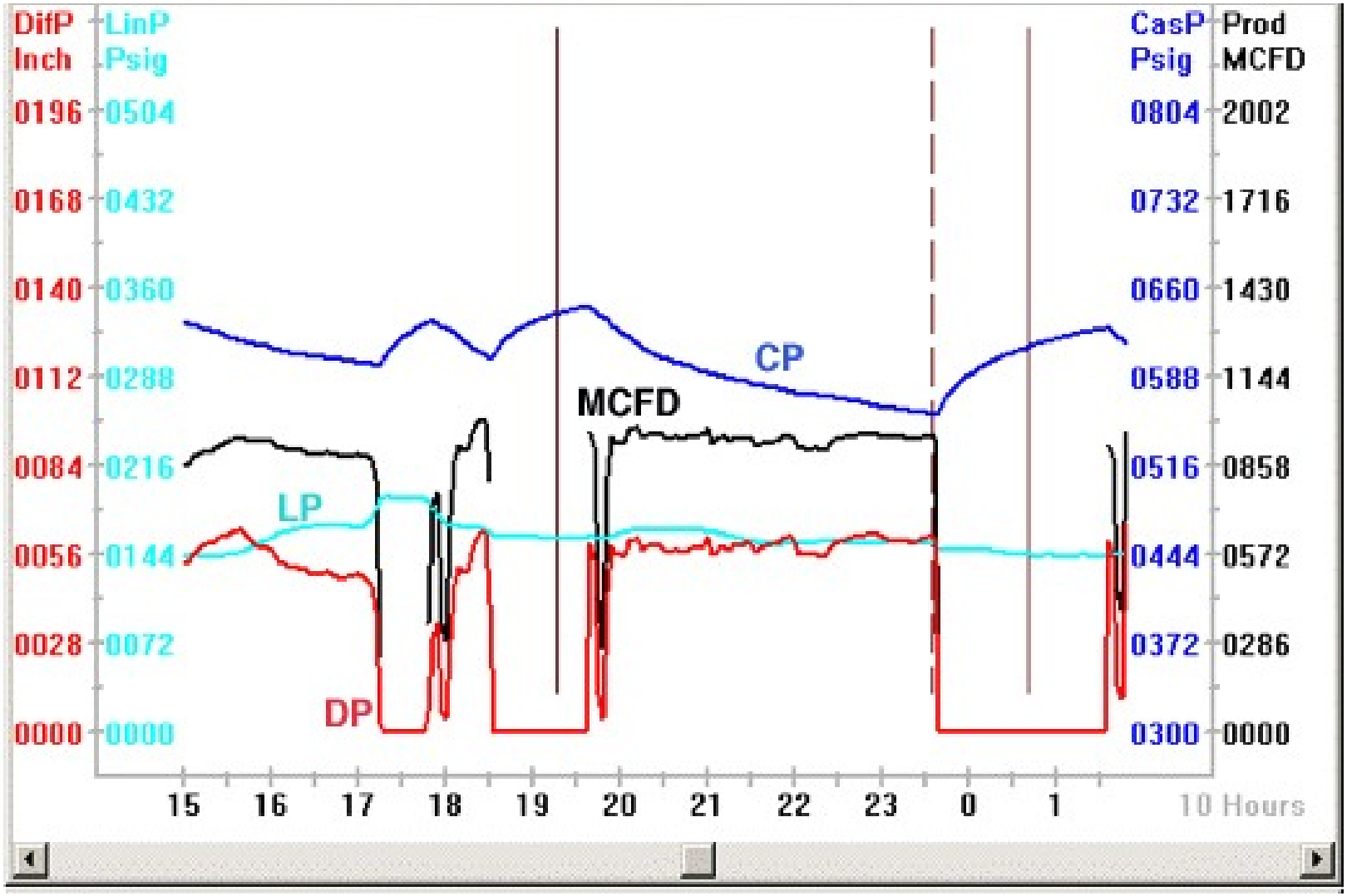
Early experiment with flow control



Production trend with no flow control

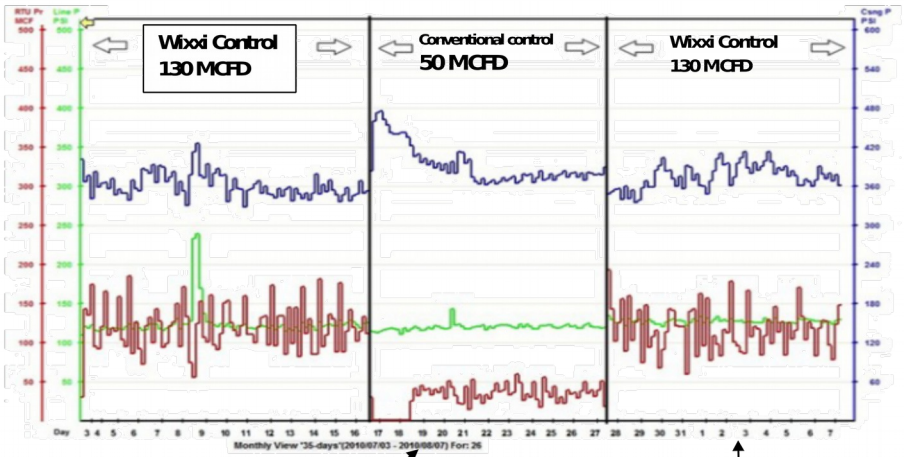


Production results with flow control

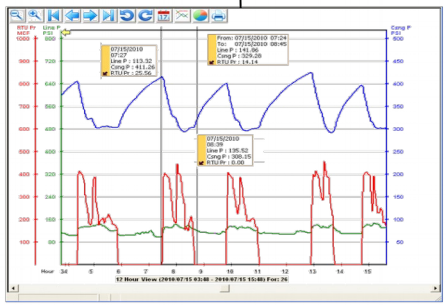


Testing a fully automated plunger controller against a conventional controller

Field test results, Wixxi plunger lift VS conventional plunger controller



Mark...will need to replace all the trend with your new one-second data



The opening and closing criteria of the conventional controller were manually adjusted on a daily basis.

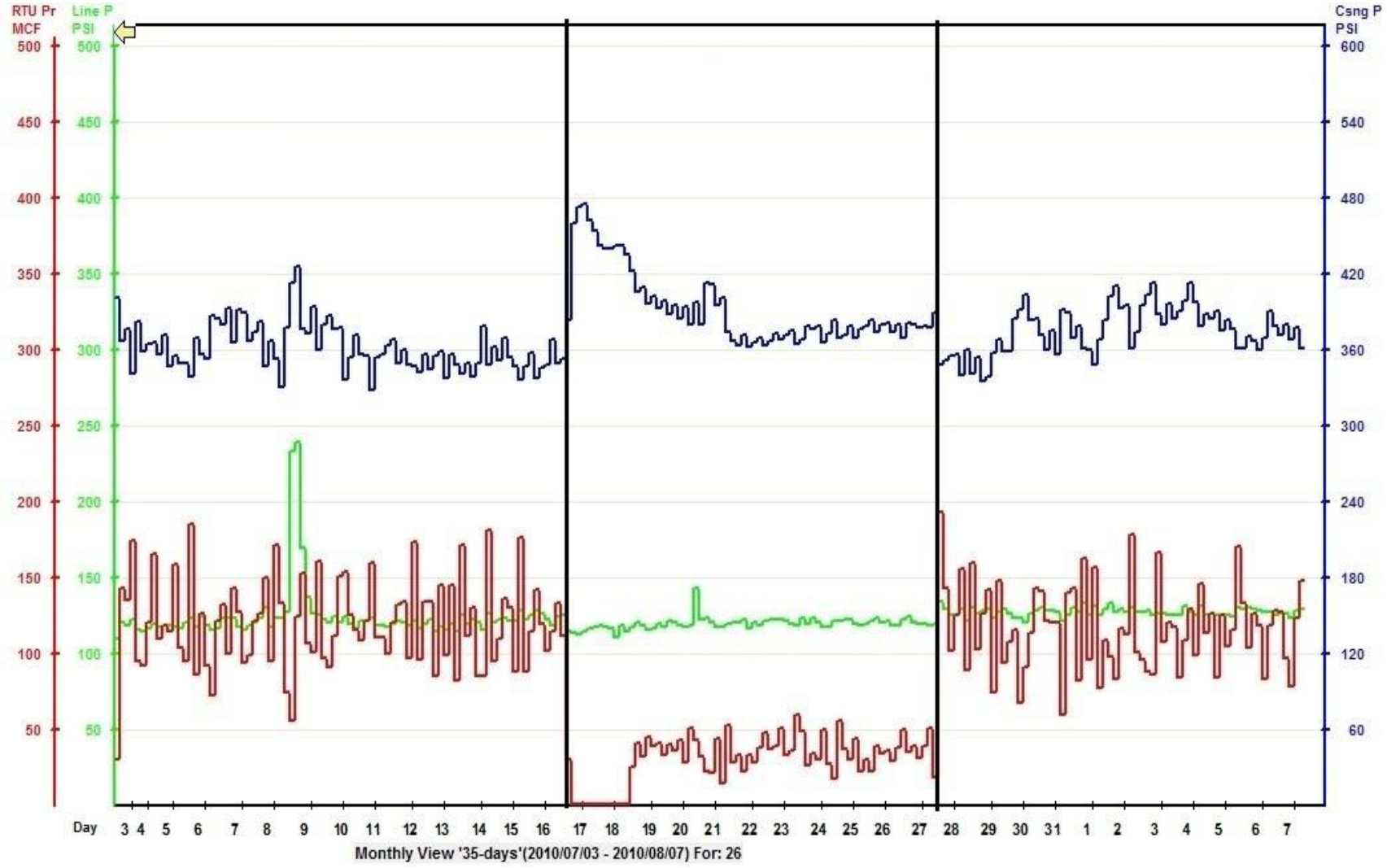
Average daily production = 50 MCFD

The opening and closing criteria of the Wixxi plunger controller are based on measured data of TP, CP, LP, and calculated flow rates.
Flow rates were constantly moderated to be within the measurable ranges.

