



S.S. Afemikhe & Co. Consulting Ltd

Nigeria Extractive Industries Transparency Initiative (NEITI)

REPORT 2006 - 2008

PHYSICAL AND PROCESS REPORT

Issued
July 2011

Based on information received by 31st March 2011

Presented to the National Stakeholder Working Group
by
Hart Resources Ltd
in association with
S.S. Afemikhe & Co. Consulting Ltd.

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

Nigeria Extractive Industries Transparency Initiative (NEITI) 2006-2008 Report

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ACRONYMS USED

AFS	Audited Financial Statements	NEPA	Nigerian Electric Power Authority (now the Power Holding Company of Nigeria – PHCN)
AGO	Diesel oil	NGC	Nigerian Gas Company
API	American Petroleum Institute – but more commonly a measure of the ‘heaviness’ of crude oil	NGL	Natural Gas Liquids
BPD	Barrels per day	NLNG	Nigeria LNG Ltd
BSW	Base Sediments & Water – the amount of contaminants in a crude stream	NNPC	Nigerian National Petroleum Corporation
BTU	British thermal unit	NPDC	Nigerian Petroleum Development Company (a subsidiary of NNPC)
CBN	Central Bank of Nigeria	NSWG	National Stakeholders Working Group
CIT	Companies Income Tax	OAGF	Office of the Accountant General of the Federation
COMD	Crude Oil Marketing Division of NNPC	OML	Oil Mining Lease
DPK	Dual Purpose Kerosene (calculations include ATK – Aviation Kerosene)	OPL	Oil Prospecting Licence
DPR	Department of Petroleum Resources	OPTS	Oil Producers’ Trade Group (of the Lagos Chamber of Commerce)
ECOWAS	Economic Community Of West African States	OSP	Official Selling Price
FAAC	Federation Accounts Allocation Committee	PAYE	Pay As You Earn
FCT	Federal Capital Territory	PHCN	Power Holding Company Nigeria
FGN	Federal Government of Nigeria	PHRC	Port Harcourt Refining Company
FIRS	Federal Inland Revenue Service	PIB	Petroleum Industry Bill
FMF	Federal Ministry of Finance	PMS	Petroleum motor spirit (petrol)
GED F&A	Group Executive Director Finance & Administration (of NNPC)	PPMC	Pipeline and Products Marketing Co Ltd
GGM	Group General Manager (of NNPC)	PPT	Petroleum Profits Tax
GMD	Group Managing Director (of NNPC)	PSC	Production Sharing Contract
GSA	Gas Sales Agreement	PTDF	Petroleum Training Development Fund
IOC	International Oil Company	RMAFC	Revenue, Mobilisation, Allocation and Fiscal Commission
IPP	Independent Power Producer		
KRPC	Kaduna Refinery and Petrochemical Company	SWIFT	Society for Worldwide Interbank Financial Transactions
LNG	Liquefied Natural Gas	TMP	Trial Marketing Period
LPFO	Low pour fuel oil	USD	US dollar
mmscfd	Millions of cubic feet per day	VAT	Value Added Tax
MMBTU	BTU millions	WAGP	West African Gas Pipeline
NAPIMS	National Petroleum Investment Management Services	WHT	Withholding Tax
NDDC	Niger Delta Development Commission	WRPC	Warri Refinery Petrochemicals Company

PREFACE

This is the final report under the Nigeria Extractive Industries Transparency Initiative (NEITI) Physical and Process Audit covering the years 2006 – 2008. This report presents the results of work done under the audit.

This report is intended for the use of the National Stakeholder Working Group of the NEITI for the purpose of that initiative and is not to be relied upon by other parties.

The scope of the Physical and Process Audit encompasses the mapping of hydrocarbon flows, the assessment of the quality of procedural systems, the technical assessment of measuring hydrocarbon streams, the volumetric analysis and reconciliation of data, recommendations for improvements and reporting templates, and the aggregate reporting of hydrocarbons produced and fiscalised in the period 2006 - 2008.

The report is to be read in conjunction with the Financial Report which is presented separately. An Executive Summary, bringing together the key findings of the Financial Report and the Physical & Process Report, and including recommendations arising from the assignment, has also been prepared.

This report reflects data and information received by Hart Group from covered entities up to 31st May 2011. Comments and adjustments received after that date have been taken into account where feasible but not all could be accommodated.



Hart Resources Ltd
The Old Coach House
Southern Road, Thame
Oxfordshire OX9 2ED
England

Tel: +44 1844 21 88 36
Fax: +44 8700 94 14 69
www.hart-nurse.co.uk



SS Afemikhe Consulting Ltd
Plot 46, Ishawu Adewale Street,
Off Modupe Johnson Crescent,
Surulere, Lagos, Nigeria

Tel: +234-1-776-3827
www.samafemikheconsulting.com

Nigerian Extractive Industries Transparency Initiative
No 1 Zambezi Crescent
Maitama
Abuja, Nigeria

19th July 2011

Independent Report Assessing and Reconciling Physical Flows and Processes within Nigeria's Oil Industry and Gas Industry (2006 – 2008)

Hart Resources Ltd and SS Afemikhe Consulting Ltd were appointed, pursuant to the NEITI Act, by the National Stakeholder Working Group of the Nigeria Extractive Industries Transparency Initiative to undertake a Physical and Process audit of the years 2006 – 2008 and to prepare a report ("the Engagement").

Our engagement was undertaken in accordance with the International Standard on Related Services applicable to agreed-upon procedures engagements. The procedures performed were those set out in the Terms of Reference appended to this report, except where stated otherwise in this report including its appendices.

We report our findings in the accompanying report including its appendices. We do not express any assurance on the transactions beyond the explicit statements set out in this report. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

Our report is solely for the purpose of informing the National Stakeholder Working Group on the matters set out in the terms of reference and is not addressed to any other party or to be used for any other purpose. This report relates only to the subject matter specifically set out herein and does not extend to any financial statements of any entity taken as a whole.

Yours faithfully,



CH Nurse
Director

For and on behalf of
Hart Resources Ltd



Sam. S. O. Afemikhe
Managing Director

For and on behalf of
S. S. Afemikhe Consulting Limited

1 EXECUTIVE SUMMARY

1.1 Crude Oil

1.1.1 Consolidated mass balance

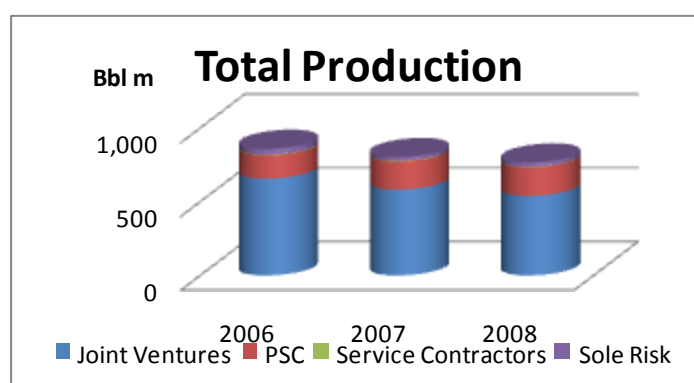
Data reported by DPR, companies (including NNPC) and terminal operators is not always consistent. The differences are set out in this report and prevent a coherent mass balance being presented. With the caveat that individual figures are reported differently by different sources, the general picture may be presented as follows:

	2006	2007	2008
Bbl millions			
Inferred production	858.20	801.87	765.25
Terminal adjustments and stock increase / decrease	-2.69	-7.40	0.92
Total liftings	860.89	809.27	764.33
<i>Of which:</i>			
Exported or sent to Nigerian refineries by NNPC	385.97	381.82	406.18

Table 2.1

1.1.2 Summary of Production and liftings

1.1.2.1 Total production of crude oil by type of producing operation during the period 2006 – 2008 is shown below.



	2006	2007	2008
Total Production (bbl m)			
JV	656.67	582.27	540.08
PSC	159.24	191.61	193.75
SC	4.05	4.00	3.44
SR	38.24	23.99	27.98
	858.20	801.87	765.25

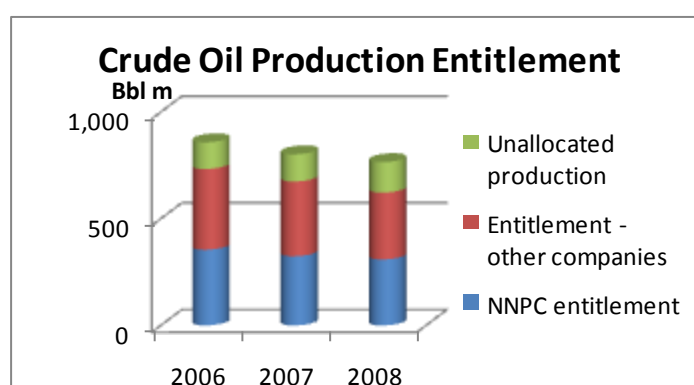
Table 2.2

During the period, total production has fallen by around 100m barrels per annum, but the proportion of production coming from the new contractual arrangements (PSCs) has increased, while the

proportion coming from joint venture operations has declined. This can be seen in the following table:-

	2006	2007	2008
Production by operation as % of total			
JV	76.5%	72.6%	70.6%
PSC	18.6%	23.9%	25.3%
SC	0.5%	0.5%	0.4%
SR	4.5%	3.0%	3.7%
<i>Table 2.3</i>			

1.1.2.2 Total entitlement to production of crude oil during the period 2006 – 2008 is shown below.



	2006	2007	2008
Entitlement to production			
NNPC entitlement	354.83	324.17	309.31
Entitlement - other companies	378.55	350.56	313.33
Unallocated production	124.82	127.14	142.61
	858.20	801.87	765.25
<i>Table 2.4</i>			

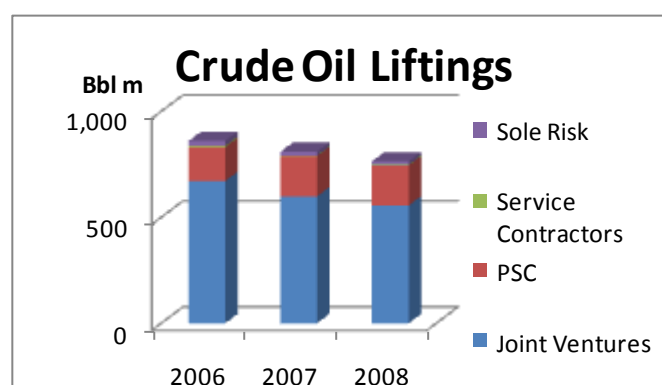
Unallocated production is crude oil production where it has not been possible to assess the entitlement. This is because:-

- a. There is a dispute between NNPC and the operators of three of the six PSC operations which were producing oil during the period. The dispute relates to interpretation of a number of aspects of the PSC (see Section 2.13.2). The affected operations are
 - i. Abo (PSC Operator – NAE)
 - ii. Bonga (PSC Operator – SNEPCO)
 - iii. Erha (PSC Operator – EEPNL)
- b. The allocation between NNPC and the PSC Operators of crude oil and sale proceeds arising during the Trial Marketing Period of several PSCs (see Section 2.1.3.2) has not been concluded or communicated to us. The operations concerned are
 - i. Bonga (PSC Operator – SNEPCO, TMP liftings in 2006)
 - ii. Erha (PSC Operator – EEPNL, TMP liftings in 2006)
 - iii. Okwori (PSC Operator – APENL, TMP liftings in 2006)

iv. Agbami (PSC Operator – Star, TMP liftings in 2008)

- c. The production information necessary to carry out an assessment of entitlement was not returned in respect of Zafiro (unitised field, operated by Mobil Equatorial Guinea, which is not a covered entity for the purpose of this assignment)

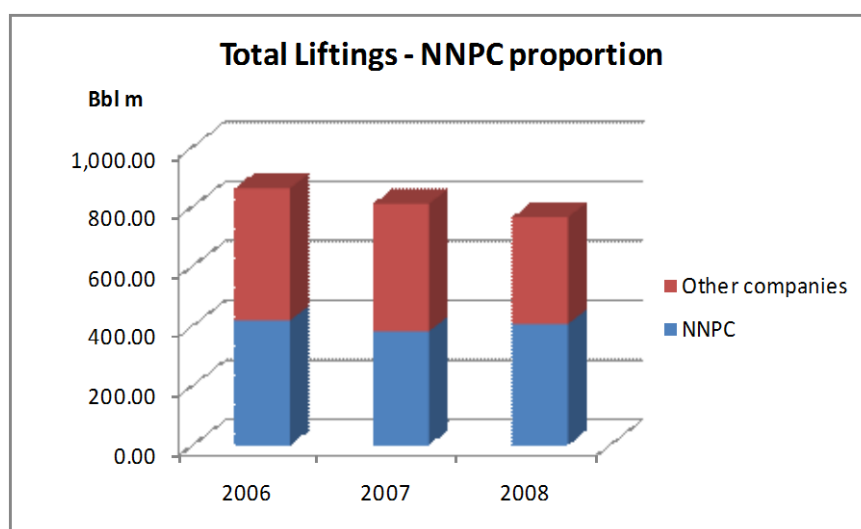
1.1.2.3 Total liftings of crude oil by type of producing operation during the period 2006 – 2008, as reported by the lifting company, are shown below.



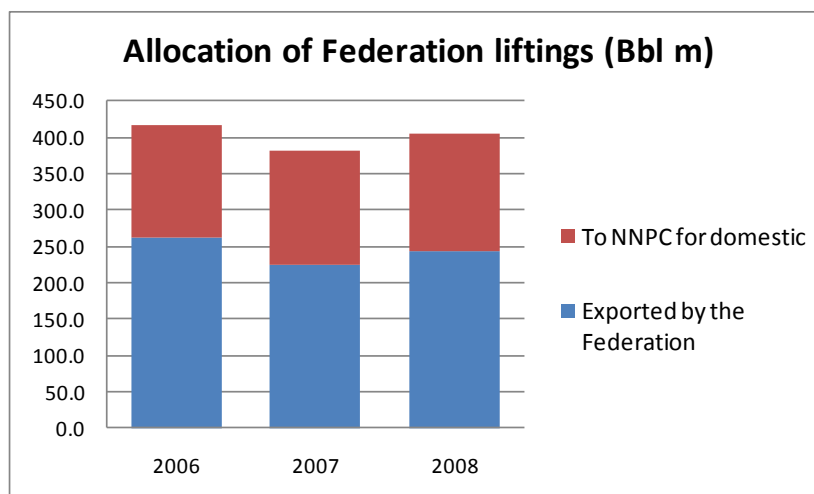
	2006	2007	2008
Total Liftings			
Joint Ventures	672.08	598.77	556.22
PSC	159.27	189.32	188.95
Service Contractors	5.90	2.51	2.70
Sole Risk	23.64	18.67	16.46
	860.89	809.27	764.33

Table 2.5

1.1.2.4 Total liftings of crude oil by NNPC and by other companies during the period 2006 – 2008, as reported by the lifting company, are shown below.

