Shell Petroleum Development Company (SPDC)

Operator for the NNPC/ Shell/ Agip/ Elf Joint Venture

SPDC Obsolescence Management Plan (Instrument, Control and Electrical (ICE), PCD-IT & Mechanical Rotating Equipment)

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August 2023

Document Number: SEPCiN-2020-02-00000014

Revision Number: A02

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Abbreviation

LV- Low Voltage
PMS- Power Management System
SIS – Safety Instrumented System
F&G – Fire and Gas
FAT – Factory Acceptance Test
HIST – Historian
FEED – Front End Engineering Design
OPC – Object Linking & Embedding for Process Controls
PH – Port Harcourt
SW – Swamp West
ENG – Engineering
WKSTN – Workstation
SVRS – Servers
AMS – Asset Management System
OS – Operating System
EMP – Extended Maintenance phase
DCS – Distributed Control System
AGG – Associated Gas Gathering
SSP - Standard Sales Phase

ECS – Electronic Control Systems
OMF - Obsolescence Management Framework
OMP - Obsolescence Management Plan
PCD – Process Control Domain
IT – Information Technology
OEM – Original Equipment Manufacturer
BOGT – Bonny Oil & Gas Terminal
KBO – Thousand Barrels of Oil
BScF – Billion Standard Cubic Feet
FOT – Forcados Oil Terminal
HMI – Human Machine Interface
ACP – Asset care plan
EOFL – End of field life
KBOEPD-Thousand barrels of oil equivalent per day
ORAT - Obsolescence Risk Assessment Tool
SWB- Switchboard
HVAC- Heat Ventilation and Air Conditioning
HV- High Voltage
SMP – Standard Maintenance Phase

Executive Summary

Obsolescence poses significant challenge to the industry and affects the availability of critical business systems like the control, safeguarding, electrical and information management systems. With the convergence of electronic / electrical systems with information technology and digitization as well as the fast pace of technology advancement, it demands a risk-based approach to manage obsolescence as no profit-oriented business can keep up with its fast pace. For SPDC, the challenges of low venture funding, insecurity in the Niger Delta in the early years of last decade and the drop in oil price of 2014 did not create opportunity to effectively manage obsolete equipment during that period. These drove over 90% of SPDC electronic and electrical systems inventory into a deep obsolete state. [1]

The exposures associated with obsolescence of our electrical and electronic systems including the power generating systems (compressors and turbines), with increasing failure rates and protracted recovery time and resulted in circa 377 KBO & 15.8BScf (i.e., $16.9M) deferred in 2016 & 2017 and over $546K spent in 2017 on recovery. Obsolete electrical equipment contributed to production deferment of circa $6M and related electrical failures / incidents (circa 300 from 2009 – 2018).[2] Additionally, major malware security breaches e.g., the WannaCry Ransomware caused serious exposures for several Multinationals between 2017 and 2022 has led to a global response from OEMs to release software patches as well as an increase in PCD security requirements. Regrettably, due to the high count of obsolete equipment in our installed base in 2022, a huge percentage of them could not implement the recommended patches and over 70 PCD-IT deviations still exist even though upgrade campaigns commenced. As at May 2022, Total PCD system obsolescence total stood at 46%. As depicted in the dashboard PCD system Obsolescence for asset hubs- West (88.73%), East (51.20%). While mitigations have been put in place for the obsolete systems under deviation, however the attendant risks of unpatched operating systems, outdated Malware protection engines, etc have not been eliminated.

This document is a roll up of all plans for managing obsolescence of Electronic and Electrical Systems with associated AG equipment and the strategies proposed for the short- and long-term mitigation of the risks to our assets using the ORAT (Obsolescence Management Tool). Following the adoption of the OMF by the Electrical discipline and Rotating Equipment (Pumps, GTGs & AG compressors a risk-based approach has now been applied and the outcome is now captured in this document.

[1] *[Source: http://sww.wiki.shell.com/wiki/index.php/Obsolescence_Management]*
[2] *[Source: http://sww.wiki.shell.com/wiki/index.php/Obsolescence_Management]*

Chapter 1: Introduction

1.1 Business Context

Obsolescence is a major threat to the business and poses a major threat to system availability. The impact is felt most when the system fails. For example, a significant problem can arise if replacement parts are no longer available from the OEM or equipment can no longer be supported by the OEM. Consequently, managing integrity of this equipment would come with high premium cost and attendant loss in production due to equipment downtime.

In 2016, SCiN had over 70% obsolescent Process Controllers, 90% obsolete Workstations & Servers and 50% obsolete Safety Systems. In 2013, Microsoft announced the EOL of Windows XP and NT Operating Systems. The vulnerabilities and risk exposures from obsolescence is pronounced with IT security related incidence in the industry leading to cyber security attacks and other PCD-IT vulnerabilities.

A proactive strategy would ensure that control systems are regularly reviewed and that appropriate actions are instituted to safely manage obsolescence throughout the Asset lifecycle, and in the most cost-efficient manner. To ensure the effectiveness of the process, an Obsolescence Management Framework was developed in 2016 providing the framework for this obsolescence management plan to be created.

This plan is one of the key deliverables for the facilities as input into the MRP and ACP and outlines the strategy towards achieving the objective of mitigating the obsolescence of ECS/ Electrical Equipment with the Combined AG equipment such as the compressors and turbine control systems in the assets. Developing and updating the OMP for each asset brings about the following benefits:

i) A structured and well-planned approach towards mitigating/eliminating obsolescence

ii) Development of Maintenance strategies that are aligned with the product Lifecycle and Asset care plan (ACP).

iii) Clear focus on ECS/ Electrical equipment whose failure can result in a significant or colossal loss to the business.

iv) Make inputs to brown field and greenfield engineering projects to proactively manage obsolescence

Figure 1

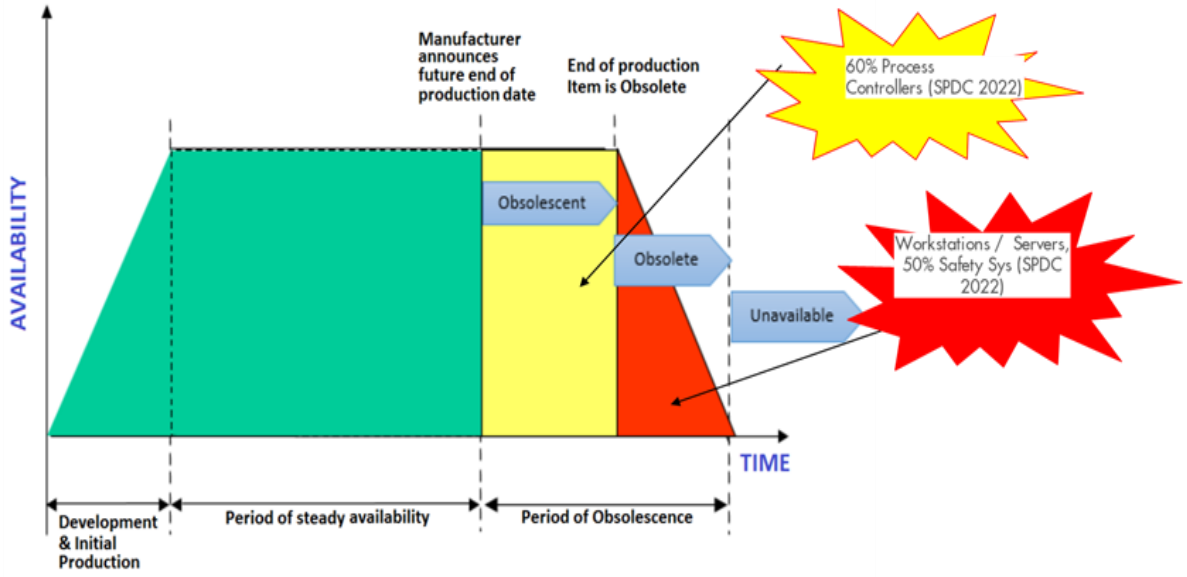


Figure 1 Obsolescence Management Cycle with annotation of SPDC's view as at 2023

1.2 Purpose

The purpose of this document is to provide a structured approach to addressing obsolescence both in the short term and long term. It describes the steps that is used in developing the site-specific OMP which includes developing and updating Electronics Control Systems (ECS), Electrical database, and combined AG equipment, GTGs, Pumps Control system etc., risk assessment for obsolescence, determining the strategy, developing the plan, and executing the plan.