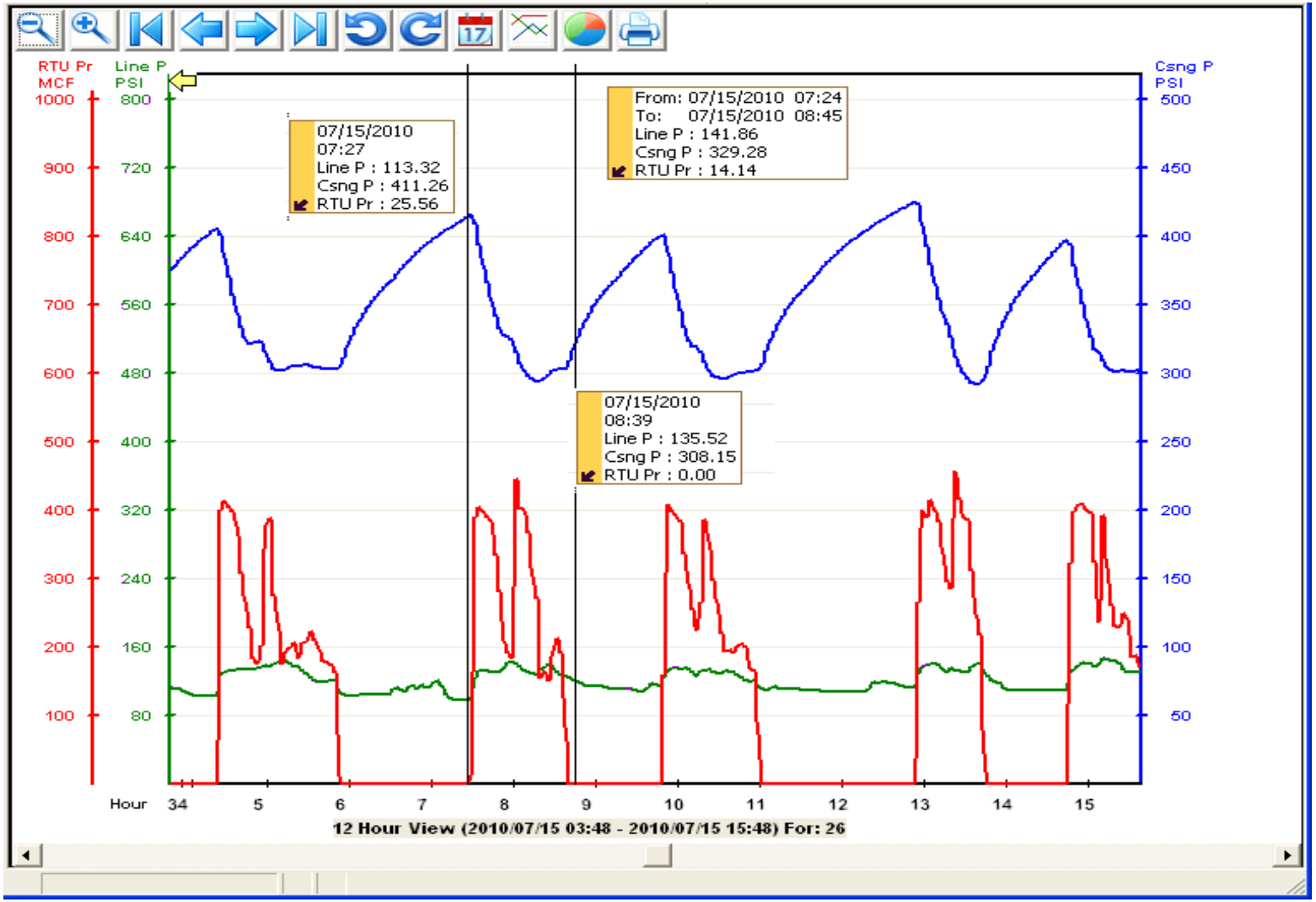
Average daily production = 130 MCFD

NO OPERATOR INPUT

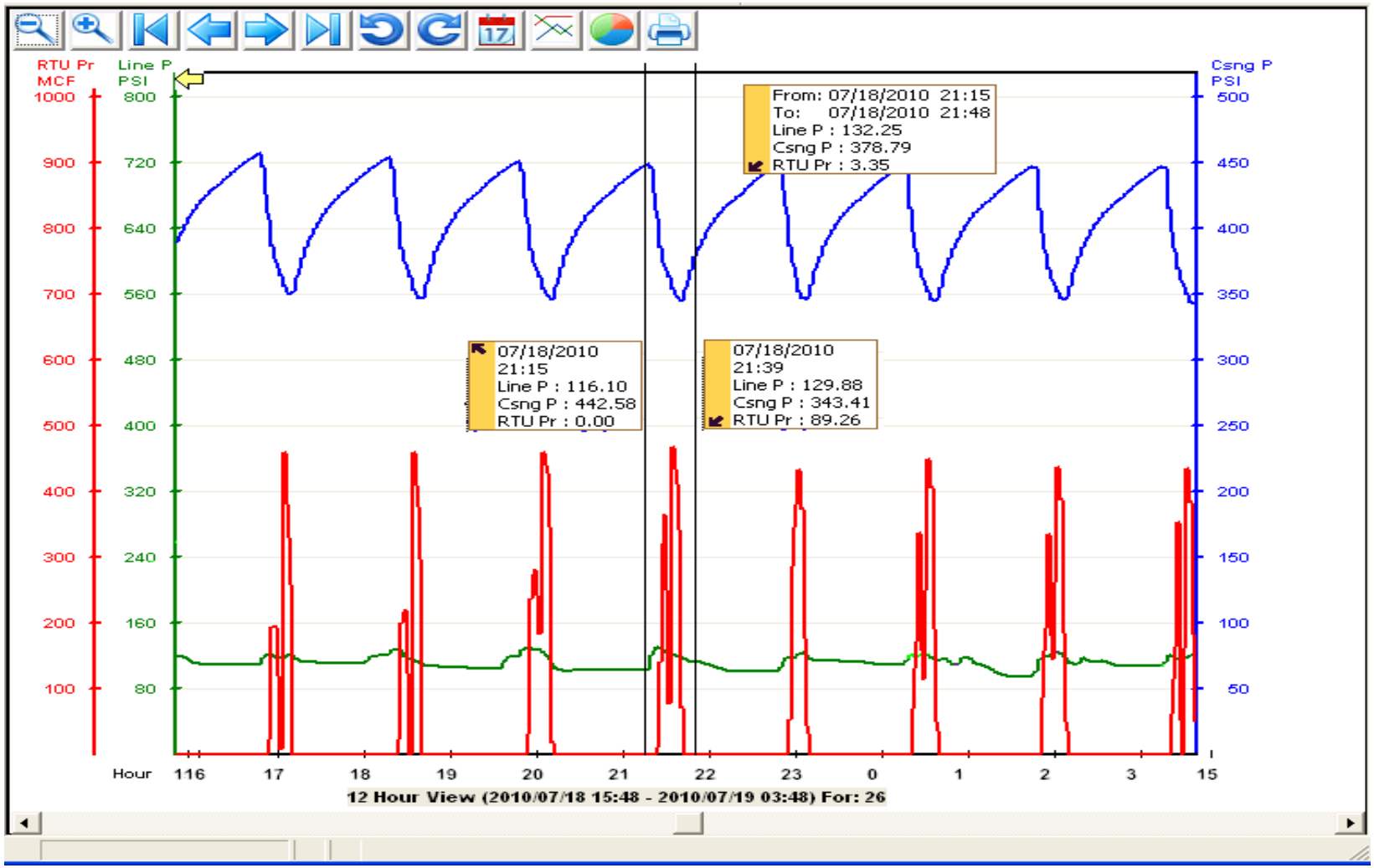
35 days plot of the test results (Cotton Valley Well)



