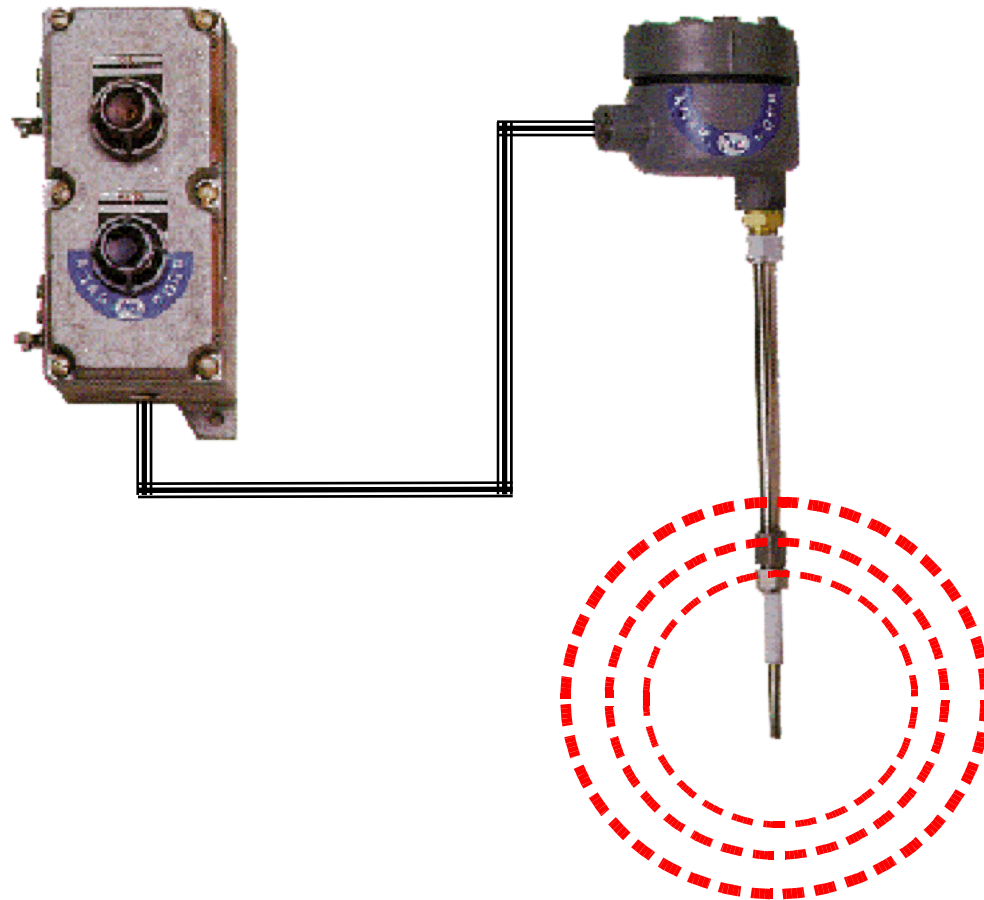


AGAR CORPORATION

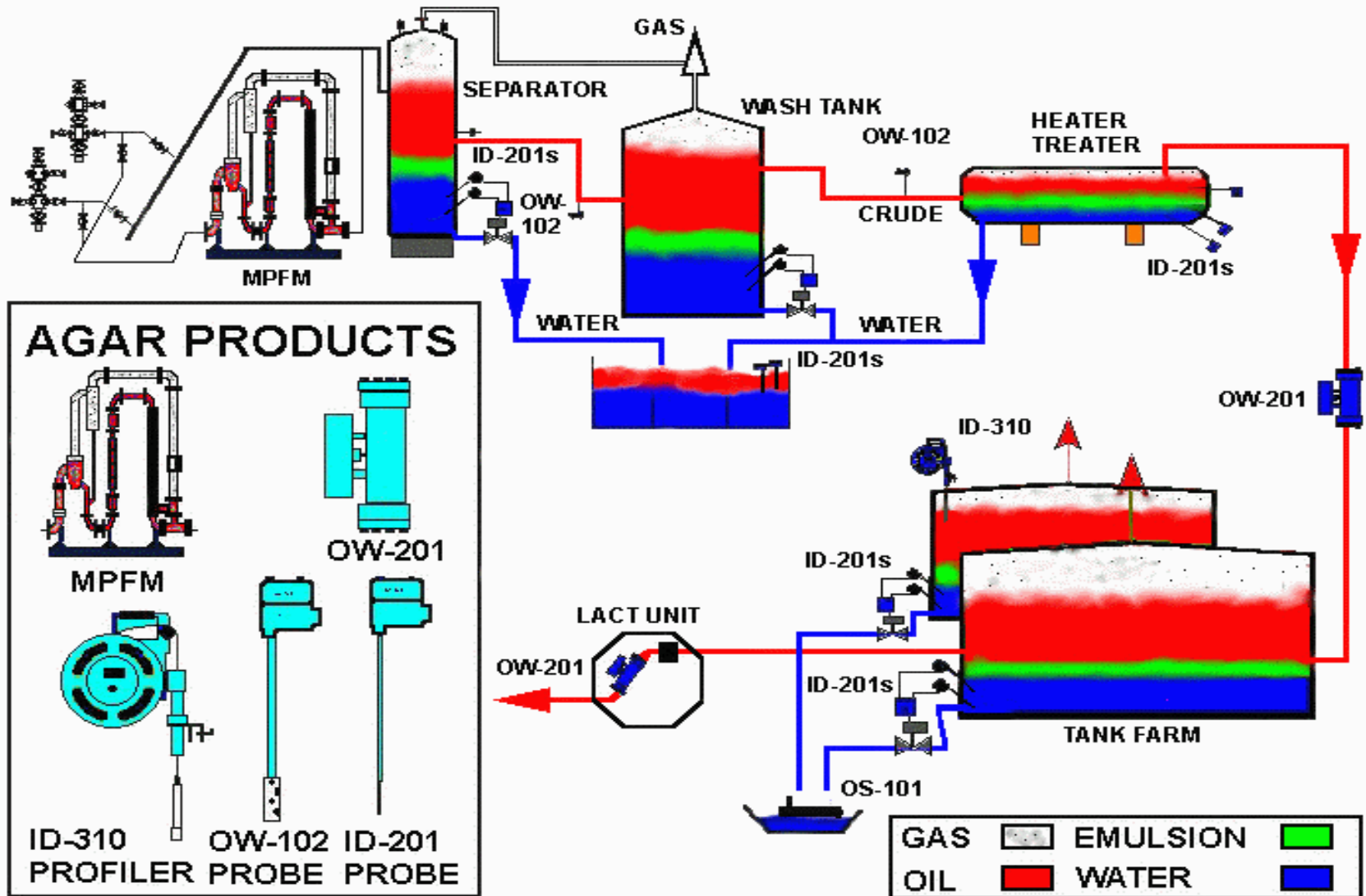
Water Cut Technologies

- Sampling
- Capacitance
- Density
- Microwave
- Optical

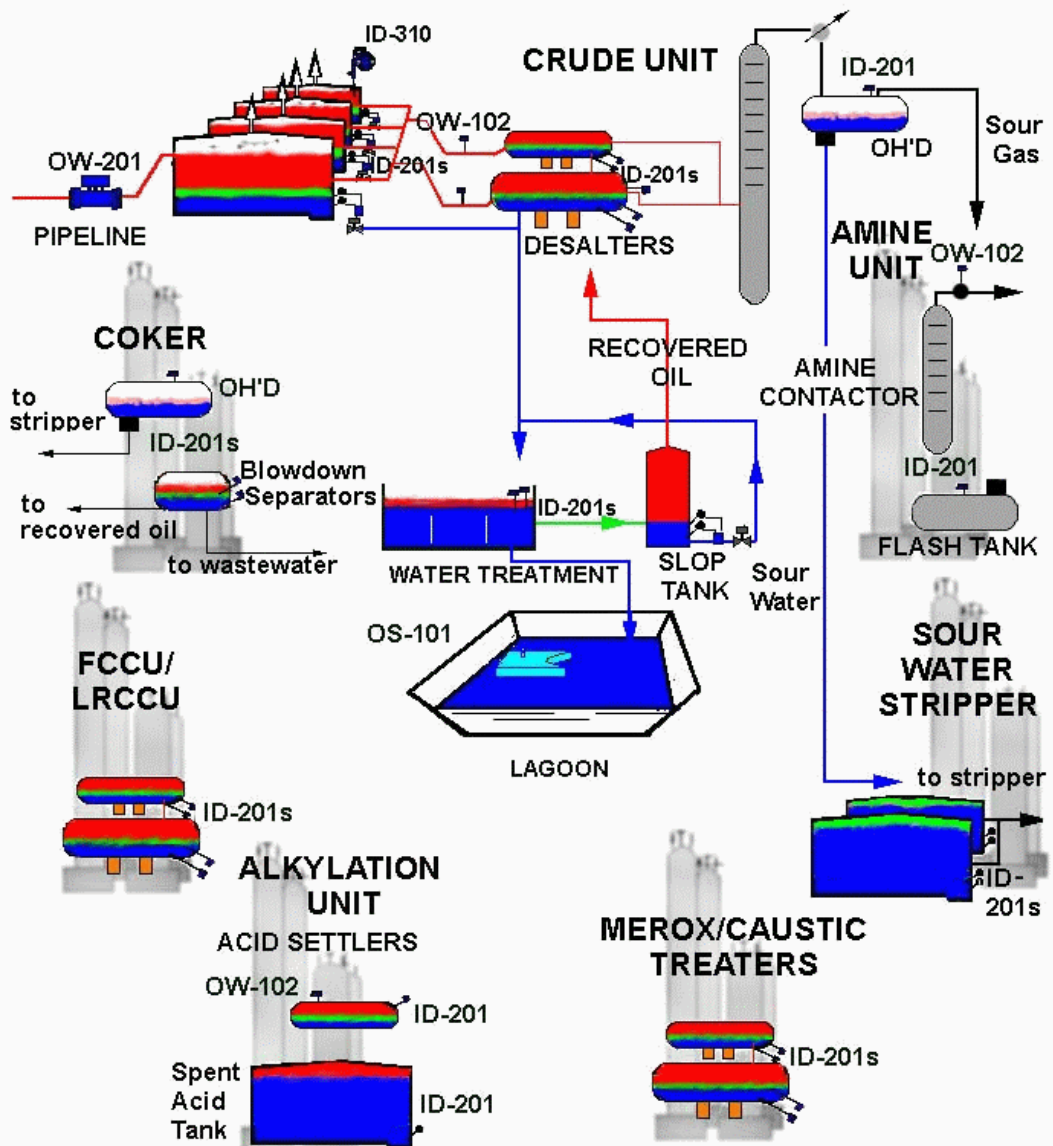