1.3 Scope

This document is applicable to SPDC assets and covers Electronics Control Systems, Electrical and combined AG equipment categories deployed across for Instrumentation, control and Electrical (ICE) purposes for DCS and SIS, including but not limited to Unit Control Systems local to Equipment (Package Equipment).

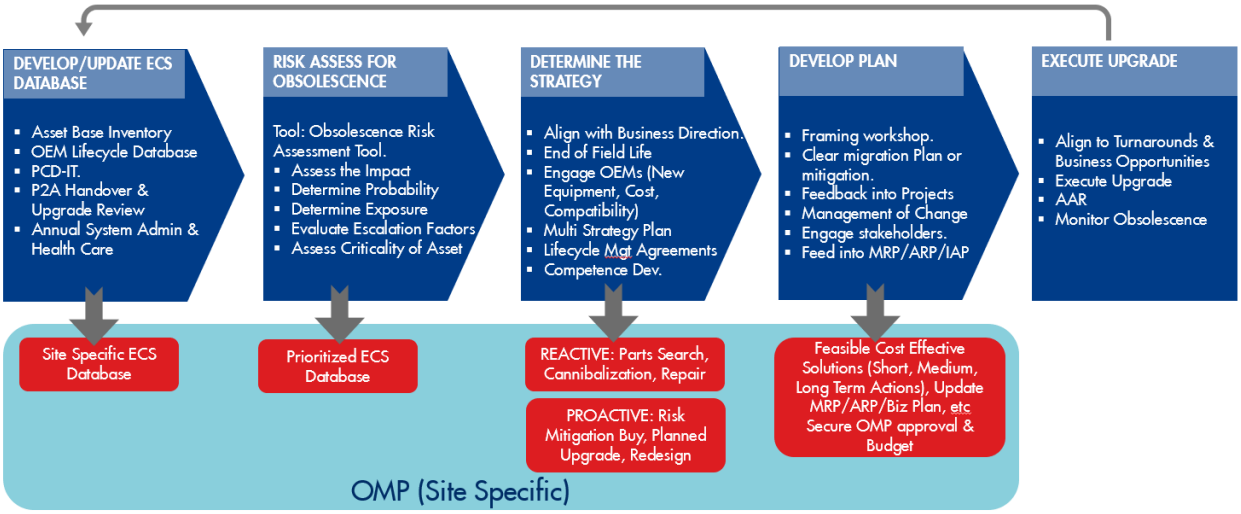
Chapter 2: Methodology

2.1 Obsolescence Management Strategy

In the management of obsolescence in SCiN, the ECS stipulates a multi-strategy approach. There are two major strategies available based on the overall component risk ranking, the reactive and proactive strategy.

A reactive strategy is pursued for "Obsolete" systems (with consequence already occurring) and a proactive strategy for Systems obsolete/approaching obsolescence with no consequence yet.

2.2 Steps in Developing an Obsolescence Management Plan



2.3 DATA VALIDATION

Legend	Lifecycle Status
	1. No OEM Support 2. End of Extended Sales Support (EES) 3. Spares not readily available 4. Maintenance Competence not available 5. OEM recommendation to upgrade to the current technology available for continuing operations 6. Parts or services based on best effort concept. 7. The product is no longer supported. Parts repair, exchange, or remanufactured services are no longer offered. 8. These products are not available for purchase. Product support is limited, potentially slower and more costly, and subject to material availability.
	1. Stop Sale/End of Production. 2. End of Mainstream Support (EMS). 3. Discontinued date announced, product orderable until discontinued date. Actively execute migrations and LTB 4. Spares no longer manufactured or guaranteed. Availability of the spare parts based on the current inventory. Sign off a LCA guarantees spare availability. 5. These products are not available for purchase. Product support is available, but oriented to maintenance (i.e., replacement parts, repairs, and field services) rather than system expansion. 6. New spare parts are no longer available, and support is limited to repair, exchange or remanufacture (subject to availability).
	1. Available 2. Most current product offering. 3. Product is fully supported but a newer product or family may exist 4. The most current product offered, with published pricing, normal lead times, and complete support. These products are recommended for all new systems and major expansions. 5. Most Recent product offering for New & Existing systems.

Chapter 3: Highlights of Obsolescence Risk Assessments from Assets

3.1 GBARAN/UBIE:

Gbaran ORAT updated in 2023. As shown in the table below highlights key findings from the Gbaran's ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2025. The asset went through the obsolescence management process implementation between 2020 and 2022, where majority of obsolete systems from electronics and electrical systems including the compressors, control retrofit completions in 2021 and with the help of the asset-based inventory which served as input into the ORAT done in 2015.

The package equipment control systems upgrade completed in 2020 and 2021 such as the Calms control for the SGT400 Gas Turbine compressor driver and power generation. All other identified top priority risks in Gbaran for immediate attention planned for execution in September 2022 and 2023. The Asset Leadership and PACO Technical Authority community approved a virtualization of all the Servers to reduce equipment count and significantly increase the life cycle of servers which was commissioned in 2021. For the obsolete components, a multi-strategy proactive approach is advised to ensure that the lifecycle of the obsolete components is extended to align with a future upgrade beyond 2025 as will be determined by the Strategic Asset Management Plan. This Multi-Strategy approach will include buying Risk Mitigation Spares that will be based on historical usage to extend the usage of the components as far as 2027 or when the next major upgrade is deemed economically viable. In addition, maintaining Lifecycle Agreements (LCA) with AOS Orwell and proactively signing System Service Agreements with other key vendors /OEMs is reduce the risk and cost of maintenance to support this multi-strategy approach.

