

SPDC WELLS DECOMMISSIONING AND RESTORATION PILOT PROJECT



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1. EXECUTIVE SUMMARY

This document contains the Project Execution Plan for disused Wellsite Decommissioning and Restoration (D&R) pilot project in SPDC. The Decommissioning and Restoration (D&R) of eleven wells in Apará and Akpor fields will be undertaken as a pilot and proposed pilot experience will be used to design long term strategy for Decommissioning and Restoration of disused wellsites in SPDC.

There are currently some five hundred wells that are not being operated as part of SPDC oil and gas generation opportunities. Some of these wells are secured but regulations require that disused wells should be decommissioned and restored as soon as no future foreseen use of the well is established.

These disused sites continue to create Health, safety, security, and environmental (HSSE) exposure. Also, lack of surveillance activities on these disused sites gave rise to community encroachment such that some sites now have human habitation on top of wellheads. Most of these wellheads are also cannibalized, thereby creating HSSE exposure such that if major incident arises in form of hydrocarbon release to the environment arises, the impacted wellhead cannot easily be accessed by fire engines for effective emergency control. The immediate communities surrounding these wellheads are also such that any wellhead fire could easily lead to village or community fire, resulting in serious damage to properties, injuries and/or fatality and this would have far reaching HSSE and reputational impact to SPDC JV.

The Akpor field came on stream in August 1974 and produced until December 1987 when the last well quit production. The Apará field, on the other hand produced from December 1961 to February 1997 when production ceased. Elelenwa wells were producing to the Apará flowstation until 1997, when they were re-routed to the Agbada flowstation on HSSE grounds. By 1997, the then Apará flowstation had been engulfed by Port Harcourt town and buildings were located side by side with the flowstation. Residents complained of heat from the flare necessitating the re-routing of the Elelenwa wells to Agbada.

Akpor expectation oil and non associated gas reserves are 3.6MMstb and 5.2Bscf while Apará expectation oil and non associated gas reserves are 23.5MMstb and 97Bscf respectively as at 1/1/2011. The proposed Wellsite Decommissioning and Restoration pilot scheme will be used to acquire data prior to decommissioning. These data will be used for further study of these fields and depending on the economics of such future study, strategic decisions will be made on these fields. These decisions could include the use of latest proven technology for development of the remaining hydrocarbon, where economic, from locations other than the existing wellsites which are now being decommissioned for HSSE reasons.

An Environmental Evaluation Report will be executed as part of the D&R activities with the objective of determining the condition of the environment, ascertaining likely impacts these facilities have had on the environment, assessing the severity of such impacts, planning mitigating measures for the identified adverse impacts, and developing a management plan for the monitoring effectiveness of the implementation of the mitigation measures.

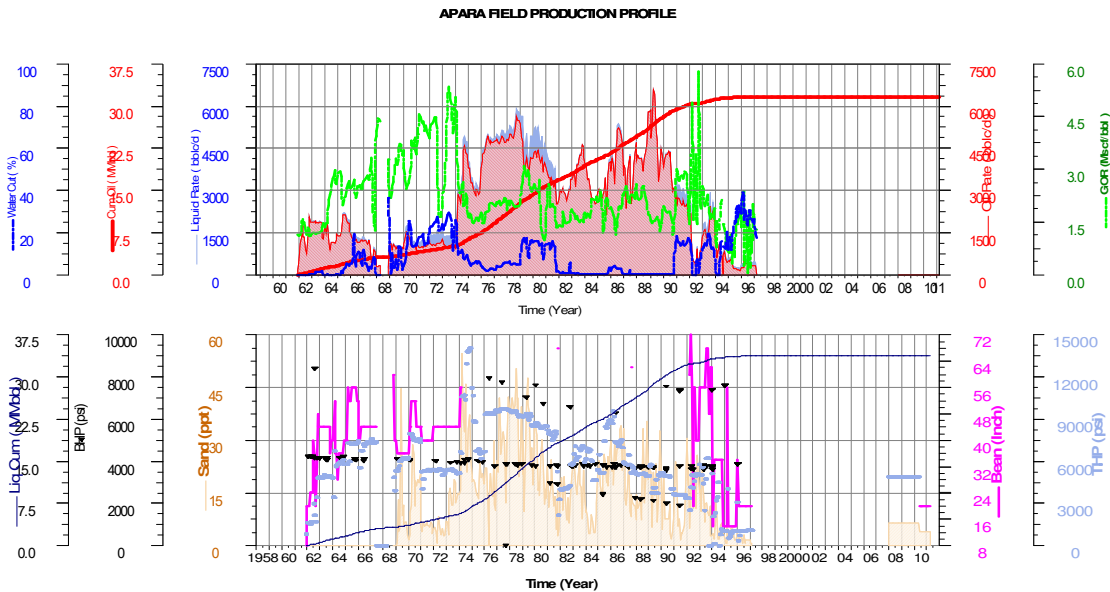
The estimated D&R pilot project will cost \$81m over the 2012 – 2013 business planning period. Details of the execution strategy, scope of work, cost estimate, project schedule, and phasing are contained in the following detailed Project Execution Plan (PEP).