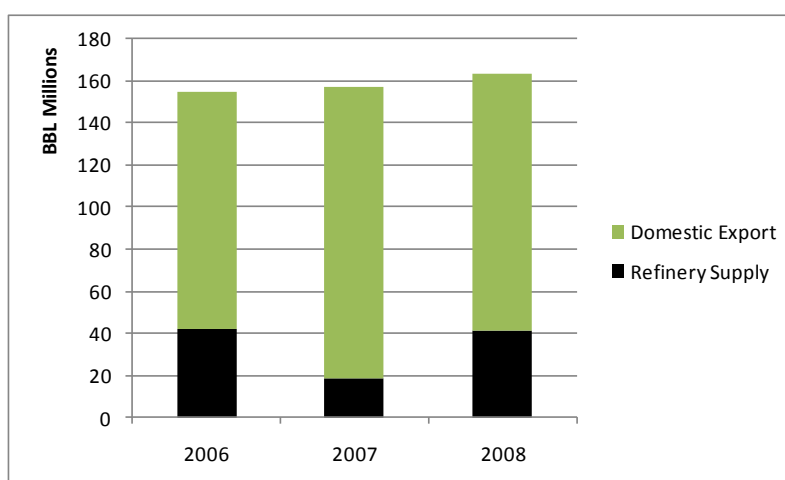


	<u>2006</u>	<u>2007</u>	<u>2008</u>
Total Liftings			
NNPC	417.89	381.82	406.18
Other companies	443.00	427.45	358.15
	860.89	809.27	764.33
<i>Table 2.6</i>			



Volume (mmbbls)	Year		
	2006	2007	2008
Exported by the Federation	263.04	224.51	242.53
To NNPC for domestic	154.85	157.31	163.66
	417.89	381.82	406.18

NNPC allocated its Domestic Crude liftings between Refineries and Export, as follows:



Volume (Bbls m)	Year		
	2006	2007	2008
Refinery Supply	41.66	18.38	41.32
Domestic Export	113.19	138.93	122.34
	154.85	157.31	163.66

- 1.1.2.5 As noted above, it has not been possible to assess the entitlement of covered entities to production in all operations. For JV operations, where production entitlement has been assessed, NNPC liftings compare with NNPC share of production as shown below.

Millions barrels		2006	2007	2008
NNPC entitlement and liftings from JV operations				
	Entitlement	354.83	324.17	309.31
	Liftings	360.00	316.12	309.20
	(Over)/under lifting	-5.17	8.05	0.11
Table 2.7				

1.1.3 Issues

1.1.3.1 Definition and determination of production

Accurate measurement of crude oil takes place only at transfer of custody. Such fiscal measurement is carried out when oil is sent from an onshore terminal or offshore FPSO or FSO for sale by export or to a Nigerian refinery. There are also fiscal measurements where oil from one party's operation is pumped to an export point via another party's pipeline.

Field measurements are also taken for the purposes of monitoring the overall system. The flows of liquids between wells and flow stations are multiphase (i.e. a mixture of oil, water, gas and other impurities). Measurement of such flows is technologically very difficult and there is typically an uncertainty of +/- 10% for nominally 2-phase flows, and greater uncertainty for 3-phase flows. The continuous field measurements are usually supplemented by periodic well tests, which sample the well and determine the fluid characteristics such as Base Sediment and Water (BSW). These measurements are accurate – but only for the point in time when the sample is taken. These analyses enable companies to allocate final volumes at the terminal back to the original field. This procedure is by no means precise, but is the best approximation given the data available.

Precision in measurement is made more difficult by evaporation of gas and further settlement of solids while the crude is stored at the terminal. Such changes to the crude are dealt with under the heading of "Terminal Adjustments". This means that when product is lifted (or measured), there may be differences from measurements taken when the product arrived.

Consequently, companies tend to take a pragmatic approach to volumetric measurement and there are agreements in place between, for example, Terminal Operators and 3rd Party users of terminal facilities on how volumes will be assessed. To simplify the commercial arrangements, the Terminal Operator may apply a standard loss factor to the 3rd party supply, irrespective of any actual loss.

We understand that all companies returned figures for production based on the fiscal measurements – i.e. after removal of BSW – grossed up for estimated BSW content and line losses. It was not within the scope of the assignment to validate the detailed processes involved in deriving production, although we include in the terminal balances information provided by companies on gross volumes, dewatering and so on.

The measurement processes and methodology applied in the calculation of production should be borne in mind when production figures are considered: production figures are mostly inferred rather than directly measured.

1.1.3.2 PSC arrangements

Except as noted in Section 2.2 or in the terminal balances (Appendix B), liftings by NNPC and PSC operators have been agreed.

It has not, however, been possible to assess the entitlement of the parties to production from several PSC operations due to disputes between NNPC and the PSC Contractors over interpretation of several aspects of the PSCs, relating to

- a) ring-fencing the costs of the PSCs;
- b) the applicable royalty rate;
- c) deductibility of certain expenditures for PPT purposes;
- d) the entitlement to and timing of capital allowances; and
- e) the entitlement to and correct application of Investment Tax Credit

The quantity of oil not apportioned in the PSCs concerned over the three year period 2006 – 2008 is 411 million barrels. The interpretation of the PSCs is now in independent arbitration and NNPC has stated that financial proceeds amounting to “over US\$7.00 billion in dispute has already been remitted to the Federation Account”,

The question of interpretation continues to cloud the entitlement of the Federation to production from the PSCs and we recommend that the parties should seek to have the arbitration concluded expeditiously, including by out-of-court settlement.

1.1.3.3 Downstream

There are various inconsistencies in the data provided by NNPC PPMC and the data supplied for depot balances, transfers and shipping movements is incomplete.

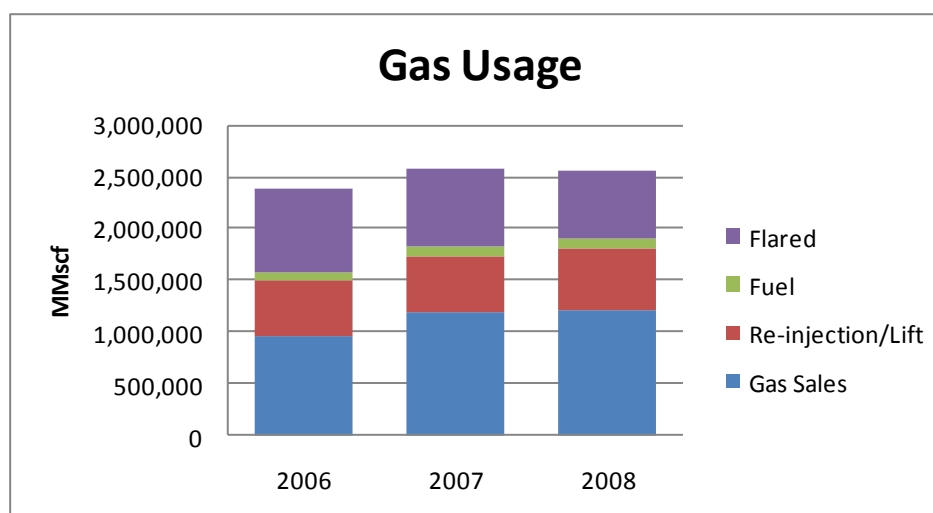
By way of example, a comparison of the data provided by NNPC PPMC with that from terminal operators for oil transferred to refineries reveals differences; and returns from Warri refinery show oil was transferred to Kaduna refinery, but the returns from Kaduna report different amounts received. No explanation for these differences has been provided.

The data supplied by NNPC PPMC for Kaduna refinery showed receipts of imported oil, however other information provided by NNPC stated that no oil was imported during the period. While we understand that stocks of imported oil are held at WRPC and that these may have been transferred to KRPC during the audit period, such transfers were not reported by NNPC.

NNPC PPMC did not declare any exports of refined products, however the audited accounts of NNPC disclose export sales of product.

1.2 Gas

Gas production and utilisation during the period was:-



Usage (mmscf)	2006	2007	2008
Gas Sales	965,925	1,194,798	1,209,021
Re-injection/Lift	523,452	538,817	603,783
Fuel	91,087	91,407	94,698
Flared	810,925	751,123	643,588
Total	902,012	842,529	738,286
<i>Table</i>			

The comparison of volumes of gas sold by producers and received by major customers is included in the Gas Report.

1.3 Product Importation and Distribution

We are unable to confirm the overall mass balance for the following reasons:

- Marine transfer data is incomplete. It appears to cover only the immediate Lagos area, not transfers between Port Harcourt, Warri and Calabar. And it is ambiguous about the owner of the product at the discharge port (PPMC or a 3rd Party).
- Importation data for split cargoes does not differentiate volumes to each destination. Furthermore, many of these split locations deliver to both PPMC and 3rd parties.
- Unable to distinguish between depot transactions that are sales to 3rd parties and those that are supplies to PPMC. Only the Mosimi Area identifies significant sales.
- No data provided on 3rd party storage (where PPMC contracts with 3rd parties to store product at their facilities).

The procedure followed by PPMC between receipt of tenders and issue of the quarterly letters authorising award of cargoes and contracts is not transparent. In some cases, contracts have been awarded at higher prices than some of the tendered prices. We have not been allowed to sight any documentation or authorisation thereof.

A shortlisting process, whereby potential suppliers are pre-selected to receive Invitations to bid, should be implemented. The practice followed during 2006 – 2008 did not appear to follow written procedures, and in any event the written procedures themselves were not transparent.

The portfolio of suppliers has been widened substantially, which is a positive step implemented since the 2005 audit report. However, whilst the number of suppliers has increased, we are not in a position to validate the competency of many of the suppliers.

The quarterly process set down for products importation tender is often run late, resulting in uncertainty for potential suppliers. Uncertainty tends to increase the risk premium that has to be paid by PPMC.

1.4 Review of Bid Rounds

Our review of bid rounds describes the licensing regime in Nigeria during the period 2006 - 2008. Our observations and conclusions are:-

- The quality of the licensing process that DPR operated in the 2006 bid round generally represented an improvement in comparison to the 2005 round. Likewise, the 2007 round included further improvements compared to 2006.
- DPR in 2006 adopted a proactive approach to improving the bidding process.
- Some blocks are subject to court challenges in relation to DPR's right to offer the blocks. This happens sufficiently often that a review should be undertaken to identify accurately the specific issues that give rise to the disputes and seek to improve respective processes. The consequence of court challenges includes the sterilisation of the block; signature bonus payments that are locked in escrow accounts; effort and expense required to pursue litigation.
- NNPC should inform DPR of the date of signing of each PSC; otherwise, DPR lacks the information to ensure that all committed signature bonuses are collected. There were inconsistencies between various schedules provided by DPR.
- A number of issues arise from the introduction of "First Right of Refusal" allocated with the approval of the Presidency to certain bidders who undertook to make infrastructure investments:
 - there was no transparency around how the rights were allocated
 - there is perception that the commitments undertaken by successful bidders are not being followed through; this is compounded by the lack of transparency in the process for managing the implementation of the infrastructure projects.
 - DPR with NNPC NAPIMS should publicly identify the organisation that is responsible for enforcing the infrastructure commitments entered into by the contractor.
- Nigerian legislation and regulation in relation to allocation and management of blocks retains a number of important administrative discretions; it is preferable to replace these with detailed procedural requirements so that investors can know what they have to do to reduce the risk of their investment.

We make further recommendations for the detailed improvement of the process in our detailed report (Appendix F).

1.5 Technical Assessment of the Measurement Process

1.5.1 Upstream

We reviewed the DPR Measurement Guidelines; these Guidelines remain a confidential "work in progress". We believe DPR Standards should be widely disseminated and available and that the document should be published on the DPR website.

It is important that the Guidelines should be kept up to date, with clearly identified revisions. Measurement technologies continue to advance,

The search for a solution to the wellhead measurement issue continues. The issue was raised in the context of (a) monitoring pipeline losses between wellhead and terminal and (b) allocating production to field. We believe that the proposal that multiphase meters should be required at all wellheads would be impractical.

1.5.2 Downstream

From our discussions with PPMC it is apparent that the issues raised in previous audits have not been addressed, in particular:

- the inadequate tank dip and sampling procedures at PPMC depots
- the requirement to train PPMC staff.

In addition we understand that the automated tank gauging system installed across the depots remains inoperative.

We have reviewed the measurement procedures applied to product importation and have concerns about the following:

- Local issues over the inaccuracy of onshore tank dips have led PPMC to rely on discharge quantities from (unclassified) lightering vessels as the basis for import calculation. This in turn is contingent on the accuracy of ship-to-ship transfer measurement, which is notoriously inaccurate.
- All imports should be accompanied by a valid Certificate of Origin and Bill of Lading from the port of loading. It is apparent that a number of cargoes are trans-shipped from “offshore Nigeria” yet appear to retain the original Bill of Lading.

1.6 Process of Pricing Federation Equity Crude

- 1.6.1** There is an established procedure within NNPC for setting and authorising monthly OSPs for Nigerian crude oils. The internal market research and analysis together with the authorisation processes have been tightened over the last few years, such that OSPs are usually published within a target date range of 15th to 18th of the prior month. The OSP methodology is sound and, subject to a few exceptions documented in our report, is well conducted.
- 1.6.2** We reviewed the pricing methodology applied. Our analysis shows a reasonable correlation between OSPs and the average of Platts for the previous month. In certain months and for certain grades, there appears to be a generous margin for offtakers, and in other instances a significant disincentive to lift. This appears to be an unavoidable consequence of the timing of setting the OSP.
- 1.6.3** COMD has progressively charged increased premiums for the pricing period option reflecting an increase in the value of the option due to steepening backwardation or contango in the market at the time. However, our analysis suggests that over certain periods the opportunity to levy even higher premiums may not have been fully exploited.
- 1.6.4** Several cargoes have been identified with 'exact' net B/L quantities, i.e. rounded to a whole number of thousands of barrels, suggesting that actual quantities loaded may not have been correctly calculated and invoiced¹.
- 1.6.5** Payments for Nigerian crude oil for the Federation account are generally clear and consistent in terms of bank account details. Variations sometimes occur in relation to PPMC account payments and also payments for FIRS or DPR, where the shipping and valuation document files that we were shown did not include an adequate audit trail or apparent authorisation from senior management for changes made to bank account nominations. We would have expected to have seen documented evidence of these changes.
- 1.6.6** Occasionally, the value of Letters of Credit is insufficient in value to cover the relevant crude oil lifting. This arises from an increase in Brent prices in the intervening period between when LCs are required to be opened and when the pricing period occurs.
- 1.6.7** We requested copies of standard procedures and / or standing instructions and minutes of meetings but we were advised that they do not exist. Instead, the contract documentation sets out the only written form of COMD's engagement with the market. COMD describes this as its 'rule book'.
- 1.6.8** While acting as agent for the Federation in selling crude oil, NNPC is also a customer of the Federation in respect of Domestic Crude (the quantity of crude allocated for refining); for this crude, NNPC is intended to pay the same price as export customers. However:
- 1.6.9** • There is no written contract between the Federation and NNPC5;
- 1.6.10** • NNPC, by agreement, pays the Federation on 90 day terms whereas other customers pay on 30 days; where NNPC exports domestic crude, NNPC obtains the cash flow benefit of this arrangement;
- 1.6.11** • NNPC exercises pricing options with the benefit of hindsight, enabling it to obtain consistently the lowest available price.