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year To Deliver
Distributed Control System DCS	Emerson Process Management	DeltaV v14.3.1 Build 7288	Controller	72				No Upgrade required
			I/O Module	636				
			Power Supply	72				
			HMI / Operator Workstations and AMS	29				
				87				

			Application Workstation (includes OPC Servers)	23				
				120				
			Network and Switches	96				
Fire & Gas Systems FGS	HIMA	H51q/H41q H51qe-HRS	Controller	68				
			I/O Modules	1269				
			Power Supply	461				
			Workstation	2				
				7				
Safety Instrumented Systems SIS	Yokogawa	HIPPS	Controller	8				
			I/O Modules	40				
			Power Supply	6				
			HMI / Workstation	2				
				3				
Package Control System (Gas Turbine Power Generation)	Siemens	Simatic S7-200	Controller	1				
			I/O Module	7				
	Allen Bradley	Control logix 5000	Controller	1				
			I/O Module	16				
			Power Supply	7				
	Allen Bradley	Control logix 5000	Controller	2				
			I/O Module	18				
			Power Supply	8				
			HMI	2				
			Network and Communication	2				2025
	Allen Bradley	Control logix 5000	Controller	2				
			I/O Module	23				
			Power Supply	9				
			HMI	2				
			Network and Communication	2				2025
	Allen Bradley	SLC 500	Controller	2				

			I/O Module	4				
	Siemens	S7-300 Simatic Net	Controller	1				
			I/O Module	8				
			HMI	1				
Metering Systems MTS	Krohne		Gas Chromatograph	2				2025
			Flow Computer	8				
				6				
			Validation / Supervisory Computer Workstations	3				
				24				
			Power Supply	3				
			Peripherals	2				
			Network and Communication / Switches	17				
Machinery Control System (AGC compressors)	Allen Bradley (Machine controls for the AGCs & GTGs)	Control logix 5000	Controller	5				
			I/O Module	261				2025
			Network and Communication	20				
			Power Supply	5				No Upgrade required
			HMI Workstation	5				
				54				
	Compressor Controls Corporation (CCC)		Controller	2				
			I/O Module	7				
			Power Supply	4				
			HMI Workstation	1				
				5				
	Tyco Fire and Integrated Solutions		I/O Module	110				
	Bentley Nevada (Vibration Monitoring System VMS)	GE 3500 Encore VMS	I/O Module (monitors)	161				
			Interface	26				
			Power Supply	25				

			HMI Workstation Server (System 1)	6				
				9				

3.2 SOKU

Soku had ORAT review in 2023. Below is a table that highlights key findings from the Soku's ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2025. From the ORAT, the main strategies chosen to mitigate the obsolescence risks are to retain procured spares up to Q4 2023, conduct complete system upgrade in Q4 2023 including procurement and installation of new Yokogawa ALR 121 ethernet cards replacing the SIS MULCOM A & B and F&G MULCOM A & B. Regular LCA conversation with Control Systems OEM(Yokogawa) have been set-up while team latches on EFA rates for projects execution.

Upgrade of Obsolete LV circuit breakers was recently concluded, while HV circuit breakers upgrade missed out in OP'23 initial submission have been recommended for injection or OP'24 budget rounds. Emergency Diesel Generator (EDG) installation and commissioning is fixed for Q4 2023. The upgrade of the protection relays is captured in OP'23 budget proposal -still outstanding and not in base plan. Replacement of 6.6kV ABB Motors are projected for OP'24.

For the combined rotating equipment, the Turbotronics V controls upgrades/retrofit completed for 2oo3 Solar Taurus 60. While pending control system upgrade to Turbotronics V is planned for Q4 2023.

AG & LP NAG HMI/Mark VI Control Systems upgrade submitted as part of OP'23 budget proposal

Details can be found in the Soku ORAT, and AG equipment sheet attached in the appendix.

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year To Deliver
Distributed Control System DCS	Yokogawa	Centum VP R6.06.00	Controller & Processors	15				2023
			Interface	80				
			I/O Module	78				
			Power Supply	36				
			HMI Operator Workstation HIS1160, HIS1162,1163, HIS/ENG1264	4				No Upgrade required
				8				

			HMI Engineering Workstation HI1164	1				
				2				
			HMI PRM STN1158 & STN1263	2				
				2				
			ExaOPC/ExaQuantum server (STN1155 & STN1156) & (STN1157-Terminal server)	1				
				2				
Fire & Gas Systems FGS Safety Instrumented Systems SIS	Yokogawa	Prosafe RS	Controller	2				
			I/O Modules	7				
			Power Supply	2				
			Interface	2				
		Prosafe SLS	I/O Modules	2198				
			MULCOM Server ESD_MULCOM_A, B	1				
				3				
			MULCOM Server F&G_MULCOM_A, B	1				2023
				3				
			SOE Recorder YOKOGAWA-64764C	1				
				3				
Distributed Control System DCS	Yokogawa	Centum VP R6.06.00	Controller	3				
			I/O Modules	11				
			Interface	22				
			Power Supply	8				
			HMI Operator Workstation HIS0363	1				
				2				
			HMI Engineering Workstation HIS0364	1				No Upgrade required
				2				
			HMI PRM STN0360	1				
				2				
Safety Instrumented Systems SIS	HIMA	HIMA HI Quad H51Q-HRS	Controller	2				
			Power Supply	4				
			I/O Modules	44				
			Interface	2				
			HMI SIO 0264 Engineering workstation	1				
				2				2023
Fire & Gas System FGS	HIMA	HIMA H51Q-HRS	Controller	2				
			Power Supply	42				
			Interface	2				

3.3 BONNY OIL & GAS TERMINAL (BOGT):

BOGT completed a third ORAT in 2022. Below is a table that highlights key findings from the BOGT's ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2025: Based on the ORAT, the main strategies chosen to mitigate the obsolescence risks are to upgrade the obsolete systems continuing from the works already done in Q1, 2020 and placing order for long lead items. Phase 3 & 4 DCS and Safety System Controllers' upgrades are in flight and FAT already scheduled for November,2023. In addition is exploring quarterly health checks Maintenance on the systems using the Corporate ECS contracts for quarterly maintenance and call out, Maintaining minimum stock of spares for obsolescent components.

For the Electrical systems, CLINK 11 systems Of SS-300 Switchboard,210 & 200 (BOGT) upgrade have been proposed in OP '23 and awaits approval. Other Priority items includes the Siemens DYNADERT variable speed drives for emulsion pump Motor, Rockwell Control Logix 5000, and SLC 500 Upgrade for the switchboards and HVAC units which are no longer supported by the OEMs requires speedy attention. Obsolete EATON switchboards, The TCP, GPP and excitation upgrade required and have been moved into OP'23 Budget proposal and should be given priority support/approval in OP'23 or OP '24 at most. There is need to make use of available corporate contracts to execute the upgrades and ensure mitigations are established for the obsolescence related identified risks

N.B: Details can be found in the attached Electrical ORAT documents in the appendix section of this document.

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Distributed Control System DCS	Yokogawa	Centum VP R.06	Controller	22				2024
			Interface	137				
			I/O Module	207				
			Power Supply	77				No Upgrade required
			HMI	1				
			Engineering Workstation	5				
			HMI	1				
			Operator Workstation	8				
				1				

			Server (EXAQUANTUM)	6			
			PRM	1			
				2			
Fire & Gas Systems FGS Safety Instrumented Systems SIS	Yokogawa (Modules Supplied by Siemens)	Prosafe PLC	Controller	1			2024
			I/O Modules	102			
			Interface	34			
			Power Supply	20			
			Servers (MULCOM)	18			
				8			
			Workstation	4			
				6			
Package Control System PCS	Rockwell Automation	SLC 500	Controller	1			
			I/O Module	11			
			Power Supply	2			2024
			HMI	2			
	SMAR	Smar	Controller	7			
			I/O Module	55			2025
			Interface	36			
			Power Supply	18			
			HMI Workstation	8			
				5			2025
	General Electric (GE)	MARK VI (Hitachi H25 Gas Turbines)	Controller	1			
			Interface	18			
			I/O Module	144			
			Power Supply	9			
			HMI	18			
				12			
	Bentley Nevada	GE 3500 Encore VMS	I/O Module (monitors)	157			
			Interface	26			
			Power Supply	3			
			HMI Workstation	13			
				12			2023
			Server (System 1)	2			
				12			
	General Electric (GE)	GE Historian	HMI (Workstation)	3			
				10			2025