This pilot D&R project, comprising of location and location access preparation, Wells decommissioning and location restoration was planned by a project team according to approved TOR, project execution will be undertaken by well engineering team – in line with SPDC EP-63 and according to approved investment plan. Locations will be returned to SPDC East Land Asset team after restoration and all change controls will be authorized by SPDC East Land Asset team.

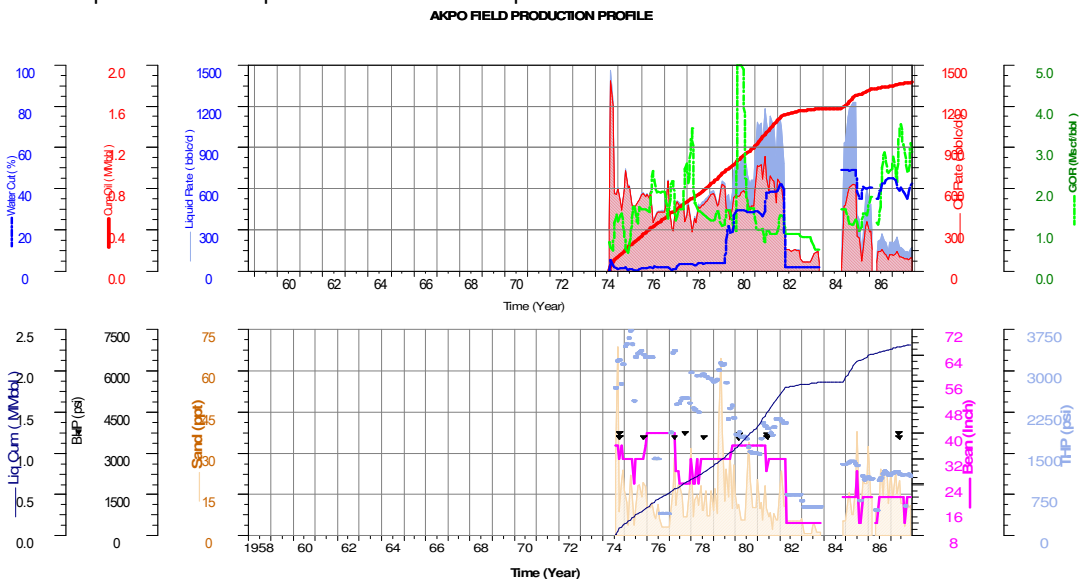
2. BACKGROUND

The Apará field was discovered by Apará-001 in 1961. A total of ten wells were drilled. However only eight (8) encountered completable hydrocarbons. The completed wells include Apará -001T, -002T, -003T, -004T, -007T, -008L/S, -009L/S and -010L/S. The field came on stream in December 1961 and attained a peak production rate of 6,577 bopd in April 1989. The field continued to produce until February 1997 when production ceased with the decommissioning of the

flowstation in 1997. Cumulative production from field stood at 31.7 Mstb. The production profile of the Apara field is shown in the plot below.