Agar Basic Design



Upstream Applications



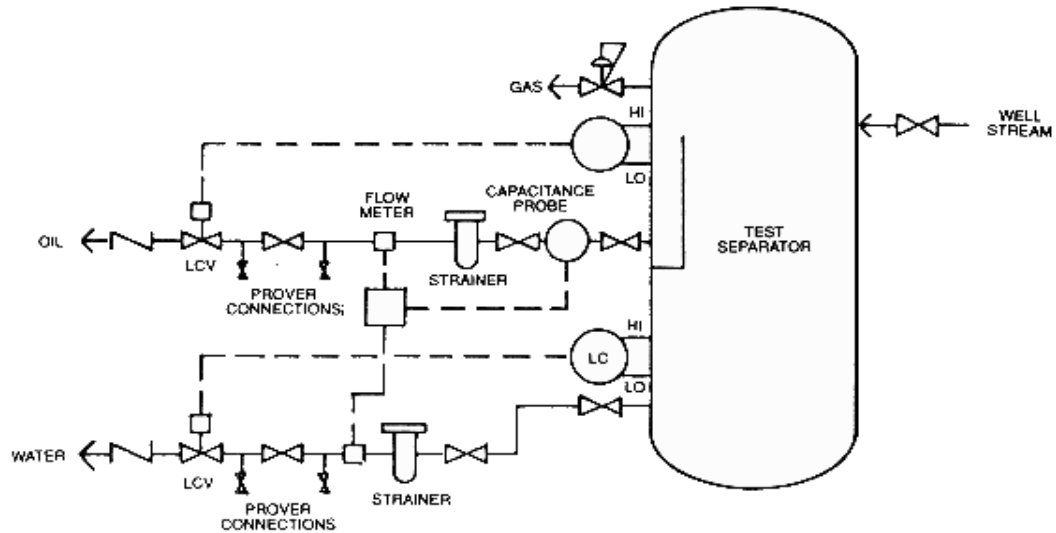
Downstream Applications



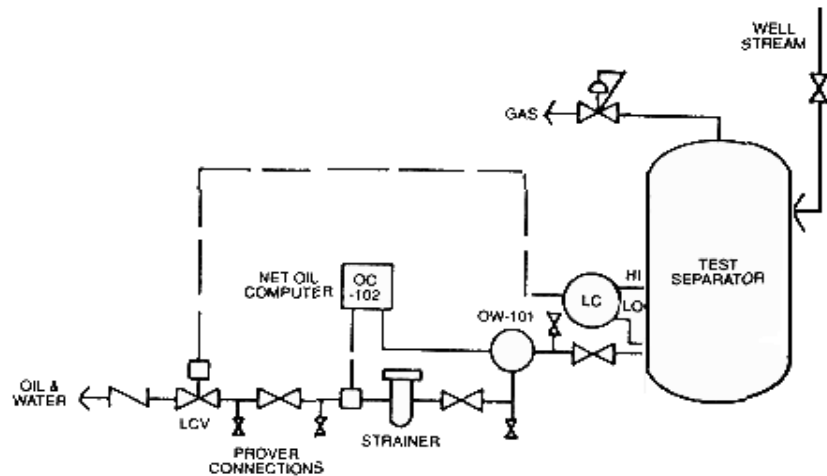
Water Cut Applications

- Well Test Monitoring
 - 0-100% Water
 - Production Allocation
 - Well Monitoring
- BS&W Monitoring
 - 0-3%, 5%, 10%
 - Pipelines
 - Only Water Measurement

2-phase Vs 3-phase Well Testing



3-phase well tester (old method)



2-phase well tester (new, simpler Agar technology)



