**Group Investment Proposal**

**Summary Information**

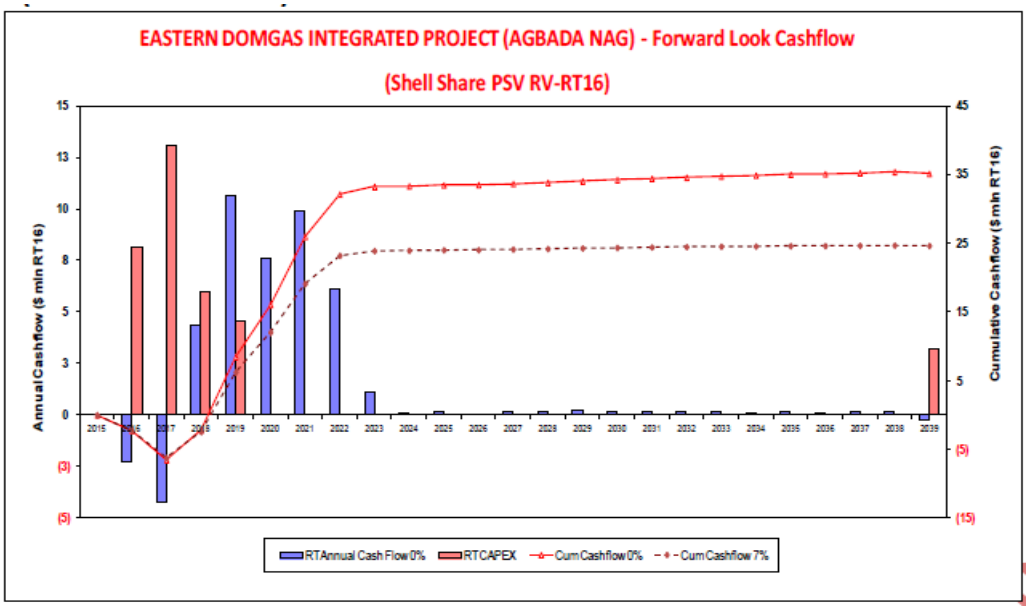
| | |
|---|---|
| Business unit and company | Upstream International Operated. Nigeria/Gabon. Shell Petroleum Development Company of Nigeria Limited (SPDC) |
| Group equity interest | 100% in SPDC, whereas SPDC is the Joint Venture (JV) operator of an unincorporated JV with a 30% interest. |
| Other shareholders/partners | Nigeria National Petroleum Company (NNPC: 55%), Total Exploration and Production Company Nigeria (TEPNL 10%) and Nigeria Agip Oil Company (NAOC: 5%) |
| Business or Function | Upstream International |
| Amount | This IP seeks approval for further Shell Equity Investment of US$ 49.2 million MOD 90/10 composed of $10.7million Overrun on GIP and $38.5million Estimate to complete. Previously, US$ 62.9million (Shell Equity) was approved on GIP 29.10.09 which is now fully spent. With this proposal, Shell's total investment in the project becomes US$ 112.1 million (P90/10). |
| Project | Eastern Domestic Gas Interim Project (Agbada-2 NAG Plant) |

Main commitments

| Description | Previously Approved GIP | Sunk Costs (ITD 2015) | Estimate to Complete | Estimate to Complete (Shell Share) | This Proposal (100%) | This Proposal Shell Share | Total GIP (100%)) | Total GIP Shell Share |
|---|---|---|---|---|---|---|---|---|
| Drilling of 2 Wells & 1 Recompletion | 54.6 | 46.1 | 16.1 | 4.8 | 7.6 | 2.3 | 62.2 | 18.7 |
| Flowlines % Hookup | 24.3 | 57.7 | 0.0 | 0.0 | 33.4 | 10.0 | 57.7 | 17.3 |
| Agbada NAG Plant | 82.3 | 111.0 | 66.7 | 20.0 | 95.4 | 28.6 | 177.7 | 53.3 |
| Project Management | 9.0 | 24.0 | 12.6 | 3.8 | 27.6 | 8.3 | 36.6 | 11.0 |
| Contingency | 30.5 | 0.0 | 13.0 | 3.9 | -17.5 | -5.2 | 13.0 | 3.9 |
| **Total Capex (Post FiD)** | **200.7** | **238.8** | **108.4** | **32.5** | **146.5** | **44.0** | **347.2** | **104.2** |
| SCD Opex | 3.2 | 0.7 | 2.5 | 0.8 | -0.0 | -0.0 | 3.2 | 0.9 |
| Pre-FiD Expenditure | 5.6 | 5.6 | 0.0 | 0.0 | -0.0 | -0.0 | 5.6 | 1.7 |
| **Total Expenditure (50/50)** | **209.5** | **245.0** | **110.9** | **33.3** | **146.5** | **43.9** | **356.0** | **106.8** |
| Overrun Allowance to 90/10 MOD | 0.0 | 0.0 | 17.5 | 5.3 | 17.5 | 5.3 | 17.5 | 5.3 |
| **TOTAL (90/10 MOD)** | **209.5** | **245.0** | **128.5** | **38.5** | **164.0** | **49.2** | **373.5** | **112.1** |