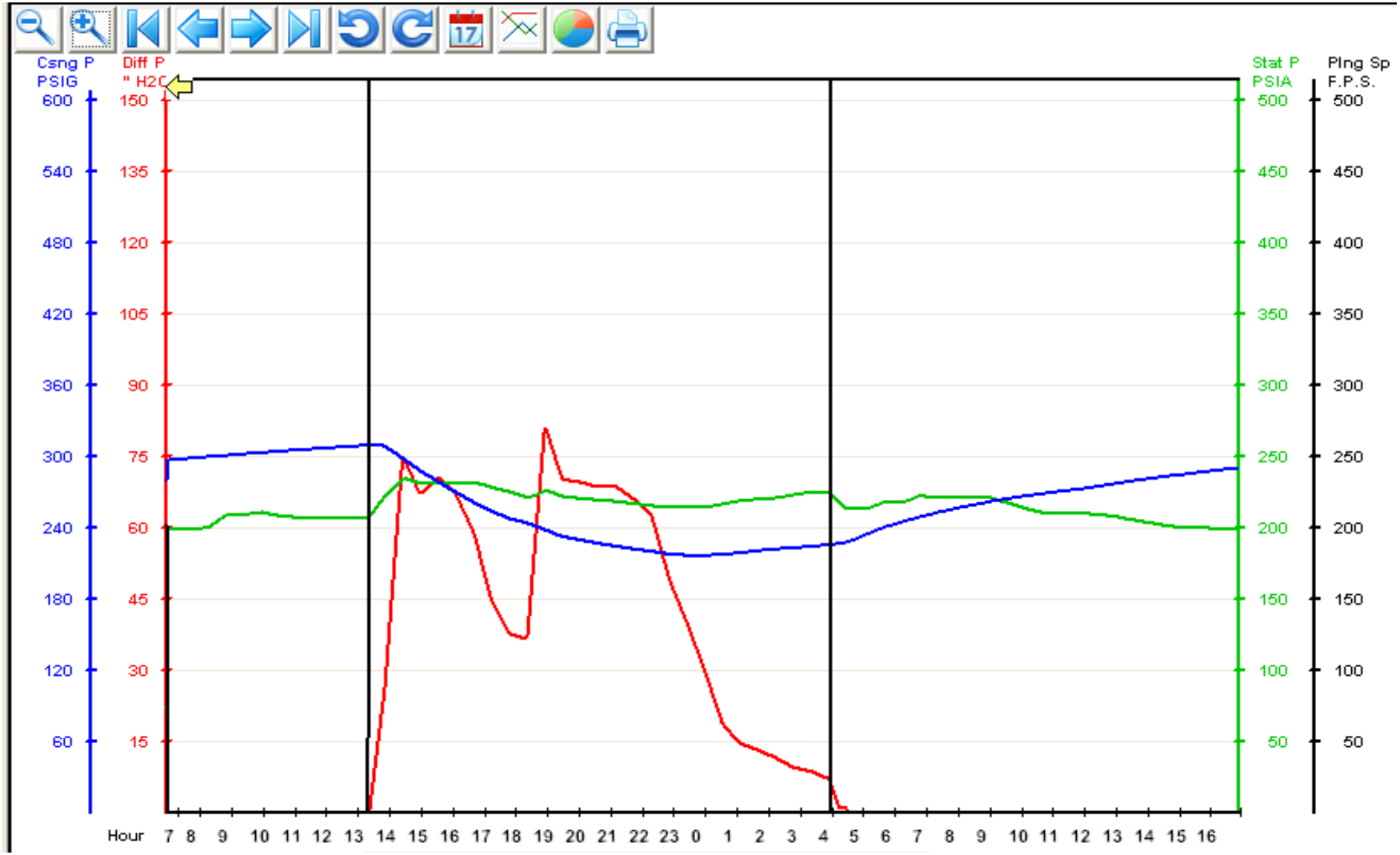
12-hour trend data of first and third test periods