	Siemens	Instrument Air Systems	Siemens	1				2024
				6				
	Rockwell Automation	Firewater System	PLCs	1				
	Emerson Delta V	Fuel Gas system -	HMI Workstations	1				
			I/O Modules	2				
			Power Supply conditioner	75				
			Servers	1				

3.4 NUN RIVER and DIEBU CREEK.

Nun river and Diebu Creek completed their first ORAT in 2022. Below is a table that highlights key findings from the integrated Nun River and Diebu Creek ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2025:

Asset	Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Nun River	Distributed Control System DCS	SMAR	SMAR	Controller	1				2024
					1				
				I/O Module	1				
				Interface	1				
				Power Supply	4				
				HMI Workstation	1				
					3				

Asset	Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Diebu Creek	Distributed Control System DCS	SMAR	SMAR	Controller	2				2024
				I/O Module	1				
				Interface	1				
				Power Supply	4				
				HMI Workstation	1				
					3				

Based on the ORAT, the main strategies chosen to mitigate the obsolescence risks were to upgrade obsolete servers and systems, maintain LCA with SMAR for annual Maintenance and call out through the Corporate ECS Contract Non-MAC, and put plan in place in BP 22 to change out and procure I/O modules and controllers.

N.B: Details can be found in the attached documents in the appendix section of this document.

3.5 FORCADOS OIL TERMINAL (FOT).

FOT completed their ORAT in 2022 and reviewed in 2023. Below, is a table that highlights key findings from the ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2025. Based on the ORAT, the main strategy chosen to mitigate the obsolescence risks is to plan to upgrade for equipment that have become obsolete before 2023 at the next major Turnaround event. This have been phased and the upgrade for FOT DCS, SIS and F&G budget have been secured, and project is in flight. Asset is taking advantage of the Major ECS contract for Life Cycle Agreements with Yokogawa to guarantee technical support and outright upgrade to Centum VP R6 for DCS, while F&G Wormald System upgrade is undergoing Procurement process. In addition, asset will procure, and stock adequate spares based on historical use for system (DCS & F&G) till ongoing upgrades are completed. Strategy to manage GTG is phased. 5 GTGs(Solar Turbines) will be upgraded between Q3 2023 and Q3 2025. Gutor/AEG UPS and AEG containerized Switchgear change out are captured for OP 23 CAPEX Proposal while electro-hydraulic start system captured OP'22 budget is in flight. ALSTHOM protection relay upgrade is in flight. More details can be found in the attached documents in the appendix section of this document.

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Distributed Control System	Yokogawa	Centum VP	Controller	3				2023
			Interface	27				
			I/O Module	456				
			Power Supply	9				
			Operator Workstation	1				
			HIS 161, HIS162, HIS163	2				
			Engineering Workstation	1				
			HIS164	3				
			Monitor DELL FX100	2				
			DELL WYSE	2				
Fire & Gas Systems	TYCO/ WORMALD	Wormald 2003B	PEP Modular Computers	7				2023
			I/O Modules	85				

Safeguarding System SGS	Yokogawa	Prosafe SLS	Gateway module to DCS	2				
			I/O Module	1672				
			PHOENIX CONTACT POWER MODULE	3				
Export Pump Vibration System		Bentley Nevada	VIBRATION MONITOR 3300 SYSTEM	5				2024
MOTOR OPERATED VALVE (MOV) MONITORING SYSTEM	ROTORK	PAKSCAN IIE MASTER STATION 1A/1B	Power Supply	4				
MOTOR OPERATED VALVE (MOV) MONITORING SYSTEM	ROTORK	PAKSCAN IIE MASTER STATION 2A/2B	Power Supply	4				
Power Generation	Bentley Nevada	Bentley Nevada Vibration Monitoring System model - 2201	Power Generation Turbines Vibration Monitoring	5				2023
Power Generation	Det-Tronics Flame Detection System	Fire and Gas system Det-Tronics Eagle Quantum Premier Safety System Controller	Controller	1				No Upgrade required
			Controller	1				
			Power Supply	1				

OEM	Category	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
AEG Fabre	Switchboards	SKV/SV18		1				2024
ALSTHOM	Protection relays	MVTU, MCG		256				2024
		MCGG22						
		MCAG, MBCIMCTH01F						
		MCGG82H						

		MYTU, MCND, MWTU						
AEG	Containerized LV switchboard	Accommodation Area		2				2024
GUTOR	UPS	DC/AC		34				2024
AEG PS								2024
LOHER	VFD	AHSK-355 MB-04A	Starter	4				
Solar Turbine	Control system upgrade GT800, 810,820, 830,840	Mars 100		10				2025

3.6 EA FIELD:

EA Field (including Sea Eagle and the Drilling Platforms A, B, J and Riser Platform A) completed their ORAT in 2022. Below, is a table that highlights key findings from the ORAT and facility level Obsolescence Management Plan. The table gives a view up to 2027.

The asset went through the obsolescence management process and with the help of the asset-based inventory which served as input into the ORAT done in 2015, the following findings were discovered.

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Distributed Control System DCS	Schneider	Foxboro IA Series Version 8.6	Controller	80				2023
			I/O Module	216				
			Server & workstations	28				
			Network & Ancillaries	10				
Fire & Gas Systems FGS		Foxboro IA Series Version 8.6	Power Supply	26				
			Controller	9				
			Communication	12				
			I/O Modules	64				
			Network	6				
Safety Instrumented Systems SIS	Rockwell Automation		Power Supply	4				
			Controller	4				
			I/O Module	4				
				4				
				8				
				4				2023

			Network & Communication	4				
			HMI/ Workstations/ Servers	2				
			Peripherals	6				
	Bentley Nevada (VMS)		Controller	2				
			I/O Module	6				
			Peripherals	2				

Currently the DCS and SIS upgrade program identified in the 2015 plan is in flight, and other identified scope already completed.

Based on the ORAT, the main strategies chosen to mitigate the obsolescence risks is to plan to upgrade for equipment that have become obsolete between 2022 and 2025 at the next major Turnaround event. This will be done in phases starting with HMI's, workstations and Servers running obsolete Windows operating systems. Asset is taking advantage of the Major ECS contract for Life Cycle Agreements with Schneider and other OEMs. For the obsolescent components (i.e., those that will be obsolete by 2023), to procure spares in line with the multi-strategy plan to stretch the use as far as 2025 before the next major upgrade. In addition, Maintain LCA with Schneider and other OEMs via the Major ECS contract to reduce risk and cost of maintenance. Failed Mechanical items (Bilge Pump) have been subjected to lifecycle checks and there no risk of obsolescence. For long-standing items in production and been supported, plan is to ensure replacements are available to eliminated outage risks. Budget support is planned to be sought for Symp Crane Winch, Power Management System PLC upgrade, Facility trip Transmitters phased replacement, Produced Water Feed Pump and 11KVA switch gear.

In EA, the following upgrades have been completed:

- Fire and gas system – Done in 2018
- Tamrotor air compressor - Done in 2018
- Tamrotor Air Dry System – Done in 2018
- Metering System – Done in 2019
- Sewage Treatment System - Done in 2018
- MPFM – Done in 2019

Upgrades in Flight:

- DCS workstations, Controllers, and mesh network (Phase 3 to be completed 2024)
- Inert Gas gathering system (IGG)
- GFC-EGC Control System Upgrade
- FPSO Crane Control System Upgrade
- GT Control System Upgrade
- FPSO VESDA
- FRAMO Control System Upgrade
- Cargo Monitoring System
- RPA, DPA, DPJ Crane Mipeg
- Flare Knockout System
- Off-take Winch replacement

N.B: Details can be found in the attached documents in the appendix section of this document.