| | |
|---|---|
| Source and form of financing | This investment will be financed with JV funding and Shell share of the expenditure will be met by SPDC's own cash flow. |

Summary cash flow



| Summary economics | RV ($80/bbl) | NPV 7% (US $mln) | VIR 7% |
|---|---|---|---|
| | Base Case * | 24.6 | 0.84 |
| | Full Life Cycle | -2.1 | -0.02 |
| | * This is for cash flow forward | | |

## Detailed information including management summary

## Section 1: The proposal (Management Summary)

This investment proposal seeks support for additional funding (Shell share) of US$ 49.2 million to complete the Eastern Domestic Gas Interim Project (EDGIP) development of Agbada NAG field.

The EDGIP project is aimed at meeting SPDC's projected supply commitments to the Eastern Domestic Gas market as well as GSA's with two Independent Power Plants; Alaoji and Geometric.

From commencement of project till date; 2 NAG wells have been drilled and flowlines completed, while the NAG plant, at 74% completion to date, being constructed by a local contractor as part of single multi-project DOMGAS & AG Solutions EPC Contract covering **9** geographically dispersed plants/facilities; the project suffered several execution challenges and delays

Although the project achieved its early gas milestone by bringing the early production facility onstream on 8th March 2016, there remains substantial site construction works to complete installation of the already procured equipment packages to meet full customer/DOMGAS specifications and requirements.

Expenditure overrun (circa SS **$ 10.7mln)** on the initial GIP is already covered in a control incident review in 2015, which this GIP revision aims to formally close-out. The requirement for supplementary funding was identified in 2013 and a revision of the GIP commenced. However, DRB was unable to support this moving ahead as decision needed to be made on whether project should continue and if so, how it will be completed in view of the severe financial challenges of the main EPC contractor, accumulated delays. increase in costs and reduction in gas volumes. The decision to continue execution, complete project with the same EPC contractor and revise the GIP was made two years later. A key learning was the failure to obtain interim approval for further commitments above approved GIP from the relevant GIP approval holder.
An independent review of the project was carried out by a joint team from UPO and P&T in July 2016, learnings from the events in the project have been shared and will be cascaded further in the project organizations. The Review team also gave recommendations to assist project team to finish strongly, amongst these are

1. Expedite and track delivery of three remaining Long Lead items, resolve and settle promptly contract Variations Orders from the contractor to ease cashflow
2. Resource fully CSU team, integrate with OR&A and maintenance teams to ensure flawless start-up
3. Continue to make interventions as required to address financial challenges of contractor to unblock issues with ROS dates for materials and support site construction
4. Prioritize project in the annual budget funding to avoid further delays in start-up date and erosion of value
5. Retain key team members until handover to Asset, BOM to stay close to project and DE/DRB to be engaged regularly.

**Cost Growth (See Figure 1 – Appendix 1)**

The key components of cost growth are as follows:

| Description | USDm (100%) |
|---|---|
| *Gas Handling Facilities* | |
| Change in Plant configuration from 120mmscf/d to 2x40mmscf/d to manage gas volumes uncertainties and improve operability | 26 |
| Full segregation of SIS & PAS, replacement of threaded with Flange conections | 9 |
| Price increase from change of OEM due to breakdown of relationship between original OEM and execution contractor | 15 |
| VO for Field Auxillary Room, Power Mgmt System, Safety Instrumented System Panels and Estimate for additional piperack and other submitted /future VOs | 19 |
| Additional Owner's costs due to prolongation | 28 |
| *Pipeline* | |
| Additional scope for upgrade of Brownfield facilities for Pipeline Tie-in (3 Generators, FGS and Instrument Air package | 32 |
| *Wells* | |
| Well Intervention to resolve casing pressure buildup in Agbada Well 68 and price escalation for re-completion planned for 2019 | 14 |
| *Early Gas - new scope* | |
| DRB sanctioned scope for Early Production (40mmscf/d) ahead of main Plant | 5 |
| **Total** | **147** |

**Forecast Changes & Opportunities:**
Post drilling, reserves dropped from 137 Bcf to 71 Bcf due to wells meeting the reservoir deeper than the predicted. The ullage created in the NAG plant by this reduction in reserves and forecast shall be filled by processing 15-30mmscf/d of off spec Agbada AG production to full Domgas specification in the short term.