Zoom-in 12-hour plot of trend data of second test period



Zoom-in to one-hour plot of second test period

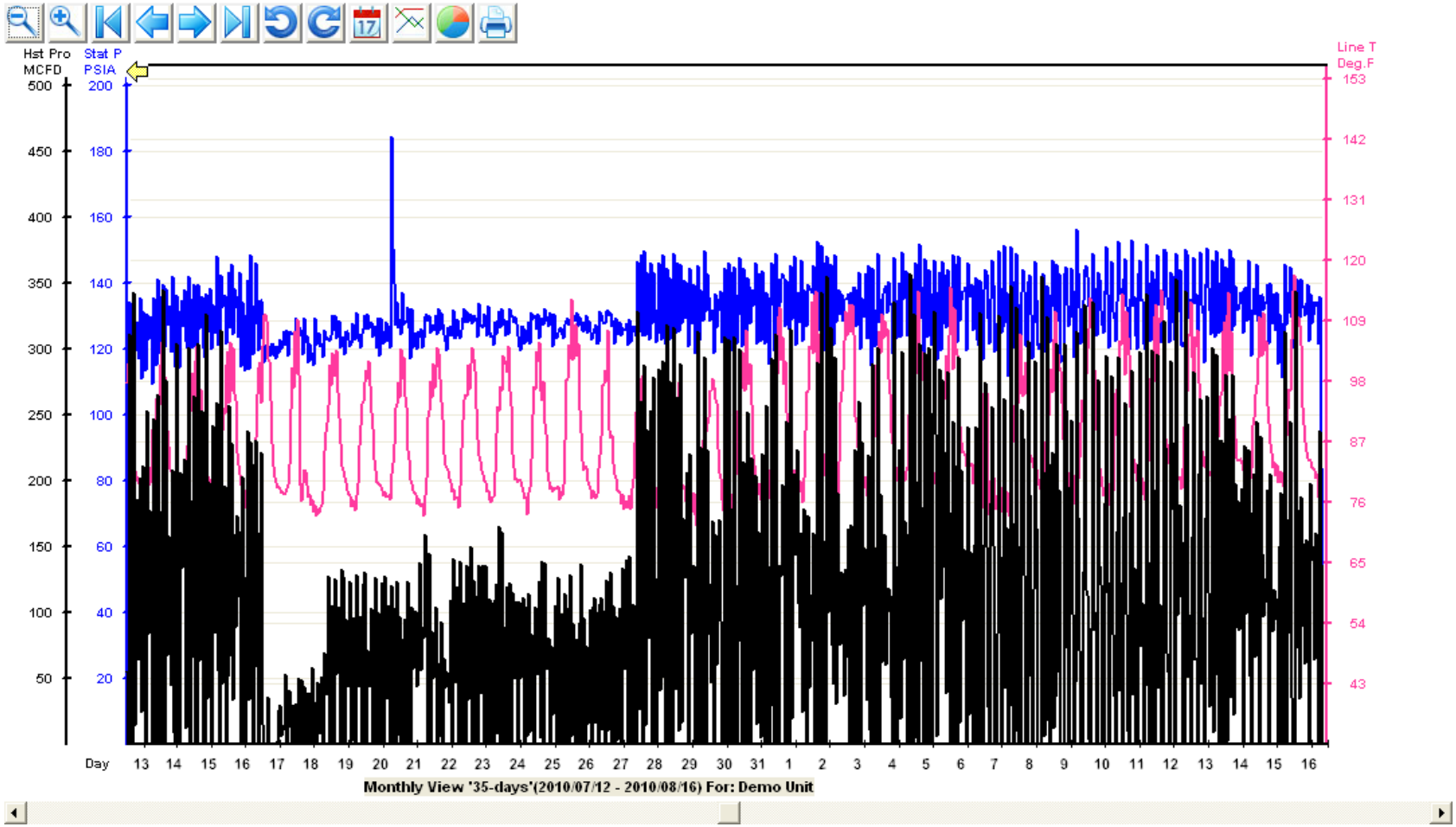


Reintegration results of rebuilding one-second data trend with the SBR method

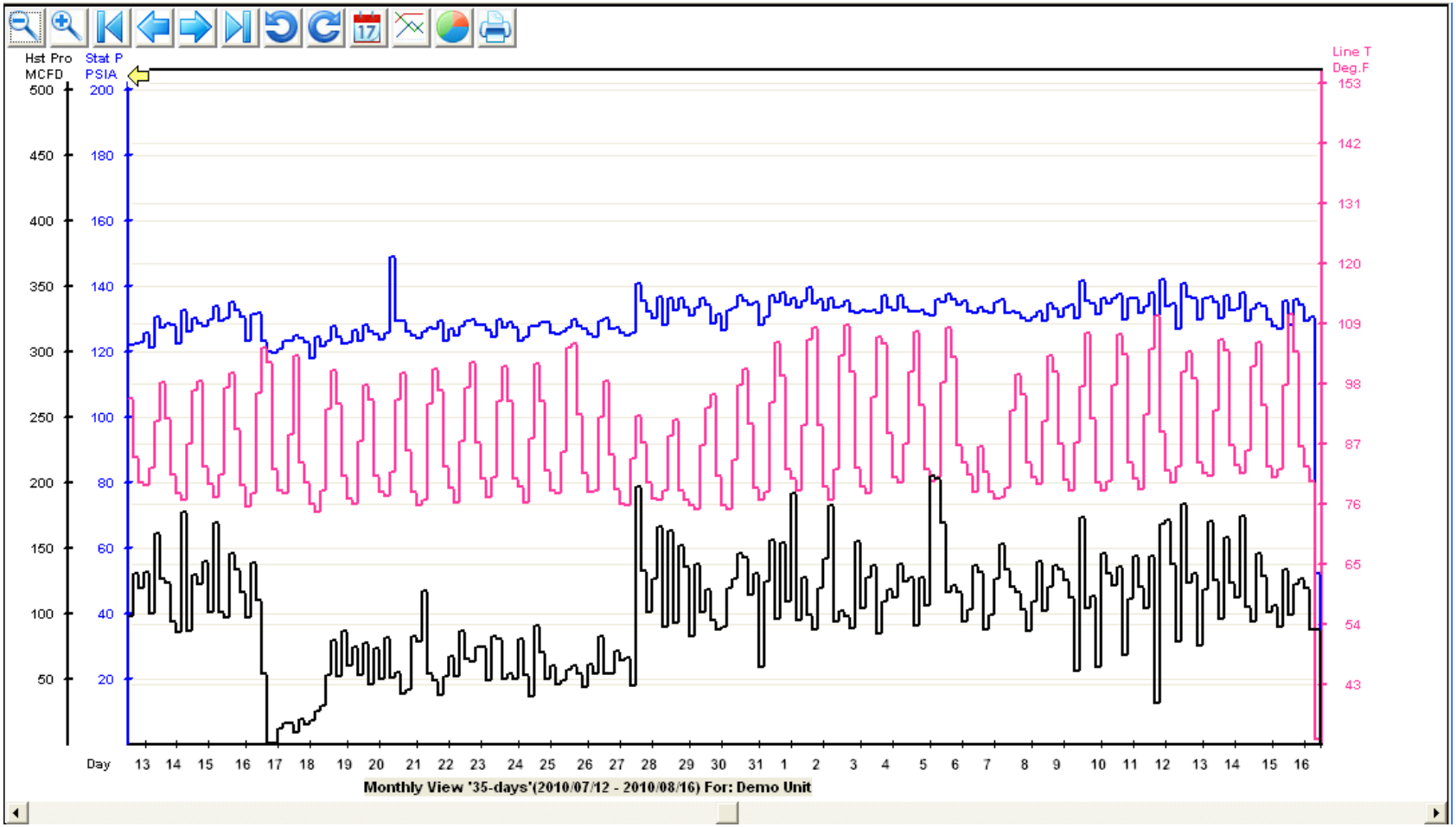
SBR = Successive Binary Redistribution

Flow character	Steady flow	Variable flow	Intermittent flow
% deviation 3 min. Avg. data	0.1%	3 % +	8% +
% deviation One-second data	0.1%	0.1%	0.1%

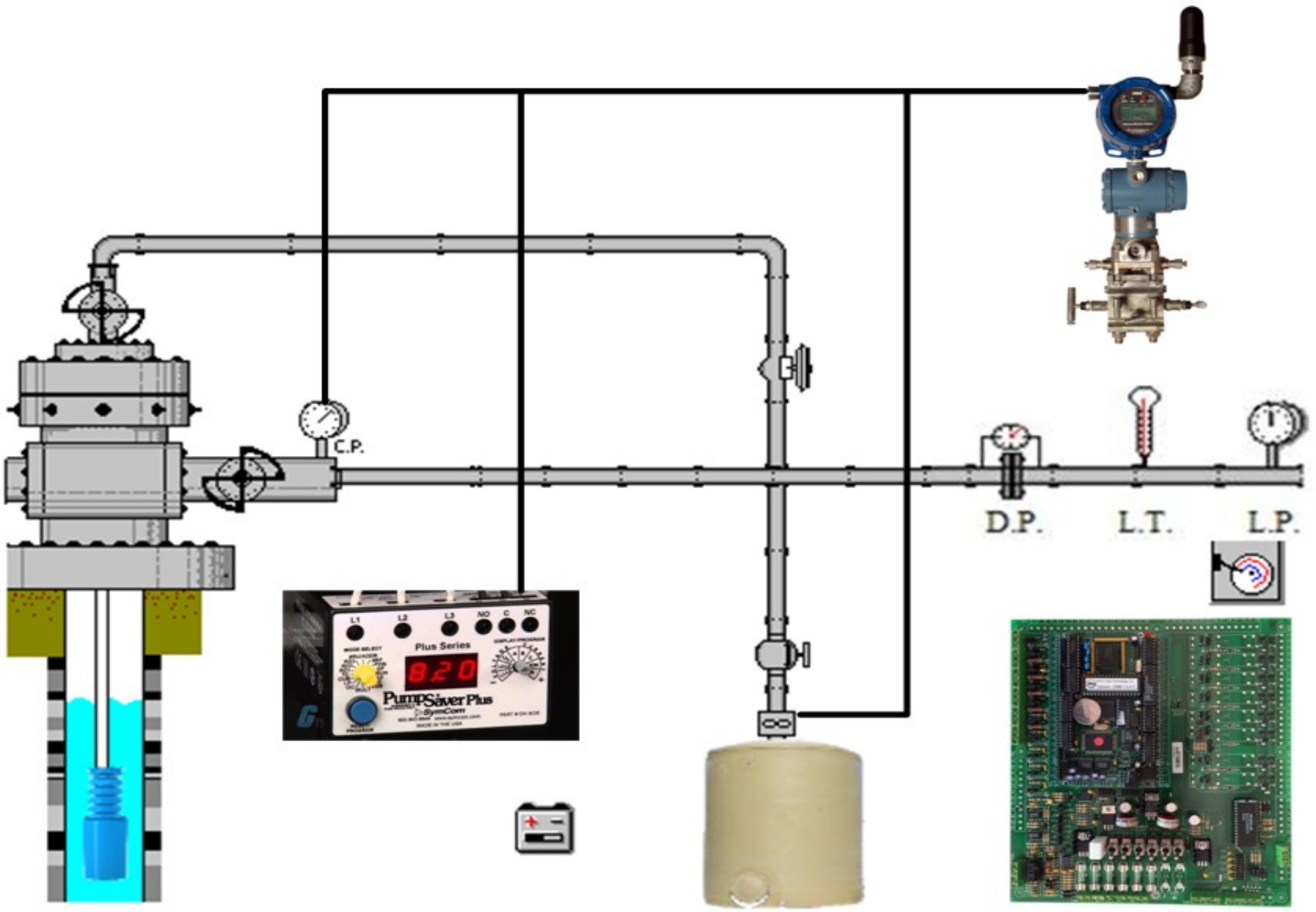
35-day plot of unfiltered 3-minute trend data



