



SOUTHWEST DESIGN AFRICA LIMITED (SWDA)

Plot 6B, Block 110, Olukayode Jacobs Street, Lekki Phase 1, Lagos, Nigeria

PROVISION OF TANK CLEANING, SLUDGE TREATMENT, OIL RECOVERY & WASTE MANAGEMENT SERVICES AT SELECTED RAEC FACILITIES IN NIGERIA

(RENAISSANCE Contract / Tender Nos.: CW-68582 / CW-515913)

DOCUMENT TITLE:

PROJECT METHOD STATEMENT (MS)

SEMI-AUTO & MANUAL TANK CLEANING WITH REMOTE-CONTROLLED CRAWLER & MONO-SUCTION PUMP SYSTEM; REMOTE HYDRO-JETTING (15,000-PSI & BLASTING NOZZLE); AND, EXTERNAL-FROM-TANK CENTRIFUGE & OIL / WATER SEPARATOR FOR MAXIMUM OIL RECOVERY

REV	DATE	ISSUE PURPOSE	ORIG	CHK	APPR
00	21 / 07 / 2026	Issued for Internal Review & Ratification	MM	NEJ	GW
01	3 / 08 / 2026	Issued for RENAISSANCE Review & Approval	MM	NEJ	GW

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DOCUMENT CONTROL NO.: RENAISSANCE-CW-68582 / SWDA-2026-RAEC-001-13	COMPANY (RENAISSANCE) APPROVAL: Contract Holder: Charles Onyeagba DATE:

LIST OF ABBREVIATIONS

The following Abbreviations are used throughout this Method Statement:

ABBREVIATION	MEANING
API	American Petroleum Institute
ATEX	Atmosphères Explosibles – EU Certification for Equipment in Explosive Atmospheres
BA	Breathing Air / Breathing Apparatus
BOSIET	Basic Off-Shore Safety Induction & Emergency Training
BS&W	Basic Sediment & Water
CFM	Cubic Feet per Minute
CO	Carbon Monoxide
COT	Crude Oil Storage Tank
COWC	Certificate of Work Completion
CPF	Central Processing Facility
CSE	Confined Space Entry
EQ	Equipment
FFD	(Medical) Fit-For-Duty
GCPF	Gbaran Central Processing Facility
H₂S	Hydrogen Sulphide
HAZID	Hazard Identification (Study)
HSE / HSEP	Health, Safety & Environment / Project HSE Plan
IBC	Intermediate Bulk Container
IS	Intrinsically Safe
ITP	Inspection & Test Plan
ITT	Invitation to Tender
JHSA	Job Hazard & Safety Analysis
JIT	Joint Inspection Team
KPI	Key Performance Indicator
LEL / UEL	Lower / Upper Explosive Limit
LiDAR	Light Detection & Ranging
LOTO	Lock-Out / Tag-Out
M³	Cubic Meters
MS	Method Statement
NME	No-Man Entry
NOSDRA	National Oil Spill Detection & Response Agency
NTP	Notice to Proceed
NUPRC	Nigerian Upstream Petroleum Regulatory Commission
O₂	Oxygen
OML	Oil Mining Lease
OSP	Offshore Safety Permit
P&ID	Piping & Instrumentation Diagram
PHC	Port Harcourt
PIP	Project Implementation Plan
PM / PMT	Project Manager / Project Management Team
PMIP	Pre-Mobilization Inspection Plan
PO	Purchase Order
PPE	Personal Protective Equipment

ABBREVIATION	MEANING
ppm	Parts Per Million
PSI	Pounds per Square Inch
PT	Process Tank
PTW	Permit to Work
QA / QC	Quality Assurance / Quality Control
RAEC	Renaissance Africa Energy Company
RAT	Rescue Access Team
SCBA	Self-Contained Breathing Apparatus
SGP	Soku Gas Plant
SOW	Scope of Work
SPDC	Shell Petroleum Development Company of Nigeria
SWDA	Southwest Design Africa Limited
WMP	Waste Management Plan

1.0 INTRODUCTION & PURPOSE OF THIS METHOD STATEMENT

Southwest Design Africa Limited (**SWDA**) has been awarded, by Renaissance Africa Energy Company (**RAEC**), an 18-Tank Cleaning, Sludge Treatment, Oil Recovery & Waste Management Project to be performed over the next two (2) to three (3) years at four (4) Renaissance Facility locations across Nigeria (**Bonny, Forcados, Gbaran & Soku**). This Method Statement (**MS**) sets out, step by step, how SWDA shall execute the Semi-Auto & Manual Tank Cleaning Methodology on this Project, utilizing the following three (3) core equipment spreads:

- **Remote-Controlled Robotic Crawler & Mono-Suction Pump System** – for Zero-Man / Minimum-Man Entry & Bulk Sludge Recovery from the Tank floor, deployed through the Tank's 28-Inch Manways and operated remotely from outside the Tank;
- **Remote Hydro-Jetting System (15,000-PSI Maximum Working Pressure & Blasting Nozzle)** – for Sludge fluidization, cutting of consolidated Sludge banks and final washing of Tank floor & wall surfaces (the mobilized Hydro-Jet unit is rated to 20,000-PSI; and, it shall be operated at or below 15,000-PSI Working Pressure under this MS); and,
- **External-from-Tank Centrifuge & Oil / Water Separator** – for 3-Phase Separation (**Oil / Water / Solids**) of all recovered Sludge, with a Project Target of recovering up to 40% to 50% of the Recoverable Oil from Sludge volume as saleable / pipeline-quality Oil returned to Renaissance.

The purpose of this MS is to give the SWDA Project Management Team (**PMT**), the On-Site Tank Cleaning Crew, and Renaissance Representatives a single-controlled document that describes the sequence of works, the equipment & personnel to be deployed, the safety controls to be applied at each step, and the acceptance criteria to be met before each Tank is closed out. Maximizing Oil Recovery (**40 – 50%**) is a stated Objective of this Project.

This MS shall be read together with the SWDA Project HSE Plan (**Doc No. SWDA-2026-RAEC-001-06**), the Pre-Mob Inspection Plan (**PMIP – Doc No. SWDA-2026-RAEC-001-05**), the Project Job Hazard & Safety Analysis (**JHSA**), and the Renaissance Permit to Work (**PTW**) system. Where any conflict arises between this MS and Renaissance site rules, the more stringent requirement shall apply.