Longer term, the plant will be filled via the development of the Rumuekpe field with a potential of 600 Bcf. Study work on this field has commenced.

**Project Completion Strategy:**
To mitigate prolonged slippages due to challenges encountered by facilities execution contractor, a 2-phase project completion approach was approved by DRB in March 2015 to enable gas production by Q1 2016.

*Phase 1 – Early Gas Production:* Gas export utilizing available ullage in dehydration package at existing AGG plant and fast tracking aspects the NAG project including construction of a temporary FAR building using a separate execution contractor. First gas achieved Q1-2016.

*Phase 2 – Main EPC Project:* Completion of main NAG facilities by EPC contractor as per original plans with agreed performance management initiatives such as tripartite agreements/direct payments to vendors, towards planned OSD of Q4 2018.

**Project Scope & Completion Status**
The revised Agbada NAG Project scope entails the installation of:

- New 2 by 40 MMscf/d NAG plant with a mechanical refrigeration processing system at Agbada-2. Ongoing.
- Two new wells (67 &68) drilled and completed in 2011 at Agbada-1. Recompletion for well (68) by 2019.
- Install 2 nos. 450KVA Gas and 1 no. 320KVA Diesel Generators, Instrument Air Package, Fuel gas system and ancillary utility works also completed in 2015.
- Two, 8 inch x 6.5Km flowlines connecting the wells to the Agbada NAG Plant, completed in 2015.
- New export 10 inch export pipeline into the Eastern Domestic Gas Network. Completed in 2015.
- New condensate export line to the Agbada-2 flowstation delivery line.

Detailed Design, procurement and fabrication of all modules for the NAG Plant have been completed and packages delivered to site. Outstanding works includes completion of Balance of Plant (BOP) procurement, site installation and commissioning works as well as the new condensate line. Figure 2 (Appendix 2) is the schematic of Agbada NAG facilities and Early Gas scope superimposed on existing facilities.

## Section 2: Value proposition and strategic and financial context

This Investment Proposal is to provide addition funds required to complete ongoing development of the Agbada NAG field, which is already at an overall completion of 74% thereby ensuring that SPDC meets its commitment to the Nigerian Government of supplying additional 80MMscfd of gas into the eastern domestic gas network as well as derive benefit for the amount already expended on this project.

Apart from the Agbada field, which is being developed via this project, there are NAG fields at various maturation stages whose development strategy involves the utilization of Agbada NAG spare capacity for producing gas from these fields. Also, completed Agbada NAG plant will be utilized for additional processing of current Agbada AG to achieve required domestic gas specifications. Failure to complete this project will lead to value erosion and missed opportunities.

**Summary Economics**

This economics evaluation was carried out on a forward-looking basis using Latest Estimate (LE) costs forecasts provided by the project team.

Two scenarios were evaluated

I. Base Case Scenario: Project scope includes an AG dew pointing facility installed
II. NAG Only Scenario: Project Scope is NAG facility only (Phase 1)

Sensitivities were carried out to access the impact of the following on the project value:

a. High (P10) and low (P90) Realization
b. High (P90) and low (P10) capex,
c. 1 year production delay.

A Tornado plot was done

A project Full life cycle evaluation was also carried out with its value evaluated at different PSVs.

The Project is sufficiently robust going forward. However, the Full LifeCycle view is value eroding due to the high cost overruns and lower UR. Various DRB sessions reviewed the project status and cost outlook and options on whether to continue or stop the project. DRB decision was to continue with the project based on Forward look and subsequent growth projects in the area that will ride on this NAG project. Suffice to know that either reducing the capex or increasing the UR by 18% respectively would result to the FLC to be value neutral. The AGs contribute about 16% of the total project value. The result also showed that the project value is most sensitive to production thus efforts should be directed at ensuring that the uncertainties around the realization of the volumes promised are reduced to as low as reasonably practicable.