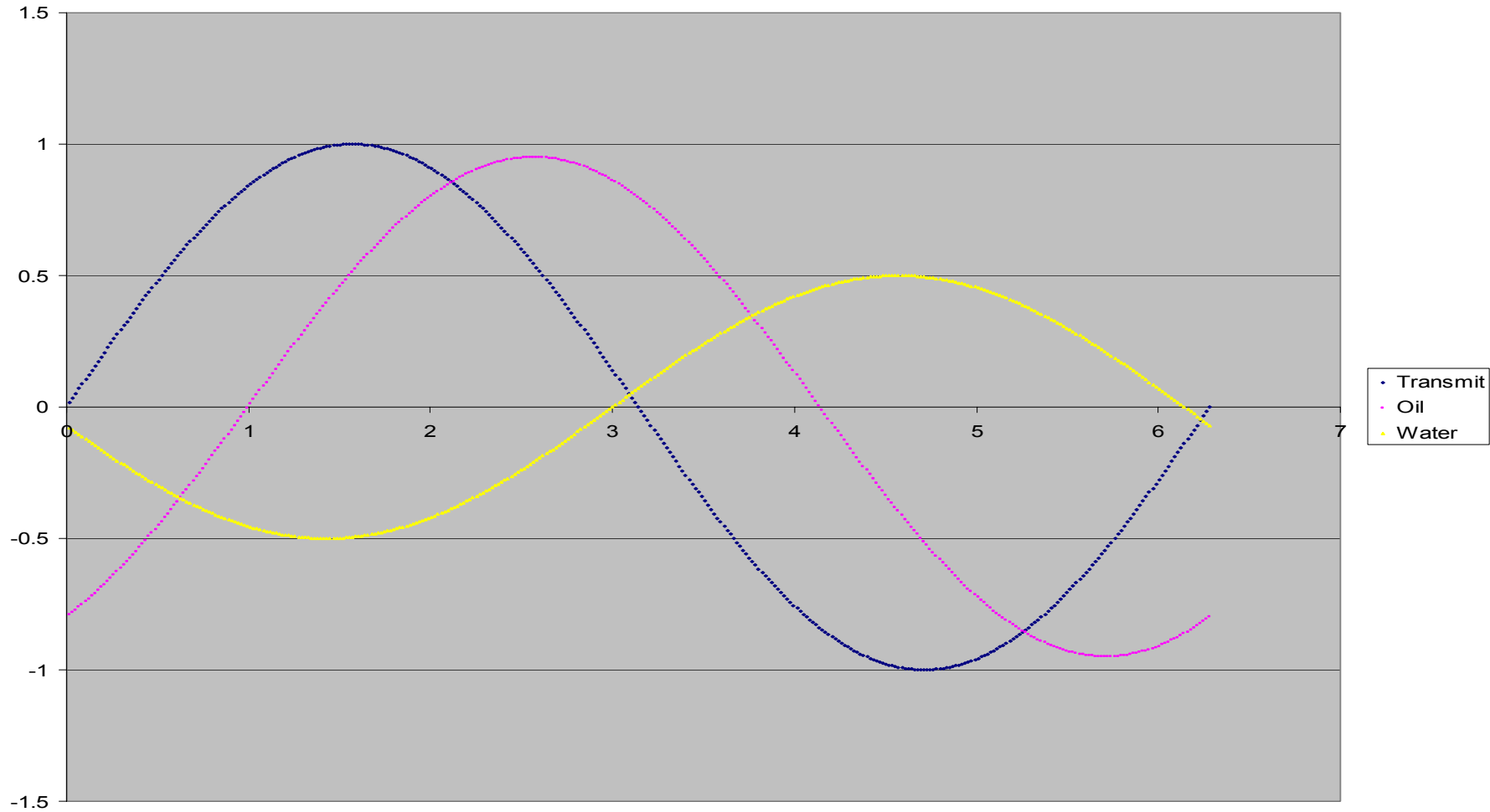
OW-200 Water Cut

- Ranges 0-1% up to 0-100%
- Unaffected by:
 - Salinity Changes
 - Density Changes
 - Velocity
 - Viscosity
 - Temperature (up to 450 Deg. F)

Salinity Effect

- Dielectric Affect
- Frequency Equation
- Higher Frequency lower effect of Salinity
- PAMS Measurement
 - Attenuation Measurement
 - Phase Change Measurement