2.0 SUMMARIZED SCOPE OF WORK (SOW)

Based upon the Renaissance ITT & Contract Documents (**Contract No.: CW-68582 & Tender No. CW-515913**), and the SWDA SOW Outline, dated 15 July, 2026, the works covered by this MS comprise the following Main Tasks per Tank:

- **Pre-Mobilization activities, Renaissance Pre-Mob Inspection** at the SWDA Kidney Island Warehouse (**PHC**) and receipt of the Renaissance Purchase Order (**PO**), Notice to Proceed (**NTP**), Tank Site ID / Layout Maps & Tank As-Built Drawings;
- **Mobilization of all Pre-Mob-approved Equipment, Consumables & Personnel** to the Renaissance-provided Tank Site, site set-up, laydown establishment, barriers & signage;
- In-Tank Drone Sludge Assessment & Tank Contents Profiling to determine Sludge depth, consistency & the volume of Renaissance-provided Cutter Stock required to ensure Sludge flow & recovery;
- **Tank Atmosphere Assessment (LEL / UEL, O₂, CO & H₂S)**, venting & gas-freeing to entry-safe / work-safe conditions;
- **Semi-Auto Sludge Removal** with the Remote Crawler & Mono-Suction Pump System, supported by the Air-Loader Vacuum Recovery Unit and Remote Hydro-Jetting at ≤ 15,000-PSI;
- **External Processing of all Recovered Sludge** through the Centrifuge & Oil / Water Separator, with recovered Oil transferred to the Renaissance-designated containment Tank / receiving pipeline, recovered Water to the Renaissance-designated disposal facility, and recovered Solids / Sands to the Renaissance-designated repository – all On-Site;
- **Manned-Entry Final Mopping / Polishing** of the Tank floor & walls (maximum six (6) Entrants in-Tank per shift under supplied air, with a standing Rescue Access Team – RAT);

- **Joint Inspection Team (JIT) Evaluation with Renaissance**, obtainment of the Certificate of Work Completion (**COWC**), waste turn-over documentation, de-mobilization and Final Project Closure Report to Renaissance & NUPRC.

Waste Management Boundary: SWDA's SOW is All On-Site. Renaissance provides all Cutter Stock, Wash Water, On-Site electricity, Waste Skips, Vacuum / Flat-Bed Trucks, and all Off-Site waste transport, treatment & disposal. SWDA documents all waste volumes generated & turned over (**See Section 9.0**).

2.1 Tanks Covered by this Method Statement

Eighteen (**18**) Tanks are covered (**8 Crude Oil Storage Tanks & 10 Process Tanks; 9 Floating-Roof & 9 Fixed-Roof**), located at Bonny Tank Farm (**8**), Forcados Tank Farm & Depot (**8**), Gbaran-Ubie CPF (**1**) and Soku Gas Plant (**1**), ranging in size from 1,060-M³ to 104,707-M³. In the absence of Renaissance-corroborated data, a 1.0-Meter average Sludge depth has been assumed for planning, giving an estimated total of 40,247-M³ of Sludge across the 18 Tanks, at an average of approximately 1,500-Tons of flowable-to-dry Sludge per average 40,000-M³ Tank. Actual per-Tank values shall be confirmed by the **Drone Assessment & Tank Contents Profiling** in Step 4 of Section 7.0 before cleaning commences. The **Tank-by-Tank Listing** is provided in **Appendix A**.

3.0 REFERENCE DOCUMENTS, STANDARDS & DEFINITIONS

- **Renaissance Contract & ITT Documents** – CW-68582 / CW-515913;
- SWDA Project Pre-Mob Inspection Plan (**PMIP**) – SWDA-2026-RAEC-001-05;
- SWDA Project Health, Safety & Environment Plan (**HSEP**) – SWDA-2026-RAEC-001-06, including Attachment 1 (**JHSA**), Attachment 2 (**Safe & Unsafe Gas Levels**) & Attachment 3 (**Safety & Warning Signs**);
- SWDA 18-Tank Specs & Location List (**Table 1, 2 July 2026**);
- **API 2015 / API 2016** – Requirements for Safe Entry & Cleaning of Petroleum Storage Tanks; **API 653** – Tank Inspection, Repair, Alteration & Reconstruction (for post-clean inspection interface);
- **NUPRC, NOSDRA** & applicable Nigerian environmental & waste-tracking regulations; Renaissance Life Saving Rules & **PTW** system.

Key definitions: “**Cutter Stock**” means Renaissance-provided light crude / gas oil used to dilute & fluidize heavy Sludge. “**NME**” means No-Man Entry. “**Semi-Auto**” means remote-operated mechanical cleaning with manned entry limited to final mopping / polishing. “**PTW**” means the Renaissance Permit to Work. “**JIT**” means the SWDA / Renaissance Joint Inspection Team. “**COWC**” means Certificate of Work Completion.

4.0 PROJECT ORGANIZATION, ROLES & RESPONSIBILITIES

The Project runs on dual 12-hour shifts, 7 days per week, with a total On-Site Strength of up to forty-three (**43**) Crew Members per Tank Site. Key roles & responsibilities under this MS are:

ROLE	RESPONSIBILITY UNDER THIS MS
Project Director (SWDA COO / ED)	Overall Project accountability; approves this MS, all Variations & the Final Closure Report; principal Renaissance interface.
On-Site Project Manager (PM)	Owns day-to-day execution of this MS; chairs Daily Toolbox Talks; controls the PTW interface with the Renaissance On-Site HSE Officer; issues Daily & Monthly Progress Reports; initiates SOW / Cost Variations.
Crawler / Hydro-Jet / Centrifuge Operators (2)	Experienced, trained & certified 2-Man Operating Crew for the Crawler, Hydro-Jet & Centrifuge / Separator systems; perform daily pre-start checks, remote operations, and train SWDA national understudies.
Lead Tank Cleaning Field Supervisor (1 per Shift)	Directs the Tank Cleaning Crew at the Tank face; enforces Exclusion Zones; verifies gas test results before any work step; supervises hose handling & skip loading.
Lead Entrant Supervisor / Confined Space Attendant	Controls all manned entries; maintains the entry log; ensures continuous attendant coverage at the Manway; orders evacuation on alarm.

Site Safety / Fire Watch Officer (1 per Shift)	Continuous gas monitoring, Fire Watch, PTW compliance checks & Stop-Work Authority.
BA Generator Operators (2 per Shift)	Operate & monitor the Mariner 320-E Breathing Air Generator, Air Accumulator & BA distribution to Entrants.
Air Compressor Operators & Mechanics (1 per Shift)	Operate the 1,600-CFM compressor & maintain all pneumatic equipment.
Tank Cleaning Entrants (6 per Shift, max.)	Perform final mopping / polishing under supplied air; only enter on a valid CSE Permit.
Rescue Access Team – RAT (3 per Shift)	Fully-kitted Rescue Stand-by (tripod, winch, harnesses, SCBA) at the Manway during every Manned Entry; perform no other duties while Entry is live.
Materials Manager / Skip Handlers / On-Site Nurse / Host Community Workers	Materials control & consumables replenishment; skip movements & waste documentation; first-aid & medical response; general site support.