| PV Reference Date: 1/7/2016 | NPV ($/$ $ mln) | | VIR | RTEP | UTC ($/boe) | | Payout-Time (RT) | Maximum Exposure (RT) |
|---|---|---|---|---|---|---|---|---|
| Cash flow forward from: 1/1/2016 | 0% | 7% | 7% | % | 0% | 7% | yyyy | $mln (yyyy) |
| Base Case | | | | | | | | |
| SV ($60/bbl) | 29.4 | 20.4 | 0.70 | >50% | 7.5 | 7.8 | | |
| RV ($80/bbl) | 35.1 | 24.6 | 0.84 | >50% | 7.5 | 7.8 | 2019 | 6.5 (2017) |
| HV ($100/bbl) | 43.6 | 30.9 | 1.06 | >50% | 7.5 | 7.8 | | |
| Sensitivities (using RV) | | | | | | | | |
| Low Capex (P10) | | 25.0 | 0.89 | | | | | |
| High Capex (P90) | | 23.4 | 0.69 | | | | | |
| Low Reserves (P90) | | 16.9 | 0.58 | | | | | |
| High Reserves (P10) | | 36.2 | 1.24 | | | | | |
| NAG Only | | 22.3 | 0.76 | | | | | |
| Full Life Cyle | | -2.1 | -0.02 | | | | | |

## KEY PROJECT PARAMETER DATA (SHELL SHARE)

| Parameter (Shell Share) | Unit | Bus Plan (RV) | Low | Mid | High | Comments |
|---|---|---|---|---|---|---|
| Capex (MOD) | US$ mln | 27.0 | 31.0 | 32.5 | 37.9 | Provision made for 2016 |
| Production Volume | mln boe | 6.0 | 4.7 | 6.0 | 7.9 | |
| Opex (MOD) | US$ mln | 9.8 | 9.8 | 9.8 | 9.8 | ABCM |
| Start Up Date | | Dec-18 | Sep-18 | Dec-18 | Mar-19 | EPC Completion |

## Risks (residual) and Alternatives

1) Contractor's cash flow challenges.
Continued contractor financial constraints as a result of general inability to fund the project exacerbated by delayed payments from SPDC could in addition to already incurred delays, impact contractors ability to complete project as planned.
*Mitigation:*

a) *Re-distribution of milestones to help contractor's cash flow.*
b) *Tripartite payments deployed to facilitate direct payments to subcontractors, vendors and OEMs as may be expedient to ensure continuous progress on project.*

2) Security.
General security situation in the Niger Delta may deteriorate during period of commissioning with reps of vendors/OEMs of critical equipment unable to attend site leading to project delay and cost overrun
*Mitigation:*

a) *Agbada is located within PH metropolis, enroute to the PH International airport. Provision of adequate security to this location*
b) *Alternatives to on-site physical participation of OEMs reps for critical equipment during commissioning are being considered.*

Alternative Considered
In the light of the various execution challenges and reduction in available gas volumes, DRB reviewed economic and strategic implications of stopping or continuing the project. Though, project had become value-eroding, decision to continue was based on future opportunities from proximate fields to utilize capacity in the plant and opportunity to high grade quality of gas currently produced from Agbada fields.

## Carbon management

There are basically two identified types of emissions into the air, on this project. The first is via leak of HC and the other via combustion. In normal operation, leaks from relief valves are routed to the flare and is infrequent. Another source of leaks could be flanges however the right level of torquing will be applied to flanges to ensure that this does not occur.
Fuel fired engines shall be of low NOx, SOx and low burning to reduce the emission of GHG.

All liquid emissions shall be routed to the closed drain header and thence pumped back into the export system, to avoid contact with the environment. As much as possible, electric heaters shall be specified instead of fuel fired burners to mitigate the effect on the environment

## Corporate Structure and Governance

This existing corporate structure and governance arrangements of SPDC-JV with SPDC as operator still subsist for this investment.

## Group and Business Standards

There are no significant accounting and/or reporting risks or opportunities associated with this proposal. This proposal complies with Shell Group Business Principles, policies and standards. Functional support for this proposal is provided by Projects & Technology (P&T), Finance, Social Performance, Contracting & Procurement, HSE, Operations, Legal, Security, Treasury, Controllers and Tax functions.

## Project Management, Monitoring and Review

Project Assurance is in place for all work scope and management of change. This is a "P&T" executed project with P&T being accountable for the delivery of technical project integration and execution. A DRB with UI Nigeria and P&T participation is in place.

## Budget provision

The project continues to be funded by the SPDC Joint Venture under the Domgas budget tranche. Forward looking costs in this GIP are fully funded in OP15 except $5.6m SS planned for NAG Well re-completion that was captured in Out of Plan due to insufficient technical maturity of the scope at OP15 plan build. This scope is now mature and included "in Plan" in OP16, this has also received DE's support.