3.7 SHELL ENERGY NIGERIA (SNG)

Shell Energy Nigeria (SNG) completed their first ORAT in 2022. Further review of this is planned for Q4 2023. Below is a table that highlights key findings from the asset. The table gives a view up to 2025:

Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
	Emerson Process Management	DeltaV v13.3.1	Controller & Processors	2				2024

Distributed Control System DCS			Network Interface	3				
			I/O Module	46				
			Power Supply	2				
		Phoenix Contact	Power Supply	4				
			HMI Engineering Workstation O-EWS (Main)	5				
				2				
			HMI Operator Workstation O-OWS	1				
				2				
			AICO-OTA	1				
				2				
		Wei muller	Fuse	10				
		Phoenix Contact	2966210	18				
		Rittal		1				
Fire & Gas Systems FGS Safety Instrumented Systems SIS		DeltaV	Controller	2				2025
			Power Supply	2				
		Phoenix Contact	Power Supply	6				
			Interface carrier	7				
		Delta V	I/O Modules	103				
		Wei muller	Fuse	16				
Boiler Management System BMS	Siemens	Simatic	Programmable Logic Controller	8				2025
			Power Supply	12				
			I/O Module	7				
	Schneider Electric		Network Interface	2				
	Carlo Gavazzi		Thermostat	2				
	GMI INTERNATIONAL		Relay	5				2025

Contract initiations already commenced to manage these obsolete systems; gas tender board already approved with budget for delivery still expected.

3.8 PU (TUNU, BENISEDE, OGBOTOBO & OPUKUSHI).

Tunu nodes currently have obsolete Delta-V Distributed Control System version 12.3.1 with teething challenges that requires urgent upgrade solutions. Upgrade for these systems to most recent version of Delta-V is highly recommended as OEM no longer support existing versions.

Schneider Power management System Upgrade, and additional UPS to restore N+1 philosophy are planned, and in OP'23 budget proposal.

Asset	Category	OEM	Product Name	Type	Total Qty	OEM Status 2022	Obsolete status in 2023	Obsolete status by 2025	Target Year
Tunu	Distributed Control System DCS	Emerson Process Management	DeltaV v12.3 Build 3327	Controller	6				2024
				HMI / Operator Workstations and AMS Application Workstation (Including OPC servers)	22				
					13				
Asset	**Category**	**OEM**	**Product Name**	**Type**	**Total Qty**	**OEM Status 2022**	**Obsolete status in 2023**	**Obsolete status by 2025**	**Target Year**
Benisede	Distributed Control System DCS	Emerson Process Management	DeltaV v12.3 Build 3327	Controller	6				2024
				Controller	8				
				HMI / Operator Workstations and AMS Application Workstation (Including OPC servers)	8				
					18				
Asset	**Category**	**OEM**	**Product Name**	**Type**	**Total Qty**	**OEM Status 2022**	**Obsolete status in 2023**	**Obsolete status by 2025**	**Target Year**
Ogbotobo	Distributed Control System DCS	Emerson Process Management	DeltaV v12.3 Build 3327	Controller	6				2024
				HMI / Operator Workstations and AMS Application Workstation	8				
					18				

				(Including OPC servers)					
Asset	**Category**	**OEM**	**Product Name**	**Type**	**Total Qty**	**OEM Status 2022**	**Obsolete status in 2023**	**Obsolete status by 2025**	**Target Year**
Opukushi	Distributed Control System DCS	Emerson Process Management	DeltaV v12.3 Build 3327	Controller	6				2024
				HMI / Operator Workstations and AMS Application Workstation (Including OPC servers)	8				
					18				

3.9 PCD IT Systems Status

OBSOLETE in 2022						
LOCATION	**NAME**	**OS / SERVER STATUS 2022**	**SERVICE PACK**	**CURRENT OS / SERVER 2023**	**RECOMMENDED OS CLASS**	**COMMENT**
DIEBU-CREEK	DCR-PHC-DIEB-FFHO	Microsoft Windows Server 2003 R2 Standard x64 Edition	Service Pack 2		Windows server 2019	Captured 2024
GBARAN	GBA-KOLS21WS1	Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
	GBA-KOLS21OPC_S	Windows Server 2003	Service Pack 2	Upgraded to Windows server 2016		Completed
	GBA-KOLS21OPC	Windows Server 2003	Service Pack 2	Upgraded to Windows server 2016		Completed
NUN RIVER	PHC-NUNR-FFHO	Microsoft Windows Server 2003 R2 Standard x64 Edition	Service Pack 2		Windows server 2019	Captured 2024
SOKU FLOW STATION	SOK-PADT	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting DCS upgrade
	SOK-HIS0364	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows server 2016		Upgraded to Windows 10
	SOK-HIS0363	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Upgraded to Windows 10

	SOK-BCVV0362	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows server 2016		Upgraded to Windows 10
SOKU	SOK-FGS_MULCOM_B	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Upgraded to Windows 10
	SOK-FGS_MULCOM_A	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting Phase 3 DCS upgrade
	SOK-ESD_MULCOM_B	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Awaiting Phase 3 DCS upgrade
	SOK-ESD_MULCOM_A	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Awaiting Phase 3 DCS upgrade
	SOK-SOKU-VLD	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 2019	Windows server 2019	Completed
	SOK-SOKU-SVCB	Microsoft Windows 2000 Server	Service Pack 4	Upgraded to Windows 2019	Windows server 2019	Completed
	SOK-SOKU-SVCA	Microsoft Windows 2000 Server	Service Pack 4	Upgraded to Windows 2019	Windows server 2019	Completed
	SOK-GSGW0138	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Awaiting Phase 3 DCS upgrade
	SOK-YOKOGAWA-64764C	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Awaiting Phase 3 DCS upgrade
	SOK-STN0260	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting Phase 3 DCS upgrade
	SOK-HIS0164	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Upgraded to Windows 10
	SOK-GSGW0144	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Awaiting Phase 3 DCS upgrade
	SOK-GT3_SVR	Microsoft Windows 7 Ultimate	Service Pack 1		Windows 11	To contact vendor on upgrade requirements (compatibility with windows 10)
	SOK-GT2_SVR	Microsoft Windows 7 Ultimate	Service Pack 1		Windows 11	To contact vendor on upgrade requirements (compatibility with windows 10)

	SOK-GT1_SVR	Microsoft Windows 7 Ultimate	Service Pack 1		Windows 11	To contact vendor on upgrade requirements (compatibility with windows 10)
	SOK-CRM1_SVR	Microsoft Windows 7 Ultimate	Service Pack 1		Windows 11	To contact vendor on upgrade requirements (compatibility with windows 10)
	SOK-2M214202DV	Microsoft Windows Server 2008 R2 Enterprise	Service Pack 1		Windows server 2019	Decommissioned
ADIBAWA	ADI-ADIC-R-OP01	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not Captured
	ADI-PI-COLLECTOR	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Not Captured
	ADI-ADIC1-SIL-OPO1	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not Captured
	ADI-ADIC1-PROP	Microsoft® Windows Server® 2008 Standard	Service Pack 2		Windows server 2019	Not Captured
	ADI-ADIC1-OP01	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not Captured
	ADI-ADIC1-APP01	Microsoft® Windows Server® 2008 Standard	Service Pack 2		Windows server 2019	Not Captured
GBARAN	GBA-GBRG14OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
	GBA-GBRG14OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
	GBA-GBRG13WS1	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Decommissioned

