



PETROLEUM FACILITIES COMMISSIONING AND DECOMMISSIONING GUIDELINES

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DEFINITION OF TERMS

In these Guidelines, unless the context otherwise requires, the following words shall have the meaning as defined below.

Boiling Liquid Expanding Vapour Explosion (BLEVE)	An explosion resulting from the failure of a vessel containing a pressurized liquid at a temperature significantly above its boiling point at normal atmospheric pressure.
Commissioning	The structured process of bringing equipment and facilities into full operational condition through systematic testing, verification, and handover. Culminates in a Pre-Startup Safety Review (PSSR) and receipt of all required regulatory approvals before introduction of hydrocarbons or LPG
Confined Space	A space large enough for a person to enter and perform work, with limited or restricted means of entry or exit, not designed for continuous worker occupancy, that may present hazards including toxic or flammable atmospheres, oxygen deficiency, or engulfment.
Decommissioning	Permanent cessation of use of a facility, followed by safe isolation, gas-freeing, purging, cleaning, removal or abandonment, environmental remediation, and post-decommissioning site restoration resulting in a NEMA Environmental Closure Certificate
Decommissioning Cost Estimate (DCE)	A detailed, costed estimate of all expenditure required for full facility decommissioning including isolation, gas-freeing, cleaning, demolition, waste disposal, environmental remediation, and site restoration.
Environmental Compliance Certificate (ECC)	A certificate issued by NEMA following approval of an EIA, authorizing construction of a project. The ECC is a mandatory pre-condition for construction of any new petroleum or LPG facility
Facility Owner/Operator	An individual or entity that holds legal title to, operates, or controls a petroleum or LPG facility. Responsible for safety, maintenance, environmental compliance, financial assurance, regulatory reporting, and all commissioning and decommissioning obligations under the Petroleum Act, Cap. 308, Energy Act, Cap. 314, Occupational Safety and Health Act, Cap. 236A, and Environmental Management and Coordination Act, Cap. 387.
Financial Assurance	A financial mechanism (bank guarantee, surety bond, escrow account, or approved insurance) lodged with EPRA to guarantee

sufficient funds are available for full facility decommissioning and site restoration, regardless of the financial condition of the facility owner at the time of decommissioning.

Gas-Freeing	The process of removing flammable and/or toxic vapours from a storage tank, vessel, pipeline, or confined space by purging with inert gas or forced air ventilation until the atmosphere meets defined safe entry or safe work criteria.
Hazardous Area Classification	The division of areas around petroleum and LPG facilities into zones based on probability and duration of flammable atmosphere, as defined in IEC 60079-10-1 (Zone 0, 1, 2 for gas/vapour), used to determine the type of certified electrical equipment permitted in each zone.
Inerting	The process of replacing air (oxygen) in a vessel or pipeline with an inert gas (typically nitrogen) to prevent formation of a flammable mixture, conducted before introducing LPG or other flammable gases into a system for the first time.
Management of Change (MOC)	A formal, documented process for reviewing, approving, and controlling all proposed changes to process design, equipment, materials, procedures, or operating conditions before implementation, to ensure new or increased hazards are identified, assessed, and controlled.
Permit-to-Work (PTW)	A formal documented system for controlling non-routine, high-risk activities on a petroleum or LPG facility, ensuring hazards are identified, controls are in place, and all personnel are informed before work commences.
Pre-Startup Safety Review (PSSR)	A structured, documented safety review conducted by a competent independent team immediately before introduction of hydrocarbons or LPG into any new, modified, or recommissioned facility, to verify all commissioning activities are complete, all safety systems are operational, and all regulatory approvals are in place.
Punch-list	A formal list of incomplete or deficient items identified during commissioning inspection, classified as Category A (safety-critical — must be closed before hydrocarbon introduction) or Category B (non-safety — may be deferred subject to written approval).
Pyrophoric Iron Sulphide (FeS)	Iron sulphide scale that accumulates in vessels, tanks, and pipelines handling H ₂ S-bearing hydrocarbon streams. Ignites spontaneously

on contact with air when wet deposits dry out during tank opening, cleaning, or decommissioning. A significant cause of tank fires and fatalities.