All Crew Members shall hold valid Medical Fit-For-Duty (**FFD**) Certificates and the applicable trade certifications (**BOSIET, OSP, CSE, Respirator Fit-Testing**) verified at the Renaissance Pre-Mob Inspection. No person may work under this MS without a documented Project Induction and attendance at the day's Toolbox Talk.

5.0 EQUIPMENT, MATERIALS & CONSUMABLES

All equipment listed below shall carry a valid Renaissance Pre-Mob Inspection tag / **“Ready-for-Use”** Certificate before mobilization (*per the PMIP*) and shall be inspected daily before start-up. Two (2) units of each critical item (**Crawler, Hydro-Jet, Centrifuge & Oil / Water Separator**) are planned – one operational and one back-up to be secured if need arises – to protect the schedule against downtime.

EQUIPMENT / SYSTEM	QTY	FUNCTION UNDER THIS MS
Remote-Operated Robotic Crawler & Mono-Suction Pump System	1 (+1 Back-up)	Tracked, remote-controlled Crawler sized to pass a 28-Inch Manway; suction head coupled to the mono / progressive-cavity Sludge Pump; ATEX / Zone 0-1 compliant; umbilical & camera for remote operation from outside the Tank.
Remote Hydro-Jet & Blasting Nozzle	1 (+1 Back-up)	High-pressure unit rated 20,000-PSI, operated at ≤ 15,000-PSI Working Pressure; remote / lance-mounted blasting nozzles with auto shut-off (dead-man) for Sludge cutting, fluidization & final surface washing.
External Centrifuge & Oil / Water Separator	1 (+1 Back-up)	Skid-mounted, external-from-Tank 3-Phase Separation spread (decanter Centrifuge + Oil / Water Separator) for Oil Recovery (Target = 40% – 50%), water polishing & solids dewatering.
Air-Loader Vacuum Recovery Pump	1	Pneumatic vacuum Sludge Recovery Unit (900 / 1,200-CFM class) for bulk transfer & pick-up of pooled Sludge.
Air Compressor – 1,600-CFM @ 10-Bar, Air Accumulator & Air Dryer	1 Each	Motive air for all pneumatic / air-driven Tank Cleaning Equipment (Zone-rated).
Mariner 320-E Breathing Air Generator, BA Hose Trolleys, Waist Belts, SCBA & Escape Sets	2 / 2 / 8 / 6 / 6	Supplied-air system for all Entrants during final mopping / polishing, with SCBA & personal escape sets.
Heavy-Duty Flapper / Sandpiper / Wilden Pumps	2	Air-driven diaphragm pumps for wash-water, interface & residual liquids transfer.
Air / Suction / Discharge Hoses (3/4", 2", 3" & 4" x 20-M) & Non-Sparking Couplings	12 Sets	Certified, intrinsically-safe hose spreads with brass quick-connections; new gaskets & O-rings fitted at Pre-Mob.

Tank Ventilators / Expellers & Ducting (20-M) & Explosion-Proof Lighting	4 / 6	Forced ventilation & lighting of the Tank during gas-freeing & Manned Entry.
MSA Altair 5X Multi-Gas Detectors & Down-Tank Sampling Hoses	4	Continuous LEL, O ₂ , CO & H ₂ S monitoring at the Manway, in-Tank & at the equipment spread.
In-Tank Drone Assessment Tool	1	Intrinsically-Safe / Zone-rated Inspection Drone (with LiDAR / Camera payload) for pre-clean Sludge profiling & post-clean verification without Entry.
CSE Rescue Set (Tripod, Winch, Full-Body Harnesses), Stretcher, Eyewash & First-Aid Stations, Fire Extinguishers & Emergency Sirens	Full spread	Rescue & emergency response equipment staged at the Manway & Laydown Area whenever work is live.
Intrinsically-Safe Radios & Digital Camera, Spill Response Drums, Bio-Surfactant, Brass Non-Sparking Hand Tools & 1-Tonne Woven Bags	Per PMIP Tables 2 & 3	Communications, spill contingency, manual mop-up tools & solids bagging.

Consumables (**PPE, HSE materials, absorbents, disposable coveralls at one per Tank-crew member per shift, etc.**) shall be held at the quantities in **PMIP Table 3**, with a Consumables Replenishment Run performed together with the Crew Rotation at the 30-day (**50% completion**) point of each average Tank.

6.0 PRE-MOBILIZATION & MOBILIZATION

Pre-Mobilization is governed by the PMIP and is summarized here for completeness of the work sequence. The official Renaissance Pre-Mob Inspection at the SWDA Kidney Island Warehouse (**PHC**) has already been accomplished within the contractual 45-day window.

- Step 1. Complete Project Contracting & Documentation;** finalize & submit the Project Work Plans to Renaissance (**HSE, HAZID, PIP, QA/QC, WMP, Pre-Mob ITP, Security, Community Engagement, Journey Management, etc.**).
- Step 2. Renew any elapsed Crew Certifications,** trainings or Medical FFD approvals; secure On-Site Crew accommodation & feeding arrangements.
- Step 3. Receive from Renaissance the Project Purchase Order (PO),** Notice to Proceed (**NTP**), Tank Site ID / Layout Maps and all Tank As-Built Drawings. No mobilization occurs before the **PO & NTP** are in hand.
- Step 4. Renaissance performs Tank Clearing** (product draw-down to minimum suction), isolation & initial opening / venting and hands the Tank over, ready for SWDA inspection.
- Step 5. Mobilize all Pre-Mob-approved Equipment, Consumables & Personnel** to the Tank Site within 72-Hours of NTP (containerized spreads within 96-Hours); complete Renaissance Site & Project Induction for all Crew.
- Step 6. Establish the Equipment Laydown Area** 50 – 100-Meters from the Tank; erect all work barriers, Exclusion-Zone signage, site offices / porta-cabins & welfare units; position spill-response drums & emergency equipment; verify Renaissance-supplied electrical power (**415V / 50Hz / 3-Phase**) and confirm earthing / bonding points.
- Step 7. Set up & operationally test all Tank Cleaning Equipment (Crawler, Hydro-Jet, Centrifuge & Separator, Compressors, BA systems, pumps & hoses)** on clean-service trials before any Sludge is introduced. Record all tests on the Site Set-Up Checklist.

7.0 PRE-CLEANING ACTIVITIES AT EACH TANK

The following steps shall be completed, in order, at every Tank before any cleaning work commences. Each step is a hold point: the next step shall not start until the previous one is signed-off by the On-Site PM and, where indicated, the Renaissance On-Site HSE Officer.