## Group financial reporting impact

There are no unusual accounting issues related to this GIP. Expenditure related to the project will be accounted for in line with Group Policy. The financial impact for project's full scope on Shell Group Financials is as indicated in the table below:

| US$ mln | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Post 2020 |
|---|---|---|---|---|---|---|---|
| **Total Commitment** | 10.7 | 8.1 | 14.2 | 6.2 | 4.8 | 0.0 | 0.0 |
| SCD OPEX | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pre-FID | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Cash Flow** | | | | | | | |
| Capital expenditure | 10.7 | 8.1 | 13.4 | 6.2 | 4.8 | 0.0 | 0.0 |
| Cash Flow from Operations | 1.9 | 10.6 | 17.2 | 19.9 | 23.9 | 16.2 | 39.3 |
| Cash Surplus/(Deficit)* | -8.8 | 2.5 | 3.9 | 13.7 | 19.1 | 16.2 | 40.7 |
| **Profit and Loss** | | | | | | | |
| NIBIAT +/- | 0.5 | 9.4 | 12.9 | 14.0 | 17.6 | 7.2 | 15.6 |

## Disclosure

Material disclosures, if any, will be done in line with the Group and SPDC Disclosure policies and guidelines.

## Financing

Shell share of the capital expenditure will be met by OU's own resources. Expenditure related to this project will be accounted for in line with Group Policy.

## Taxation

No other unusual taxation features.

## Key Parameters

The following are the main aspects of this proposal:

- This IP seeks approval for further Shell Equity Investment of US$ 49.2 million MOD 90/10. Previously, US$ 62.9million (Shell Equity) was approved on GIP 29.10.09 which is now fully spent. With this proposal, Shell's total investment in the project becomes US$ 112.1 million (P90/10).

***Section 13: Signatures***

This Proposal is submitted for approval

Initiator: _____

Toyin Olagunju - PTP/O/N

Date …/…./….

Supported by:

.....

**Erwin Nijsse (FUP/O)**

Date .../... /...