The Akpor field on the other hand was discovered by Akpor-001 in 1974. A total of three wells were drilled. The field came on stream in August 1974 and attended a peak production rate of 1385 bopd by September 1974. The field continued to produce until December 1987 when the last well quit production. Total cumulative production from field is 1.83Mstb. The production profile of the Akpo field is shown in the plot below.



Apara expectation oil and non associated gas reserves are 23.5MMstb and 97Bscf respectively while Akpo expectation oil and non associated gas reserves are 3.6MMstb and 5.2Bscf respectively as at 1/1/2011. The proposed Wellsite Decommissioning and Restoration pilot scheme will be used to acquire data prior to decommissioning. These data will be used for further study of these fields and depending on the economics of such future study, strategic decisions will be made on these fields. These decisions could include the use of latest proven technology for development of the remaining hydrocarbon, where economic, from locations other than the existing wellsites which are now being decommissioned for HSSE reasons.

As a result of the foregoing Akpor 01, Akpor 02, Akpor 03, Apará 01, Apará 02, Apará 03, Apará 04, Apará 07, Apará 08, Apará 09, Apará 10 wellsite locations are recommended for Decommissioning and Location Restoration.

3. CASE FOR DECOMMISSIONING & RESTORATION OF DISUSED WELLSITES

A satellite map of some of the well sites planned for decommissioning are shown in Fig 4.1 – 4.3. Fig 4.4 shows the state of one of the well head planned for decommissioning while Fig 4.5 show the state of Apará 1 flowstation location during a field visit in August 2012.



Fig4.1

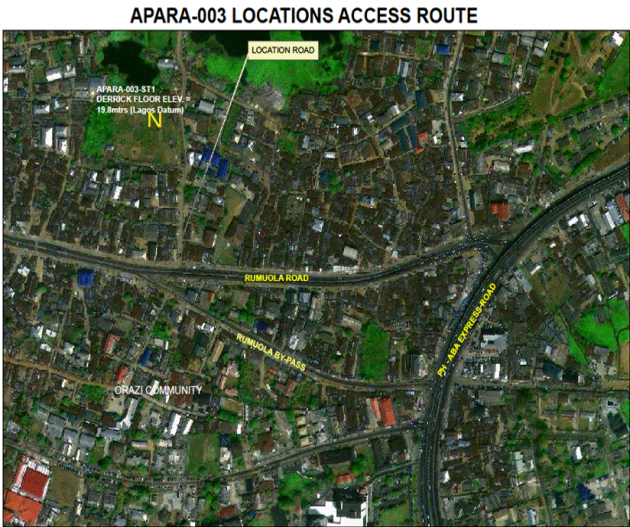


Fig4.2



Fig 4.3

Akpor - Non-producing / Legacy Location with construction near wellhead



Fig4.4

Apara 1 Wellsite during a location visit 04/08/2011



Fig 4.5

The situations on these disused wellsites are worrisome and could have huge HSSE and reputational impact on SPDC JV, hence the urgency to Decommission and Restore these disused well sites. Details of these potential HSSE exposure are discussed below.

3.1 FIRE

The possibility of fire outbreak in these well locations is high. Most of the well heads have been tampered with and as such we cannot eliminate the presence of free hydrocarbon in the environment. With houses built around the area and occupants bringing all sorts of sources of ignition close to the well heads one would worry that there could be fire and explosion one day. Bearing in mind that fire can only result when the three components (Fuel, Oxidant and Heat) undergoes exothermic chemical reaction, SPDC must ensure that one or two of these components are eliminated. If release of Hydrocarbon is eliminated in these areas by permanently decommissioning these wells, this would mean safety of Life of people are assured. In all, it would demonstrate due diligence on the part of SPDC.