¹ COMD comment: Exact net B/L quantities are not operationally possible. The cases sited occur in split parcels loading into a single vessel. Essentially, the split is executed only in documentation and not in load and stop loading operation.

- 1.6.12** Among the sample shipments reviewed, the prices at which NNPC sells domestic crude oil are sometimes higher than the prices at which NNPC purchases the same crude from the Federation. It has been observed that between 2006 and 2008 the invoice amount was short by about \$244 million. It should be noted that this is probably on the low side, as we were not readily able to compare pricing of crude that was sent for refining.
- 1.6.13** NNPC commented that this arose due to NNPC exercising the most advantageous available pricing option when purchasing crude from the Federation.
- 1.6.14** In our view, NNPC took advantage of its privileged position as selling agent for the Federation: whereas other buyers are required to select their pricing option at lifting, NNPC delayed its selection until the 'future' prices were known. Thus, NNPC did not adhere to the Federation's marketing procedures.
- 1.6.15** The COMD offtaker list is not well balanced and should be reviewed. The ongoing practise of entering into export contracts for greater volumes than are available exacerbates the issue when Federation offtakers are cut back. NNPC should continue to reduce contracted volumes to better match expected production and also consider increasing the offtaker list to include final end user buyers/ major oil companies and reduce the current large contract allocation to traders². Domestic crude reallocated for export is dominated by a single NNPC JV offtaker (Calson Bermuda Ltd).

1.7 Utilisation of Gas

The overall picture of the gas market in Nigeria during the period of this review was encouraging, with improvements in the metering of gas, the operations of DPR and the relationship between producers and NAPIMs.

PHCN, NGC and NLNG did not fully comply with the NEITI's information requests, in particular with regard to gas contracts. Therefore, in the absence of copies of the various gas contracts as highlighted above it has not been possible to determine regarding the pricing mechanisms in use during the period of this review.

In terms of contractual compliance, those stakeholders interviewed had a positive view of the day-to-day operation of the contracts, however, the problem of non-payment continues. Until resolved, the problem of non-payment will not only undermine the existing gas market but the developing gas market too. Whilst it is recognised that even where payment does not take place, burning gas in non-paying power stations is marginally better than flaring it, such an economic strategy will hardly underpin a developing gas market.

Many of the recommendations from previous audits have not yet been implemented in full, and remain important issues to be completed, in particular with regard to non-payment, subsidies and many of the measures contained in the Petroleum Industry Bill, which has not yet been passed.

1.8 Systems and Procedures

In accordance with the Terms of Reference, we reviewed the procedures applied by DPR for management of royalty, the systems documentation for the FIRS and the systems and procedures for the OAGF. Our full reports are included in the Appendices listed. A summary of the major matters noted follows.

² COMD comment: Contractual volume allocations are given subject to production forecast and availability. Unfortunately, during the period under review Nigeria suffered serious setbacks in production despite several new oil fields coming on stream. Going forward, NNPC will consider curtailing contractual volume or number of customers

1.8.1 DPR royalty management (Appendix J i)

We obtained schedules of outstanding royalty payments for the period 2006 to 2008 from DPR for analysis and reporting. However, we could not make any meaningful analysis on the schedules because DPR informed us that the process of reconciling the outstanding balances with companies was continuing and that the outstanding balances could change once the reconciliation exercise is completed.

DPR stated that the reconciliation exercise which commenced in early 2007 will cover 1990 to the period of the audit.

The figures provided by DPR in connection with this exercise show that significant amounts of royalty have not been collected. The amounts recorded by DPR as due but not paid were:-

31st December 2006	\$ 838 m
2007	\$ 778 m
2008	\$1,041 m

We recommend that DPR concludes this historical reconciliation promptly, and in future carries out on a regular basis reconciliation of accounts with the producing companies so that the outstanding royalty payments are incontrovertibly established and strategies put in place to ensure that all arrears are collected.

1.8.2 Systems documentation for the FIRS (Appendix J ii)

We examined the processes in place in the Federal Inland Revenue Service covering assessment and collection of taxes, investigations and tax queries. No significant matters were noted.

1.8.3 Systems and Procedures for the OAGF (Appendix J iii)

The OAGF office does not have comprehensive list or database of all the Exploration and Production (E&P) upstream companies operating in the country.

- The NNPC monthly returns on crude oil sales does not indicate the volume of crude, the price charged, the exchange rate used and the method used for computing the proceeds.
- The OAGF has no control over the offshore accounts as it cannot deal directly with the Bankers. It relies on information supplied by CBN and NNPC.

In order to strengthen the OAGF and to optimally perform its constitutional role regarding Federation accounting, we recommend as follows:

- Government should computerize OAGF's operations and integrate all its data processes into a unified system for seamless storage, tracking and retrieval of financial flow data.
- The OAGF should receive all Exploration and Production (E&P) operating data in Nigeria so that it can have the complete and correct information and data to properly monitor compliance with all statutory obligations.
- The corollary of the above is the need to put in place a structure for a continued and improved interface with the upstream companies and the revenue agencies (FIRS, DPR and NNPC) in the funds flow process.

- The technical information and expertise available to the OAGF should be increased, to assist with more effective monitoring of revenues from the oil and gas sector
- The Federal government should grant the OAGF authority to liaise with the offshore banks on financial flow transactions that concern the upstream companies.
- NNPC should be advised to regularly submit detailed monthly returns that contain useful and required information for the proper update of OAGF's records.
- CBN should regularly offer the full services that a banker offers to its customer to OAGF. This includes sending regular (daily) funds receipt and payment advices, regular (daily but not exceeding) weekly statements of all funds received into all the accounts held by CBN on behalf of OAGF.
- CBN should offer full support to the OAGF in regularly reconciling the Federation account records held by the OAGF to the CBN bank statements for those accounts and speedily clear unreconciled items.

1.9 Information from covered entities

Certain information has not been provided to us by covered entities, which has materially affected the analysis we have been able to undertake and the conclusions drawn.

1.9.1 Upstream

- a. We did not receive complete information from DPR on production. In many instances whole months of data were simply missing. The DPR annual summary of production is different from that provided on the DPR monthly schedules.
- b. The Zafiro field is a cross border unitisation. Production is carried out by Mobil Equatorial Guinea (MEGI), which was not requested to provide any data to us, being an entity outside Nigeria. Information on liftings during the period was provided by TEPNG, NNPC and DPR, although data from DPR only starts in mid 2007. This will be an ongoing issue. We recommend that NEITI directly approach MEGI and aim to establish a mechanism to obtain data for future audits.

1.9.2 Downstream

The incomplete nature of the data provided by PPMC meant that we are unable to confirm the overall downstream mass balance, in particular:

- The marine transfers data did not include any transfers to or from ports outside the immediate Lagos area, particularly Calabar, Port Harcourt and Warri.
- The importation data did not completely describe the destination for cargoes that split discharge between two or more locations.
- There was no differentiation between discharges to 3rd parties (that would be a PPMC "sale") and discharges to PPMC own facilities. Similarly for onshore depots, there was no distinction made between transfers to PPMC facilities and 3rd Party Facilities. In particular we were aware that PPMC had set up agreements with 3rd parties for the storage of products. Although we requested the data, no details were provided of volumes stored with 3rd parties.
- Difficulties were also caused by provision of information in a different format and by volumetric (m³) data being provided on templates that requested mass (tonnes) data.

2 REPORT OUTLINE

2.1 Objectives

The purpose of the report is to

- present an aggregated Hydrocarbon (oil and gas) gross fluids mass balance for Nigeria
- reconcile production, supplies to refineries, exports and vessel liftings, based on NNPC COMD records
- reconcile company data of fiscalised crude oil with the data as per the records of the DPR and the volumes of oil / gas used for PPT and Royalty purposes and to estimate the impact on Government take of any discrepancies
- present a reconciliation of gross production by field (wellhead measurements, if available, otherwise flow station measured quantities) with terminal receipts, as provided by covered entities
- confirm the Operator's calculations of the way in which production has been shared to each interested company and in particular to the Government

This report is structured to address these objectives for each of the hydrocarbon systems.

There are separate sections dealing with:

- the reconciliation of oil flows between production fields, terminals and liftings
- the allocation of production to equity owners
- gas flows
- LPG and NGLs

The TOR exclude activities and entities involved in the petrochemical industry (e.g. refineries, chemicals production), or the processing of crude oil and gas, but such entities are required to confirm their relevant stocks, receipts from and inputs to the oil and gas sector.

As the drive to eliminate gas flaring continues, increasingly producers are installing equipment to process gas. Generally, so-called "wet gas" can be processed into:

- "lean gas" – used for fuel either in power stations or industrial factories
- LPG - used mostly for domestic fuel
- NGLs (Natural Gas Liquids) - may be used as chemical feedstock, but in Nigeria they are usually "spiked" (recombined) back into a crude stream to become part of the blend.

2.2 Structure of the report

The report comprises:

Reconciliation report

Appendices (bound separately)

The Reconciliation report contains an Executive Summary, a brief overview of the extractive sector in Nigeria, oil and gas flows in summary and on a disaggregated basis, a downstream mass balance and a reconciliation of supplies of crude to the Nigerian refineries..

Disaggregated reconciliations are set out in full in the accompanying appendices.

Recommendations are presented in Section 10 for improvements in transparency and EITI processes, based on issues arising during the Engagement.

2.3 Scope of work

Hart Resources Ltd and SS Afemikhe & Co (Chartered Accountants) ("the Consultants") were required to undertake the work set out in the Terms of Reference (TOR) for the engagement. The assignment has been carried out under the TOR included as Part 12 - Resource Documents - section C.

This report reflects data and information received by Hart Group from covered entities up to 31st May 2011. Comments and adjustments received after that date have been taken into account where feasible.

2.4 Participants in the Reconciliation

We presented a report of the entities to be included in the 2006 – 2008 NEITI Report to the NSWG under the Terms of Reference for the assignment. the entities approved by the NSWG for inclusion in the exercise are listed in Resource Document B, "Covered Entities Report".

2.4.1 Government

For the Physical and Process Report, the government reporting entities are:

- NNPC, including its relevant business units and associated entities;
- The Department of Petroleum Resources
- The Office of the Accountant General of the Federation (systems and procedures)
- The Federal Inland Revenue Service (systems and procedures)

2.4.2 Companies

The Terms of Reference state that all companies which are or were:

- Involved in producing Nigerian oil and gas;
- Party to an agreement to produce Nigerian oil and gas, and in which production did in fact commence during the period;
- Party to an agreement to explore for oil and gas within Nigeria for which any payment (such as acreage rental, signature bonus, etc.) was due for payment during the period;
- Party to a grouping which was awarded a block in a licensing round in the period, or to a grouping that was otherwise awarded a license; or
- Party to cross-border unitization agreements where there was production from Nigerian resources in the period

- Contracted to do work on a producing field and received remuneration in kind during the period.

are to be included as Covered Entities. The process of identifying the companies, the difficulties encountered with DPR and the list of companies included is set out in Part 12- Resource Documents - section B.

2.5 Methodology

Requests for information on oil production and export volumes were issued to all companies who produced oil or gas during the audit period, and information was requested from NNPC COMD and NNPC NAPIMS on exports, production sharing calculations and inputs to refineries. NNPC/PPMC was requested to provide information on downstream importing and distribution, while NNPC was requested to provide information on refinery inputs and outputs.

Similar templates were issued to DPR requesting details of volumes fiscalised for each producing company in respect of production and liftings.

These requests included templates on which the data was to be reported (see Resource Documents).

Reconciliation Issues

- Generally the quality of data provided for this audit was lower than for the 2005 audit. There were more errors and it was less complete.
- Physical data received was in effect based upon net balance (after de-watering, etc.). We had asked for production data derived from in-situ field records. Almost all companies provided field data back-calculated from terminal data.
- Some specific issues have been caused by shut-in of facilities. In particular Forcados Terminal was closed, but in order to keep the gas fields supplying the power stations, arrangements had to be made to handle the associated condensate (which normally would have been spiked back into the Forcados crude stream). Consequently for a number of months, a condensate sales operation was handled through Warri Refinery. For the purpose of the mass balance, this significantly complicated matters.
- Location of stock. Although the majority of stock is held at terminals, stocks are also held at various flow and processing points. In the case of the Forcados Condensate, the stock actually held in two locations – the Ughelli Gas Plant and the Warri Refinery. For third party injections, where fiscalised transfers are made into another company's infrastructure, stock is also held at the third party's facilities. These stocks will generally be included in the calculation of production, but are not included in the terminal stock figure.
- Terminal Adjustments are made by Terminal operators to account for shrinkage (and sometimes spillage) that occurs at the terminal. Even nominally dry crude that sits in a tank suffers shrinkage from evaporation, water separation and the release of dissolved gases. To simplify the templates we had aggregated water separation (at the terminal) and shrinkage into one line item.
- Adjustments are applied to production on a month by month basis and appear to affect the notional stock applicable to each operation.
- Reconciling cargoes to terminals was problematic due to a greater than expected number of errors in the company supplied data. A number of cargoes were allocated to the wrong terminal and some were "double-counted".

- Date formats. We encountered a significant number of problems due to companies using different formats. Although all templates requested data to be provided as dd-mmm-yy (eg 02-mar-07), which is unambiguous, many templates were returned with the formats dd/mm/yy or mm/dd/yy (the latter being the US date format) or simply dd-mmm.

During the aggregation and reconciliation this resulted in a number of timing differences as cargoes were placed into the wrong month. Unravelling such errors is made harder since most cargoes are of similar volumes, so the resultant numerical difference may be small.