- Step 1. Tank Isolation Verification (Hold Point – Renaissance & SWDA).** Jointly verify with Renaissance that the Tank is positively isolated: all product, slops, drain & vapour lines blinded / spaded per the As-Built P&IDs; mixers & heaters locked out; cathodic protection & electrical feeds isolated; floating-roof legs (**where applicable**) confirmed landed & pinned. Record on the Isolation Register with a Lock-Out / Tag-Out (**LOTO**) log.
- Step 2. Initial Atmosphere Testing.** Test the Tank atmosphere through roof fittings & the top Manway using calibrated MSA Altair 5X Gas Detectors with down-Tank sampling hoses at top, middle & bottom elevations: **%LEL, O₂, CO & H₂S**. Pump-test & calibration-check all detectors daily before use.
- Step 3. Controlled Venting & Gas-Freeing.** Install pneumatic ventilators / expellers with 20-M ducting and force-ventilate the Tank. Continue until sustained readings meet the work-safe criteria of Section 10.2 (**commence works at: ~5% LEL or less; O₂ = 19.8% – 21.5%; & H₂S ≤ 5-ppm**). Vapours shall be discharged away from ignition sources & downwind of work areas.
- Step 4. In-Tank Drone Sludge Assessment & Contents Profiling (No-Entry).** Operate the intrinsically-safe Assessment Drone through the top Manway / roof hatch to map Sludge depth, surface profile, consolidated banks and any internal obstructions (columns, heating coils, swing lines, roof legs). Combine the Drone Survey with bottom-sample dips at accessible points to characterize Sludge consistency (**flowable / mucky / dry-sandy per Appendix A expectations**). Output: the Tank Sludge Profile Report, which fixes (a) the required Renaissance Cutter Stock volume, (b) the Crawler entry Manway & work lanes, and (c) the confirmed cleaning duration for that Tank.
- Step 5. Cutter Stock Determination & Request.** From the Sludge Profile Report, calculate the Cutter Stock demand (typically dosed stepwise at 5% – 15% of Sludge volume for mucky-to-dry Sludges) and issue the formal request to Renaissance. Renaissance provides all Cutter Stock & Wash Water; SWDA shall log every liter received & injected for the material balance.
- Step 6. Duration & Variance Check (Commercial Hold Point).** Compare the confirmed Sludge volume / consistency against the planning assumption (**1.0-M depth; ~1,500-Tons Sludge per average Tank**). If the confirmed condition materially exceeds the assumption, prepare & submit a SOW / Cost Variation to Renaissance immediately – before cleaning starts – so completion on budget & schedule is protected.
- Step 7. Permit to Work (Hold Point – Renaissance).** Obtain from the Renaissance On-Site HSE Officer the PTW (and associated certificates: hot-work exclusion, confined-space where applicable) covering the day's specific activities. Post the PTW at the work front. The PTW is revalidated each shift and suspended immediately on any gas alarm, weather event (lightning / storm), or emergency.
- Step 8. Daily Toolbox Talk & Operational Checkoffs.** Every shift begins with a Toolbox Talk covering the day's steps from this MS, the JHSA controls, gas test results, emergency muster & roles. All equipment pre-start checklists (Crawler, Hydro-Jet, Centrifuge, Compressors, BA systems, hoses & couplings) are completed & filed before work starts.

8.0 STEP-BY-STEP TANK CLEANING METHODOLOGY

The cleaning of each Tank proceeds in six (6) phases. Phases 2 to 4 run concurrently once established – the Crawler & Hydro-Jet feed Sludge to the Mono-Suction / Vacuum recovery train, which feeds the external Centrifuge & Oil / Water Separator continuously across both 12-hour shifts.

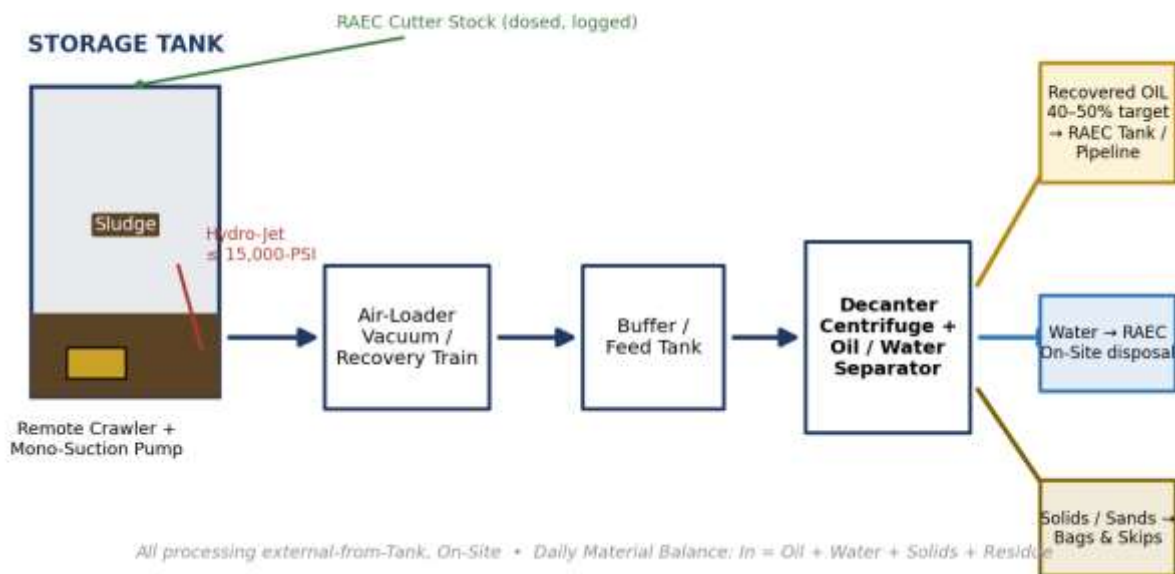


Figure 1 – Semi-Auto Tank Cleaning & Oil Recovery Process Flow (External-from-Tank Processing)

Phase 1 – Equipment Rig-Up at the Tank

- Step 1. Position the Centrifuge & Oil / Water Separator skids**, Air-Loader Vacuum unit and pump spread in the Laydown Area (50 – 100-M from the Tank shell), on drip trays / bunded mats, and bond & earth all skids.
- Step 2. Rig-certified Suction & Discharge Hoses (2", 3" & 4")** from the selected bottom Manway to the Recovery Train and onward to the Centrifuge feed tank. Pressure-test the Hydro-Jet hose spread to 1.25 x Working Pressure and function-test all Dead-Man / Auto Shut-Off controls and Emergency Shut-Off buttons.
- Step 3. Erect the Manway access platform**, mount the Manway cone / door-sheet adaptor (allowing the Crawler umbilical, suction hose & Hydro-Jet lance to pass while restricting vapour egress), and stage the CSE Rescue set even though Phases 2 – 4 are No-Entry (**Defence-in-Depth**).
- Step 4. Confirm Communications:** dedicated radio channel between Crawler / Hydro-Jet Operators, Field Supervisor, Fire Watch, Centrifuge Operator & Skip Handlers; test emergency sirens.