GBA-GBRG13OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRG13OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRG12WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-GBRG12OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRG12OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRG11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-ETES11OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-ETES11OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-AGC1	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-AGC2	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-CCC-PC	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-CCRAMS	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows server 2016		Completed
GBA-CCRHIST	Microsoft Windows Server 2003 Standard	Service Pack 2	Upgraded to Windows server 2016		Completed
GBA-CCRPRO	Microsoft Windows Server 2003 Standard	Service Pack 2	Upgraded to Windows server 2016		Completed
GBA-CCRSIS-GU	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Completed
GBA-CCRWS1	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Completed

GBA-CCRWS2	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Completed
GBA-CCRWS3	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Completed
GBA-CCRWS4	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise		Completed
GBA-DW54	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-D4QLT9M1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-CD10110087	Microsoft Windows Server 2003 R2 Standard Edition	0	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-CD10100072	Microsoft Windows Server 2003 R2 Standard Edition	Service Pack 2	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-KRMS31WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-KRMS31OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KRMS31OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-EPUS21WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-EPUS21OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-EPUS21OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-EPUS11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-EPUS11OPC_S	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Decommissioned
GBA-EPUS11OPC	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Decommissioned

GBA-KRMS21WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-KRMS21OPC_S	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Decommissioned
GBA-KRMS21OPC	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRS21WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-GBRS21OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRS21OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KROHNE-PC1	Windows XP	Service Pack 2		Windows 11	Decommissioned
GBA-CCROPROF	Windows XP	Service Pack 3		Windows 11	Decommissioned
GBA-USER-707A4E67AA	Windows XP	Service Pack 2		Windows 11	Decommissioned
GBA-SIMATIC	Windows XP	Service Pack 3		Windows 11	Decommissioned
GBA-MULCOM-ZARAMA	Windows 2000	Service Pack 4		Windows server 2019	Decommissioned
GBA-MULCOM_KOLOCREEK	Windows 2000	Service Pack 4		Windows server 2019	Decommissioned
GBA-ZRMS11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-ZRMS11OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-ZRMS11OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-PMS-CP105X2	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Decommissioned
GBA-Paul_Scholes	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Decommissioned
GBA-LATITUDE	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned

GBA-KRMS11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-KRMS11OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KRMS11OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KOLS12WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-KOLS12OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KOLS12OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KOLS11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-KOLS11OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-KOLS11OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GTG3	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-GTG2	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-HMI-NA0092-03	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-GBRS12WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-GBRS12OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRS12OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRS11WS1	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Decommissioned
GBA-GBRS11OPC_S	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned

GBA-GBRS11OPC	Microsoft Windows Server 2003 Standard	Service Pack 2		Windows server 2019	Decommissioned
GBA-GBRG14WS1	Microsoft Windows XP Professional	Service Pack 3			Decommissioned
GBA-CD15071033	Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-CD15071032	Windows 7 Professional	Service Pack 1			Decommissioned
GBA-CD15071031	Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-CD15071029	Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-CD15071028	Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-CD15061026	Microsoft Windows Server 2008 R2 Standard	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
GBA-MININT-O7UQ4AC	Windows 7	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-OPS4	Microsoft Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-OPS3	Microsoft Windows 7 Professional	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Completed
GBA-OPC_EDG2	Windows 7 Professional	Service Pack 1			Decommissioned
GBA-WIN-SMHE47GRK8J	Microsoft Windows Server 2008	Service Pack 1		Windows server 2019	Captured in 2024 upgrade plan
GBA-USER-PC	Windows 7	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
GBA-GBARANELECTRICA	Windows 7	Service Pack 1		Windows 11	Captured in 2024 upgrade plan

	GBA-SISA-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
BONNY	BNY-A-2111A	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Captured in 2024 upgrade plan
	BNY-A-2111B	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Captured in 2024 upgrade plan
	BNY-A-2112	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Captured in 2024 upgrade plan
	BNY-REMOTEHMI	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
	BNY-BTIP-PI-2	Microsoft® Windows Server 2008 Standard	Service Park 2	Upgraded to Windows server 2019	Windows server 2019	Captured in 2024 upgrade plan
	BNY-HIS01	Windows 7 Ultimate	Service Pack 1	Upgraded to Windows 10 Enterprise	Windows 11	Captured in 2024 upgrade plan
	BNY-WALL-DISPLAY	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
	BNY-TVC-700	Microsoft Windows 7 Ultimate	0		Windows 11	Captured in 2024 upgrade plan
	BNY-PG	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
	BNY-CLP-PC	Windows 7 Professional Edition	0		Windows 11	Captured in 2024 upgrade plan
	BNY-00TGS-001	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-00TGS-002	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan

	BNY-00TGS-003	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-00TGS-004	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-05STD0919_HMI	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-05STD0919_HMI3	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-APP01	Microsoft Windows XP Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
	BNY-BonnyFAR100-200	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-BonnyFAR-300	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-EXAOPC2	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-Display_3	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-DVPROPLUS	Microsoft Windows XP Professional	Service Pack 1		Windows 11	Captured in 2024 upgrade plan
	BNY-exaquantum	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-rslinx-server	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-SIS_A	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-SIS_B	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-SPDC	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan
	BNY-SS300	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan
	BNY-svca	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-GT5SVR	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed

	BNY-GT6SVR	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
	BNY-GT7SVR	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows server 2019	Completed
	BNY-his0160	Microsoft Windows XP Professional	Service Pack 3	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-his0164	Microsoft Windows Server 2003 R2 Standard Edition	Service Pack 2	Upgraded to Windows server 2016	Windows server 2019	Completed
	BNY-HIS0241	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-HIS0242	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-his0260	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-his0261	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-his0262	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-his0263	Microsoft Windows 2000 Professional	Service Pack 4	Upgraded to Windows 10 Enterprise	Windows 11	Completed
	BNY-HIS0264	Microsoft Windows 2000 Server	Service Pack 4	Upgraded to Windows server 2016	Windows server 2019	Completed
	BNY-lc1330	Microsoft Windows 2000 Professional	Service Pack 4		Windows 11	Captured in 2024 upgrade plan
	BNY-mms-aux-01	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-mms-aux-02	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-OPCSRV01	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan

	BNY-OPCSRV02	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan
	BNY-ROCKWELL-B40BE4	Microsoft Windows 2000 Professional	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-FGS_A	Microsoft Windows XP Professional	Service Pack 1	Windows 2000		Captured in 2024 upgrade plan
	BNY-FGS_B	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-svcb	Microsoft Windows 2000 Server	Service Pack 4		Windows server 2019	Captured in 2024 upgrade plan
	BNY-SHELL01	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan
	BNY-SHELL02	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Captured in 2024 upgrade plan
	BNY-POTABLE_WATER	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-FIRE_WATER	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-SIS_FGS_EWS	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-33LCP-A3311A	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
	BNY-CALSYS	Microsoft Windows Server 2003 R2 Standard Edition	Service Pack 2		Windows server 2019	Captured in 2024 upgrade plan
	BNY-BNY-INST-LAPTOP	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2024 upgrade plan
OTUMARA	OTU-OWS1	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not captured
	OTU-OWS2	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not captured
	OTU-OWS3	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not captured
	OTU-AMS	Microsoft windows server 2008	Service Pack 1		Windows server 2019	Not captured