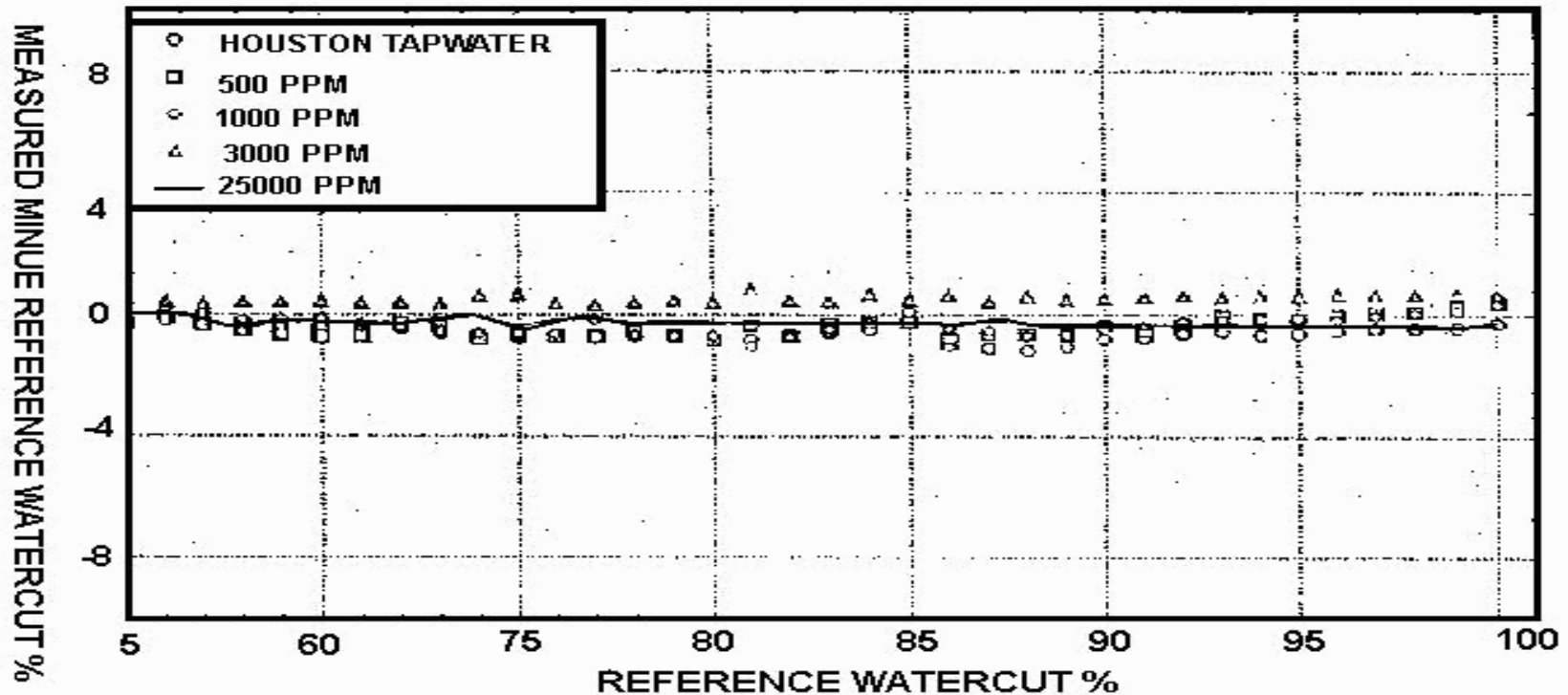
PAMS Measurement



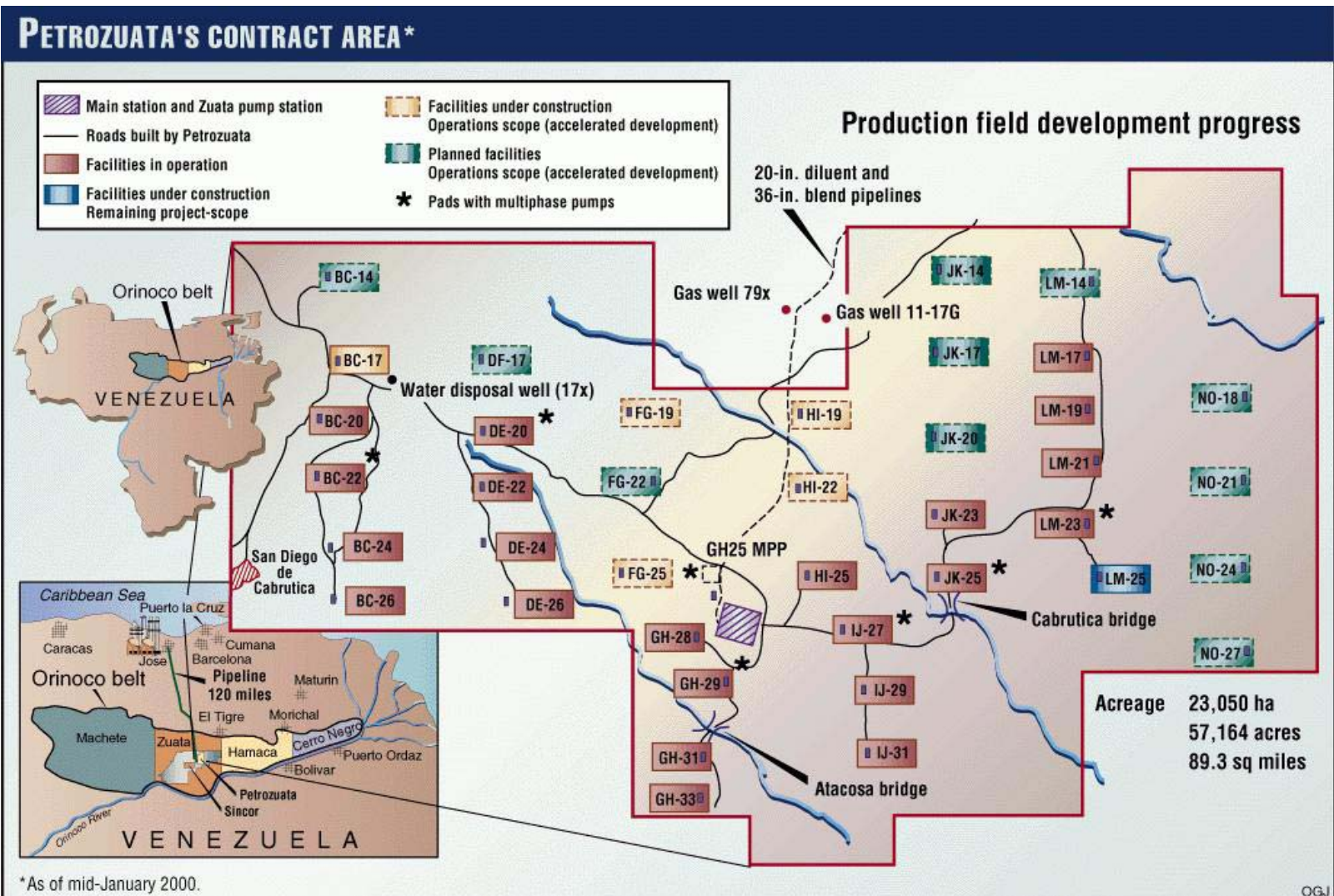
Salinity Field Report

- Coriolis, Microwave, Microwave with out correction
- All Calibrated to 100% at 2300 ppm
- Coriolis - 96.6 at 1000 ppm
- Micro w/ out 14.1%
- Microwave w/ Salinity 100.7%

