



Industry: Oil & Gas

Process: EOR - Enhanced Oil Recovery

Application: Steam Custody Transfer between a cogeneration plant and an operator. The oil field operator injects the steam into the ground to heat the heavy (API gravity 6-15 typically) oil. Once heated the oil can be retrieved via traditional pumping methods. The operator pays for the steam by the BTU at the negotiated point of custody transfer. The cogeneration plant guarantees a pressure and quality at that point. Verification of quality is done periodically using a surface separator.

Measurement Challenge/Difficulty: The oil field operator requires varying amounts of steam depending on the method of EOR used. The main inlet of steam from the cogen. may be only one of several methods of acquiring steam for the field. If several sources are used and one temporarily drops out. It is generally necessary to increase output from the other sources (if possible). The entire field, or large portions thereof, are piped together in one system. Rangeability is therefore extremely important. In addition to this, it is very important to maintain high accuracy due to the nature of custody transfer. Steam wears blunt primary elements out fairly quickly.

Previous Method: Orifice Measurement

Solution: A 4" V-Cone provides sufficient flow turndown to meet the varied rates (nom. 4000 barrels of steam per day CWE in this case). In addition to this, wear is not a problem and accuracy is insured over the long run without yearly primary element replacement. As an added benefit, the V-Cone has less of a measurement shift in a potentially two phase flow environment (water/vapor) than traditional flow elements. The steam quality seen in this application is typically between 90 and 100 percent. Lower steam qualities are seen at the injectors.

Date Installed: Third quarter 1992

Literature No.

24509-72/Rev. 1.1

Industry:

Oil

Niche Market:

EOR - Enhanced Oil Recovery

Process:

Steam Custody Transfer from a cogeneration plant

Product:

Oil

Fluid:

Steam

Viscosity:

0.11451 Cp.
1.105 pounds/cubic foot
1.106

Flow Rate:

Nominally 4000 BPD
CWE

Pressure:

450 Psig

Temperature:

Size:

4 Inch Dia.

Date:

Third quarter 1992

Submitted by:

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