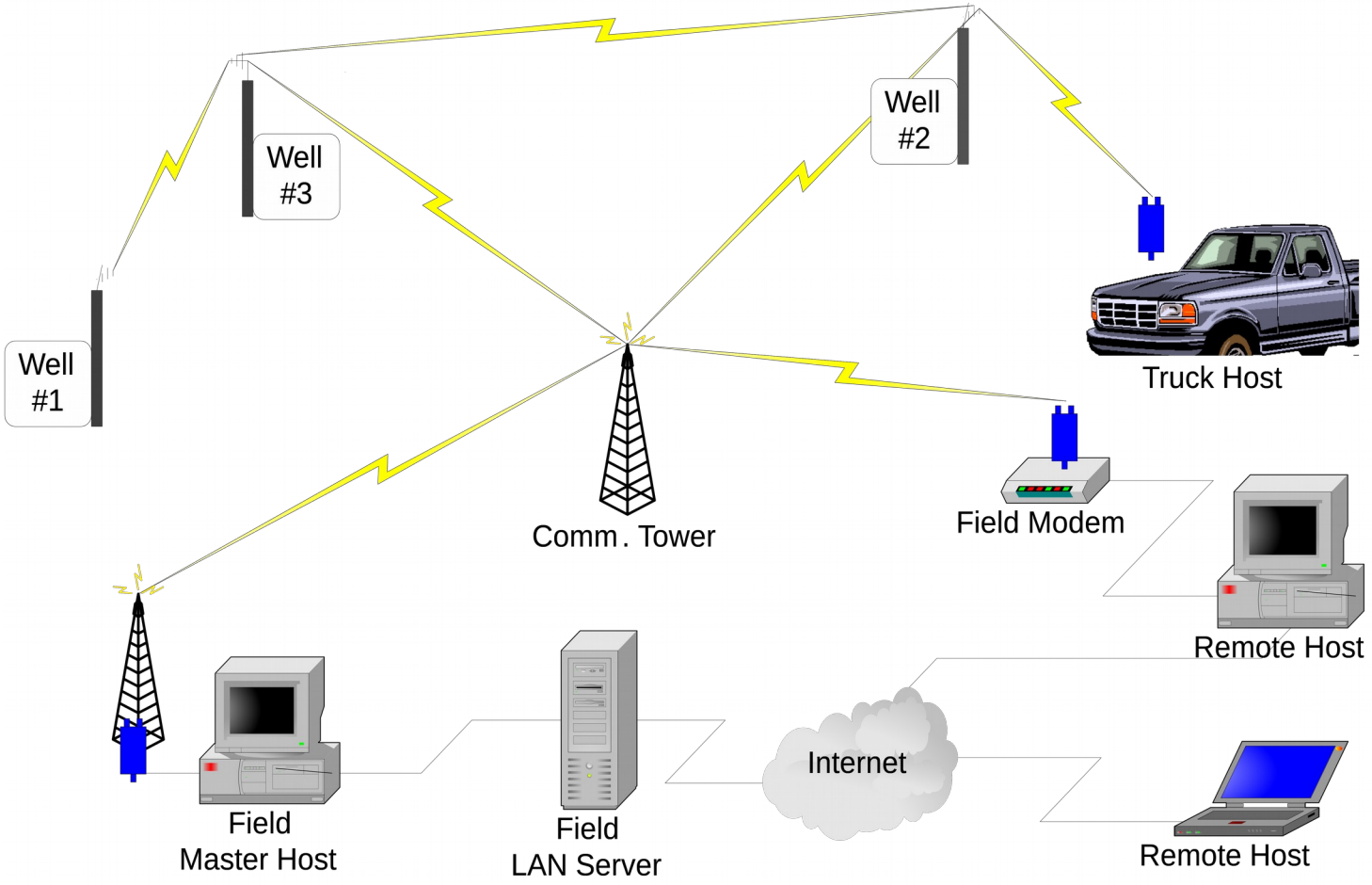
SBR for filtering technique



Distributive SCADA with discrete and smart end-devices



Patented Multi-Host Telemetry System



- **Acquire data from any well from any location without upgrading radio network.**
- **Move high resolution data in less time than Modbus or DNP3.**

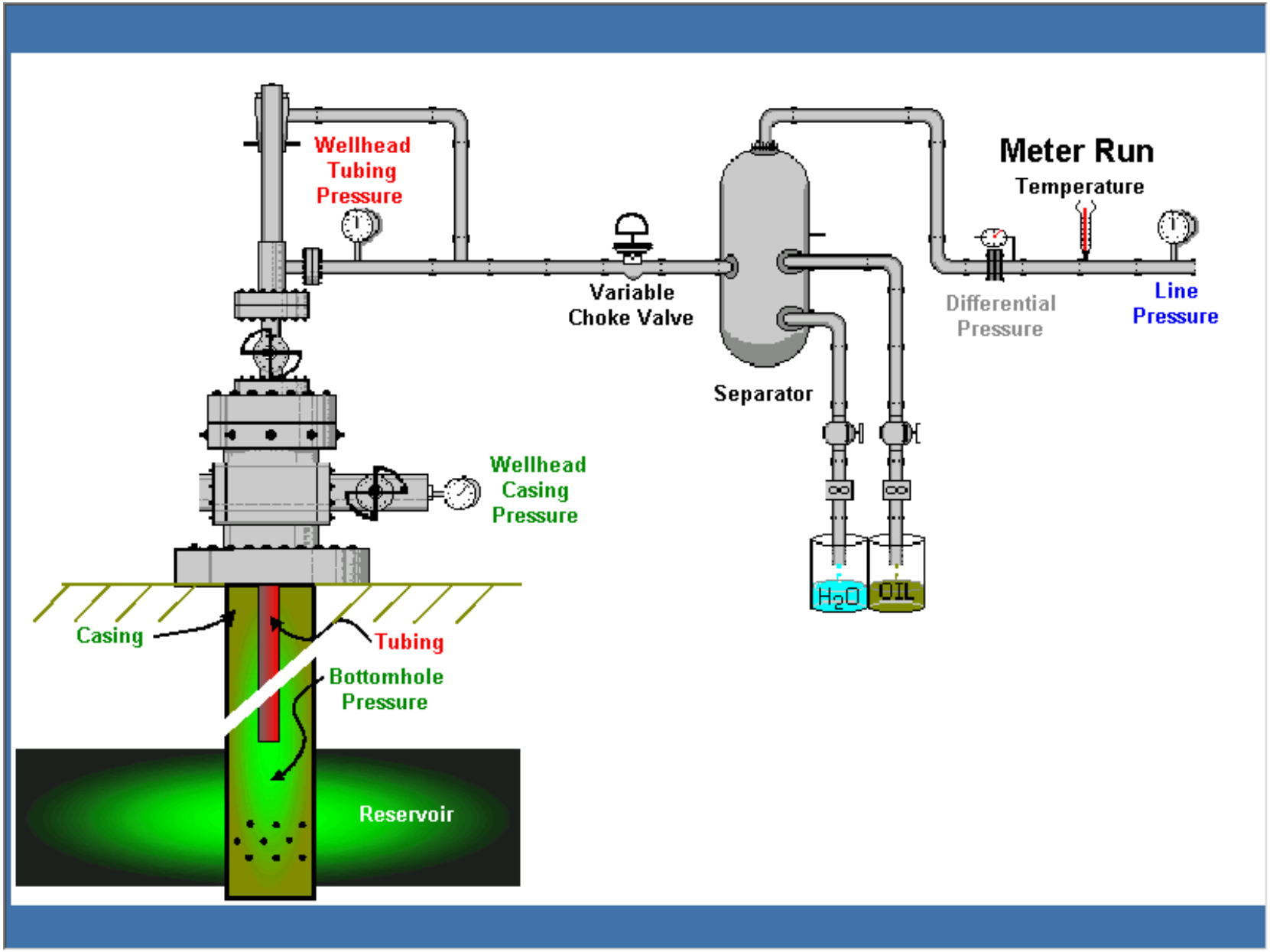
UWA, A compact wellhead SCADA or RTU that fits into a 5” dia. and 5” deep Class I Div I enclosure

- **I/O specifications:**
- **6 analog/digital inputs (0-5V, 4-20 ma)**
- **2 single-ended or bipolar pulse inputs**
- **4 digital FET outputs (0.5 amp. @ 12 V)**
- **1 RS-485 serial port**
- **1 build-in LAN radio**
- **2 RS-232 serial ports**

Functional features

One device fits all concept

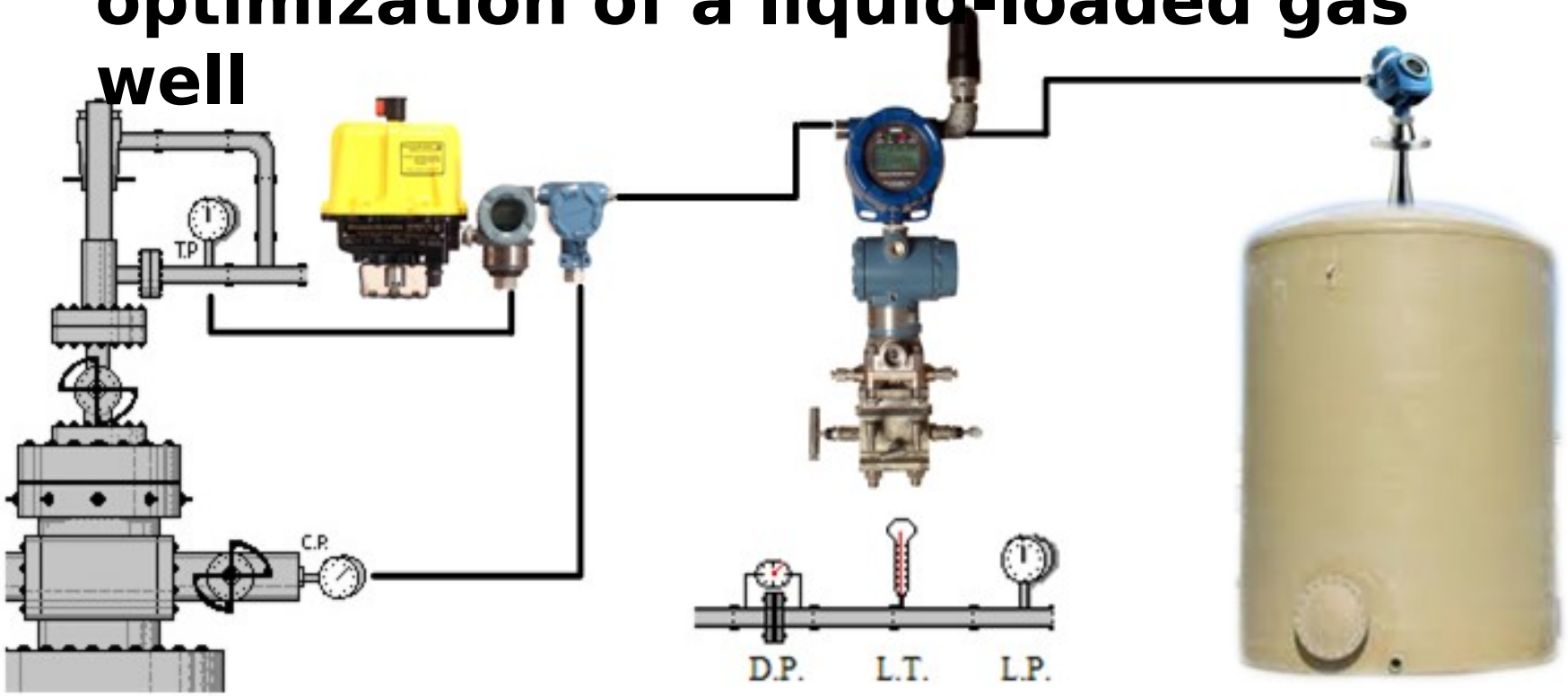
- **One-second data logger**
- **Gas, oil, and water measurement**
- **Programmable controller**
- **Telemetric communication**
- **Wired and wireless (LAN) connectivity with discrete and smart MODBUS devices**