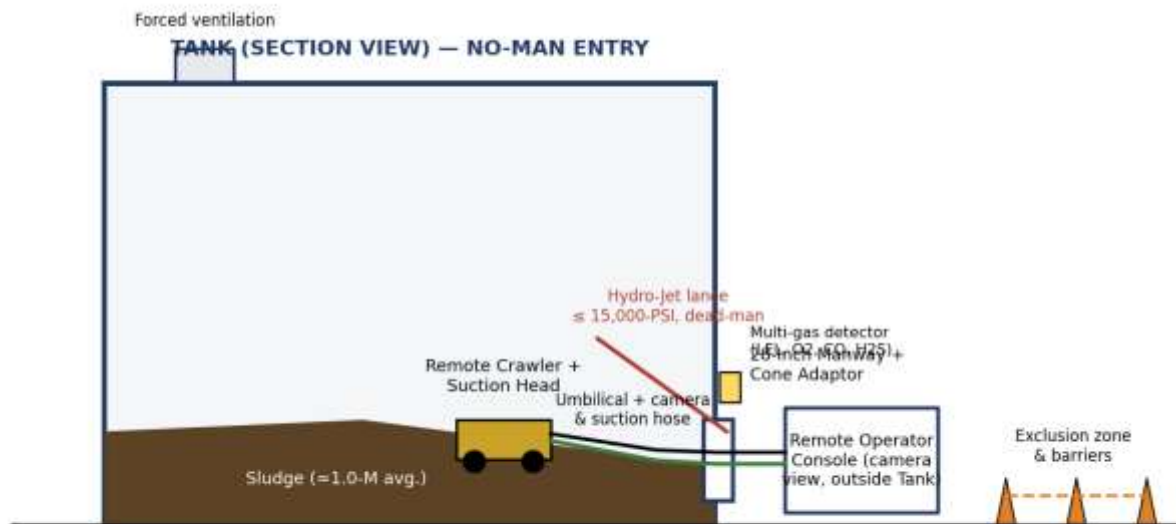
Phase 2 – Bulk Sludge Recovery (Air-Driven Test & Ramp-Up)

- Step 1. Utilizing the Air-Driven Equipment first**, select the deepest Sludge area identified by the Drone Sludge Profile and test the Air-Loader & pumping capacities on flowable Sludge nearest the Manway. Record achieved Sludge Recovery rates (M^3 / HR) – this fixes the realistic daily production rate for the Tank.
- Step 2. Where Sludge is free-flowing**, continue direct vacuum / mono-suction recovery from the Manway, working inward along planned suction lanes. Transfer all Recovered Sludge directly to the Centrifuge feed / buffer tank – never to open ground.
- Step 3. Where Sludge will not flow**, inject Renaissance Cutter Stock in controlled, logged batches at the recirculation points and allow contact / soak time; re-test flowability before each recovery run. Escalate dosage stepwise rather than flooding the Tank – excess Cutter Stock dilutes Recovered Oil quality and inflates processing volumes.

Phase 3 – Remote Crawler & Hydro-Jet Operations (Semi-Auto & No-Entry)

- Step 1. Insert the Remote Crawler through the selected 28-Inch bottom Manway** using the davit / handling frame. Verify camera, lights, track drive & suction head function inside the Tank before releasing it to work.

- Step 2. Drive the Crawler along Pre-Planned Lanes from the Manway** toward the far shell, pushing / suctioning Sludge to the Mono-Suction Pump pick-up. The Operator works from the remote console outside the Tank with continuous camera view; the second Operator manages the umbilical & hoses at the Manway.
- Step 3. Deploy the Remote Hydro-Jet ($\leq 15,000$ -PSI with Blasting Nozzle)** to cut & fluidize consolidated Sludge banks ahead of the Crawler and to wash Sludge off internal structures (**columns, coils, sumps**). Jetting is performed remotely (**lance through the Manway cone or Crawler-mounted**), never hand-held inside a non-gas-free Tank. Maintain the jetting Exclusion Zone; only the trained Operators handle the gun / lance, with the Dead-Man Control live at all times.
- Step 4. Test & Record the alacrity of the Sludge Removal & Handling Process** during the first 3 – 5 operating days; identify the worst Sludge conditions in the Tank. This data confirms the Project Duration Schedule for the Tank and whether any SOW & Cost Variation is necessary – if so, submit it to Renaissance immediately (**Section 12.0**).
- Step 5. Continue Crawler / Hydro-Jet / Vacuum Operations** across both shifts until the floor is reduced to a thin residual film & non-pumpable heel only. Rotate the back-up Crawler / Hydro-Jet into service during maintenance windows so recovery never stops for planned servicing.



Phases 2–4: bulk recovery, jetting & processing conducted remotely — personnel remain outside the Tank

Figure 2 – Remote Crawler & Hydro-Jet Operations through the 28-Inch Manway (No-Man Entry)

Phase 4 – External Sludge Processing & Oil Recovery

- Step 1. Feed recovered Sludge from the Buffer Tank to the Decanter Centrifuge** at a controlled, steady rate. The Centrifuge splits the stream into (a) solids / sands, (b) oily water, and (c) recovered Oil-rich phase. Test & record the operational capacity of the Centrifuge & Oil / Water Separator on Sludge-Oil Recovery % during the first operating week and tune feed rate, temperature (**via Cutter Stock ratio**) and differential speed to maximize Oil yield.
- Step 2. Route the Oil-rich phase through the Oil / Water Separator** for final polishing. Recovered Oil meeting the agreed BS&W specification is transferred to the Renaissance-designated On-Site Containment Tank / receiving pipeline. Sample & retain a sealed sample of every transfer batch; record volume, time & BS&W on the Oil Recovery Log countersigned by Renaissance Representative.
- Step 3. Discharge separated Water to the Renaissance-designated On-Site Water Disposal facility** only after visual & (where required) analytical verification; discharge solids / sands to 1-Tonne woven bags and/or Renaissance-provided 2.3-M³ lockable Skips for the Renaissance-designated repository.

Step 4. Maintain the running Material Balance daily: Sludge recovered (**In**) vs. Oil + Water + Solids + Residue (**Out**), with Cutter Stock volumes credited. The Project Target is 40% – 50% of Sludge volume recovered as Oil; the daily balance is the evidence base for that KPI and for Renaissance billing.