Recommissioning	The structured process of returning equipment or facilities to full operational condition after major alteration, repair, rehabilitation, or extended shutdown of more than twelve months, requiring a full PSSR before restart.
Safety Instrumented System (SIS)	An instrumented system that brings a process to a safe state when predetermined hazardous conditions are violated. Comprises sensors, logic solvers, and final elements (e.g., ESD valves). Designed and validated to defined Safety Integrity Levels (SILs).
Safety Integrity Level (SIL)	A discrete level (SIL 1, 2, 3, or 4) specifying the required probability of failure on demand (PFD) of a Safety Instrumented Function, determined by Layer of Protection Analysis (LOPA) or equivalent.
SIMOPS	Simultaneous Operations: the planned performance of two or more activities at or near the same location at the same time, where each activity creates hazards that could affect the other, requiring formal assessment and a designated SIMOPS Coordinator

LIST OF ACRONYMS

AC	Alternating Current
AFFF	Aqueous Film-Forming Foam
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ATG	Automatic Tank Gauging
AWS	American Welding Society
BINDT	The British Institute of Non-Destructive Testing
BLEVE	Boiling Liquid Expanding Vapour Explosion
BPVC	Boiler and Pressure Vessel Code (ASME)
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAT	Cable Avoidance Tool
CBK	Central Bank of Kenya
CFR	Code of Federal Regulations
CISRS	Construction Industry Scaffolders Record Scheme
CMP	Commissioning Management Plan
CO	Carbon Monoxide
CP	Cathodic Protection
CSE	Copper-Sulphate Electrode
Cu	Copper
CuSO ₄	Copper (II) Sulphate
DC	Direct Current
DCE	Decommissioning Cost Estimate
DCP	Dry Chemical Powder
DCS	Distributed Control System
DOSHS	Directorate of Occupational Safety and Health Services
DP	Decommissioning Plan

DPI	Dye Penetrant Inspection
EAS	East African Standard
EBK	Engineers Board of Kenya
ECC	Environmental Compliance Certificate
EI	Energy Institute (formerly Institute of Petroleum, IP)
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act, (Cap.387)
EN	European Norm (European Standard)
EPRA	Energy and Petroleum Regulatory Authority
ERP	Emergency Response Plan
ESD	Emergency Shutdown
ESMP	Environmental and Social Management Plan
FAT	Factory Acceptance Test
FeS	Iron Sulphide
FS	Functional Safety
H ₂ S	Hydrogen Sulphide
HAZID	Hazard Identification Study
HAZOP	Hazard and Operability Study
HHLA	High High Level Alarm
HLA	High Level Alarm
HMI	Human Machine Interface
HSE	Health, Safety and Environment
IEC	International Electrotechnical Commission
ILI	Inline Inspection (intelligent pigging)
IP	Institute of Petroleum
IR	Infrared Radiation
JSA	Job Safety Analysis

KEBS	Kenya Bureau of Standards
KS	Kenya Standard
LDS	Leak Detection System
LEL	Lower Explosive Limit
LOPA	Layer of Protection Analysis
LOTO	Lock-Out Tag-Out
LPG	Liquefied Petroleum Gas
LTIFR	Lost Time Injury Frequency Rate
MAOP	Maximum Allowable Operating Pressure
MAWP	Maximum Allowable Working Pressure
MDMT	Minimum Design Metal Temperature
MFL	Magnetic Flux Leakage
MHI	Major Hazard Installation
MOC	Management of Change
MOP	Maximum Operating Pressure
MPI	Magnetic Particle Inspection
N ₂	Nitrogen
NACE	National Association of Corrosion Engineers
NDT	Non-Destructive Testing
NEMA	National Environment Management Authority
NFPA	National Fire Protection Association
O ₂	Oxygen
OSHA	Occupational Safety and Health Act, Cap. 236A 2007 (Kenya)
OWS	Oil Water Separator
P&ID	Piping and Instrumentation Diagram
PCN	Personnel Certification in Non-Destructive Testing
PE	Professional Engineer

PFD	Probability of Failure on Demand
PF	Passive Fire Protection
PHA	Process Hazard Analysis
PPE	Personal Protective Equipment
PPM	Parts Per Million
PSSR	Pre-Startup Safety Review
PTW	Permit to Work
PV	Photovoltaics
RAMS	Risk Assessment and Method Statement
RPO	Radiation Protection Officer
RT	Radiographic Testing
SABA	Supplied-Air Breathing Apparatus
SAT	Site Acceptance Test
SCBA	Self-Contained Breathing Apparatus
SIF	Safety Instrumented Function
SIL	Safety Integrity Level
SIMOPS	Simultaneous Operations
SIS	Safety Instrumented System
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
TLV-TWA	Threshold Limit Value — Time-Weighted Average
TPH	Total Petroleum Hydrocarbons
TÜV	Technical Inspection Association
TWA	Time-Weighted Average
UN	United Nations
UPS	Uninterruptible Power Supply
US	United States of America
UST	Underground Storage Tank

UT	Ultrasonic Testing
UV	Ultraviolet
VOC	Volatile Organic Compound

1. INTRODUCTION

These Guidelines provide detailed technical, environmental, health and safety, legal, and administrative requirements for the commissioning (placing into service), decommissioning (permanent cessation, removal, and site restoration), and recommissioning (reinstating previously decommissioned or recently repaired) of petroleum and Liquefied Petroleum Gas (LPG) facilities and installations in Kenya.