Wellhead
Tubing
Pressure
Variable
Choke Valve
Separator
Meter Run
Temperature
Differential
Pressure
Line
Pressure
Wellhead
Casing
Pressure
Casing
Tubing
Bottomhole
Pressure
Reservoir
H2O
OIL

UWA as a standalone EFM and a one-second data logger with one-second data reconcilable audit-trail

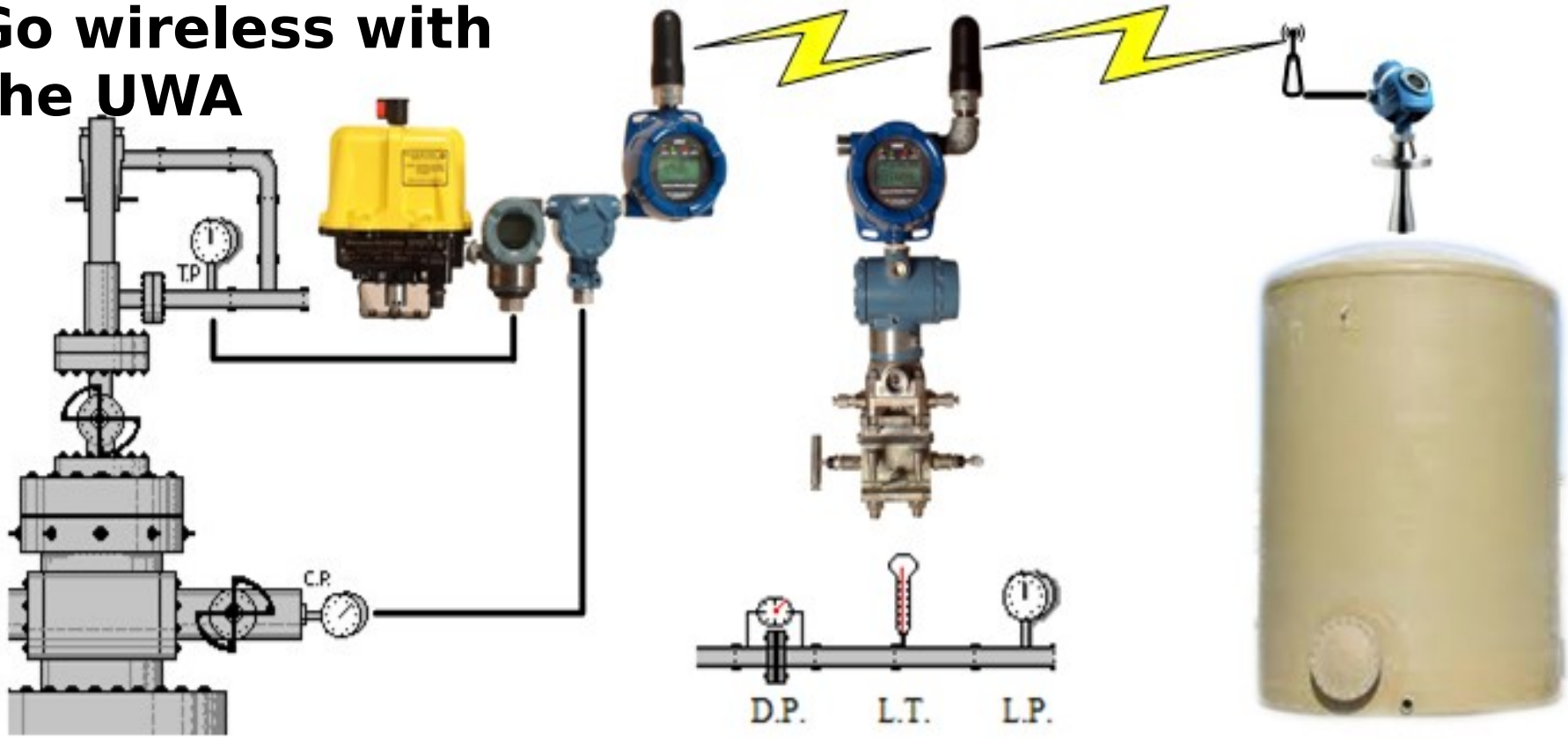
Flow character	Steady flow	Variable flow	Intermittent flow
% deviation Avg. Hourly data	0.1%	3 % +	30% +
% deviation One-second	0.1%	0.1%	0.1%

Complete measurement and control-optimization of a liquid-loaded gas well



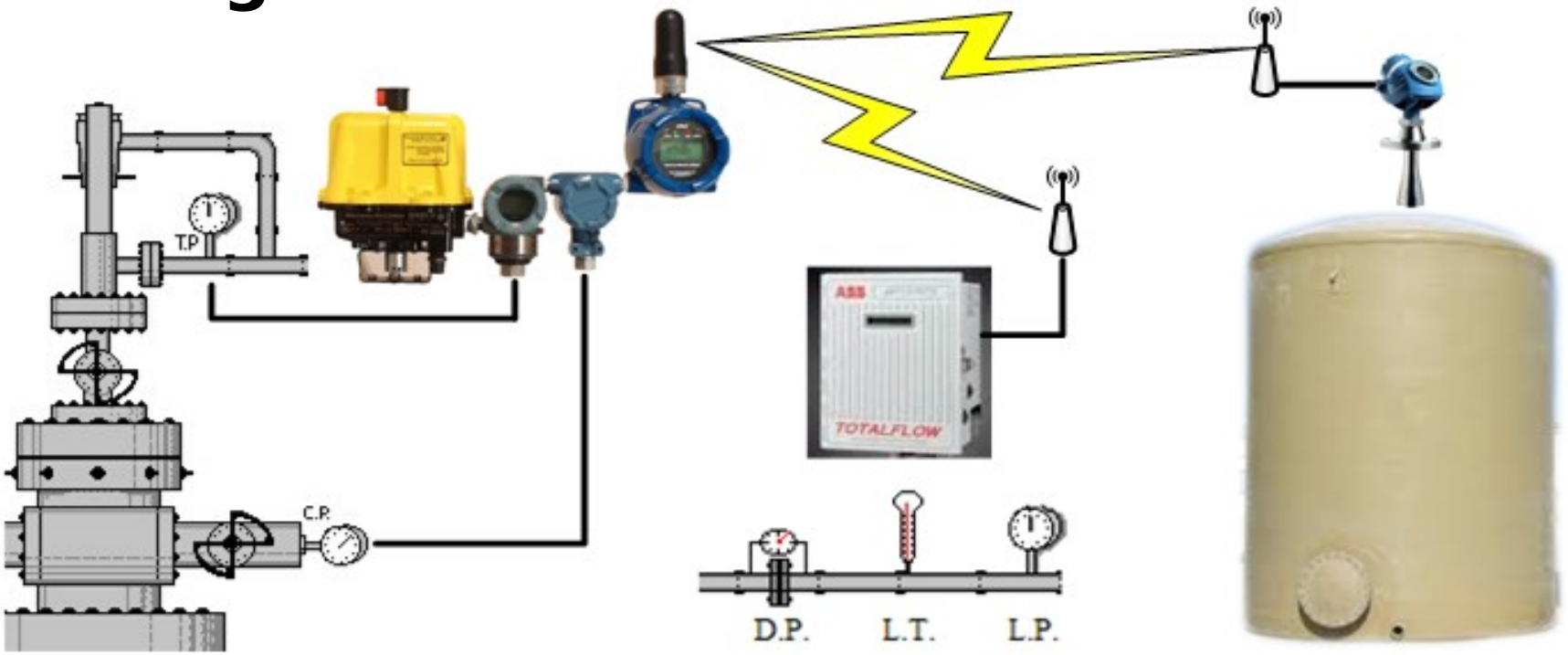
- EFM
- Auto-cycle and flow modulation
- One-second data logger of DP, P, T, CP, TP, Tank Level