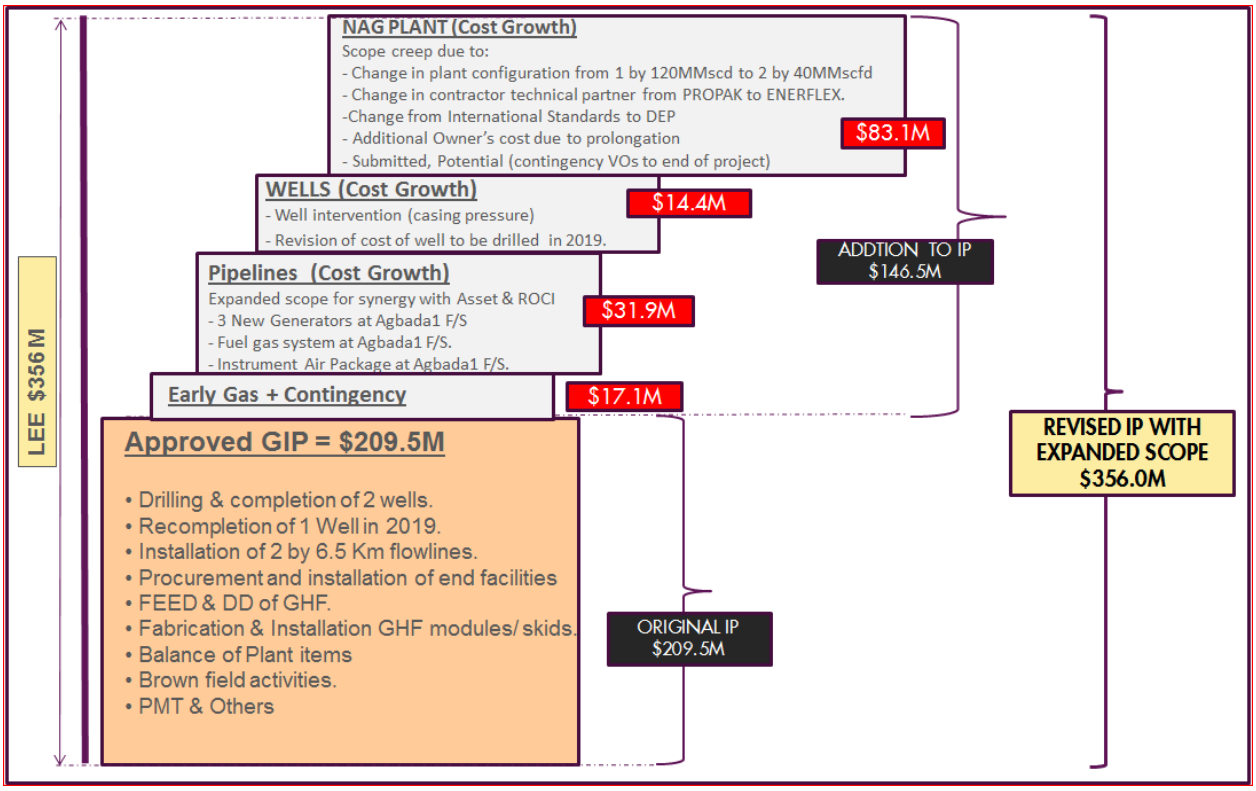
**<u>For shareholder Support :</u>**

.....

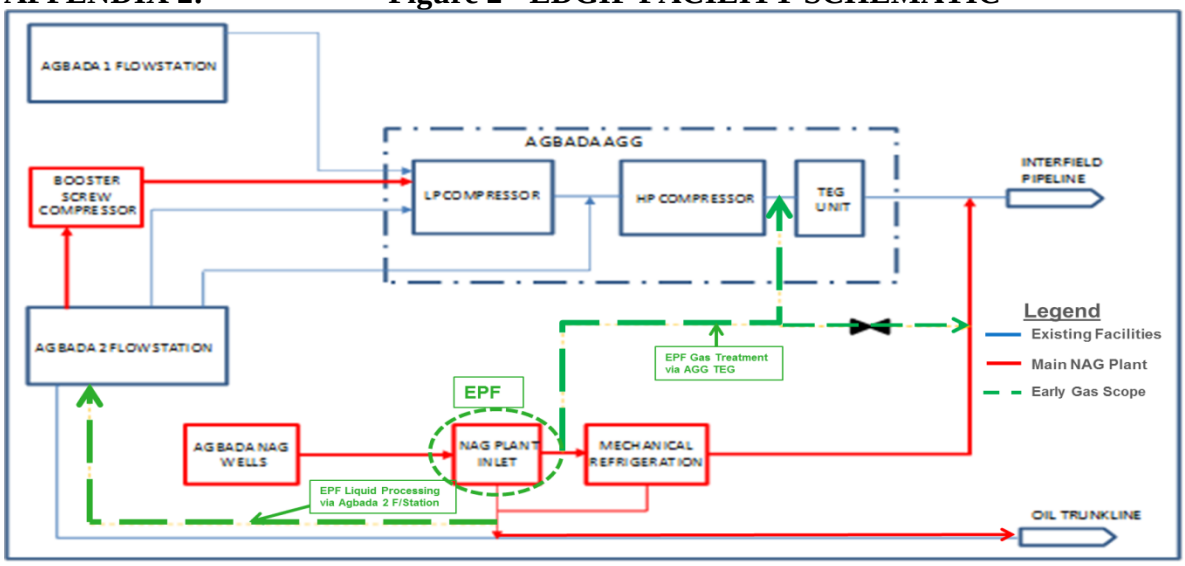
**Van de Leemput, Bart (UPO)**

Date .../.... /....