Phase 5 – Final Manned-Entry Mopping & Polishing

Step 1. When remote recovery is complete, re-ventilate and perform Final Tank Clearance Atmosphere Testing at multiple points & elevations. Entry is only approved when sustained readings meet Section 10.2 Entry Criteria, witnessed by the Renaissance On-Site HSE Officer, and a Confined Space Entry (**CSE**) Permit is issued.

Step 2. Manned Entry is made through the bottom Manway under the CSE Permit: a maximum of six (**6**) Entrants in-Tank per shift (commencing with three (**3**) and scaling to six (**6**) only where the Tank atmosphere, visibility & footing are confirmed amenable), each on supplied breathing air (**Mariner 320-E BA System**) with a personal escape set, harness & lifeline where practicable. The Confined Space Attendant maintains the Entry Log continuously; the 3-Man RAT remains rigged & standing by at the Manway for the full duration of every Entry; and, Entrants are rotated to prevent exhaustion.

Step 3. Entrants squeegee, scrape & mop residual film to the suction points using brass non-sparking tools; the Flapper / Sandpiper pumps and the Air-Loader take away washings. Low-pressure washdown (and spot Hydro-Jetting at reduced pressure under a specific permit) is applied to floor & lower wall staining; and, sump & drain lines are cleared & flushed.

Step 4. Continuous Gas Monitoring runs throughout every Entry (**attendant-side & in-Tank personal monitors**). Any alarm, BA fault or siren = immediate, orderly evacuation and PTW suspension; Re-Entry only after re-testing & Permit revalidation.

Step 5. On completion of Mopping / Polishing, perform the Initial Tank Conditions Assessment jointly with Renaissance (**floor, shell, roof underside & internals**) and photograph all surfaces with the intrinsically-safe camera for the Tank Closure dossier.

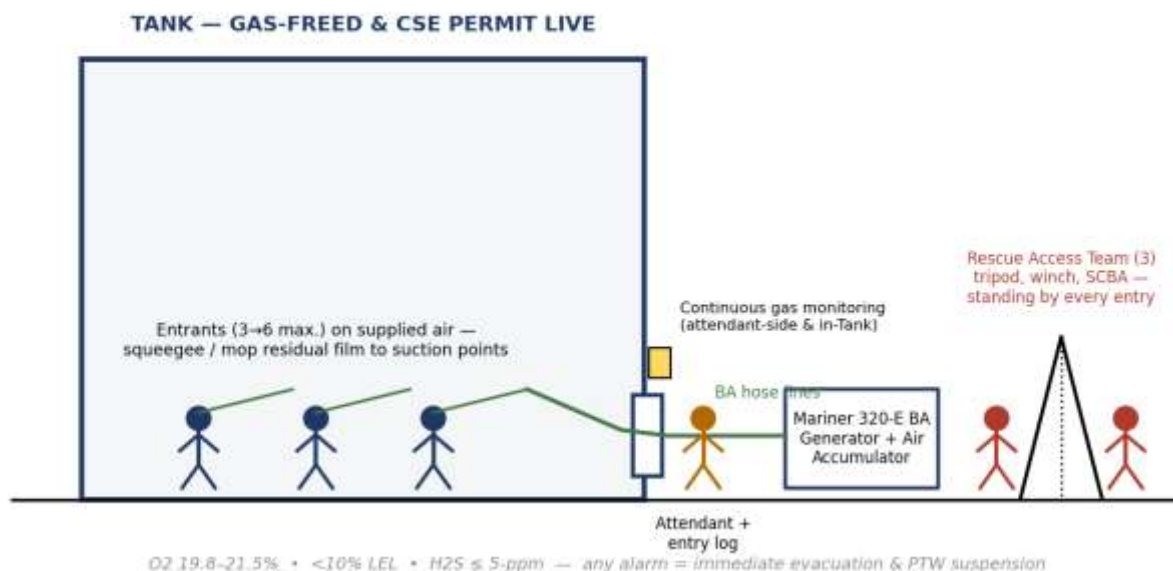


Figure 3 – Final Manned-Entry Arrangement: Entrants on Supplied Air, Attendant & Standing RAT

Phase 6 – Inspection, Acceptance & Tank Closure

Step 1. Perform Final Housekeeping: remove all tools, hoses, lighting & temporary equipment from the Tank; final air monitoring & cleanliness check; leave the Tank in the agreed condition (**visually clean, oil-free surfaces, sumps empty**) ready for Renaissance's inspection / maintenance program.

Step 2. Invite Renaissance for the Joint Inspection Team (JIT) evaluation of the cleaned Tank. Close out any punch items same day where practicable, obtain Closure Approval and the Certificate of Work Completion (COWC) from Renaissance.

Step 3. Document all Waste Turn-Over Volumes & final delivery / disposal locations (**Section 9.0**); reinstate Manways / fittings as directed by Renaissance; demobilize or move to the next Tank per Section 14.0.

9.0 ON-SITE WASTE MANAGEMENT & MATERIAL BALANCE

SWDA's Waste Management scope is strictly On-Site. Renaissance provides all Waste Skips, Vacuum / Flat-Bed Trucks, all Off-Site Transport, and all Off-Site Treatment / Disposal, together with the On-Site facilities for recovered water disposal, the solids / sands repository and the recovered-Oil containment Tank / receiving pipeline. (**Off-Site Waste Management is being pursued as a separate WM Contract and does not form part of this MS**). SWDA shall nonetheless confirm & document Waste Management On-Site, with recorded volumes for every stream:

STREAM	SOURCE	DESTINATION (ON-SITE)	DOCUMENTATION / NOTES
Recovered Oil	Centrifuge + Oil / Water Separator	Renaissance On-Site Containment Tank / Receiving Pipeline	Oil Recovery Log; batch samples; Renaissance countersignature; KPI = 40% – 50% of Sludge Volume
Recovered Water	Separator Water Leg + Final Rinse Water (Treated On-Site)	Renaissance-designated On-Site Disposal Location	Daily Volume Log; Verification before Discharge
Recovered Solids / Sands	Decanter Centrifuge Solids Discharge + Manual Mop-Up	1-Tonne Woven Bags / Renaissance Skips to Renaissance-designated Repository	Bag / Skip tally sheets; Weighbridge or Volumetric Estimate
Residual Sludge Residues	Non-Recoverable Heel & Filter Residues	Renaissance Skips for Renaissance Off-Site Transport / Treatment / Disposal	Estimated at ~30% of the average 1,500-Tons per Tank (≈ 450-Tons), i.e. ~7.5-Tons / Day over 60 days or ~15-Tons / Day over 30 Days
General / Camp Waste & Used PPE	Site & welfare operations	Segregated Waste Bins to Renaissance-approved Waste Stream	Weekly Log

All Waste Movements off the pad are recorded on Turn-Over Notes signed by both SWDA & Renaissance, and the consolidated volumes are reported in the Daily & Monthly Progress Reports and the Final Project Closure Report to Renaissance & NUPRC.

