in association with

# NIGERIA EXTRACTIVE INDUSTRIES TRANSPARENCY INITIATIVE

## REPORT ON THE PROCESS AUDIT 1999-2004

### REFINERIES AND PRODUCT IMPORTATION

## APPENDIX J: CONVERSION FACTORS

Presented to

**The National Stakeholder Working Group**

by

**Hart Resources Ltd**

in association with

**SS Afemikhe Consulting Ltd**

and

**CMA Ltd**

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The report and all appendices relating to the report are intended for the use of the National Stakeholder Working Group of the NEITI for the purpose of that initiative and are not to be relied upon by other parties.

APPENDIX J

CONVERSION FACTORS

NIGERIAN CRUDE

| Crude Grade | API | Conversion Factor | |
|---|---|---|---|
| Bonny Light | 35.0 | 7.50 | Sweet Crude |
| Qua Iboe Light | 36.0 | 7.50 | |
| Escravos Light | 36.0 | 7.46 | |
| Brass Blend | 43.0 | 7.70 | |
| Pennington Light | 36.0 | 7.46 | |
| Forcados Blend | 30.0 | 7.24 | Medium Crude |
| Bonny Medium | 26.0 | 7.02 | |
| Antan Blend | 32.5 | 7.31 | |
| Oso Condensate | 47.0 | 7.95 | |

Conversion Factor = number of barrels of crude oil to the metric tonne.

# OIL INDUSTRY CONVERSIONS

Crude petroleum, and the refined products made from crude oil, are normally measured either by volume in gallons and US barrels, or by weight in tons or tonnes. The relationship between volume and weight is usually measured by density in the United Kingdom (the alternative measure is relative density or specific gravity). American oilmen usually reckon quantities of oil produced, moved or processed in barrels per day (bpd or b/d). The loose but simple rule of thumb for conversion is that a barrel a day is roughly 50 tonnes a year, but the relationship varies according to density and so according to product.

## CONVERSION FACTORS FOR PETRLEUM PRODUCTS

| | At 86°F (30°C) (approximation) | | | |
|---|---|---|---|---|
| Product | Litres/Ton | Litres/Tonne | Gallons / Tonne | Barrels / Tonne |
| L.P.G | 1,864 | 1,835 | 484.6 | 11.54 |
| JP.4 | 1355 | 1333 | 352.4 | 8.39 |
| Jet A-1 | 1,274 | 1,254 | 331.2 | 7.89 |
| Premium | 1,375 | 1,353 | 357.5 | 8.51 |
| Regular | 1,440 | 1,418 | 374.5 | 8.92 |
| Kerosene | 1,293 | 1,273 | 336.2 | 8.00 |
| Gas Oil | 1,197 | 1,177 | 311.2 | 7.41 |
| Diesel Fuel | 1,177 | 1,159 | 306.1 | 7.29 |
| Fuel oil 80 CST | 1,082 | 1,065 | 281.2 | 6.70 |
| Fuel oil 180 CST | 1,067 | 1,050 | 277.4 | 6.60 |
| Fuel oil 230 CST | 1,064 | 1,047 | 276.6 | 6.59 |
| Fuel oil 280 CST | 1,061 | 1,044 | 275.9 | 6.57 |
| Bitumen | 994 | 979 | 258.5 | 6.15 |

1 MMSCF of natural gas = 172.3 barrels of crude oil equivalent
= 365 x 1,000,000 standard cubic feet
1 million cubic feet of natural gas = 18.91 tons liquid
= 1598.69 cubic feet liquid
1 standard cubicfeet of natural gas = 1000 BTU = 252 kilocalories
1 ltr of fuel oil 1500 sec = 38.9 cubic feet of natural gas
1 kg of LPG = 47.0 cubic feet of natural gas

Flow rate of gas:
1 normal cubic metre per day ($Nm^3/d$) = 37.33 standard cubic feet per day (SCFD)

1 ton of LNG = 1.14 1.4 x $10^3$ normal cu.m.natural

LNG conversions:
gas ($Nm^3$) = 52.3 x $10^3$ standard cubic feet natural
gas (SCF) = 55.0 x $10^9$ joules (HHV)
1 ton of LNG = 1.22 tonne crude oil

| | |
|---|---|
| 1 barrel per day (b/d) | = 50 tonnes per year (approx.) |
| 1 barrel of oil equivalent | = 1 barrel of crude oil |
| | = 5,487 cubic feet of gas * |

* Natural gas is converted to barrels of oil equivalent using a ratio of 5,487 cubic feet of natural gas per one barrel of crude oil. This ratio is based on the actual average equivalent energy content of TOTAL's natural gas reserves.

| | |
|---|---|
| 1 barrel of crude oil per day | = appr. 50 tons of crude oil per year |
| 1 ton of crude oil | = 1 metric ton of crude oil |
| | = appr. 7.3 barrels of crude oil |
| | (assuming a specific gravity of 33 API) |
| | = 6.6-8.0 bbl. of crude oil with 7.333 bbl. taken as average |
| | = 1.16 kl. of crude oil (average) |
| 1 ton of oil equivalent | = appr. 1,125 cubic meters of natural gas |

| | |
|---|---|
| MMSCF | Million standard cubic feet |
| CST | Centi-Stroke |
| A. | American |
| E. | English |