3.2 UNAUTHORIZED SETTLEMENTS & POTENTIAL COMMUNITY ISSUES

With high demand for land in Portharcourt and some lax on required surveillance of these discussed wellsites, squatters started to use these disused sites for habitation. Such gradual encroachment usually starts with temporal accommodation but with time these wooden temporal accommodation become more permanent. In such situation, it is not impossible that one influential community squatter assumes ownership of disused wellsites and starts letting parts of the land for use as Mechanic and carpentry workshops. These unorganized settlement could lead to potential community problems especially if the occupants are not original owners of the land, in addition to the huge fire potentials as explained in section 4.1.

3.3 UNPLANNED DUMPSITES WITH POTENTIAL FOR POTABLE WATER CONTAMINATION

Most of the borrow pits that were dug several years ago by SPDC have been turned to dumpsites for all sorts of waste materials (hazardous and nonhazardous) by the villagers. Looking at the depth of these pits it is possible that the ground

water level has been reached. Due to this unrestricted and uncontrolled dumping of waste in these areas there is the possibility of contamination of the ground water. However this would be verified after the Environmental Evaluation Studies have been carried out.

3.4 DROWNING

The situation around the well heads is that the entire perimeter fences are all broken down and people have built houses within and around the well head area. The well head cellars are filled with rain water and are potential drowning hazards especially for those that have houses around the well head area including possible passersby. Also some of the borrow pits now contain run-off water throughout the year and these could pose drowning issues.

4. WORK SCOPE

4.1 SOCIAL PERFORMANCE STRATEGY

Apara/Akpor Field is located in the Land operation Area of SPDC-E in Obio-Akpor LGA of River State. About nine communities, Rumunkara-Rumuola and Rumuokania-Rumuokwuta, Rumuadolu and Eberewidolu-Rumuola, Rumuchiaworlu-Mgbuoba, Oroazi, Rumumini/Rumuoke, Rumuokwuta and Ogbogoro-Akpor own the oil field. The nine communities are Ikwerre by tribe. The major occupation of all above communities are farming and trading. The relationship between Apara/Akpor communities and SPDC has been cordial over the years, though there has been no oil operation in the areas for the past 14 year or more. The goal of the Social Performance activities is to ensure there would be no disruption to the abandonment project arising from the communities while providing opportunities for them to have economic and social benefits as a result of the project. There are no SPDC's legacy projects in the area. Any impacts, perceived or real are to be managed basically via stakeholder engagement throughout the duration of the project.

The Community Relations team will proactively engage the communities and Government agencies to create an enabling social environment for the decommissioning activity. This will include:

- Securing (License To Operate {LTO}/Freedom To Operate {FTO}) agreements, which actively seek to manage issues and impacts arising from the project with a bid to timely close them out.
- In the course of our engagement, we shall interact with the communities through the Community Governance structure (CGS) since there is no operational GMoU in the area.
- PGMoU or Project MoU model will be used to implement sustainable development projects delivery to the nine communities impacted by the project.
- Some sustainable community development projects (SCD) will be identified and agreed for possible execution in the course of this project.

4.2 ACCESS ROAD REHABILITATION

This will include re-opening the boundary of the access road (SPDC ROW), bush clearing/Scarification of dilapidated road surface, earthworks (sharpsand or lateriritic fill material), base course (0 – 50mm crushed rock) and hot Rolled asphalt Surfacing

4.3 LOCATION REHABILITATION

This will include; re-open the boundary of the Location (if Location is not fenced), bush clearing/scarification of dilapidated Location platforms, laying Durabase mats or Earthworks, Basecourse and Hot Rolled asphalt Surfacing.

4.4 WELL DECOMMISSIONING

The functional requirements for permanent abandonment of wells in SPDC include: A permanent abandonment barrier that restores cap rock integrity, zonal isolation to prevent cross flow of reservoirs, Isolation of fresh water reservoirs from hydrocarbon bearing reservoirs, Surface (wellhead, stove pipe etc) retrieved and removal, Hole closure at surface, Surface location restoration to it's original state where possible and Documented evidence of proper abandonment

4.5 BORROW PIT DECOMMISSIONING

Borrow pit decommissioning includes studies for feasible options for Borrow pit decommissioning, receipt of approved Environmental Evaluation Review report from DPR as a regulatory requirement to ascertain the environmental condition of the area, Decommission the borrow pit by backfilling or as may be recommended in the EER, or other best practices as may be recommended by planned feasibility study, to its natural state.