Go wireless with the UWA

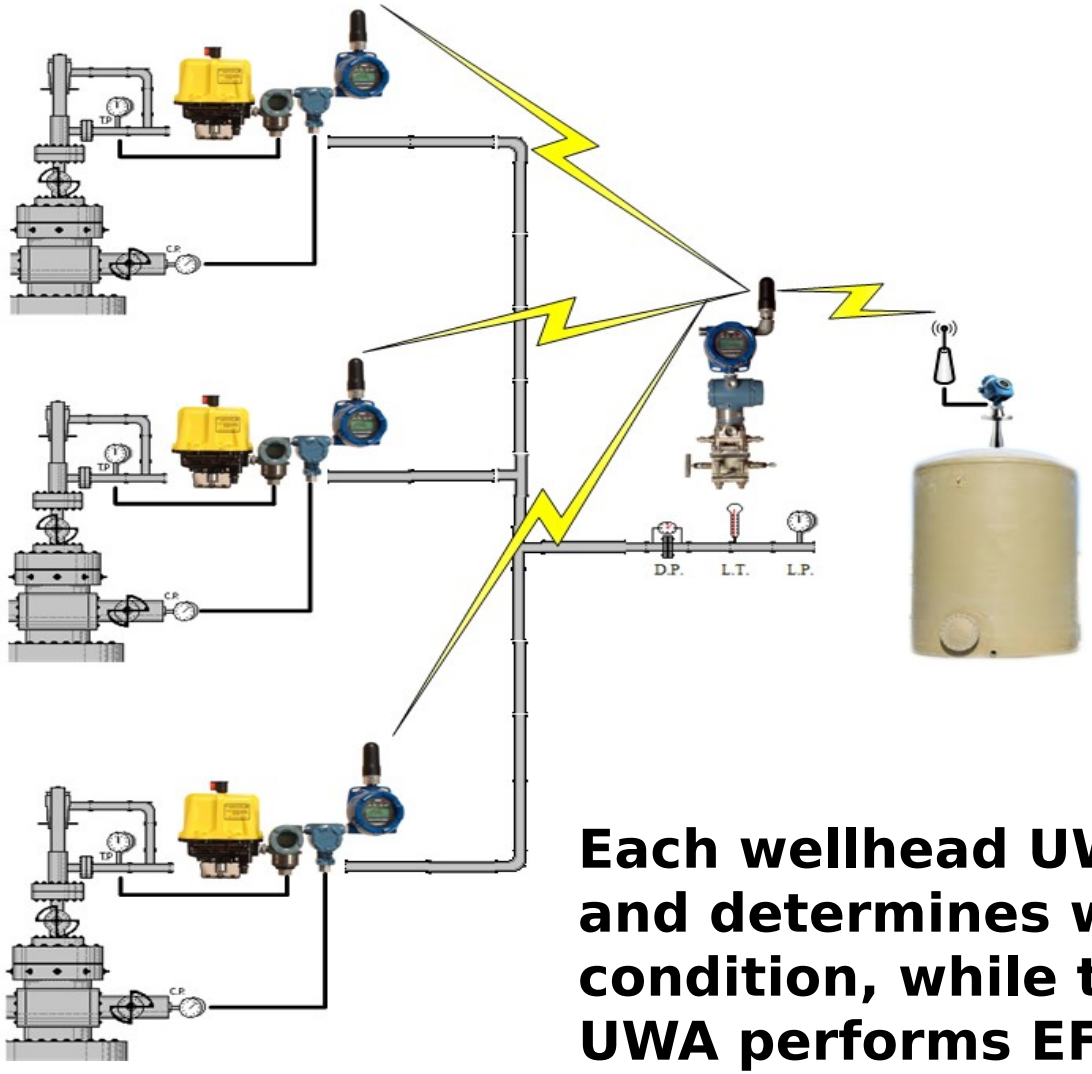


…where distance separating the wellhead, metering station, and tank location are impractical for hardwire installation, the above wireless connectivity (LAN) and Wixxi

Integrate with existing EFM



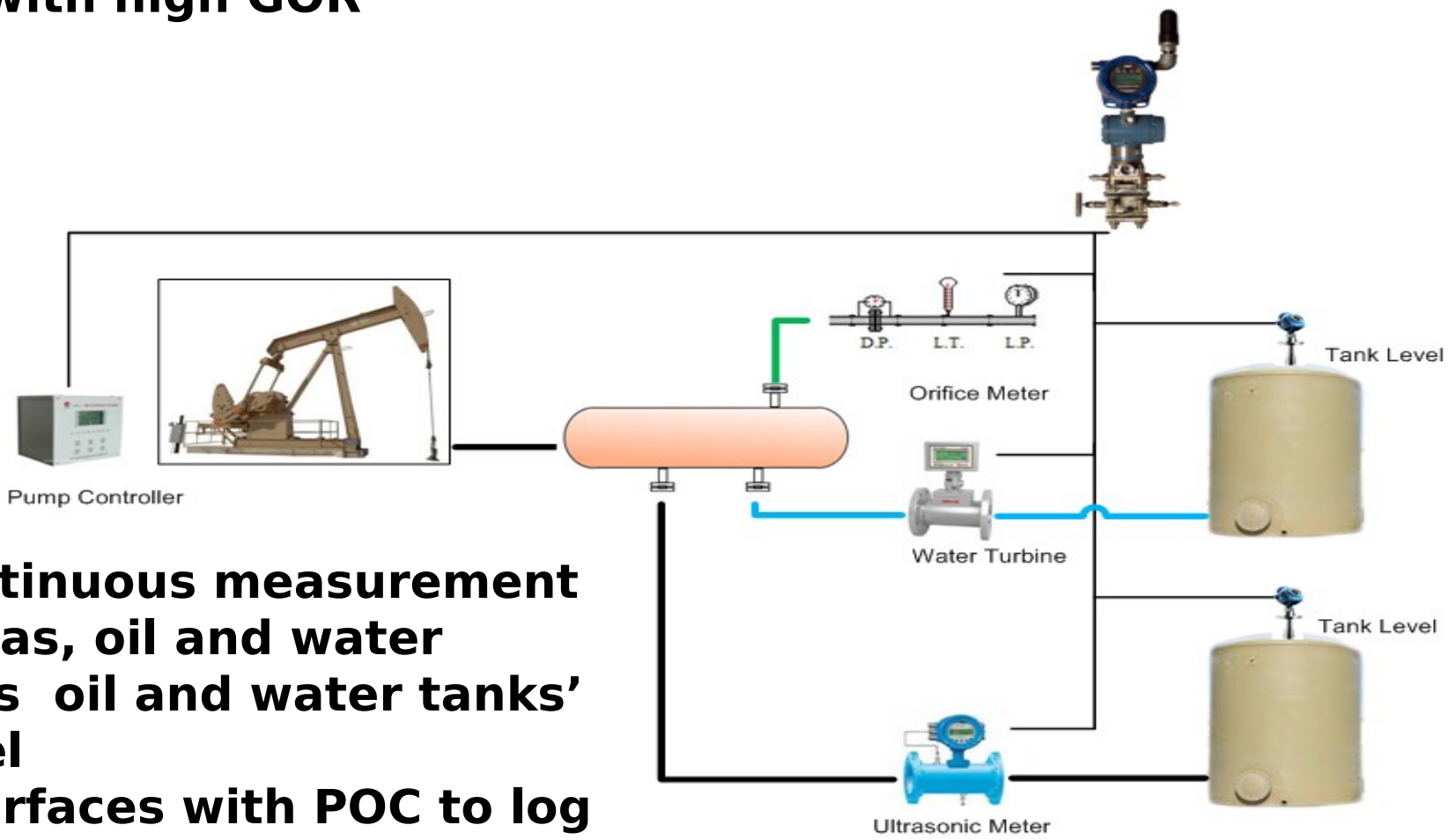
Install a UWA deliquification system to optimize production and upgrade the existing EFM to provide reconcilable one-second data audit-trail and analytical quality data. Wixxi's control of flow within the measurable ranges eliminates measurement slippage, enhances measurement accuracy, and optimizes production