- Identification of Lifter: As mentioned above, NNPC is entitled to lift from a number of different crude streams entering the main onshore terminals. Furthermore, NNPC lifts on behalf of the Panocean JV and NPDC. In reality this results in a single cargo perhaps holding two or three parcels of crude attributable to different operations. This issue is spreading to the other companies as production from the small independent producers is often sold to the terminal operator at the terminal since the volumes are insufficient to make up complete cargoes.

Two particular difficulties resulted from APDNL not identifying the lifter on the templates, and TEPNG misallocating cargoes to the wrong terminal: since one of these was Zafiro, we did not have Terminal Operator data against which to reconcile the differences.

DPR

- DPR continue to make little distinction between producing JVs and lifting companies (e.g. SPDC JV from SPDC, the company). or to distinguish accurately or consistently between subsidiary companies. This makes reconciliation of information difficult, both for NEITI but also for DPR.

2.6 *Material differences*

The Terms of Reference for the NEITI reconciliation report state that:

- every discrepancy in the underlying data, or differing data from competing sources, pertaining to a specific transaction where the difference exceeds 5,000 barrels equivalent shall be specifically identified in the report and the nature of the discrepancy, if determined, shall be summarised.
- where the aggregate value of discrepancies within an individual financial flow is less than US\$5m ,no further investigation is required
- the permissible margin of error for aggregate reporting is zero point five percent of the aggregate value of all flows encompassed within the audit's scope, otherwise the Consultant shall report that the data has not been confirmed.

The result of the reconciliation is that flows were materially reconciled except for the following:

3 INDUSTRY STRUCTURE

In this section, we describe the institutional arrangements in the sector:

- Government agencies
- Nigerian National Petroleum Corporation
- The private sector

3.1 *Government agencies*

The government agencies involved in the areas of

- regulation of the oil and gas sector
- monitoring of the oil production activities in terms of technical commercial viability
- monitoring of the oil production activities in which the government participates either as Joint Venture Partner or Production Sharing Concessionaire

are described briefly below. The description relates to the period 2006 – 2008.

3.1.1 DPR

The Department of Petroleum Resources is responsible for the supervision of all petroleum industry operations being carried out under licences and leases in Nigeria. This includes processing all applications for licences, monitoring the timeliness and adequacy of all rent and royalty payments and maintaining records on the operations of the petroleum industry, particularly those relating to petroleum reserves, technical viability of production and exports of crude oil, gas and condensate, licences and leases.

Further details on DPR can be found at www.dprnigeria.com.

DPR is responsible for providing information for the NEITI reconciliation concerning holders of licences to prospect or extract hydrocarbons, the bidding process and signature bonuses. This is an essential part of determining the business entities which are covered by the NEITI reconciliation.

3.1.2 NNPC

NNPC is a corporation established by statute, owned 100% by the Federal Government of Nigeria, with responsibility to the Ministry of Energy for participating on behalf of the Federation in the exploration and exploitation of hydrocarbon reserves, and the processing, import/export and sale of hydrocarbons.

Information about the Corporation may be found at www.nnpcgroup.com/Home.aspx.

NNPC and its subsidiaries are responsible for providing information for the EITI reconciliation on all the covered flows (see Section 2.4).

The activities of NNPC on behalf of the Federation are carried out by NAPIMS. NNPC also undertakes commercial operations in its own right: in the upstream through its subsidiary the Nigerian Petroleum Development Company (NPDC); through the three refineries; and in the downstream through the Pipeline Products & Marketing Company (PPMC) and Nigerian Gas Company (NGC)

3.1.3 NAPIMS

National Petroleum Investment Management Services (NAPIMS) in the Exploration & Production (E&P) Directorate of NNPC is the upstream arm of NNPC that oversees the Federation investment in the Joint Venture Companies (JVCs,) Production Sharing Companies (PSCs) and Services Contract Companies (SCs).

NAPIMS is, therefore, set up to earn margin arising from investments in the JVCs, PSCs, SCs, with the multinationals and also protect the nation's strategic interests in the joint ventures. In addition, NAPIMS engages in frontier exploration services in basins where the multinationals hesitate to venture, like the Chad Basin.

Further details can be found at <http://dev.nnpcgroup.com/napims/Home.aspx> and at <http://www.nnpcgroup.com/NNPCBusiness/Subsidiaries/NAPIMS.aspx>

3.1.4 Operations

NPDC is the operator of 3 onshore fields and one offshore field, and a participant in a number of exploration and development licences. As its capacity and capability grow it is expected to take on the operatorship of more existing Joint Venture fields as NNPC exercises its pre-emptive right to appoint the operator under the JOA.

NNPC has refineries at Kaduna, Port Harcourt and Warri. These have a combined design capacity of 445,000 bpd

A network of pipelines and depots located throughout Nigeria, managed by the Pipelines and Products Marketing Company (PPMC), facilitates the supply of refined product, supplemented as necessary by imports, to customers throughout the country, both in bulk and also through NNPC's own retail outlets

The Nigerian Gas Company Limited (NGC) is charged with the responsibility of developing an efficient gas industry to fully serve Nigeria's energy and industrial feedstock needs through an integrated gas pipeline network and also to export natural gas and its derivatives to the West African Sub-region. NGC gathers, treats, transmits and markets Nigeria's natural gas and its by-products to major industrial and utility gas distribution companies in Nigeria and neighbouring countries.

NNPC participates on behalf of the Federation in other gas distribution and downstream activities, such as Nigeria Natural Gas Limited (NLNG) (see <http://www.nlng.com/NLNGnew/default>), where it has a 49% shareholding; and West African Gas Pipeline Company Limited, where it has a 25% shareholding (see <http://www.wagpco.com/>).The WAGP was in the build phase during the period of this reconciliation]

The downstream and processing activities are not included in the scope of the reconciliation.

3.2 Private Sector

3.2.1 Introduction

The rights to win and carry away petroleum, including natural gas, in Nigeria are granted to investors by the Minister through the Oil Prospecting Licence (OPL), which is converted to the Oil Mining Lease (OML) once commercial quantities of hydrocarbon have been discovered.

An OPL or OML is held by NNPC, by companies in joint venture with NNPC, or by companies as a sole risk operation. Since the early nineties, all new areas have been governed by Production Sharing

Contracts (PSC), which allow NNPC (as licence holder) to contract with investors to bear exploration and production risks in return for cost oil and part of profit oil.

3.2.2 Joint Ventures

There are 6 Joint Venture Operations producing Oil and Gas. Five of these are with IOCs and one (POOC JV) is with an indigenous company.

SPDC JV	NNPC (55%) Shell Petroleum Development Company Ltd (30%) Total Exploration & Production Nigeria Ltd (10%) [formerly EPNL] Nigerian Agip Oil Company Ltd (5%)
CNL JV	NNPC (60%) Chevron Nigeria Ltd (40%)
TEPNG JV (formerly EPNL JV)	NNPC (60%) Total Exploration & Production Nigeria Ltd (40%)
MPNU JV	NNPC (60%) Mobil Producing Nigeria Unlimited (40%)
NAOC JV	NNPC (60%) Nigerian Agip Oil Company Ltd (20%) Phillips Oil Company Nigeria Ltd. (20%)
POOC JV	NNPC (60%) Pan Ocean Oil Company Ltd. (40%)

The JVs operate according the Joint Operating Agreement (JOA), the main principles of which are that:

- One of the partners is designated the operator.
- All parties share in the cost of operations (agreed annually and financed through cash calls)
- Each partner can lift and separately dispose its interest share of production subject to the payment of Petroleum Profit Tax (PPT) and Royalty.

During the Reconciliation period, through its subsidiary NPDC, NNPC has begun to take over the operatorship of some fields from JVs, starting with Orede and Oziengbe South.

3.2.3 Production Sharing Contracts (PSCs)

PSCs are agreements between NNPC and a company (the Contractor). NNPC is granted the licence and must fulfil the licence obligations to pay taxes. The Contractor bears all the costs and risks of development. The produced oil is shared between NNPC and the Contractor to cover Royalty, Production Costs (including capital) and PPT. The remaining (profit) Oil is shared.

PSCs do not cover the exploitation of gas, except to state that where gas is discovered in quantities which may be commercially exploited, a separate Gas Development Agreement is to be agreed between the NNPC and respective investors.

The entitlement to oil produced under PSCs differs from JV arrangements. The state is entitled to royalty as a first call on production; development costs may then be recovered by the contractor, any PPT liability is then settled to the state and any remaining oil is shared between NNPC (for the government) and the contractor under percentages set out in the PSC.

During the Reconciliation Period, six PSCs were producing, four of which were undergoing trial marketing at some point during the period:

Main Field	Contractor
Abo	Operated by Nigerian Agip Energy Ltd
Agbami	Operated by Star Deepwater Petroleum Ltd (a subsidiary of ChevronTexaco) (Agbami is a unitisation between two PSCs)
Antan	Operated by Addax Production Development Nigeria Ltd
Bonga	Operated by Shell Nigeria Exploration & Production Co Ltd
Erha	Operated by Esso Exploration & Production Ltd
Okwori/Izombe	Operated by Addax Petroleum Exploration Nigeria Ltd.

3.2.4 Sole Risk Operations

The following indigenous companies are participating in Sole Risk operations that were producing in 2006 - 2008:

Amni International
Atlas Petroleum
Brass Exploration Unlimited*
CAMAC*
Cavendish
Conoil Producing/Continental Oil & Gas
Dubri
Express Petroleum
Moni Pulo
Midwestern Oil & Gas*
Niger Delta Petroleum Resources*
Newcross Petroleum*
Platform Petroleum
Shebah Exploration & Production Co Ltd
Waltersmith Petroman

Companies marked with an asterisk are partners to a producing field, not operators.

In addition, NPDC is the Operator of the Okono (Mystras FPSO) field, until 2006 operated under a Service Contract by Agip Energy & Natural Resources Ltd (AENR).

3.2.5 Unitisation Agreements

Where a single hydrocarbon reservoir is found to cross the boundary of two or more licence areas, it becomes necessary to reapportion the rights between the participants in each licence. For purposes of efficient reservoir exploitation a single operator is appointed.

In addition to the local unitisation agreements, there is one cross-border unitisation agreement (Ekanga/Zafiro). This is operated by Mobil Equatorial Guinea Inc and the TEPNG JV is the Nigerian unitisation partner.

3.2.6 Marginal fields

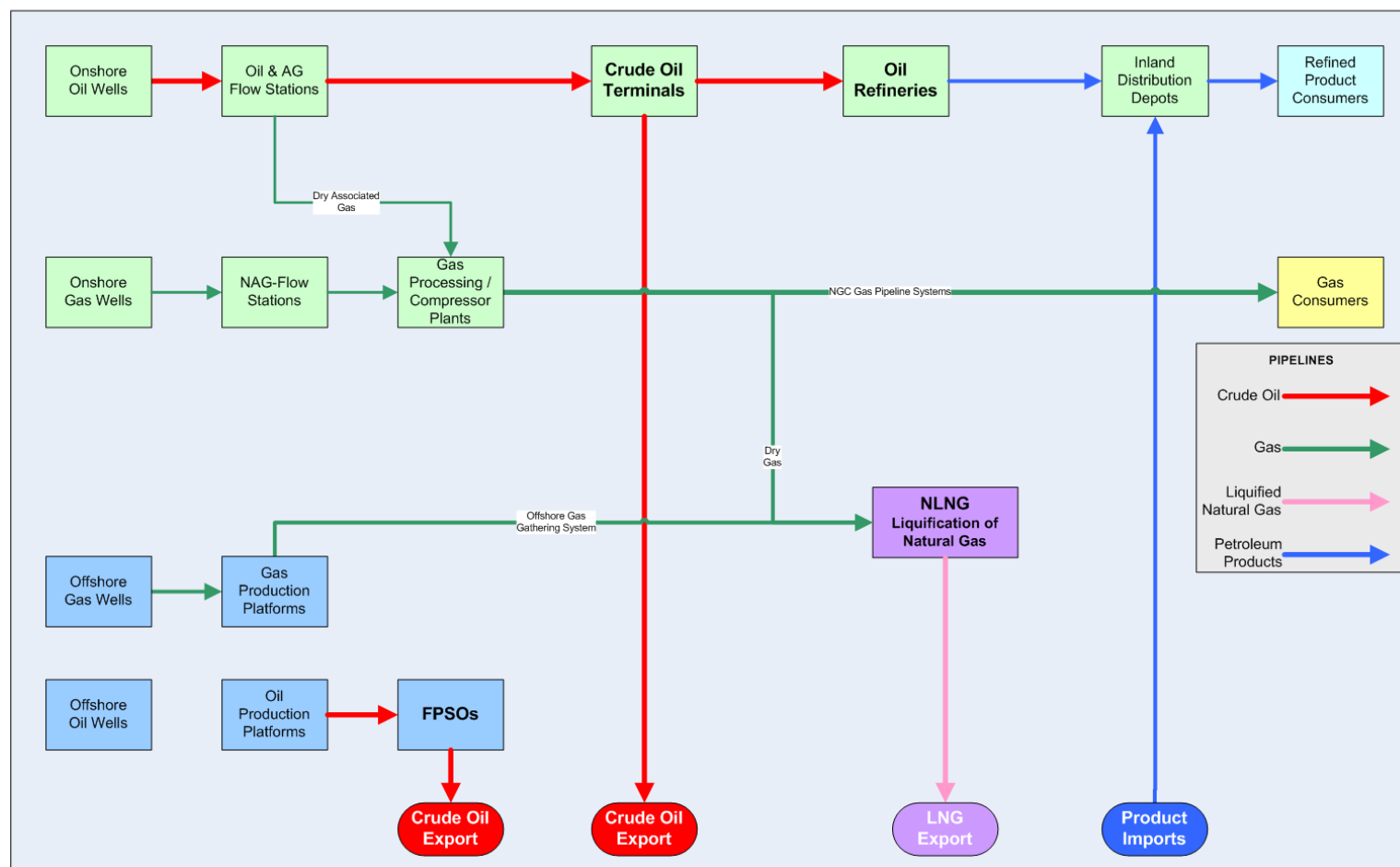
The Marginal Field programme was instituted by the Government to promote the local indigenous sector and develop discovered fields that had not been exploited by the JVs. So far only three of these fields have commenced production (identified* below).