4.6 LOCATION RESTORATION

This involves verification of pollution levels of the environment during the Environmental Evaluation Review studies, Close out all the Environmental Monitoring Program (EMP) action items approved in the EER, Carry out Remediation of the environment as may be required, Planting of native species within the environment and continuous monitoring, evaluation and improvement.

5. PROJECT RISKS AND OPPORTUNITIES

5.1 Technical Risks

Proposed well decommissioning is similar to normal well operations and hence no specific challenges are expected. However SPDC has very limited experience on use of Hydraulic workover unit and this could pose some risks. Also proposing an operationally acceptable method for decommissioning of related borrow pits could be challenging. Sandfilling seems an option but this could have huge implications on proposed D&R pilot.

5.2 Economic Risks

Contracting issues and cost effectiveness could also be an issue considering that SPDC currently does not have any contract with Hydraulic Workover Unit (HWU) equipment vendor. Also scaling the access and location preparation scope to the required minimum for D&R could be a challenge.

5.3 Execution Risks

A major show stopper to proposed pilot D&R is ability to secure a HWU contract in good time. Unless this equipment is secured, proposed project will be delayed or very expensive if executed using normal rig operations. The issue of rigging up on obsolete well heads is also an important risk if we secure the required HWU. Also the subsurface integrity of the concerned well and our ability to isolate all reservoir could pose additional risks.

5.4 Community Risks

The possibility of community disturbance during project execution cannot be completely ruled out. The ability to operate a fully integrated community engagement plan are being developed and agreed with the concerned community. However it is also possible that restiveness may increase, upon community realization that SPDC JV is leaving location for good, since communities take pride on the number of well locations within the given community.

5.5 HSE Risks

Related HSSE risks relate to heavy equipment movement, deployment and decommissioning, noise levels due to operations of heavy equipment, temporal influence of operations on the community system, staff accommodation and transport to worksite, etc. There is also an increased safety risk due to hydrocarbon containment during decommissioning and restoration.

5.6 Opportunities

There would be significant savings and reduction of HSSE exposure if disused wells are abandoned as appropriate. There are currently some five hundred wells that are not being operated as part of SPDC oil and gas generation opportunities. Some of these wells are secured but regulations require that disused wells should be decommissioned and restored.

6. COST ESTIMATE AND PHASING

The project cost estimate is F\$81mln. The breakdown and phasing is as shown below:

s/no	Activity	2012		2013		TOTAL
		F\$	%	F\$	%	F\$
1	EIA Studies	133333	0.31%	0	0.00%	133333
2	BORROW PIT DECOMMISSIONING STUDIES	1000000	2.29%	0	0.00%	1000000
3	LOCATION & ACCESS ROAD	3077531	7.05%	3077531	8.30%	6155062
4	WELL ABANDONMENT	22000000	50.38%	18000000	48.56%	40000000
5	LOCATION DECOMMISSIONING BUDGET	1846519	4.23%	1846519	4.98%	3693038
6	LOCATION RESTORATION BUDGET	2580000	5.91%	2580000	6.96%	5160000
7	RESTORATION OF 4 BORROW PITS	3220723	7.38%	3220723	8.69%	6441445
8	COMMUNITY RELATIONS BUDGET	846500	1.94%	729000	1.97%	1575500
9	TRAVELS/LOGISTICS/STAKEHOLDER MGT	230000	0.53%	200000	0.54%	430000
10	Contingency (20%)	8735000	20.00%	7414000	20.00%	16149000
		43669606	100.00%	37067773	100.00%	80737378.2

Two studies will be started in 2011. An Environmental Evaluation Report is being executed to determine condition of the environment, evaluate and ascertain the likely impacts the facilities have had on the environment, examine and assess the severity of impacts, mitigate measures for the identified adverse impacts and Develop a management plan for the monitoring of effectiveness of the implementation of the mitigation measures.