Water Salinity Test



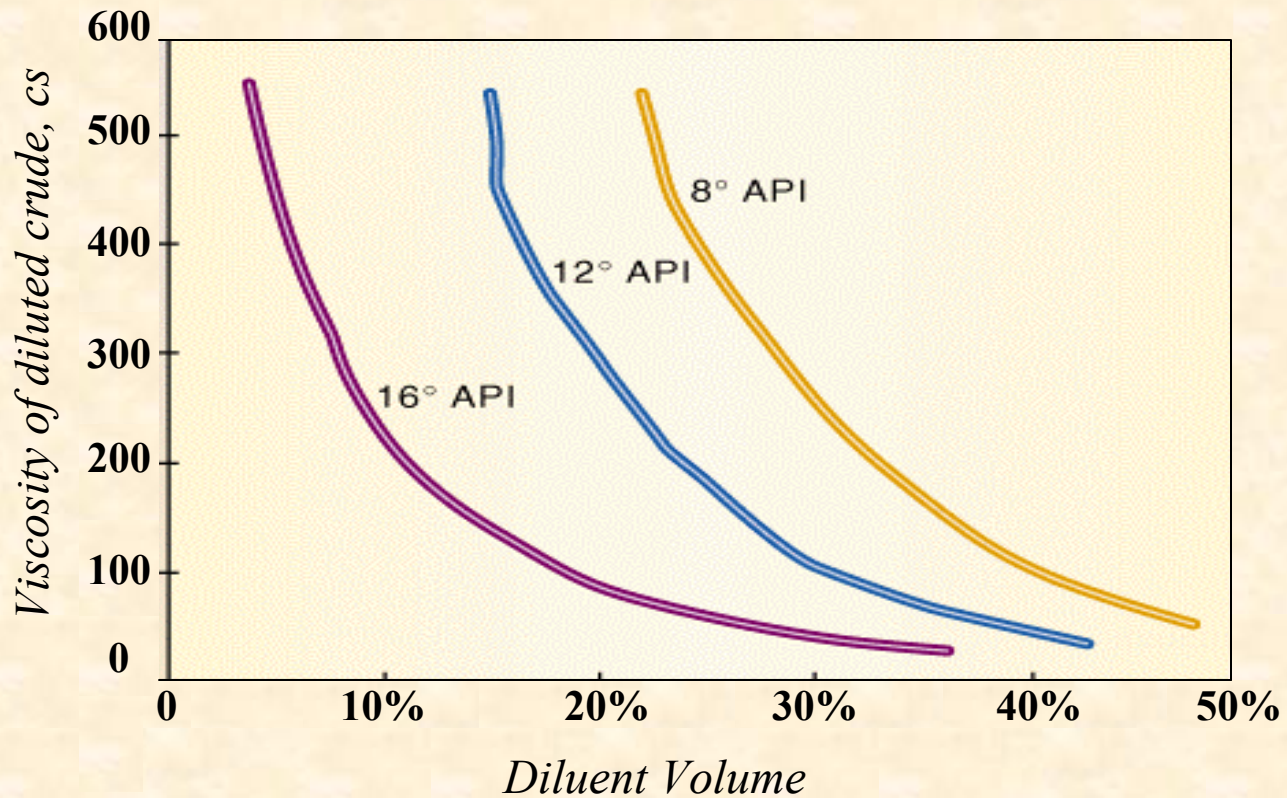
This graph shows the independence of Agar OW-201 on changing salinity of the process water. In cases where steam or ocean water is used to recover oil, the salinity of the process fluid changes drastically. Salinity has a tremendous effect on water cut since the NaCl ions are good conductors. The Agar OW-201 monitors and measures not only the water cut but also the salinity of the process water and compensates the water cut with this salinity reading...



