

PHILLIPS PETROLEUM COMPANY
RESEARCH AND DEVELOPMENT DEPARTMENT
BARTLESVILLE, OKLAHOMA

cc: R & D Files (KY-4-3-10)
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Norway/Prod/Bream 17/12-IX Companion
Separator Analysis and Total Sulfur
on Hydrocarbon Samples Taken During
DST No. 6 in "F" Type Containers
RL-197-G-13-72

WFB-45-72

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Compositional analyses including sulfur contents were made on companion separator samples from DST No. 6 of the Bream 17/12-IX, Norwegian Sector, North Sea. The samples were taken in "F" type sampling containers.

A pressure base of 14.65 psia and an atmospheric pressure of 14.66 psia were used in calculating the composition of the composite well stream. F_g and F_{pv} factors based on the attached gas and liquid analysis were used to recalculate the gas volume for the gas-oil ratio and the recalculated value was 257 cubic feet per barrel or 4.9 per cent higher than the ratio calculated at the well location.

The compositions of the composite well stream have been calculated and the results are attached as computer output sheets. Pertinent information concerning sampling conditions are recorded below.

Bream 17/12-IX

| | |
|--|---------------------------------------|
| Drill Stem Test Number | 6 |
| Time Gas Sampled | 0830 |
| Time Liquid Sampled | 0830 |
| Date Sampled | 6-13-72 |
| Producing Formation | Denian |
| Interval Tested, ft | 7,600-7,632 |
| Separator Sample Point | Oil: oil leg Gas: water run (assumed) |
| Pressure of Sample Point, psig | 160 160 (assumed) |
| Temperature of Sample Point, °F | 105 105 |
| Pressure in Containers, psig | Oil: <160 Gas: 160 (assumed) |
| Oil Produced, bbl/D | 1,020 |
| Gas Produced, Mcf/D | 262 |
| Gas/Liquid Ratio (Scf/bbl) | 257 |
| Gravity Stock Tank Liquid, °API @ 60°F | 32.4 |
| Sampled by | Geoservices |
| Total Sulfur Content of Gas, Weight per cent | <1 ppm |
| Total Sulfur Content of Oil, Weight per cent | 0.35 |

W.F. Bueck

W. F. Bueck
262 RB #1, Ext. 3538

WFB:rw
Attachment

ANALYSIS OF SEPARATOR PRODUCTS AND CALCULATED WELL STREAM

BREAM 17/12-1X, NORWEGIAN SECTOR, NORTH SEA, INTERVAL TESTED: 7600-7660, DST NO. 6

| COMPONENT | SEPARATOR LIQUID MCL PER CENT | SEPARATOR GAS MCL PER CENT | CALCULATED COMPOSITE WELL STREAM MCL PER CENT |
|------------------|----------------------------------|-------------------------------|---|
| CARBON DIOXIDE | 0.10 | 1.12 | 0.43 |
| NITROGEN | 0.0 | 3.34 | 1.07 |
| HYDROGEN SULFIDE | 0.0 | 0.0 | 0.0 |
| METHANE | 4.60 | 86.91 | 31.08 |
| ETHANE | 0.70 | 2.51 | 1.28 |
| PROPANE | 1.81 | 2.38 | 1.99 |
| ISO-BUTANE | 0.95 | 0.70 | 0.87 |
| N-BUTANE | 2.78 | 1.28 | 2.30 |
| ISO-PENTANE | 2.10 | 0.45 | 1.57 |
| N-PENTANE | 2.93 | 0.47 | 2.14 |
| HEXANE | 6.64 | 0.30 | 4.60 |
| HEPTANES PLUS | 77.39 | 0.45 | 52.64 |
| HELIUM | --- | 0.09 | 0.03 |
| | 100.00 | 100.00 | 100.00 |

PROPERTIES OF HEPTANES PLUS

| | | | |
|------------------|--------|--------|--------|
| SPECIFIC GRAVITY | 0.8600 | 0.7737 | 0.8557 |
| MOLECULAR WEIGHT | 247.6 | 110.5 | 247.2 |

GAS PROPERTIES

| | |
|------------------------------------|------------|
| GAS COMPRESSIBILITY FACTOR (Z) | 0.9527 |
| SEPARATOR GAS GRAVITY (AIR=1.0000) | 0.6821 |
| GROSS HEATING VALUE/SCF | DRY |
| AT 14.696 AND 60. F | WET |
| | 1132.4 BTU |
| | 1112.7 BTU |

MULTISTAGE FLASH RECOMBINATION CALCULATIONS

CASE IDENTIFICATION BREFAM 17/12-1X, MOPW IAN SECTOR, NORTH SEA

INTERVAL TESTED: 7680-7682'. DST NO. 6

COMPOSITION OF FLOW STREAM, MOLE FRACTIONS

| COMPONENT | WELL STREAM | STAGE 1 | | STAGE 2 | | STAGE 3 | | STAGE 4 | |
|-------------------|----------------|-----------------------|---------------|---------|-----------|---------|-----------|---------|---------|
| | ATMOS PSIA | TEMP.F | PRES.PSIA | TEMP.F | PRES.PSIA | TEMP.F | PRES.PSIA | TEMP.F | PRES.PS |
| | 14.660 | 105.0 | 174.66 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | LIQ. | GAS | LIQ. | GAS | LIQ. | GAS | LIQ. | GAS |
| CO2 | 0.00428 | 0.0010 | 0.0112 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| N2 | 0.01075 | 0.0000 | 0.0334 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2S | 0.00000 | 0.0000 | 0.0000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| METHANE | 0.31082 | 0.0460 | 0.8691 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ETHANE | 0.01282 | 0.0070 | 0.0251 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PROPANE | 0.01993 | 0.0181 | 0.0238 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ISOBUTANE | 0.00870 | 0.0055 | 0.0070 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| N-BUTANE | 0.02297 | 0.0278 | 0.0128 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ISOPENTANE | 0.01569 | 0.0210 | 0.0045 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| N-PENTANE | 0.02139 | 0.0293 | 0.0047 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HEXANE | 0.04600 | 0.0664 | 0.0030 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C7+ | 0.52636 | 0.7739 | 0.0045 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HELIUM | 0.00029 | 0.0000 | 0.0009 | | | | | | |
| MOLFS | 1.00000 | 0.67827 | 0.22173 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ***** | | | | | | | | | |
| AVG. MW | 145.552 | 204.928 | 19.760 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C7PLUS MW | 247.222 | 247.601 | 110.517 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SPEC. GRAV. | | 0.8333 | 0.6821 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C7PLUS SG | 0.8557 | 0.8600 | 0.7737 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SCF OF GAS | | | 122.48 | | 0.0 | | 0.0 | | 0.0 |
| GAS DEN(LBS/CUFT) | | | 0.5975 | | 0.0 | | 0.0 | | 0.0 |
| BRL OF LIQUID | | 0.47633 | | 0.0 | | 0.0 | | 0.0 | |
| LIQ DEN(LBS/CUFT) | | 51.9724 | | 0.0 | | 0.0 | | 0.0 | |
| | | | | 0.0 | | 0.0 | | 0.0 | |
| | | | | | 0.0 | | 0.0 | | 0.0 |
| GCR(SCF/BBL) | | 257.1 | | 0.0 | | 0.0 | | 0.0 | |
| | | COMBINED GCR(SCF/BBL) | | 257.1 | | | | | |
| | | API 60 DEG F | | 34.5820 | | | | | |