There are 26 such companies involved, many of whom are partnered with international companies to provide technical expertise and finance:

Associated Oil & Gas Ltd
Bayelsa Oil Company Ltd
Bicta Energy Management Services Ltd
Brittania U-Nig
Chorus Energy
Dansaki Petroleum Unlimited
Del Sigma
Energie
Eurafric Energy Ltd
Excel
Frontier Oil Ltd
Goland Petroleum Development Co Ltd
Guarantee Petroleum Ltd
Independent Energy Ltd
Midwestern Oil & Gas*
Millenium Oil & Gas Ltd
Movido Exploration & Production Ltd
Network Exploration & Production Ltd
Niger Delta Petroleum Resources Ltd
Pillar Oil Ltd
Platform Petroleum Ltd*
Prime Exploration & Production
Sahara
Sogenal Ltd
Universal Energy Resources Ltd
Waltersmith Petroman*

3.3 Schematic Overview

Hydrocarbon System Overview – Flow Diagram



Detailed schematics for each system have been provided in the Production Arrangement reports, found in Appendix A.

3.4 Overview of Crude Terminals

At the end of 2008 there were the following twenty one oil export terminals in Nigeria.

OPERATOR	LOCATION	Offshore vessel
NAOC	Brass	(onshore)
CNL	Escravos	(onshore)
MPNU	Qua Ibo	(onshore)
MPNU	Oso (cond)	(onshore)
SPDC	Bonny	(onshore)
SPDC	Forcados	(onshore)
Addax	Antan	Knock Adoon
Addax	Okwori	Sendje Berg
Amni	Ima	Ailsa Craig
Amni	Okoro	Armada Perkasa*
CNL	Oloibiri	Pennington
Cavendish	Obe	Crystal Sea
Express/SEPCOL	Ukpokiti	Trinity Spirit
MPNU	Yoho	Falcon
NAE	Abo	Gray Warrior
NPDC/AENR	Okono	Mystras
SPDC	EA	Sea Eagle
SNEPCO	Bonga	Bonga
EPNL	Amenam	Unity
EEPNL	Erha	Erha
Star	Agbami*	Agbami*

*commenced during 2008

All these export points have their own fiscalised metering systems for crude oil exports. In addition, 3rd party inputs to these terminals are fiscalised prior to injection. Third party inputs to export terminals are as follows:-

OPERATOR	Terminal
Panocean	Forcados
Conoil	Escravos
Conog	Oloibiri
NPDC	Brass, Bonny
Dubri	Escravos
Monipulo	Antan
NDPR	Bonny
Platform	Brass
Midwestern	Brass
Waltersmith	Bonny

4 UPSTREAM CRUDE OIL VOLUMETRIC RECONCILIATION

4.1 Introduction

In this section, we discuss key methodological issues concerning the volumetric reconciliation and its relation to company-level production entitlements.

The physical reconciliation has three components:

- Production and Terminal balance including stock changes
- Export reconciliation
- Allocation of production to participating equity interests

Technical and commercial issues arise in each.

4.2 Mass balance methodology

The 1999-2004 audit report discussed in detail the difference between a Gross Oil Balance and a Net Oil Balance. Briefly the net oil balance is derived from the allocation of terminal data back to individual fields, whereas a gross balance seeks to quantify all causes of loss (leakage, shrinkage, theft etc.) throughout the system.

The 2005 Audit attempted to create a simplified gross balance and this approach was used again for the 2006-8 audit.

The producing companies were requested to provide monthly data to enable a “Gross Liquid Mass Balance” to be compiled. They were requested to show, for each Flow Station (from records of measurements at the flow station):

- 1) The total measured flow rate of liquids into the flow station each month (this would normally be a mixture of oil, water and gas – and would not be expected to be precise)
- 2) The volume of any 3rd party additions at the flow station (normally this would be dry crude)
- 3) The volume of water removed at the flow station
- 4) The volume of liquids passed on from this flow station (this may be oil and water) – to the next identified processing point, or to the export terminal.
- 5) The quantity of gas flared
- 6) The quantity of gas passed on (if the gas is used) and where the next gas processing point is.

Theoretically, aggregating this information across all producers will give the total of liquids entering the system. Though there are a number of limitations and caveats:

- 1) We recognise that measurement at the wellhead is largely impractical. Hence any losses between the wellhead and the flow station would not be detected.
- 2) Field meters are not very accurate (+/-10%). There is debate about whether the inaccuracy is random – i.e. over a large number of measurements the average reading would be correct. Or whether there are systemic inaccuracies – i.e. particular flow conditions may cause a meter consistently to over/under measure.

At the other end of the system, the terminal operators were requested to provide the following data:

- 1) Opening stock.
- 2) Monthly gross receipts (i.e. total liquids arriving at the terminal during the month)
- 3) Total de-watering/terminal adjustments applied
- 4) Total liftings during the month
- 5) Closing stock each month

Aggregating this data across all terminals, theoretically allows us to calculate the total liquids leaving the system at the end point. And a comparison between the production data and the terminal data would quantify the total losses in the system (although it would not identify the cause of the loss).

In practice, there was great variation in how the information was provided. All the producers appeared to provide production data calculated on a netback basis, rather than raw field production data. Further, many identified water separation at the field level, even in cases where water is only separated at the terminal (this attribution of produced water back to the field is usually based on water cut analysis of production samples and is used to support the attribution of crude to each field).

5 SUMMARY OF OIL FLOWS

Figures for production are reported by the terminal and sole risk operators and by PSC contractors, in their capacity as the organisation responsible for managing the production operations, and are also reported by DPR, as the regulator on behalf of the state.

Figures for liftings are reported by the terminal and sole risk operators and by PSC contractors, in their capacity as the organisation responsible for managing liftings at the point of export. Liftings are also reported by DPR, as the regulator on behalf of the state. The entity which is lifting the crude oil also reports the quantities lifted; this includes NNPC, which reports all liftings which it makes.

There are differences between the figures reported for production by operators and by DPR; and there are differences between the figures reported for liftings by operators, DPR and the lifters themselves. Commentary is included throughout the report.

5.1 Production and liftings

Total production and total liftings during the period were reported by the terminal, sole risk or PSC operators, and also by DPR

<i>Millions barrels</i>	2006	2007	2008
Production			
<i>Reported by Operators</i>			
JVs	656.67	582.27	540.08
PSCs	159.24	191.61	193.75
Service Contractor	4.05	4.00	3.44
Sole risk	38.24	23.99	27.98
Total	858.20	801.87	765.25
<i>Reported by DPR</i>			
Total	856.59	785.69	722.10
Difference	1.61	16.18	43.15
Liftings			
<i>Reported by lifting company</i>			
JVs	671.75	596.69	555.33
PSCs	159.61	191.40	189.84
Service Contractor	5.90	2.51	2.70
Sole risk	23.64	18.67	16.46
Total	860.90	809.27	764.33
<i>Reported by DPR</i>			
Total	859.71	810.11	765.70
Difference	1.19	-0.84	-1.37
<i>Table 6.1</i>			

The figures reported by DPR for production differ from those reported by the operators due in large part to gaps in the data provided by DPR – for example, where data for particular months was not provided.

The differences in lifting volumes reported by the companies and by DPR arose at the following terminals (a negative figure indicates that the company reported liftings were lower than the DPR reported liftings):

<i>Millions barrels</i>	2006	2007	2008
Bonny			-0.30
Escravos			-1.07
Forcados	-0.18	-1.37	0.00
Obe	-0.64	-0.13	0.00
Ukpokiti	0.19	-0.07	-0.01
Zafiro	1.80	0.74	
Total	1.17	-0.83	-1.38
<i>Table 6.2</i>			

The reasons for the largest differences shown above were

- Bonny – NDPR overstated their liftings in December 2008 – the DPR liftings for NDPR agree with the terminal operator
- Escravos – The difference is caused by a crude exchange cargo for refined product (not known which product) obtained from Tema refinery in Ghana – the terminal operator and DPR agree it was lifted, but it was omitted from the NNPC data.
- Forcados – NNPC only reported the NNPC share of Forcados condensate liftings. DPR & the terminal operator stated that NNPC lifted all the condensate on behalf of the SPDC JV partners and re-imbursed the JV partners in cash.
- Ukpokiti – reason for differences unresolved
- Obe – Cavendish, the operator and lifter of this terminal, did not provide any data
- Zafiro – DPR did not provide data on liftings from Zafiro for 2006 or the first half of 2007. The process of obtaining information from DPR and the gaps in data are discussed in Section 2.9 & 3.5.

5.2 Production entitlement

5.2.1 Joint Ventures

Based upon information provided to us by companies and by NNPC, we have assessed the entitlement of the parties to the production from joint ventures as shown below.

<i>Millions barrels</i>	2006	2007	2008
Entitlement to production			
JVs			
NNPC	354.83	324.17	309.31
Companies	311.00	262.10	234.26
Sub total {1}	665.83	586.27	543.57
Unresolved differences	-9.16	-3.99	-3.49
Total JV production	656.67	582.28	540.08
<u>Table 6.3</u>			

5.2.2 Sole Risk

In the case of sole risk operations, NNPC has by definition no entitlement to a share in the production.

5.2.3 Production sharing contracts

The parties to several of the PSCs are in dispute as to Production entitlement. This issue is set out in greater detail in Appendix N to the Financial Report, as the disputes are essentially financial. In the present context, we set out briefly the volume data that is in dispute.

	NNPC view of entitlement in the PSCs						Contractor view of entitlement in the PSCs					
	Abo	Bonga	Erha	Antan	Okwori	Total	Abo	Bonga	Erha	Antan	Okwori	Total
	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m	bbl m
2006												
Entitlement												
NNPC	3.50		2.80	9.20		15.50	1.60	10.40	6.10	10.00	4.50	32.60
Contractor	5.50	58.30	39.20	6.80	11.20	121.00	7.80	62.50	42.10	9.70	6.70	128.80
Total	9.00	58.30	42.00	16.00	11.20	136.50	9.40	72.90	48.20	19.70	11.20	161.40
Production v entitlement												
Reported total production	9.17	70.36	48.21	19.70	11.80	159.24	9.17	70.36	48.21	19.70	11.80	159.24
Difference from entitlement	-0.17	-12.06	-6.21	-3.70	-0.60	-22.74	0.23	2.54	-0.01	0.00	-0.60	2.16
2007												
Entitlement												
NNPC	4.20	20.80	12.70	13.70	11.20	62.60	0.90	10.60	14.60	10.00	8.20	44.30
Contractor	2.10	47.50	61.50	6.30	4.60	122.00	5.00	62.70	63.40	13.10	7.70	151.90
Total	6.30	68.30	74.20	20.00	15.80	184.60	5.90	73.30	78.00	23.10	15.90	196.20
Production v entitlement												
Reported total production	6.12	73.34	74.31	22.78	15.06	191.61	6.12	73.34	74.31	22.78	15.06	191.61
Difference from entitlement	0.18	-5.04	-0.11	-2.78	0.74	-7.01	-0.22	-0.04	3.69	0.32	0.84	4.59
2008												
Entitlement												
NNPC	2.10	26.90	40.20	8.20	8.10	85.50	1.20	15.40	35.20	8.60	7.00	67.40
Contractor	4.20	34.00	29.40	9.50	7.00	84.10	8.40	45.40	38.20	14.90	8.10	115.00
Total	6.30	60.90	69.60	17.70	15.10	169.60	9.60	60.80	73.40	23.50	15.10	182.40
Production v entitlement												
Reported total production	6.61	60.85	71.82	24.03	15.48	178.79	6.61	60.85	71.82	24.03	15.48	178.79
Difference from entitlement	-0.31	0.05	-2.22	-6.33	-0.38	-9.19	2.99	-0.05	1.58	-0.53	-0.38	3.61

It can be seen that the sum of the entitlements claimed by each party each year differs from the total production reported by the PSC operator and materially confirmed by DPR³.

The contractors and NNPC differ as to entitlement in total and for each operation. The total differences are:

	bbl m
Difference as regards NNPC entitlement	19.3
Difference as regards Contractor entitlement	(68.6)
Difference as to total entitlement	49.3

The difference as to total entitlement should be zero, because entitlement should equal actual production.

On an annual basis, the picture shows some inter-year anomalies. Whereas the parties need to agree on entitlements for each year, the liftings will usually vary from the entitlements and be corrected subsequently.

³With the exception of Bonga (where there are differences of between 1% and 2% of production reported by the Contractor and DPR), production reported by DPR is within 0.5% of that reported by the operator in each year, with the exception of Bonga 2007 and 2008. In 2007, DPR reported 0.6m barrels more than SNEPCO (0.9% variance) and in 2008, DPR reported 1.2m barrels more than SNEPCO (1.9% variance). Given the difficulties of obtaining precise numbers for production, even a 0.9% variance is probably within the degree of accuracy achievable.

6 DISAGGREGATED OIL FLOWS

6.1 Liftings

6.1.1 Comparison between liftings reported by companies and DPR

Crude oil liftings during the period, as reported for each export point by the companies and by DPR, are shown in the table below.

N.B. 'Companies' in these tables include NNPC, represented by COMD. In most cases, after investigation and reconciliation, the data presented to us by lifting companies and the data from COMD, which monitors all liftings, were in agreement but the DPR data were different.

Summary of Liftings by Export Point as reported by Companies and DPR (000 barrels)			
2006			
	Companies	DPR	Diff
ABO	8,977	8,977	0
AGBAMI	0	0	0
AMENAM	66,753	66,753	0
ANTAN	23,347	23,347	0
BONGA	73,041	73,040	1
BONNY	168,517	168,517	0
BRASS	63,784	63,784	0
EA	3,259	3,259	0
ERHA	47,597	47,597	0
Escravos	121,204	121,204	0
FORC COND	0	0	0
FORCADOS	14,862	15,045	-183
IMA/OKORO	442	442	0
OBE	0	636	-636
OKONO	21,170	21,170	0
OKWORI	11,164	11,164	0
OSO	27,550	27,550	0
PENNINGTON	13,779	13,779	0
QIT	138,601	138,601	0
UKPOKITI	1,513	1,318	195
YOHO	53,532	53,532	0
ZAFIRO	1,800	0	1,800
Grand Total	860,891	859,714	1,177
<i>Table 7.1</i>			

- Obe – Cavendish, the operator and lifter of this terminal, did not provide any data
- Zafiro – DPR did not provide data on liftings from Zafiro for 2006 or the first half of 2007.