Four of the well sites have associated borrow pit. One of the borrow pit are currently used as a refuse dump. Proposed second study will assess the borrow pits and recommend a best practice option for the decommissioning of such borrow pits.

7. EXECUTION STRATEGY

SPDC JV is committed to ensuring that well facilities and sites are properly decommissioned after use in line with regulation to ensure that potential HSSE issues that could arise due to these disused sites are reduced to As Low as Reasonably practicable (ALARP).

An SPDC project team has been formed and the roles and responsibilities of the team are as documented in chapter 8. Engagements with DRB, NAPIMS and DPR are ongoing and an Environmental Impact assessment is being initiated. A major bottleneck to the realization of the planned D&R pilot project is the absence of an appropriate abandonment unit contract. SPDC currently has four rigs and these are fully engaged. The planned D&R cannot be accommodated in the approved rig sequence. Also the use of these rigs may not be cost effective, hence a focused Well Engineering contracting strategy is proposed for D&R.

This pilot D&R project, comprising of location and location access preparation, Wells decommissioning and location restoration was planned by the project team according to the approved TOR, project execution will be undertaken by well engineering the team – in line with SPDC EP-63 and according to approved investment plan. Locations will be returned to the asset team after restoration and all change controls will be authorized by the Land East Asset team.

7.1 WELL DECOMMISSIONING EQUIPMENT SELECTION

Equipment options considered for planned Well Decommissioning and restoration pilot project includes Crane, Light Workover Unit and Hydraulic Work-over Unit (HWU). The HWU, which is a relatively light weight, self contained assembly

powered by a hydraulic system and provides a very economical means for all types of well intervention / workover in particular for well abandonment was selected for planned D&R pilot project. The main disadvantage of using HWU is slow trip time as compared to work-over rig but as there will be few pulling out trips in well abandonment, this disadvantage does not make a significant difference.

7.2. CONTRACTING STRATEGY FOR WELL D&R EQUIPMENT

SPDC currently has running contracts for provision of pumping, brine, cementing, and logging services. However, there is no contract for supply of an HWU – the work unit required to urgently execute the workscope and address the HSSE issues of the disused wells. The pilot phase of this project is planned to commence in Q1 2012 for duration of 2yrs. Contracting options for hiring an HWU include:

- a) Open Tender: Contracting through is a long process will take at least 18months before the unit becomes available for use. As this project is to commence in Q1 2012, this option will not provide an HWU required to start the project.
- b) Farm-in of an existing NAPIMS contracted HWU: This is a quicker option which will deliver the equipment in 2-3 months considering the urgency to mitigate safety hazards. The HWU with NPDC was considered for this, however further engagement revealed that contract has expired and the HWU released.
- c) Selective tendering/single sourcing of identified HWUs: From a market survey carried out, an HWU has been identified and confirmed to be readily available from an indigenous contractor. This option can also deliver the HWU in 3months if it is single sourced from the contractor.

8. ORGANIZATION

8.1 PROJECT SPONSORS

UIG Development and Wells General Managers are project sponsors. UIG Development GM is the Project Decision Executive while the Decision Review Board comprises Development GM, Wells GM, Business Planning GM and SPDC Finance Director.

8.2 MANAGEMENT STEERING COMMITTEE

Project Steering committee comprise UIG GM Wells, UIG Production Technology Discipline Lead, Technical Planning Manager, and SPDC Environmental Performance BOM.

This Committee will screen and support every recommendation from the project team to enable DRB or DE approval, as well as ensure project continuity by managing staff changes as appropriate and also advise on strategy for D&R deployment.

8.3 ASSET OWNER

All the eleven Wells selected for this pilot project belong to SPDC Land Asset team (DSLE).

This pilot D&R project, comprising of location and location access preparation, Wells decommissioning and location restoration was planned by project team according to approved TOR, project execution will be undertaken by SPDC Well engineering team – in line with SPDC EP-63 and according to approved investment Proposal. Locations will be returned to the asset team after restoration and all execution change controls will be authorized by DSLE.