**APPENDIX 1:** **Figure 1 - EDGIP COST GROWTH**




**APPENDIX 2:** **Figure 2 - EDGIP FACILITY SCHEMATIC**



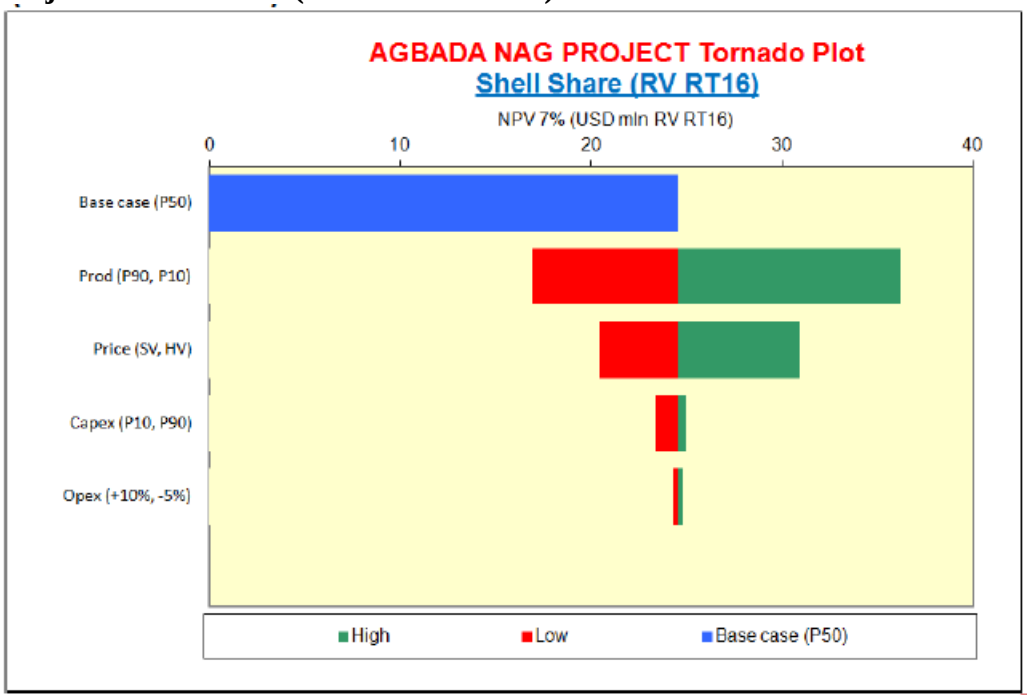

**APPENDIX 3: ECONOMICS TABLE AND CHATS**

| PV Reference Date: 1/7/2016 | NPV ($/$ $ mln) | | VIR | RTEP | UTC ($/boe) | | Payout-Time (RT) | Maximum Exposure (RT) |
|---|---|---|---|---|---|---|---|---|
| Full Life Cycle Cashflow from: 1/1/2012 | 0% | 7% | 7% | % | 0% | 7% | yyyy | $mln (yyyy) |
| Base Case | | | | | | | | |
| SV ($60/bbl) | 13.7 | -6.4 | -0.05 | 3% | | | | |
| RV ($80/bbl) | 19.4 | -2.1 | -0.02 | 5% | 23.0 | 30.7 | 2020 | 40.5 (2012) |
| HV ($100/bbl) | 27.9 | 4.2 | 0.03 | 7% | | | | |