Summary of Liftings by Export Point as reported by Companies and DPR (000 barrels)			
2007			
	Companies	DPR	Diff
ABO	6,231	6,231	0
AGBAMI	0	0	0
AMENAM	67,204	67,204	0
ANTAN	23,766	23,766	0
BONGA	72,838	72,838	0
BONNY	140,842	140,842	0
BRASS	51,751	51,751	0
EA	0	0	0
ERHA	74,225	74,225	0
Escravos	112,803	112,803	0
FORC COND	0	0	0
FORCADOS	15,442	16,807	-1,365
IMA/OKORO	529	529	0
OBE	0	131	-131
OKONO	15,612	15,612	0
OKWORI	15,854	15,854	0
OSO	19,849	19,849	0
PENNINGTON	6,073	6,073	0
QIT	134,660	134,660	0
UKPOKITI	611	684	-73
YOHO	47,394	47,394	0
ZAFIRO	3,596	2,851	745
Grand Total	809,281	810,106	-825
<i>Table 7.2</i>			

- Forcados –NNPC only reported the NNPC share of Forcados Condensate liftings. In reality NNPC lifted all the Condensate on behalf of the SPDC JV partners.
- Obe – Cavendish, the operator and lifter of this terminal, did not provide any data
- Zafiro – DPR did not provide data on liftings from Zafiro for 2006 or the first half of 2007.

Summary of Liftings by Export Point as reported by Companies and DPR (000 barrels)			
2008			
	Companies	DPR	Diff
ABO	6,292	6,292	0
AGBAMI	13,636	13,636	0
AMENAM	57,807	57,807	0
ANTAN	25,163	25,163	0
BONGA	60,783	60,783	0
BONNY	92,783	93,087	-305
BRASS	53,514	53,514	0
EA	0	0	0
ERHA	72,199	72,199	0
Escravos	110,639	111,705	-1,065
FORC COND	0	0	0
FORCADOS	64,803	64,803	0
IMA/OKORO	1,695	1,695	0
OBE	0	0	0
OKONO	10,763	10,763	0
OKWORI	15,097	15,097	0
OSO	14,295	14,295	0
PENNINGTON	9,636	9,636	0
QIT	108,936	108,936	0
UKPOKITI	599	605	-6
YOHO	41,837	41,837	0
ZAFIRO	3,850	3,850	0
Grand Total	764,328	765,705	-1,376
<i>Table 7.3</i>			

- Bonny – NDPR overstated their liftings in December 2008 – the DPR liftings for NDPR agree with the Terminal Operator.
- Escravos – The difference is caused by a crude exchange cargo that was omitted from the initial NNPC data (crude sent to Tema refinery, Ghana and settled by a swap for refined products).

As can be seen, generally total liftings out of a given terminal are agreed between the companies and DPR. In reviewing the DPR information, it seems that DPR is not always able to identify the beneficial owner of the lifting, resulting in DPR showing liftings as belonging to one company, when they belonged to another. Such differences were dealt with during the reconciliation process.

6.1.2 Comparison between liftings reported by terminal operators and lifters themselves

Crude oil liftings reported by the terminal operators, as well as by the lifters themselves. For each export point, liftings reported by the companies compare with liftings reported by operators as follows:

Summary of Liftings by Export Point as reported by the lifting Companies and Terminal Operator (000 barrels)			
2006			
	Companies	Terminal Operator	Diff
ABO	8,977	8,977	0
AGBAMI	0	0	0
AMENAM	66,753	66,753	0
ANTAN	23,347	23,347	0
BONGA	73,041	73,041	0
BONNY	168,517	168,518	-1
BRASS	63,784	63,801	-17
EA	3,259	3,259	0
ERHA	47,597	47,313	284
Escravos	121,204	121,204	0
FORC COND	0	0	0
FORCADOS	14,862	14,917	-55
IMA/OKORO	442	442	0
OBE	0	636	-636
OKONO	21,170	21,170	0
OKWORI	11,164	11,164	0
OSO	27,550	27,550	0
PENNINGTON	13,779	13,779	0
QIT	138,601	138,601	0
UKPOKITI	1,513	0	1,513
YOHO	53,532	53,532	0
ZAFIRO	1,800	0	1,800
Grand Total	860,891	858,004	2,887
<i>Table 7.4</i>			

- Zafiro – Mobil Equatorial Guinea, the operator of this terminal, did not provide any data in connection with NEITI

Summary of Liftings by Export Point as reported by the lifting Companies and Terminal Operator (000 barrels)			
2007			
	Companies	Terminal Operator	Diff
ABO	6,231	6,231	0
AGBAMI	0	0	0
AMENAM	67,204	67,204	0
ANTAN	23,766	23,766	0
BONGA	72,838	73,339	-501
BONNY	140,842	140,842	0
BRASS	51,751	51,776	-25
EA	0	0	0
ERHA	74,225	74,225	0
Escravos	112,803	112,803	0
FORC COND	0	0	0
FORCADOS	15,442	16,886	-1,444
IMA/OKORO	529	529	0
OBE	0	0	0
OKONO	15,612	0	15,612
OKWORI	15,854	15,854	0
OSO	19,849	19,849	0
PENNINGTON	6,073	6,081	-8
QIT	134,660	134,660	0
UKPOKITI	611	0	611
YOHO	47,394	48,223	-829
ZAFIRO	3,596	0	3,596
Grand Total	809,281	792,268	17,013
<i>Table 7.5</i>			

- Zafiro – Mobil Equatorial Guinea, the operator of this terminal, did not provide any data in connection with NEITI

<i>Summary of Liftings by Export Point as reported by the lifting Companies and Terminal Operator (000 barrels)</i>			
2008			
	Companies	Terminal Operator	Diff
ABO	6,292	6,292	0
AGBAMI	13,636	13,636	0
AMENAM	57,807	57,807	0
ANTAN	25,163	25,163	0
BONGA	60,783	60,783	0
BONNY	92,783	93,087	-304
BRASS	53,514	53,514	0
EA	0	0	0
ERHA	72,199	72,199	0
Escravos	110,639	111,705	-1,066
FORC COND	0	0	0
FORCADOS	64,803	64,899	-96
IMA/OKORO	1,695	1,695	0
OBE	0	0	0
OKONO	10,763	10,763	0
OKWORI	15,097	15,097	0
OSO	14,295	14,295	0
PENNINGTON	9,636	9,640	-4
QIT	108,936	108,936	0
UKPOKITI	599	0	599
YOHO	41,837	41,837	0
ZAFIRO	3,850	0	3,850
Grand Total	764,328	761,348	2,980
<i>Table 7.6</i>			

- Zafiro – Mobil Equatorial Guinea, the operator of this terminal, did not provide any data in connection with NEITI
- Escravos – The difference is caused by a crude exchange cargo that was omitted from the initial NNPC data (crude sent to Tema refinery, Ghana and settled by a swap for refined products).

6.2 Production

Crude oil production during the period, as reported by the operators and by DPR, for each export point, was as follows:

Summary of production through each export point (000 barrels)			
2006			
	COMPANIES	DPR	Diff
ABO	9,166	7,863	1,303
AGBAMI	0	0	0
AMENAM	68,750	67,710	1,039
ANTAN	23,650	23,650	0
BONGA	70,361	72,858	-2,497
BONNY	168,895	168,931	-37
BRASS	64,612	60,616	3,996
EA	3,419	3,419	0
ERHA	48,209	47,350	859
ESCRAVOS	120,633	120,613	20
FORCADOS	17,250	17,497	-247
IMA	386	384	1
OBE	0	681	-681
OKONO	21,360	21,365	-4
OKWORI	11,798	11,798	0
OSO	14,039	9,003	5,035
PENNINGTON	28,402	28,402	0
QUA IBOE	139,647	139,715	-68
UKPOKITI	0	1,132	-1,132
YOHO	47,620	53,601	-5,981
	858,195	856,587	1,608
Table 7.7			

Summary of production through each export point (000 barrels)			
2007			
	COMPANIES	DPR	Diff
ABO	6,123	6,139	-16
AGBAMI	0	0	0
AMENAM	67,492	65,977	1,515
ANTAN	23,626	23,626	0
BONGA	73,339	66,556	6,782
BONNY	140,254	140,244	11
BRASS	51,219	46,684	4,535
EA	0	0	0
ERHA	74,313	74,364	-52
ESCRAVOS	112,856	113,159	-303
FORCADOS	15,248	15,248	0
IMA	690	668	22
OBE	0	18	-18
OKONO	15,564	15,548	16
OKWORI	15,057	10,993	4,064
OSO	5,730	5,778	-49
PENNINGTON	19,028	19,028	0
QUA IBOE	133,896	133,817	79
UKPOKITI	0	427	-427
YOHO	47,440	47,418	22
	801,874	785,692	16,182
<i>Table 7.8</i>			

Summary of production through each export point (000 barrels)			
2008			
	COMPANIES	DPR	Diff
ABO	6,606	3,201	3,405
AGBAMI	14,966	14,966	0
AMENAM	57,913	58,870	-957
ANTAN	25,509	25,509	0
BONGA	60,850	51,791	9,059
BONNY	92,693	93,371	-678
BRASS	53,434	46,796	6,637
EA	0	0	0
ERHA	71,820	65,419	6,400
ESCRAVOS	111,861	111,120	741
FORCADOS	63,995	64,800	-804
IMA	1,695	1,681	14
OBE	0	0	0
OKONO	11,093	10,887	207
OKWORI	15,483	0	15,483
OSO	10,237	10,245	-8
PENNINGTON	15,021	11,150	3,871
QUA IBOE	110,612	110,627	-14
UKPOKITI	0	117	-117
YOHO	41,461	41,551	-90
	765,249	722,100	43,149
<i>Table 7.9</i>			

The methodology by which the companies have calculated production is set out in 2.1.4.1.

DPR provided some very detailed data on production – for every JV and Sole Risk producer, a separate spreadsheet for every month detailing field by field production (a total in excess of 600 sheets). In addition a number of files were presented that included production data for PSCs. Unfortunately this data was incomplete. In numerous instances individual months of data were missing, thus when aggregating the DPR data to annual totals, significant differences emerge.

In general the month by month differences between DPR data and company data were small. An exception is the production for Amenam, where a difference occurs every 3 months.

The significant increase in differences for 2008 is largely accounted for by an absence of DPR data from Abo (6months), Erha (1 month) and Okwori (12 months).

The calculation of production from fields that export through Brass Terminal is particularly complex. The bulk of crude received at the terminal arrives mixed with water and comes from NAOC JV and AENR/NPDC operations. But this is comingled with numerous 3rd party supplies (CNL JV, Addax PSC, Midwestern and Platform Petroleum). Furthermore the CNL JV feed is comingled with the Addax before water separation and subsequent injection into the NAOC JV infrastructure.

6.3 Entitlement to oil production

6.3.1 Background

Historically, most oil was produced by joint ventures between private operators and NNPC (representing the Federation). Production was shared between the parties to the joint venture in proportion to their agreed share, which remained constant from year to year.

More recently, alternative financing methods have been introduced to modify the JV arrangements – for example, “carry agreements”, where NNPC does not contribute capital for development and the other partner(s) recover their investment over time from capital allowances on carried capital assets and production, with the remaining production allocated in proportion to the share of each partner in the JV. Some JV operations are subject to multiple carry agreements.

In addition, there is an increase in the number of unitisations, which introduce a further layer of complexity to entitlement to JV production.

For some time now, new licences have been granted under PSC arrangements. Under these arrangements, NNPC as the concession owner is responsible for settlement of the liability of the PSC for royalty and PPT, while the PSC Operator as contractor is responsible for funding capital and operating expenditure which is recovered from production. Oil production is allocated between NNPC and the contractor (including working interest holders) to enable them to meet these obligations, and any production remaining unallocated is shared as “profit oil” in the proportions set out in each PSC. The order of allocation of oil production is

1. Royalty
2. Recovery of costs
3. PPT
4. Profit oil

Since there are disputes between a number of the PSC Contractors and NNPC NAPIMS regarding the cost accounting and recovery model for the PSC and the applicable royalty rates, there is no agreement over entitlement to production, and while NNPC and the Operators have continued to make liftings of oil, determination of whether the parties have lifted the appropriate share, and whether liabilities for royalty and PPT have been settled is outstanding. These issues have been dealt with in detail in the 1993 PSC PPT and Royalty Validation Report.

Treatment of oil lifted during the initial stages of production of a PSC – the Trial Marketing Period – has also not been resolved in a number of cases as a result of many issues including the agreement on applicable price to apply in the valuation of the crude, reconciliation of entitlements to TMP crude proceeds

6.3.2 Federation entitlement

6.3.2.1 Entitlement

The Federation is entitled to oil:-

- from its participation in upstream Joint Venture operations (equity crude); and
- as payment in kind for Royalty, and PPT from PSCs; and
- as payment in kind for its share of profits arising from PSCs.

The Federation's crude oil entitlement is divided into two parts:

- Crude that is sold internationally (Export Crude)
- Crude that is allocated for domestic use (Domestic Crude)

6.3.2.2 Marketing

Export Crude is marketed on behalf of the Federation by NNPC Crude Oil Marketing Division (COMD) and Domestic Crude is sold to NNPC to be refined at its refineries for domestic consumption. The Domestic Crude allocation has remained unchanged at 445,000 bpd since it was fixed by Government in 2003; this volume is the design capacity of the refineries in Nigeria. Any Domestic Crude allocation purchased by NNPC in excess of the refineries' day-to-day operational requirement is sold in the export market by COMD, on behalf of NNPC.

6.3.3 Production entitlement by company

Information was requested from NNPC and the companies with an entitlement to a share of production to enable the entitlement of these entities to the oil produced to be validated.

In the case of PSCs, the dispute between NNPC and the PSC operators as to the calculation of PSC royalty and PPT liabilities and hence as to the calculation of the quantities of oil that should be lifted in order to settle royalty and PPT, and the remaining profit oil has meant that some operators did not provide the comprehensive information, particularly as to oil valuation, that we requested for the purpose of this reconciliation. It has not, therefore, been possible to assess the entitlements of the parties to PSCs. (Refer to paragraph 5.2.3 and to the Financial Report, Appendix N).

Sole risk producers are entitled to all their own production.

Parties to JVs provided the information requested.