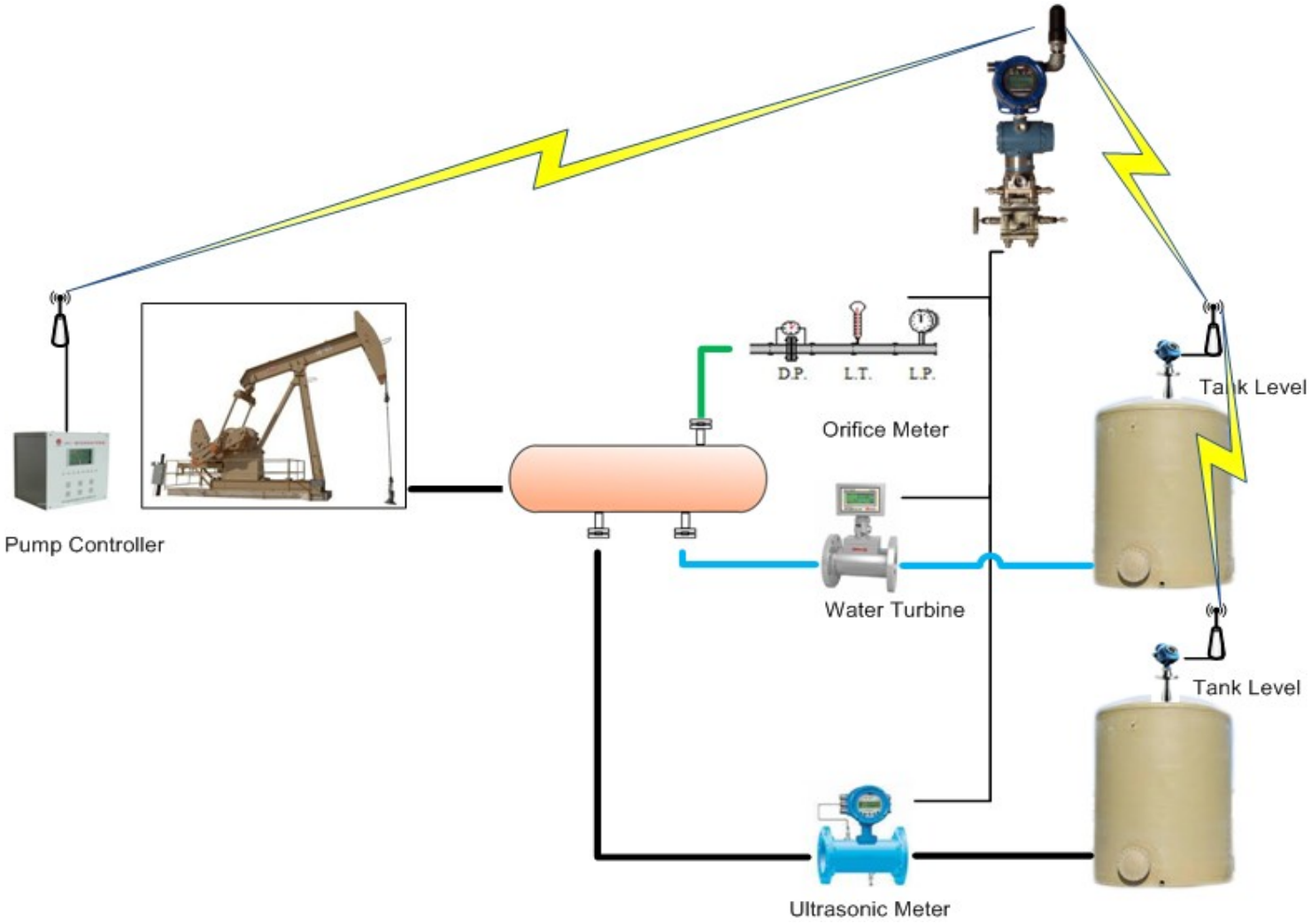
Multiple-liquid loaded Wells Sharing a Single Meter Station and Tank Facility.

Each wellhead UWA logs TP&CP and determines well opening condition, while the meter station UWA performs EFM and flow modulation, schedules well on-line, and logs the tank level.

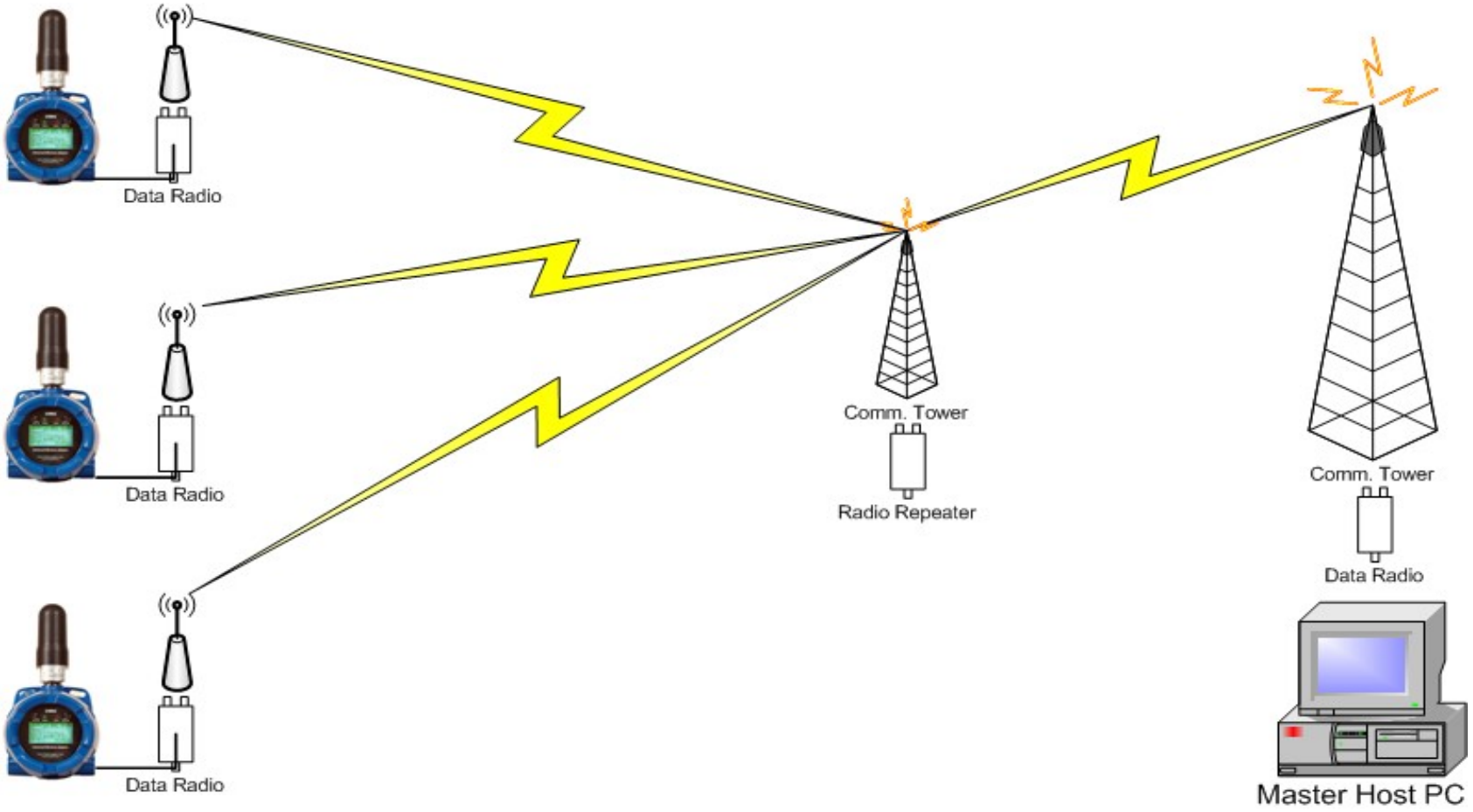
UWA, complete automation of oil well with high GOR



Continuous measurement of gas, oil and water
Logs oil and water tanks' level
Interfaces with POC to log dyno-card and pump operating conditions



Wireless option for oil well production measurement and control



Full duplex data communication between the central host PC and field UWAs can be wirelessly achieved per the above WAN connectivity using common spread spectrum radio.

Summary of Wixxi value propositions

- SCADA with one-second data logger
- Compact Class I Div I enclosure
- One device fits all
- Wireless option with distributed architect and token passing control
- EFM with one-second data audit-trail
- Patented trend data decompression technique with better than 200 to 1 ratio
- Analytical quality data with one-second resolution
- Plunger lift controller with flow control and no user input

Valuation of one-second analytical quality data

- **Reconcilable audit-trail for off-site gas flow re-integration**
- **Visual inspection for correct sizing of orifice plate**
- **Tracking and providing audit-trail for zero and off range instrument shift**
- **High resolution analytical quality trend profiles with zoom-in and out option**