OTU-MIMIC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not captured
OTU-OPCDA	Microsoft windows server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-OPCDA_S	Microsoft windows server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-HISTORIAN	Microsoft Windows Server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-EWS	Microsoft Windows Server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-SF_EWS	Microsoft Windows Server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-SOLAR-697A01DAD	Microsoft Windows XP Embedded	Service Pack 3		Windows 11	Not captured
OTU-SOLAR-790BD0182	Microsoft Windows XP Embedded	Service Pack 3		Windows 11	Not captured
OTU-SOLAR-CDB379132	Microsoft Windows XP Embedded	Service Pack 3		Windows 11	Not captured
OTU-SVC-001	Microsoft Windows Server 2008	Service Pack 1		Windows server 2019	Not captured
OTU-SVC-002	Microsoft Windows Server 2008	Service Pack 1		Windows server 2019	Not captured
OTU-WIN-2TQ7UYA6JR6	Microsoft Windows Server 2008	Service Pack 2		Windows server 2019	Not captured
OTU-2085507-001	Windows XP	Service Pack 3		Windows 11	Not captured
OTU-DAEWOOOPC	Windows XP	Service Pack 3		Windows 11	Not captured
OTU-PC1	Windows 7	Service Pack 1		Windows 11	Not captured

	OTU-PC2	Windows 7	Service Pack 1		Windows 11	Not captured
	OTU-800ENGNODE	Windows 7	Service Pack 1		Windows 11	Not captured
	OTU-HP650	Windows 7	Service Pack 1		Windows 11	Not captured
	OTU-GTW1-ITP	Windows XP	Service Pack 3		Windows server 2019	Not captured
	OTU-GTW2-ITP	Windows XP	Service Pack 3		Windows server 2019	Not captured
	OTU-IAOPC_P	Windows XP	Service Pack 3		Windows server 2019	Not captured
	OTU-IAOPC_S	Windows XP	Service Pack 3		Windows 11	Not captured
Tunu	TNU-SPDCWARVMS0001	Microsoft Windows Server 2008 Standard Edition	Service Pack 1		Windows server 2019	Captured in 2024 upgrade plan
	TNU-SPDCWARW5731	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Captured in 2024 upgrade plan
BENISEDE	SPDCWARW5734	Microsoft Windows Server 2008 Standard Edition	Service Pack 2		Windows server 2019	Captured in 2024 upgrade plan
Opukushi	SPDCWARW5736	Microsoft Windows Server 2003 Standard Edition	Service Pack 2		Windows server 2019	Captured in 2024 upgrade plan
EA	EAF-Clamponas-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
	EAF-EASYS1RAS	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Captured in 2023 upgrade plan
	EAF-EASYS1DAQ	Microsoft Windows Server 2008 R2 Standard	Service Pack 1		Windows server 2019	Captured in 2023 upgrade plan
	EAF-DPJ-TCX-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan

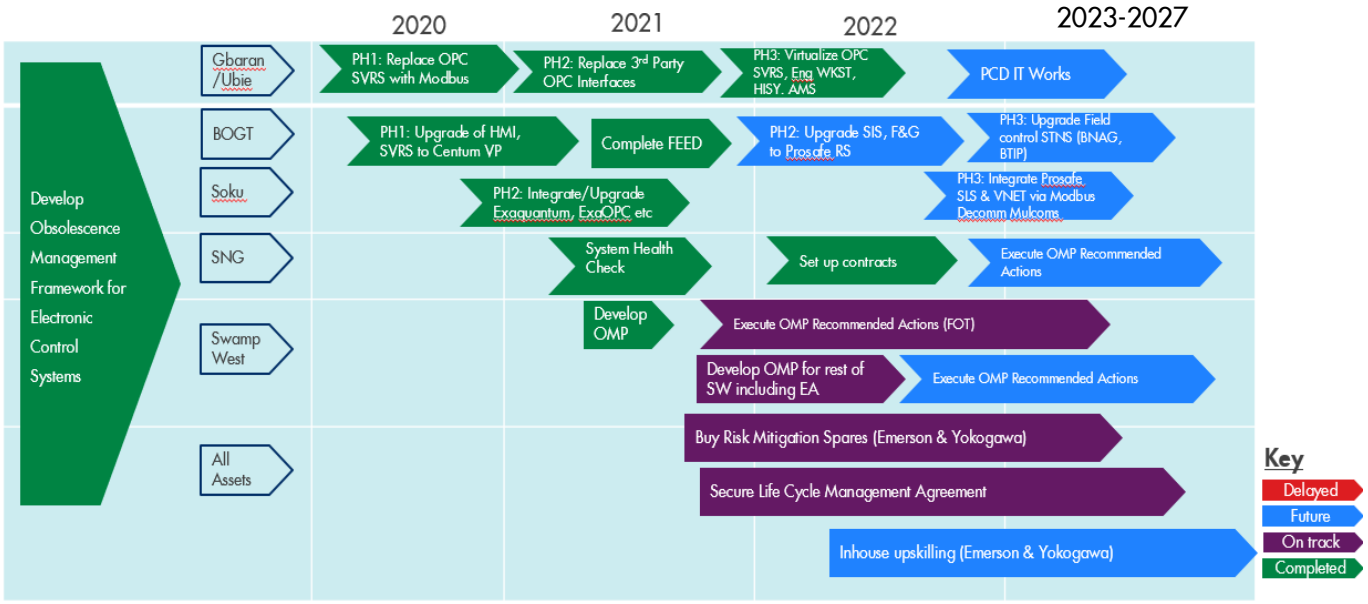
EAF-Clamponas-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-SEMETERING-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-Tristation	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EA-PI-OPC	Microsoft Windows Server 2008 R2 Enterprise	Service Pack 1	Upgraded to Windows server 2019	Windows server 2019	Captured in 2023 upgrade plan
EAF-SEGASCOMP-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Not Captured in 2020 plan
EAF-DPB-SOE_PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-DPA-SOE_PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-SeaeagleDCS-HP	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
Tristation fo RP-A	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-SEAEAGLE	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2023 upgrade plan
EAF-1046452-5S1	Microsoft Windows 2000 Professional	Service Pack 1		Windows server 2019	Captured in 2023 upgrade plan
EAF-FLASHGAS	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting FGC/EGC upgrade
EAF-EXPORTGAS	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting FGC/EGC upgrade
EAF-Clampon-PC	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Captured in 2023 upgrade plan
EAF-MATRIKON-1159A7	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Captured in 2023 upgrade plan

	EAF-EAWP8E	Microsoft Windows XP Professional	Service Pack 3		Windows 11	Awaiting DCS upgrade
	EAF-EAWP8D	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	EAF-EAWP8C	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	EAF-EAWP8B	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	EAF-EAWP8A	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	EAF-EAAW8B	Microsoft Windows Server 2003 R2 Standard Edition	Service Pack 2		Windows server 2019	
	EAF-EAAW8A	Microsoft Windows Server 2003 R2 Standard Edition	Service Pack 2		Windows server 2019	
	EAF-EAWP8F	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	EAF-AWXP01	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
FCD	FCD-SOLAR2 WORKSTATION	Microsoft Windows 7 Professional	0		Windows 11	Awaiting Solar upgrade
	FCD-SOLAR1 WORKSTATION	Microsoft Windows 7 Professional	0		Windows 11	Awaiting Solar upgrade
	FCD-HIS0164	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	Awaiting DCS Upgrade planned for 2023
	FCD-HIS0163	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	
	FCD-HIS0162	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	
	FCD-HIS0161	Microsoft Windows 7 Professional	Service Pack 1		Windows 11	