Based upon this data, we have assessed and summarised the entitlement to production during the period at the terminals shown⁴ (excluding PSC terminals) as follows:

⁴ These terminals are the export points primarily for the JVs. Some sole risk producers, and an Addax PSC, also export through these terminals and their production is included in these figures

Entitlement to production dispatched through these terminals (000 barrels)												
	Amenam	Bonny	Brass	Ea	Escravos	Forcados	Oso	Oloibiri	QIT	YOHO	Zafiro	TOTAL
2006												
TEPNG	39,178	18,613	487	0	0	1,779	0	0	0	0	0	60,057
SPDC	0	42,204	1,462	2,534	0	5,336	0	0	0	0	0	51,536
NAOC	0	7,172	10,853	0	0	954	0	0	0	0	0	18,979
CNL	0	6,498	421	0	52,621	0	0	1,884	0	0	0	61,423
NDPR	0	785	0	0	0	0	0	0	0	0	0	785
AENR	0	0	806	0	0	0	0	0	0	0	0	806
POCNL	0	138	10,609	0	0	64	0	0	0	0	0	10,812
Dubri	0	0	0	0	120	0	0	0	0	0	0	120
Conoil	0	0	0	0	644	0	0	0	0	0	0	644
NPDC	0	0	0	0	0	318	0	0	0	0	0	318
PANOCEAN	0	0	0	0	0	506	0	0	0	0	0	506
Conog	0	0	0	0	0	0	0	9,340	0	0	0	9,340
MPNU	0	0	0	0	0	0	11,360	0	63,946	36,341	0	111,647
PSC	0	0	1,404	0	0	0	0	0	0	0	0	1,404
NNPC	29,572	94,352	38,389	885	67,289	10,735	17,041	2,825	75,767	17,183	0	354,038
Total	68,750	169,763	64,432	3,419	120,673	19,693	28,401	14,049	139,713	53,524	0	682,415
<i>Table 7.10</i>												

Entitlement to production dispatched through these terminals (000 barrels)												
	Amenam	Bonny	Brass	Ea	Escravos	Forcados	Oso	Oloibiri	QIT	YOHO	Zafiro	TOTAL
2007												
NNPC	28,927	78,124	29,405	0	62,496	10,020	12,263	1,348	76,724	23,762	0	323,070
TEPNG	38,565	15,836	390	0	0	1,771	0	0	0	0	0	56,562
SPDC	0	34,592	1,169	0	0	5,314	0	0	0	0	0	41,074
NAOC	0	5,858	7,980	0	0	978	0	0	0	0	0	14,816
CNL	0	5,315	555	0	49,929	0	0	899	0	0	0	56,697
NDPR	0	417	0	0	0	0	0	0	0	0	0	417
AENR	0	0	926	0	0	0	0	0	0	0	0	926
POCNL	0	92	7,785	0	0	93	0	0	0	0	0	7,970
PLATFORM	0	0	83	0	0	0	0	0	0	0	0	83
Conoil	0	0	0	0	432	0	0	0	0	0	0	432
Conog	0	0	0	0	0	0	0	3,533	0	0	0	3,533
MPNU	0	0	0	0	0	0	8,175	0	57,093	23,602	0	88,870
Total	67,492	140,233	48,292	0	112,858	18,177	20,438	5,780	133,817	47,364	0	594,451
<i>Table 7.11</i>												

Entitlement to production dispatched through these terminals (000 barrels)												
	Amenam	Bonny	Brass	Ea	Escravos	Forcados	Oso	Oloibiri	QIT	YOHO	Zafiro	TOTAL
2008												
NNPC	25,984	51,732	30,018	0	65,381	34,880	10,036	2,552	65,933	24,150	0	310,667
PSC	0	0	2,434	0	0	0	0	0	0	0	0	2,434
TEPNG	31,929	12,199	451	0	0	5,149	0	0	0	0	0	49,727
SPDC	0	22,198	1,353	0	0	15,446	0	0	0	0	0	38,997
NAOC	0	3,776	8,334	0	0	2,862	0	0	0	0	0	14,972
CNL	0	2,406	409	0	45,967	0	0	1,702	0	0	0	50,484
NDPR	0	1,348	0	0	0	0	0	0	0	0	0	1,348
WSPL	0	173	0	0	0	0	0	0	0	0	0	173
AENR	0	0	838	0	0	0	0	0	0	0	0	838
POCNL	0	76	8,109	0	0	287	0	0	0	0	0	8,472
PLATFORM	0	0	1,355	0	0	0	0	0	0	0	0	1,355
Dubri	0	0	0	0	26	0	0	0	0	0	0	26
Conoil	0	0	0	0	492	0	0	0	0	0	0	492
NPDC	0	0	0	0	0	2,205	0	0	0	0	0	2,205
PANOCEAN	0	0	0	0	0	3,800	0	0	0	0	0	3,800
Conog	0	0	0	0	0	0	0	5,979	0	0	0	5,979
MPNU	0	0	0	0	0	0	6,691	0	44,681	17,378	0	68,750
Total	57,913	93,908	53,300	0	111,866	64,629	16,727	10,233	110,614	41,528	0	560,718
<i>Table 7.12</i>												

There are differences between the total production reported by companies and the total production which the companies reported as allocated between the parties at the terminals. These may be summarised as follows:-

	2006			2007			2008		
	Production through terminal	Production allocated	Difference	Production through terminal	Production allocated	Difference	Production through terminal	Production allocated	Difference
Amenam	68.75	68.75	0.00	67.49	67.49	0.00	57.91	57.91	0.00
Bonny	168.89	169.76	-0.87	140.25	140.23	0.02	92.69	93.91	-1.22
Brass	64.61	64.43	0.18	51.22	48.29	2.93	53.43	53.30	0.13
Ea	3.42	3.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Escravos	120.63	120.67	-0.04	112.86	112.86	0.00	111.86	111.87	-0.01
Forcados	17.25	19.69	-2.44	15.25	18.18	-2.93	64.00	64.63	-0.63
Oloibiri	14.04	14.05	-0.01	5.73	5.78	-0.05	10.24	10.23	0.01
Os	28.40	28.40	0.00	19.03	20.44	-1.41	15.02	16.73	-1.71
Qua Ibo	139.65	139.71	-0.06	133.90	133.82	0.08	110.61	110.61	0.00
Yoho	47.62	53.52	-5.90	47.44	47.36	0.08	41.46	41.53	-0.07
Total	673.26	682.40	-9.14	593.17	594.45	-1.28	557.22	560.72	-3.50
<i>Table 7.13</i>									

Having identified that there are disputes over the calculation of entitlement, the focus of this assignment has been to confirm that all oil transferred to government, as evidenced by liftings, has been accounted for. Government income has been reported as the value of the oil lifted by the government, based on the amount realised (or to be realised) from those liftings.

However, no inference may be drawn from this that the government was in fact entitled to that value. Adjustments might be required later.

7 DOWNSTREAM MASS BALANCE AND FLOWS

7.1 *Objective and Methodology*

The objective with regards to downstream product flows was to obtain for the three years 2006 to 2008 hydrocarbon product balances at depot/Jetty, and national level, by product type and in total, consisting of:-

- Imported products
- Pipeline flows between locations
- deliveries by sea and by road and exported products

in common with the approach elsewhere, templates were issued to NNPC PPMC. After a very considerable delay, PPMC submitted incomplete data to us, some on the templates approved by the NSWG and some on internally produced spreadsheets, without a description of the purpose of these spreadsheets or explanation of the source of data.

We requested that information supplied be reconciled to the audited accounts of NNPC, to gain assurance on the integrity of the data. NNPC has not provided any reconciliation.

7.2 *Overall mass balance*

We are unable to confirm the overall mass balance for the following reasons:

- Marine transfer data is incomplete (only covers the immediate Lagos area, not transfers between Port Harcourt, Warri and Calabar)
- Importation data for split cargoes does not differentiate volumes to each destination. Furthermore, many of these split locations deliver to both PPMC and 3rd parties.
- Unable to distinguish between depot transactions that are sales to 3rd parties and those that are supplies to PPMC. Only the Mosimi Area identifies significant sales.
- No data provided on 3rd party storage
- Failure to distinguish between sales to 3rd parties and road transfers from depots

Additional difficulties were caused by volumetric (m3) data being provided on templates that requested mass (tonnes) data.

7.3 Reconciliation of refinery supplies

7.3.1 Methodology

We requested the following data from entities:

Entity	Data	Received?
Companies	Refinery supplies lifted from Terminals	Yes
NNPC (COMD)	Refinery supplies booked to the domestic account	Yes
Refineries	Refinery Receipts	Yes
NNPC (PPMC)	Crude Imports	No

7.3.2 Operational Situation

The three refineries in Nigeria - Port Harcourt, Warri and Kaduna - are normally supplied as follows:

- PHRC is supplied by pipeline from Bonny Terminal
- WRPC is supplied both by pipeline from Escravos Terminal and by imports at the local jetty (though limitations on draft restrict vessel capacity to 30,000 tonnes).
- KRPC is supplied by a 370 mile 16" pipeline (2C) from the Warri Refinery

During 2006, the Forcados crude export terminal was unable to operate, due to the security situation. Consequently a considerable number of SPDC JV fields, PanOcean JV and some NAOC JV and NPDC operated fields had to be shut down.

A number of the SPDC JV fields affected by the closure were the sole supply of gas to the local PHCN Power Station. To provide continuity of electricity supply it was essential to keep these fields operating. However, these gas fields also produce quantities of condensate (it is not possible to produce the gas without the associated gas liquids). Under normal operation the liquids would be spiked back into the crude supply pipeline to Forcados terminal.

With this pipeline inoperable the storage capacity at the Ughelli Gas Plant began filling up with condensate. When it became apparent that the Forcados closure would not be resolved quickly, it became imperative to handle this condensate, or else stop the power station.

An agreement was made between SPDC JV and WRPC, whereby condensate would be stored at Warri refinery. This was possible because the Escravos Terminal that normally supplied WRPC was also shut down and the Escravos crude tanks could be utilised for condensate storage.

As the situation continued, this storage too became full and three transfers of condensate were made from Warri to Kaduna refinery in June, July and August 2006. Eventually the decision was taken to export condensate from the Warri Jetty. Under the agreement, NNPC would lift and sell all the condensate and distribute the proceeds to the SPDC JV partners according to equity share (after paying WRPC a fee for storage and handling).

These condensate sales continued from August 2006 through the following 19 months to February 2008.

The implications of this operation for the upstream hydrocarbon balance and the Refinery balance are quite subtle as the refineries typically measure a mass balance, whereas terminals operate a volume balance. This is because the refineries are concerned with the conversion of a mass of crude into a mass of a number of different products: Gasoline, Diesel, Heavy and Light Oils, Naphtha, Bitumen etc., whereas the terminal is concerned with the volume of a crude blend loaded onto a vessel.

Under normal operations the output from a terminal is a reasonably standard blend made up from a blend of a number of different supply crude streams [it needs to be reasonably standard so that the international market understands the quality of, for example, a cargo of Bonny Light and can apply the appropriate differential to benchmark crude prices].

The production and liftings for the Forcados Condensate Operation are shown in the main upstream hydrocarbon balance section of this report.

7.3.3 Refinery Supply Reconciliation

Based on the data received, we have prepared a reconciliation of the supply and receipt of crude oil to the Nigerian refineries (below).

There are various issues arising from this reconciliation but due to the late receipt of information from NNPC PPMC, there has been no resolution of such matters arising. We would draw attention to the following in particular:-

- Kaduna reports receipts of imported oil but NNPC has said no imports were received
- The audited accounts of NNPC report export sales of refined product but the physical balances do not reflect exports
- Kaduna receipts of crude oil do not equal crude oil supplied from Warri and elsewhere
- There are differences between crude oil supplies to refineries reported by terminal operators and crude oil receipts reported by refineries (e.g. Bonny & PHRC)
- It is not known whether there is a regular procedure for reconciliation of supplies and receipts between crude oil producers and refineries

A summary of the data received is set out in the tables which follow.

2006

2006 Supply to Warri and Kaduna Refineries

2006	(MT)		WRPC Crude Receipts	Trans to KRPC	KRPC Crude receipts (MT)			
	Forc Cond	Escravos			Total	Local	Foreign	Total
jan		202,949	202,949	124,708	78,241	57,576	0	57,576
feb			0	0	11,003	0	0	0
mar	3,571		3,571	4,108	12,718	31,218	27,269	58,487
apr			0	0		0	0	0
may			0	0		0	0	0
jun	26,224		26,224		26,224	3,068	16,622	19,690
jul	18,076		18,076		18,076	0	18,264	18,264
aug	49,419		49,419		49,419	25,181	21,622	46,803
sep			0	0		0	0	0
oct			0	0		0	0	0
nov			0	0		0	0	0
dec			0	0		0	0	0
TOTAL	97,290	202,949	300,238	128,816	195,680	117,043	83,777	200,820

2007

As described above, there were no supplies during 2007.

2008

2008 Supply to Warri and Kaduna Refineries

(MT)			WRPC Crude Receipts	Trans to KRPC	KRPC Crude receipts (MT)		Total
SPDC Cond	Escravos	Total			Local	Foreign	
	72,731	72,731	106,030		0	0	0
	313,753	313,753	294,178	58,611	0	0	0
	425,521	425,521	381,910	143,967	22,580	127,638	150,218
	345,243	345,243	265,581	109,065	0	118,160	118,160
	286,739	286,739	382,127	29,564	0	51,614	51,614
	418,175	418,175	427,669	100,680	62,246	13,756	76,002
	370,454	370,454	355,447	197,466	155,161	39,906	195,067
	401,320	401,320	451,855	181,123	138,755	49,428	188,183
	435,640	435,640	426,189	172,127	143,390	27,845	171,235
	40,654	40,654	74,117	40,936	55,223	19,082	74,305
	126,378	126,378	61,503	22,216	3,614	14,543	18,157
	340,149	340,149	298,726	4,844	0	0	0
0	3,576,758	3,576,758	3,525,332	1,060,600	580,969	461,972	1,042,941

2006

PHRC Crude Receipts	Bonny Supply	
bbls	bbls	diff
3,321,762	3,317,451	-4,311
3,044,567	3,039,826	-4,741
3,176,638	3,172,552	-4,086
3,326,239	3,321,923	-4,316
4,120,411	4,158,527	38,116
4,191,560	4,163,054	-28,506
3,647,337	3,667,209	19,872
3,878,194	3,890,287	12,093
3,556,394	3,563,340	6,946
2,308,919	2,305,349	-3,570
3,134,814	2,575,825	-558,989
2,449,071	2,994,304	545,233
40,155,904	40,169,647	13,743

2007

PHRC Crude Receipts	Bonny Supply	
bbls	bbls	diff
2,699,057	2,685,066	-13,991
2,253,443	2,234,536	-18,907
2,245,111	2,249,380	4,269
1,208,478	1,232,864	24,386
1,522,183	1,517,062	-5,121
61,337	64,019	2,682
1,233,015	1,226,648	-6,367
1,764,296	1,783,707	19,411
1,385,643	1,391,712	6,069
2,064,238	2,051,091	-13,147
1,537,619	1,549,041	11,422
415,993	398,063	-17,930
18,390,413	18,383,189	-7,224

2008

PHRC Crude Receipts	Bonny Supply	
bbls	bbls	diff
2,365,194	2,358,619	-6,575
964,767	983,280	18,513
1,480,515	1,301,330	-179,185
1,615,287	1,837,454	222,167
1,183,208	1,158,820	-24,388
2,071,305	2,096,701	25,396
1,675,884	1,755,949	80,065
269,359	277,760	8,401
113,253	129,917	16,664
1,419,112	1,491,950	72,838
1,371,620	1,478,701	107,081
107,593	138,755	31,162
14,637,097	15,009,236	372,139

8 PRODUCTION AND UTILISATION OF GAS

8.1 Methodology

Gas data was requested from the Operators of producing fields. Two templates capture gas data: P1.01 (Oil Production) collects gas flare by flow station and P2.01 (Gas Production) captures the usage of all gas produced and details customers.