10.0 HSE REQUIREMENTS & CONTROLS

10.1 General Controls

- **All work under the Renaissance PTW system**; JHSA reviewed at every Toolbox Talk; Stop-Work Authority held by every Crew Member.
- **Ignition Control**: the Tank & bund are a Hot-Work-Free Zone; only Zone 0 / Zone 1-rated, air-driven or intrinsically-safe equipment inside or on the Tank; all skids, hoses & the Tank shell bonded & earthed; brass / non-sparking hand tools only; no phones, matches or non-IS devices past the barrier.
- **Hydro-Jetting Controls**: Exclusion Zone around all pressurized hose runs; whip-checks at every coupling; dead-man triggers never tied back; ≤ 15,000-PSI Working Pressure; jetting PPE for any manual lance work in Gas-Free conditions.

- **Manual Handling, Lifting (Certified Slings & Tested Lifting Lugs per the PMIP)**, heat-stress management (**water, shade & rotation**), and journey management per the approved plans.
- **Spill Contingency Planning:** Absorbent Pads / Rolls / Booms & Bio-Surfactant staged at the Tank & Laydown Area; any spill is contained, recovered to the process and reported same-day.

10.2 Atmosphere Criteria (from HSEP Attachment 2)

PARAMETER	WORK-SAFE / ENTRY CRITERIA	ACTION
Oxygen (O ₂)	19.8% – 21.5% (normal 20.8% ± 0.2%)	Entry & Work permitted only within this Band; below 19.8% or above 21.5% = No Entry / Stop Work
Flammables (%LEL)	Commence Works at ~5% LEL or less	Maintain < 10% LEL at all times; suspend Works & ventilate if ≥ 10% LEL
Hydrogen Sulphide (H ₂ S)	0 – 5 ppm	Above 5-ppm = Respiratory Protection Escalation & PTW Review; Personal Monitors on all Entrants
Carbon Monoxide (CO)	Per Detector Alarm Setpoints	Monitored continuously with the Multi-Gas Detectors

Nitrogen displaces Oxygen: any nitrogen-purged or enriched-N₂ space is treated as oxygen-deficient regardless of LEL readings. Detectors are bump-tested daily & calibrated per manufacturer schedule; results are attached to the PTW.

10.3 Emergency Response

- **Site Alarms (sirens)** tested daily; a single continuous tone = evacuate to Muster Point; all personnel accounted for by the Attendant's Entry Log & the Site Tally Board.
- **Rescue:** the 3-Man RAT is rigged (**Tripod, Winch & SCBA**) at the Manway for every Entry; Rescue Drill performed before first Entry on each Tank & monthly thereafter.
- **Medical:** On-Site Nurse & stocked First-Aid Stations each shift; MedEvac route & Retained Hospital arrangements per HSEP Attachments 6 & 7.
- **Fire:** 12-KG dry-powder Fire Extinguishers at the Manway, Laydown Area & fuel point; Fire Watch posted whenever the Hydro-Jet power pack or diesel equipment runs; refueling only via the hand pump from bundled IBC tanks with the equipment shut down.

11.0 QUALITY CONTROL, ACCEPTANCE CRITERIA & REPORTING

- **Tank Cleanliness Acceptance:** visually clean floor & lower shell (**No Free Oil, No Sludge Accumulations**), sumps & drain lines clear, verified by the JIT walk-down (**and Drone Survey of upper surfaces where Entry is restricted**), photographed & signed off on the COWC.
- **Oil Recovery KPI:** 40% – 50% of Recovered Sludge Volume returned to Renaissance as Oil, evidenced by the daily Material Balance & Oil Recovery Log.
- **Records:** Daily Progress Reports (**production, Gas Tests, PTW refs, Waste Volumes, downtime**) and Monthly Reports in the Renaissance-approved format, supporting daily EQ & Personnel operational billing documentation; all calibration certificates, Entry Logs, Toolbox registers & Turn-Over Notes filed in the Tank Closure dossier.
- **Close-Out:** Final Project Closure Report per Tank (and consolidated) submitted to Renaissance & NUPRC, including the full Waste & Oil Material Balances and Lessons Learned feeding the next Tank's execution.

12.0 SCHEDULE, PRODUCTIVITY & VARIATION MANAGEMENT

Planning durations per the 18-Tank List range from 15 Days (**Tank 901, Forcados**) to 60 Days (**the 100,000-M³-Class COTs**), totalling approximately 640 Cleaning Days (**~1.83 Years**) across the 18 Tanks, excluding inter-site moves. For the average 40,000-M³ Tank with ~1,500-Tons of flowable Sludge and 28-Inch Manways, the Best-Case Scenario (**Sludge < 1.0-M deep, flowable, amenable atmospheres**) is 35 – 45 days; the Contract-Budget Case requires 30 Days, and the Conservative Case is 60 Days. The 30-Day Case is only achievable where the Best-Case Conditions hold, and dual-shift production is uninterrupted – hence the emphasis in this MS on Early Production Testing (**Phase 2 / 3**) and immediate Variation submission.

- **Days 1 – 3:** Rig-up, Drone Assessment, Gas-Freeing, PTW – no production expected;
- **Days 3 – 7:** Air-driven & Crawler production trials at the deepest Sludge area; recovery-rate & Oil-yield data captured; duration re-confirmed;
- **By Day 7:** Re-evaluate job duration & the availability of additional Semi-Auto equipment; if required, provide Renaissance an all-encompassing Variance immediately to ensure completion on budget & schedule;
- **Day 30 (Average Tank, 50% Completion):** Crew Rotation & Consumables Replenishment Run, with a progress & schedule-adherence report;
- **Continuous:** Observe all Semi-Auto Equipment Efficiency with an eye to maximize efficiency & minimize job days across the Crawler, Hydro-Jet, Centrifuge & Separator operations.