Orinoco Heavy Oil

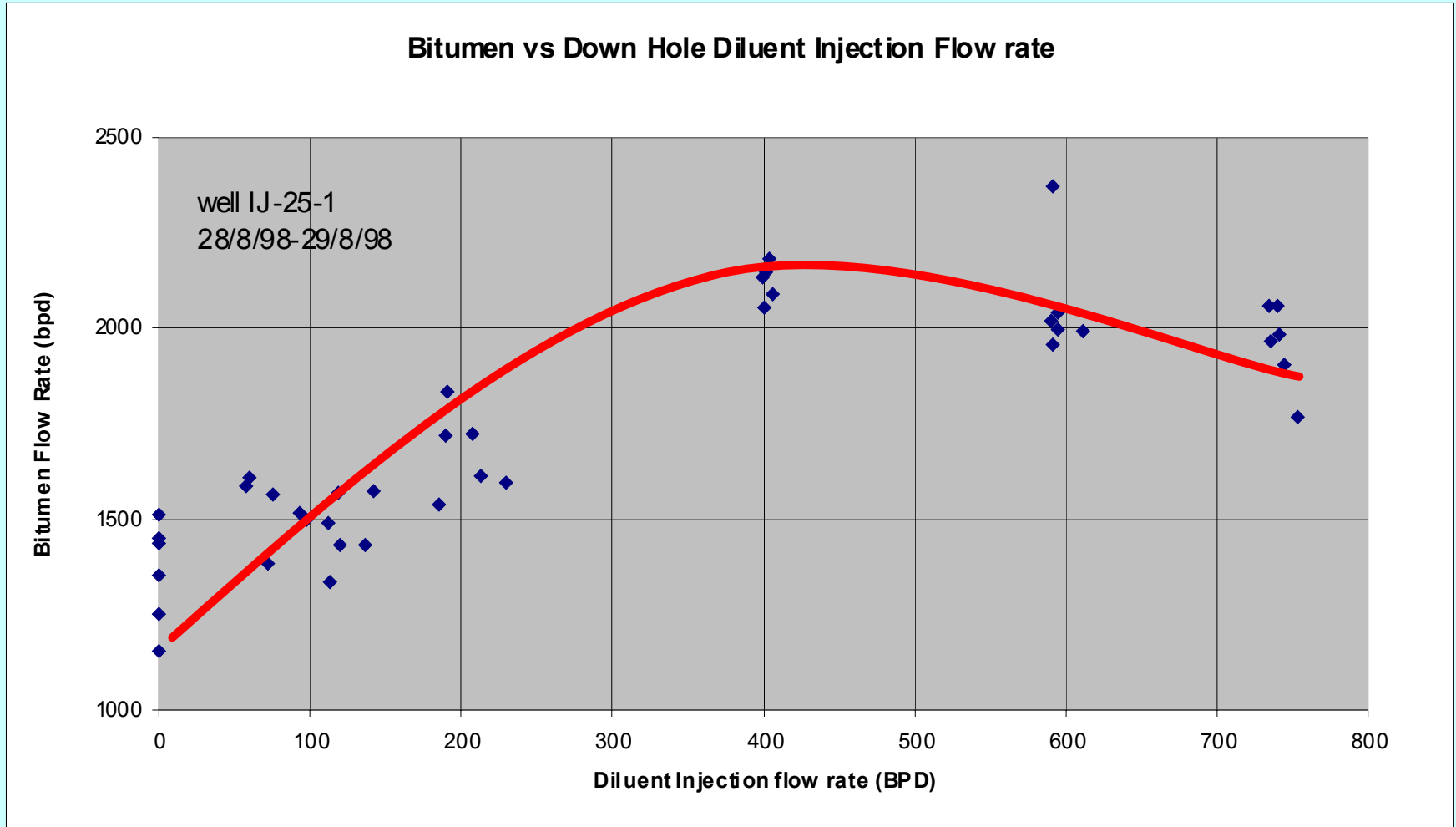
Petrozuata's heavy oil (8-10° API) project is in the Orinoco belt, a huge deposit of heavy and extra-heavy crude that covers an area of 700 by 50-100 km in the states of Monagas, Anzoátegui, and Guárico

EFFECT OF CONDENSATE DILUTION



From Oil & Gas Journal. Oct. 26, 1998. Nunes et al.