NGC, NLNG and PHCH returned data on Gas Purchases.

No data on Gas was received from the following companies: Conoil, Continental Oil & Gas, Dubri, SEPCOL, Panocean.

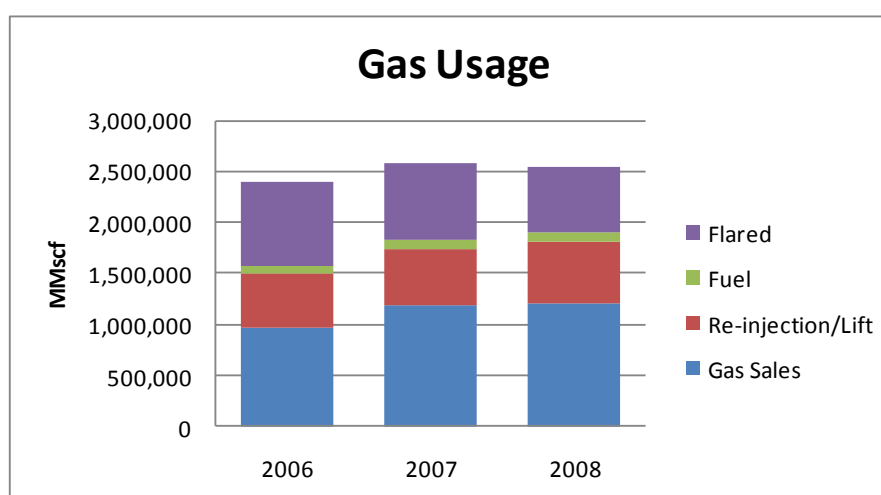
The issues surrounding gas measurement are discussed in a separate report, however we would re-emphasise that measurement of gas flare and gas re-injection are usually estimates or at best measurements with a high degree of uncertainty. This is mainly due to the contaminants in the gas stream.

8.2 Overview of Gas

The Nigerian gas infrastructure is rapidly developing. For many years, the majority of gas produced in Nigeria was flared, since it had no commercial value – there was a limited local industrial market and no infrastructure for export. Now, the local market is developing as more Power Plants come on stream and local industrial users. And the International market is developing with NLNG and gas export via the West African Gas Pipeline (not commenced operation during the audit period). Also there are an increasing number of plans for small local gas plants to produce LPG for the local market.

8.3 Gas Usage

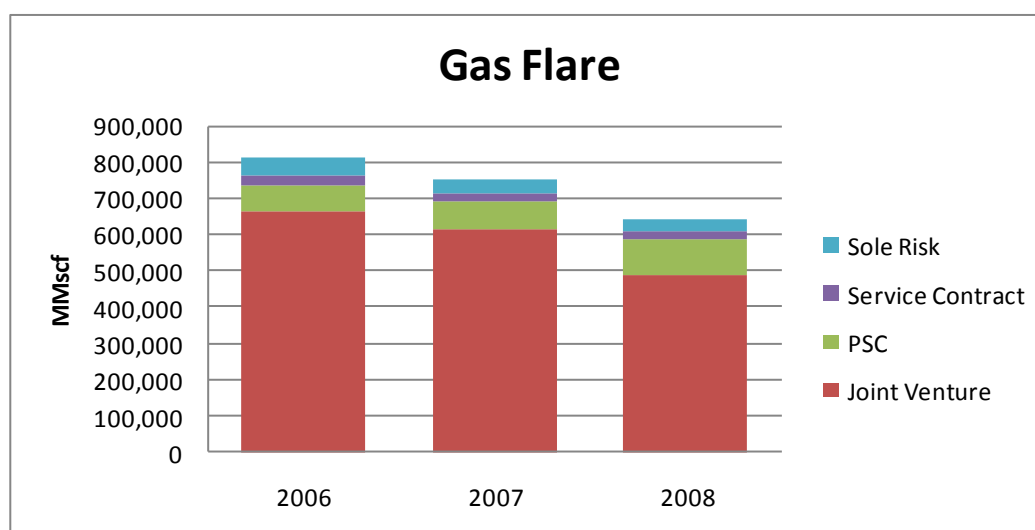
The following chart shows the total production and usage of gas:



Usage (mmscf)	2006	2007	2008
Gas Sales	965,925	1,194,798	1,209,021
Re-injection/Lift	523,452	538,817	603,783
Fuel	91,087	91,407	94,698
Flared	810,925	751,123	643,588
Total	902,012	842,529	738,286

ExxonMobil is the major user of reinjection as a means to enhance crude production and store gas for future exploitation. Significant efforts are made to transfer gas produced at one field to another in order to enhance oil recovery. In addition, NAOC JV sells a small quantity of gas to SPDC JV to be used for re-injection.

Generally this chart shows an encouraging trend, in that the proportion of gas for useful purposes is increasing even as the total volume of gas produced increases. Gas Flare is reducing as shown below.



Regime (mmscf)	2006	2007	2008
Joint Venture	663,942	613,196	487,843
PSC	73,140	79,730	96,648
Service Contract	27,341	21,077	21,894
Sole Risk	46,501	37,119	37,203
Total	810,925	751,123	643,588

The trend in gas flare continues to be downwards. And although the Government's 'zero flare' target is unlikely to be achieved, it is testament to continued pressure and incentive being applied on operators to avoid flaring.

Of slight concern is the increase in flaring from PSC operations. These, typically deep offshore operations are likely to be distant from any gas handling infrastructure, so handling the associated gas becomes a significant challenge. Unfortunately the overall trend will be to increase the proportion of national Crude Oil production from these offshore fields.

8.3.1 Gas

The Federation is entitled to gas from its participation in upstream Joint Venture operations and from its engagement in PSCs.

In fact, the PSCs signed to date do not themselves make any provision for how the parties to the PSC should deal with any gas which is available for commercial exploitation, except to say that the parties should conclude a separate agreement.

Gas is commercially exploited by the following organisations in which the Federation, through NNPC, participates:-

- i. SPDC joint venture
- ii. NAOC joint venture
- iii. TEPNG joint venture
- iv. CNL joint venture
- v. SNEPCO - Bonga

NNPC was requested to provide a copy of the agreements pertaining to its gas operations, but has not done so. We are, therefore, not able to comment on the commercial arrangements relating to the Federation's entitlement to gas.

8.4 Gas sales

During the Audit period only four operations sold gas:

- i. SPDC JV, NAOC JV and TEPNG JV sold to NLNG.
- ii. SPDC JV and CNL JV sold to the local gas company NGC.
- iii. In addition, SPDC JV and NAOC JV sold directly to local Independent Power Producers (IPPs), EPCL and, in the case of SPDC JV, direct to local industrial companies.

Total gas sales were as follows:

Total Natural Gas Sales Volumes (mmscf)				
Supplier	Customer	2006	2007	2008
Bonga	NLNG	46,719	50,731	44,599
SPDC JV	NLNG	362,884	520,538	525,341
NAOC JV	NLNG	223,961	186,904	170,820
TEPNG JV	NLNG	101,797	207,661	238,963
SPDC JV	NGC	157,922	159,132	122,203
CNL JV	NGC	10,287	0	50,621
SPDC JV	IPP	1,996	537	1,219
NAOC JV	IPP	23,591	28,876	24,950
SPDC JV	NEPA	25,364	25,764	15,159
NAOC JV	EPCL	8,147	9,817	10,166
SPDC JV	<SPDC>	3,256	4,839	4,982
Total		965,925	1,194,798	1,209,021

Table 5.4

The Bonga PSC is a material provider of gas. Currently there is no agreed gas sales agreement in place for the commercialisation of this gas and the matter is in dispute between the PSC co-venturers and NNPC. Bonga is connected (via the Offshore Gas Gathering System) to the NLNG plant and we understand that that Bonga gas is currently sold to SPDC JV for onward transmission to NLNG.

8.5 Reconciliation of gas supplies

The following table shows the gas supplied to NLNG and the volume reported by NLNG.

	Gas Received by NLNG (mmscf)	Gas Supplied to NLNG (mmscf)	Difference
2006	743,333	735,361	1.1%
2007	942,606	965,834	-2.4%
2008	979,431	979,722	0.0%

source: NLNG and Company Templates

Gas is supplied to NGC from SPDC JV and CNL JV. During 2007, the CNL JV producing fields were shut-in.

	Gas Received by NGC (mmscf)	Gas Supplied to NGC (mmscf)	Difference
2006	161,799	168,209	-3.8%
2007	155,430	159,132	-2.3%
2008	162,302	172,824	-6.1%

8.5.1 NNPC Share of gas sold

NNPC is entitled to revenue from its share of gas sold by JV operations. The following table shows the volumetric split of total sales

	(mmscf)	Share of Gas per JV equity shares					
	Total	NNPC	SPDC	NAOC	TEPNG	CNL	POCNL
2006	965,925.394	549,648.103	179,442.800	81,047.024	100,532.881	4,114.697	51,139.890
2007	1,194,798.164	678,801.851	228,462.285	83,196.299	159,218.477	0.000	45,119.252
2008	1,209,021.292	689,737.647	214,050.770	76,862.160	166,935.294	20,248.389	41,187.032

Notes:

- 1) Assumes Bonga gas sales are all to SPDC JV for onward sale to NLNG
- 2) Ignores the effect of field unitisations on production entitlement.

9 RECOMMENDATIONS

During the course of the assignment, we noted areas where improvements can be made to improve control over Government revenues, to increase transparency and to assist in carrying out EITI reconciliations in future years.

9.1.1 Timeliness of NEITI reconciliation

1. DPR should agree with companies the basis of calculation of production for the determination of royalty and the method should be applied consistently across the industry.
2. For future audits, NEITI should consider the separation of the audit process into two distinct phases:
 - i. Determination of physical liftings and assessment of production for royalty determination
 - ii. Financial flows resulting from physical
3. NEITI has a legitimate interest in understanding the reasons for losses from the physical system. Attempts to shed light on this through the current audit process are made difficult since companies are cautious about disclosing data that may subsequently be used to alter their fiscal obligations. The companies believe that the current audit process will compare their disclosures with DPR and NNPC disclosures, so there is an incentive to provide the data that best agrees. DPR itself does not have an independent source of data on production volumes but is reliant on what companies disclose, perhaps tempered by reference to data from NNPC, which has access to source data through its participation in JVs and PSCs.

Identification of system losses should be undertaken as a completely separate exercise focussing on the reconciliation of Hydrocarbon Accounting data with Operational, Well and Reservoir performance data.

9.1.2 Bid rounds

1. Criteria for pre-qualification should be designed which exclude companies lacking financial substance and companies where controlling shareholders cannot be identified. We recommend that detailed criteria with respect to the suitability of companies as licensees should be made statutory
2. Pre-qualification should be permitted out of Round, both for operators and non-operators, in order to ease the administrative burden on the DPR during bid rounds.
3. Maintain a publicly accessible list of those companies that are pre-qualified with details of the zones in which they are entitled to bid and corporate information: share capital, latest annual report and accounts, and details of beneficial share owners and shadow directors (if any).

9.1.3 Measurement

1. DPR Standards should be widely disseminated and available. The document should be published on the DPR website
2. The Guidelines should be kept up to date, with clearly identified revisions

3. Guidelines should specify outcomes and not be overly prescriptive on procedure (except where procedure is critical to outcome)
4. DPR should consider the procedures for assuring the measurement system 'works'; ensuring that DPR representatives are suitably qualified; and ensuring that companies are diligently following agreed procedures. Periodic audits of company measurement procedures, practices and record keeping..... should be undertaken (or commissioned) by DPR.
5. Trans-shipments are measured by tank dips at sea. These are very unreliable, especially in pitching seas. In such situations, we would recommend at least five successive gauge readings should be taken for each tank, the highest and lowest readings dropped and the remaining three averaged and recorded. The successive gauges should be taken as quickly as is practical and a description and extent of the adverse measurement conditions recorded. Inshore lightering vessels are usually <10,000 dwt and therefore unclassified. There is no requirement for certification of lighter capacities, hence tank dips may be inaccurate.

We recommend that continued efforts are made to improve the quality and reliability of the Shore Tank Measurements to negate the need to rely on lightering vessel tank dips.
6. Improving the facilities and operation at Atlas Cove and SPM should be a priority for increasing the importation flow rate. Also, since all facilities here are under PPMC control, this should be the most accurate importation point.

9.1.4 Pricing Federation Equity Crude

1. The COMD offtaker list is not well balanced and should be reviewed. The ongoing practice of entering into export contracts for greater volumes than are available exacerbates the issue when Federation offtakers are cut back.

NNPC should continue to reduce contracted volumes to better match expected production and also consider increasing the offtaker list to include final end user buyers/ major oil companies and reduce the current large contract allocation to traders⁵

2. Procedures and systems should be in place to ensure that without exception L/Cs are modified to provide full payment cover for the cargo to be loaded.

We found examples where the value of L/Cs provided were too low to cover the financial exposure, as a result of market price increases over the period between the provision of the L/C and the relevant pricing period. On occasions this exposure reached \$20-30 million on a single cargo.

9.1.5 Gas

1. There are a number of recommendations from the previous audits that have not yet been implemented in full, in particular covering issues such as non-payment, subsidies, and a number of the measures contained within the proposed Petroleum Industry Bill.

It is recognised that this Bill may provide a major step forward in a number of areas relating to gas, however, at the time of finalising this report it had still not been passed by the National Assembly. While there have been improvements, particularly in areas of metering and in the roles of DPR and NAPIMS, the recommendations from previous Audits remain in place and should be implemented in full.

⁵ COMD comment: Contractual volume allocations are given subject to production forecast and availability. Unfortunately, during the period under review Nigeria suffered serious setbacks in production despite several new oil fields coming on stream. Going forward, NNPC will consider curtailing contractual volume or number of customers

2. It is recommended that the pricing dynamics for gas sales and transportation be considered further, in particular in the context of changing oil prices, and the risk of perverse investment incentives arising out of the new pricing framework.