13.0 ANTICIPATED CHALLENGES & PROFFERED SOLUTIONS

ANTICIPATED CHALLENGE	PROFFERED SOLUTION / MITIGATION
Sludge Deeper / Harder than the 1.0-M Planning Assumption	Drone Profiling before commitment; staged Cutter Stock dosing; Hydro-Jet cutting of banks; immediate SOW / Cost Variation to Renaissance before Schedule damage occurs.
Sludge will not Flow even with Cutter Stock (Dry / Sandy Heels)	Crawler mechanical pushing to suction points; increased jetting passes; manual removal limited to the final polishing phase; realistic per-Tank durations from the T1 list applied (e.g. sandy Process Tanks).
Oil Recovery Rate below the 40% – 50% Target	Tune Centrifuge feed rate & differential speed; optimize Cutter Stock ratio (over-dosing dilutes yield); re-process interface streams through the Separator; report actual Oil Recovery transparently with the Material Balance.
Equipment Breakdown of a Single-String Item (Crawler / Hydro-Jet / Centrifuge)	Back-up Unit Strategy (2 of each critical item – one Ops, one Stand-By to be secured if need arises); Operators double as maintainers; 2-YR spares philosophy; planned maintenance in shift changeovers.
28-Inch Manway constraint on Equipment & Rescue	Crawler & tooling pre-verified to pass 28-Inch openings at Pre-Mob; Manway cone adaptor; Rescue Drills specific to the restricted opening; Entrant numbers scaled 3 → 6 only when conditions allow.
Gas Excursions / Atmosphere Instability (esp. Floating-Roof COTs)	Continuous multi-point monitoring; hard 10%-LEL suspension rule; re-ventilation capacity held on site; No-Entry posture maintained for as long as possible (Phases 2 – 4 are No-Entry by design).
Renaissance-dependency Delays (Cutter Stock, Power, Skips, Trucks & Water Disposal)	Dependencies logged & flagged in Daily Reports; Stand-By provisions per the Contract apply to Renaissance-caused idle days; early written requests with lead times from the Sludge Profile Report.
Weather (Rainy Season Flooding of Bunds & Lightning)	PTW weather-suspension rules; covered electricals; bund dewatering via Renaissance-approved route; schedule float in the 60-day case.
Security & Community Interface at Niger Delta Sites	Approved Security & Community Engagement Plans; Host Community Workers employed on Crew (3 per Shift); proper Journey Management for all moves.
Crew Fatigue on Dual 12-HR Shifts, 7 Days / Week	Entrant rotation rules; 30-day Crew rotation; On-Site Nurse monitoring; accommodation & feeding secured near site.

14.0 DEMOBILIZATION & PROJECT CLOSURE

- Step 1. On COWC receipt, decontaminate all hoses,** pumps, the Crawler & the Centrifuge train at the wash point; all washings go to the process / Renaissance-designated disposal, never to ground.
- Step 2. Complete the Waste Turn-Over Documentation (Volumes & final Delivery / Disposal Locations)** countersigned by Renaissance.
- Step 3. De-mob all Project Equipment, Personnel & Materials** (containerized spreads on flat-bed / self-loaders per the De-Mobilization Plan), either rolling directly to the next Renaissance Tank Site or returning to the Kidney Island base until receipt of the next **PO**.
- Step 4. Reinstate the Laydown Area & Tank surrounds to Pre-Work Conditions;** Joint Site Release Inspection walk-down with Renaissance.
- Step 5. Prepare & submit the Final Project Closure Report to Renaissance & NUPRC,** including the Oil-Recovery Performance Report Summary.

APPENDIX A – SUMMARY DETAILS OF THE 18 RENAISSANCE PROJECT TANKS

(Volumes presented are SWDA's Planning Estimates at an assumed 1.0-M Sludge Depth per Tank; not corroborated by Renaissance; to be confirmed per Tank by the Drone Assessment. Source: Table 1, 2 July 2026.)

S/N	TANK NO.	TANK LOCATION	TANK TYPE / ROOF	TANK VOL. (M ³)	EST. SLUDGE VOL. (M ³)	EST. DAYS
1	Tank 9	Bonny Tank Farm	COT / Floating	41,335	1,870	30
2	Tank 11	Bonny Tank Farm	COT / Floating	67,188	3,536	50
3	T-1201-A	Bonny Tank Farm	PT / Fixed	7,422	707	20
4	T-1201-B	Bonny Tank Farm	PT / Fixed	7,422	707	20
5	Tank 13	Bonny Tank Farm	COT / Floating	67,188	3,536	50
6	Tank 21	Bonny Tank Farm	COT / Floating	104,707	4,572	60
7	Tank 22	Bonny Tank Farm	COT / Floating	104,707	4,572	60
8	T-1401-A	Bonny Tank Farm	PT / Fixed	7,422	707	20
9	Tank 206	Forcados Tank Farm & Depot	COT / Floating	99,872	4,560	60
10	Tank 209	Forcados Tank Depot	COT / Floating	99,872	4,560	60
11	Tank 620	Forcados Tank Depot	PT / Fixed	8,638	881	20
12	Tank 901	Forcados Tank Depot	PT / Fixed	1,060	177	15
13	Tank 203	Forcados Tank Depot	COT / Floating	99,872	4,560	60
14	Tank 102	Forcados Tank Depot	PT / Floating	30,763	1,810	30
15	Tank 601	Forcados Tank Depot	PT / Fixed	8,836	707	20
16	Tank 610	Forcados Tank Depot	PT / Fixed	8,638	881	20
17	GCPF Tank	Gbaran-Ubie CPF (OML-28)	PT / Fixed	15,530	1,195	25
18	SGP Tank	Soku Gas Plant	PT / Fixed	12,724	707	20
TOTALS:		18 Tanks – 8 COTs & 10 PTs; 9 Floating & 9 Fixed Roofs:		793,195	40,247	~640

APPENDIX B – KEY RENAISSANCE / SWDA PROJECT INTERFACE RESPONSIBILITIES

ITEM / SERVICE	RESPONSIBLE PARTY
Cutter Stock (Light Crude / Gas Oil) & Wash Water	Renaissance
On-Site Electricity (415V / 50Hz / 3-Phase) for Tank Cleaning Equipment	Renaissance
Waste Skips, Vacuum & Flat-Bed Trucks; all Off-Site Waste Transport, Treatment & Disposal	Renaissance
On-Site Recovered-Water Disposal Facility; Solids / Sands Repository; Recovered-Oil Containment Tank / Receiving Pipeline	Renaissance
Tank Clearing, Isolation, Opening & Initial Venting; As-Built Drawings; PTW Issuance	Renaissance
Diesel Fuel for SWDA Tank Cleaning Equipment; all Semi-Auto Cleaning Equipment, Consumables & Crew; On-Site Waste Documentation	SWDA
Drone Assessment, Sludge Profiling, Tank Cleaning Execution, Oil Recovery Processing & all Project Reporting (Daily / Monthly / Closure)	SWDA
Host Community Settlements & Payments (except SWDA-arranged Local Labour)	Renaissance

— END OF METHOD STATEMENT —