Diluent Injection Optimization

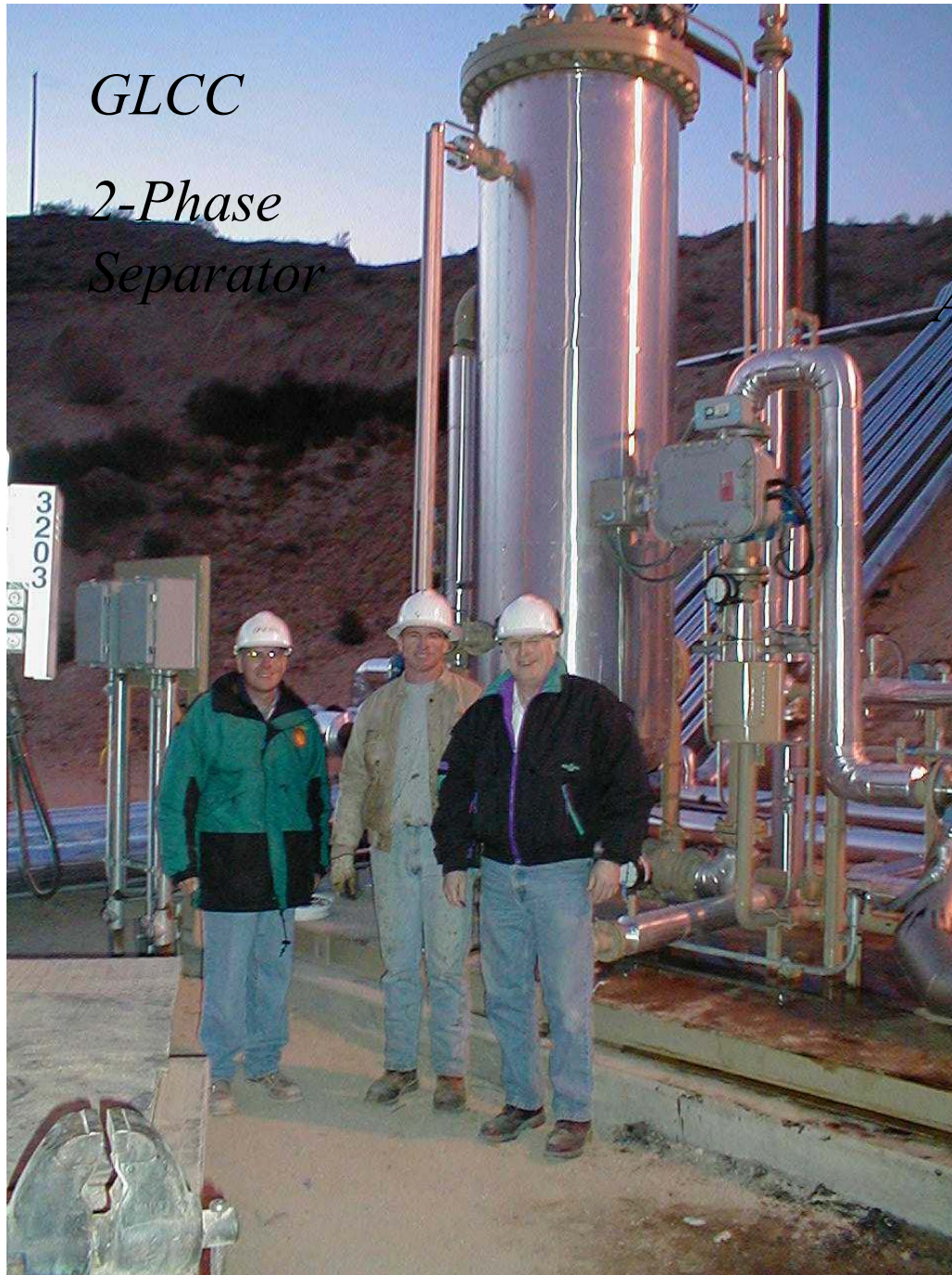


Production increases as the rate of diluent injection increases. At some point of diluent injection, the production is at its maximum. Further addition of diluent reverses the effect and production begins to decline. The Agar MPFM provides real time data which allows for diluent optimization

GLCC

*2-Phase
Separator*

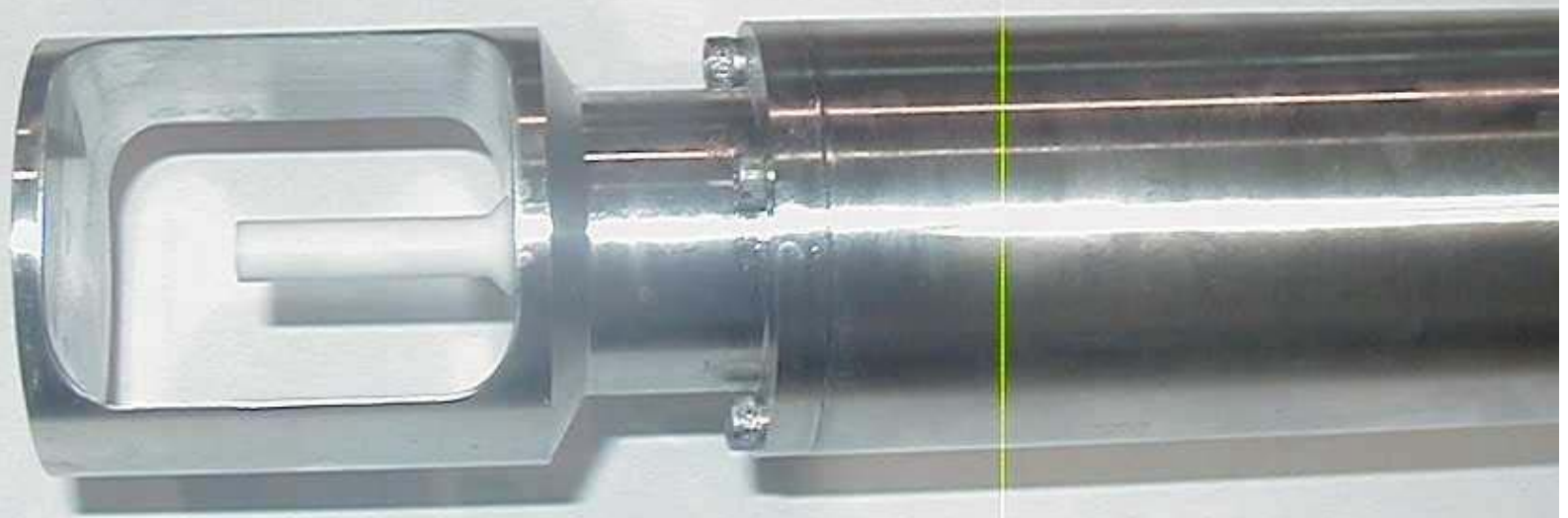
Agar OW-201



*Coriolis
Flowmeter*

BS&W Monitoring

- Large Line Size - 2" up to 48"
- High Accuracy +/- 0.01%
- Extractable under full line pressure
 - 2" Full Port Valve Required
 - Insertion Mechanism available for over 50 PSI
- Temperature, Density Compensated



Measuring Conditions

- Well Mixed Flow
 - Vertical, Ascending Flow
 - After Static Mixer
 - After Pump or Valve
- Middle of Pipe
 - Reduce Separation Error
 - Buy from top, Sell from Bottom
- No Gas

Dielectric Density Affect

- 1 Deg API = 0.13% WC
- Correction built into calculation
- Density input
 - Densitometer
 - User Input

Sulfur Effect

- 1% Sulfur change causes the reading to shift 0.14% Water