	FCD-FORCADOS-PI	Microsoft® Windows Server® 2008 Standard	Service Pack 2	Upgraded to Windows server 2019	Windows server 2019	
	FCD-SPDC-F47B0642EF	Microsoft Windows XP Professional	Service Pack 3		Windows 11	
	FCD-STATION1	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Decommissioned
	FCD-STATION2	Microsoft Windows XP Professional	Service Pack 2		Windows 11	Decommissioned

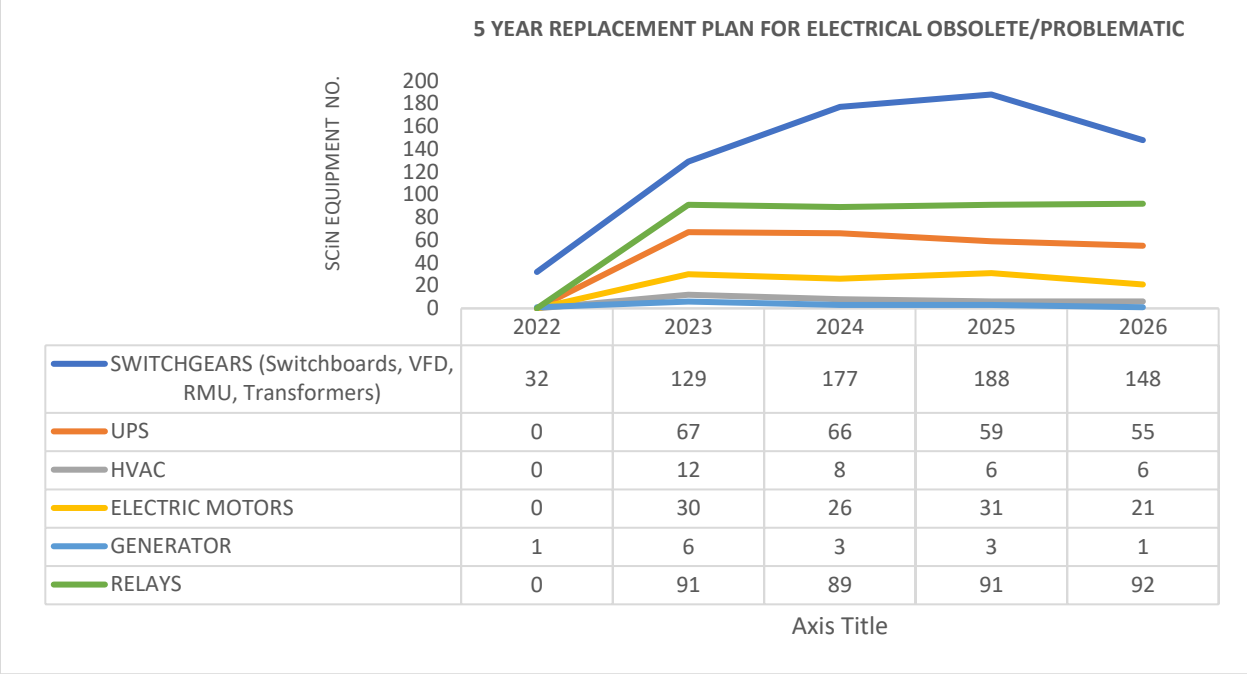
3.10 Journey So Far

The obsolescence management journey for various assets as of August 2023 is shown.



Status of Obsolescence strategies in various assets in August 2023.

Summary Strategy for Electrical Equipment



Chapter 4: Action Parties and Support

4.1 EAST ASSET

	Accountable Action Party	
	AMIL (Terfa I & Ozuribo O)	
	Responsible Action Parties	
East PU	**ICSS & ELECTRICAL**	**MAJOR ROTATING EQUP.**
SOKU	Sesugh A	Kene Odunze
BOGT	Iyoloma C	Kene Odunze
GBARAN	Iyoloma C	Kene Odunze
Systems	**Technical Assurance Team -TA & SMEs**	
ICSS	Awe Afolabi	
Electrical	Osaigbovo Diana	
Rotating Equip.	Kene Odunze & Taslim Abioye	
Metering	Omokaro Godfrey	

4.2 WEST ASSET

	Accountable Action Party	
	AMIL (Adama U I & Chris U)	
	Responsible Action Parties	
West PU	**ICSS & ELECTRICAL**	**MAJOR ROTATING EQUP.**
Forcados	Aford A	Taslim Abioye
SSAGS	Aford A	Taslim Abioye
Sea Eagle	Aford A	Ekelechi Ogbonnaya
Systems	**Technical Assurance Team -TA & SMEs**	
ICSS	Awe Afolabi	
Electrical	Osaigbovo Diana	
Rotating Equip.	Kene Odunze & Taslim Abioye	
Metering	Omokaro Godfrey	

Chapter 5: Conclusion

This document highlights the work done so far on the obsolescence management of ECS and Electrical and combined AG equipment in various SCiN assets. Based on the OMP created for each asset and the use of the ORAT, both the short-term and long-term strategies have been chosen on different components.

Most facilities would experience an upgrade of the ECS, PMS and Low Voltage intelligence module; whilst some upgrades have been completed in recent past, some are on-going, and the rest are slated for the near future, majorly before Q4,2024. The attendant costs for some activities have been summarized and captured for all operations from OP23 plan. This plan will be part of the input to the BP23 forecast. The Annual System Admin and healthcare assessments as required by the framework has not happened much but is work in progress ,with good outlook 2023 and upwards. This will help to determine when an ORAT review is required to ensure we maintain a proactive approach in managing obsolescence.

This strategy document has aggregated all the efforts from different assets and provides a basis for a corporate approach to manage obsolescence and shared ownership of the challenge of obsolescence. Lessons learnt will continually be shared across assets and technical knowledge from ongoing upgrades will also provide a basis for deepening the skills and competences of our technicians and engineers.

References

The following documents were referenced in developing this report.

- SEPCiN Obsolescence Management Framework for Electronic Control Systems
- SPDC Corporate Electronic Control Systems Obsolescence Management Roadmap
- ORATS from BOGT, OLOMA, GBARAN, SOKU, FOT, NUN RIVER, DIEBU CREEK, SEN, SSAGS+ (TUNU NODES) and SEA EAGLE.

Chapter 6: Appendices

Appendix 1: OMF	 OMF Final.pdf
Appendix 2: BOGT ORAT	 Copy of BOGT ORAT 2.xlsx
Appendix 3: FOT ORAT	 FOT ORAT V_2022.xlsx
Appendix 4: SOKU ORAT	 SOKU ORAT FINAL (005).xlsx
Appendix 5: EA ORAT	 EA ORAT.xlsx
Appendix 6: Gbaran ORAT	 Mod Gbaran ORAT_1.xlsx
Appendix 7: SSAGS+ NODE ORAT	 Tunu ORAT.xlsx

Appendix 8: Shell Energy Nigeria (SNG)	SNG ORAT DRAFT.xlsx
Appendix 9: NUN RIVER _DIEBU CREEK	NUNR DBUC ORAT_May 2022.xlsx
Appendix 10: Combined AG Equipment	Combined AG Power Equipment Status rev
Appendix 11: SCiN Electrical Equipment	SCiN Electrical EquipmentObsolesc
Appendix 12: SCiN Obsolescence Management Roadmap	Work in Progress