8.4 DECOMMISSIONING AND RESTORATION PROJECT COORDINATION

This team comprises Wells D&R FEPM and a planner and is responsible for overall project coordination, resource assignment, monitoring and reporting to project steering committee and sponsors.

SPDC Decommissioning and Restoration project Front end project manager (FEPM) is the overall project coordinator in SPDC. FEPM co-ordination role involves stakeholder management (including interface and communication) and securing budget from sponsors. The role also includes project performance evaluation and regular reporting. Additionally the

FEPM through Liaison with functional team members should ensure that SPDC (and third party) Approvals are received as appropriate.

8.5 SUBSURFACE AND WELLS ACTION TEAM

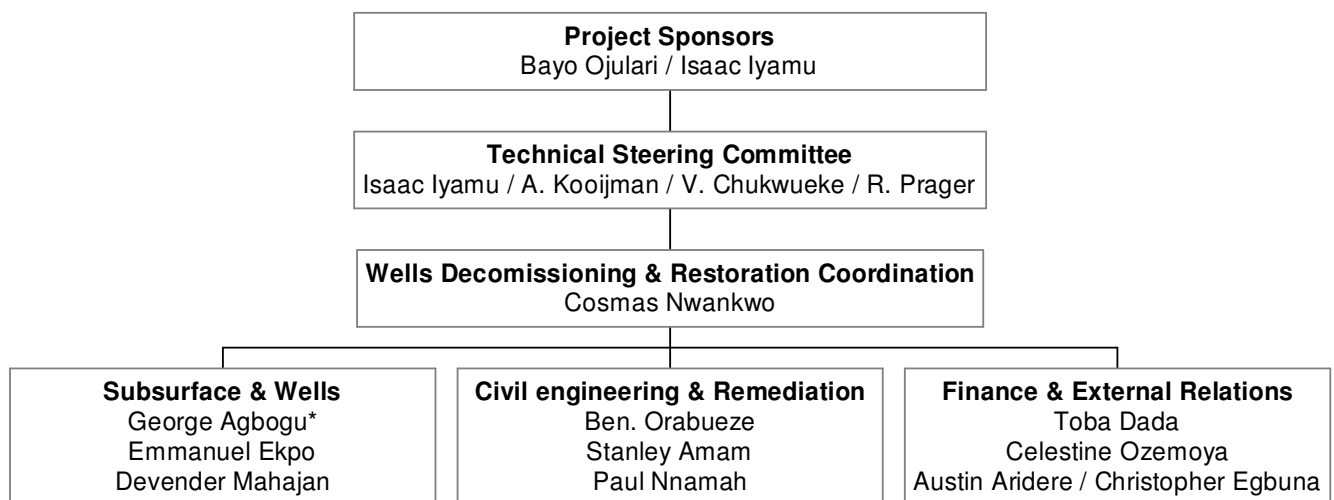
This team comprise Subsurface petroleum and Well engineers and are responsible for all subsurface well decommissioning work. Specifically this team is responsible for ensuring that reservoirs access created when the wells were drilled are properly abandoned in line with regulations. Other accountabilities for this team include well proposal generation, discipline challenge and approvals, regulatory engagements and approvals, cost leadership initiative, contractor equipment and personnel deployment, HSSE management etc.

8.6 CIVIL ENGINEERING AND REMEDIATION ACTION TEAM

This team comprises Civil Engineering, Geomatics, and Environmental management team members. Team is responsible for all location and location access preparation, location decommissioning, re-vegetation, receipt of decommissioning certificates etc. Other team actions include defining strategies for decommissioning of related borrow pits, discipline challenge and approvals, regulatory engagements and approvals, cost leadership initiative contractor equipment and personnel deployment, and HSSE management.

8.7 FINANCE AND EXTERNAL RELATIONS ACTION TEAM

This team comprises Finance, Community development, Legal and Security team members. team is responsible for project financial planning, monitoring and reporting. Other team actions include contracting support, community engagement, government relations and security.



**Wells Abandonment Execution Project Leader*