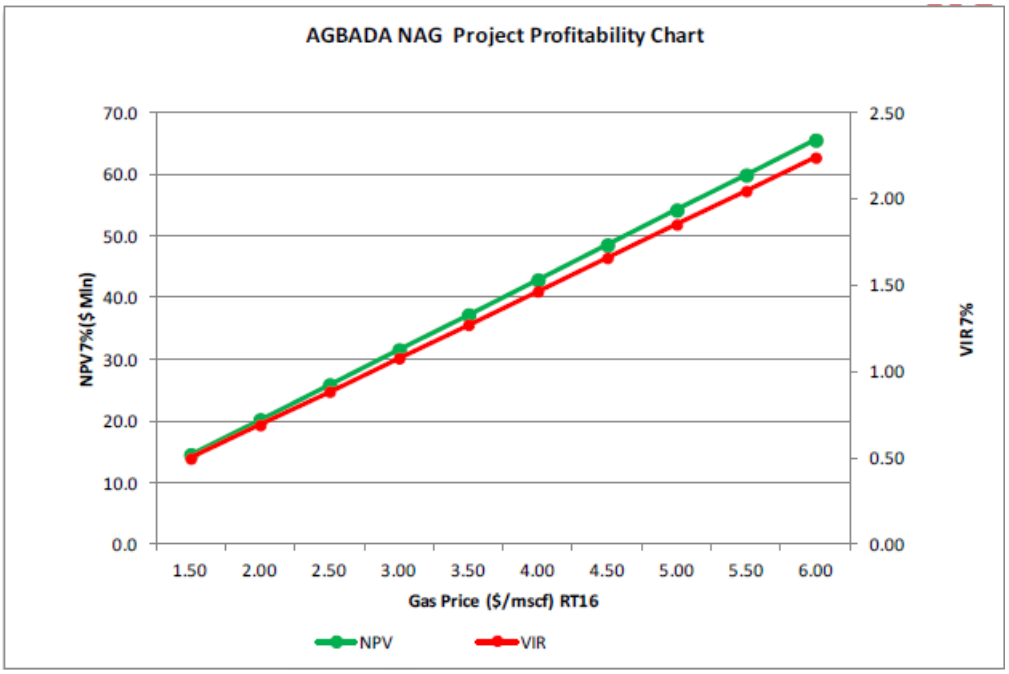
**Economics Assumptions:**

- Short term Oil PSVs of $42.5/bbl in 2016, $60/bbl in 2017 $60/bbl in 2018, and $60/bbl in 2019 – all in MOD, with applicable price offsets applied. RV-RT16 price $80/bbl used from 2020 onwards, as well as the SV-RT16 and HV RT16 were used for the full project scope.
- Condensate treated as Oil and taxed under Petroleum Profit Tax (PPT tax rate of 85%).
- Gas PSV of $2.4/Mscf in 2016 based on Nigeria Gas Master Plan (NGMP).
- Gas taxed under Companies Income Tax Act (CITA) with Associated Gas Framework Agreement (AGFA) incentive.
- Education Tax of 2% of assessable profit.
- NDDC levy of 3% total expenditure.
- Gas Heating Value (GHV) of 1000 btu/scf).
- Flare Fees of NGN10/Mscf was applied and is not tax deductible.
- Abandonment cost is estimated at 10% of total project RT CAPEX.
- AG before hydrocarbon dew pointing is priced at 75% of gas price and 100% of gas price after hydrocarbon dew pointing.

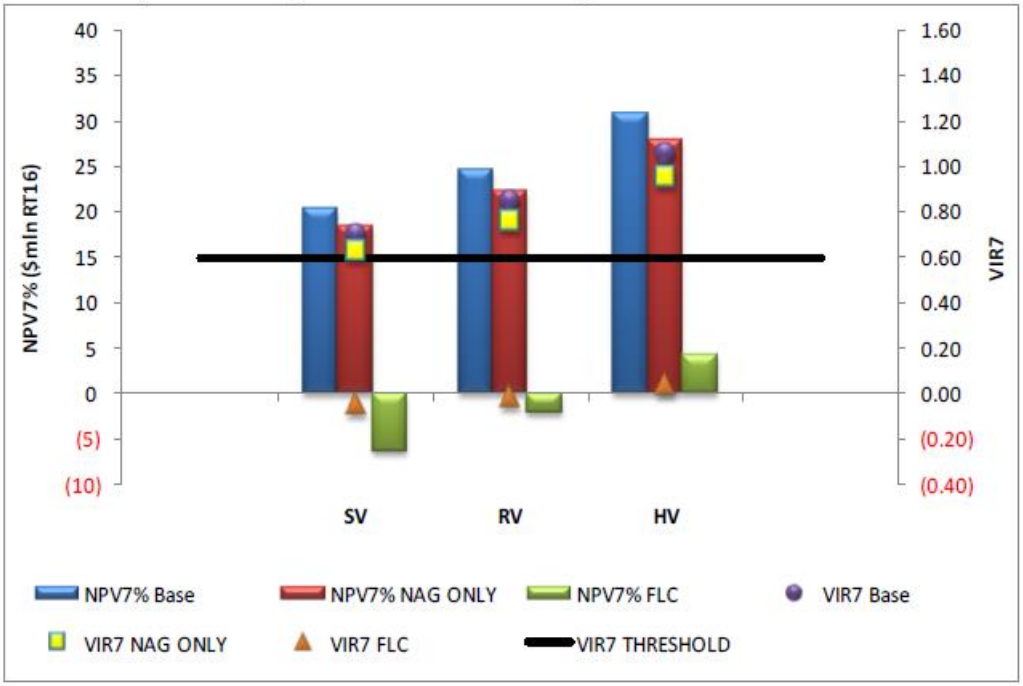
**Project Tornado Plot (Shell Share RT16)**




**Profitability Plot (Shell Share RV-RT16)**




**Economics Results: -Base Case, NAG Only Case & FLC Value @ Different PSVs**




**APPENDIX 4: Project Plan**

| Event Description | Planned Date BP07 | Actual/ Forecast Date | Comment. |
|---|---|---|---|
| DG3 (Eastern Interim) | 9th April 2007 | 9th April 2007 | Actual |
| VAR4 Agbada | 4th Dec. 2007 | 4th Dec. 2007 | Actual |
| Pre-FID IP | 30th May 2008 | 26th June 2008 | Actual |
| Award NAG Plant | 31st Mar. 2008 | 1st Sept 2008 | Actual |
| DG4 | 31st Jan. 2008 | 13th May 2008 | Actual |
| FID (Agbada) | 15th Mar. 2008 | 29th Oct 2009 | Actual |
| 1st Gas (50/50 Date) | 28th Jun 2010 | 8th March 2016 | Actual |
| Project OSD | 28th Jun 2010 | 6st Dec 2018 | Proposed |