They are aligned with:

- The Petroleum Act, Cap. 308, and its subsidiary legislation;
- The Energy Act, Cap. 314, and its subsidiary legislation;
- The Occupational Safety and Health Act, Cap. 236A, and its subsidiary legislation;
- The Environmental Management and Coordination Act, Cap. 387, and its subsidiary legislation;
- The Water Act, Cap. 372;
- EPRA regulatory requirements and licence conditions;
- NEMA regulatory requirements and licence conditions;
- KEBS Kenya Standards;
- International industry standards including API, NFPA, ASME, IEC, ISO, and EI/IP standards as listed in Annex XVI.

2. PURPOSE

To ensure safe, environmentally sound, legally and industry-compliant commissioning and decommissioning of petroleum and LPG facilities in Kenya.

These Guidelines seek to:

- Standardize procedures for commissioning and decommissioning of petroleum and LPG facilities across Kenya;
- Enhance protection of life and property by establishing minimum safety and process safety requirements;
- Reduce the likelihood and severity of petroleum and LPG related incidents through application of recognized risk management principles;
- Establish mandatory Pre-Startup Safety Review (PSSR) and Management of Change (MOC) requirements aligned with international process safety standards;
- Introduce a risk-based classification and inspection framework to support proportional regulatory oversight;

- Establish minimum financial assurance requirements to guarantee funds for full facility decommissioning and site restoration;
- Support harmonized enforcement and coordinated oversight with EPRA, NEMA, DOSHS, county governments, and relevant agencies.
- Have regulatory oversight of available petroleum and gas infrastructure for strategic planning and monitor security of supply

3. SCOPE

These Guidelines apply to all stages of the lifecycle for petroleum and LPG facilities within the Kenyan jurisdiction, including:

- Petroleum and LPG handling depots, terminals, and jetties;
- Retail service stations and consumer sites;
- Autogas (LPG vehicle fuel) refueling facilities;
- Bulk LPG storage and filling plants;
- Petroleum and LPG pipelines, including mainline, product transfer, and distribution pipelines;
- Underground Storage Tanks (USTs) at all petroleum and LPG facility types;
- Common user facilities including refineries, manifolds, metering systems, vapour recovery systems, and associated process infrastructure.

Exclusions: Routine maintenance and temporary outages where service will be resumed without significant modification.

4. ROLES AND RESPONSIBILITIES

4.1 Licensee/Operator

The licensee/operator shall:

- Prepare and fund commissioning and decommissioning plans and submit them to EPRA for approval;
- Conduct hazard identification studies (HAZID), HAZOP studies, and risk assessments;
- Implement all works in accordance with approved plans, these Guidelines, and applicable standards;
- Establish, implement, and maintain a Management of Change (MOC) system before commissioning commences;

- Conduct a Pre-Startup Safety Review (PSSR) before introducing hydrocarbons or LPG into any new, modified, or recommissioned facility;
- Register the facility as a workplace with DOSHS before commencing operations;
- Establish and maintain adequate financial assurance for decommissioning and site restoration;
- Notify EPRA, NEMA, DOSHS, and county governments as required by applicable law;
- Maintain full documentation and records throughout the facility operational life;
- Submit the signed PSSR completion certificate to EPRA before the operating licence is activated.

4.2 EPRA

EPRA shall:

- Review and approve commissioning and decommissioning plans;
- Conduct inspections and surveillance during commissioning and decommissioning activities;
- Require, review, and hold financial assurance instruments for decommissioning;
- Receive and register signed PSSR completion certificates before activating operating licences;
- Maintain a register of all licensed facilities' decommissioning cost estimates and financial assurance instruments;
- Enforce compliance through stop-work orders, fines, restoration orders, and prosecution.

4.3 NEMA

NEMA shall:

- Review and approve Environmental Impact Assessments (EIAs) before construction commences;
- Conduct Environmental Audits of operational facilities periodically;
- Oversee environmental monitoring during commissioning and decommissioning;
- Issue Environmental Closure Certificates upon satisfactory completion of site remediation and post-decommissioning monitoring.

4.4 DOSHS

DOSHS shall:

- Conduct statutory inspections of pressure vessels and issue examination certificates before first operation and at the prescribed intervals throughout the operations;
- Receive notification of Major Hazard Installations and review Safety Reports;
- Register factories and issue workplace registration certificates;
- Enforce occupational safety and health requirements during commissioning and decommissioning.

4.5 Contractors

Contractors shall:

- Execute works as per approved plans and HSE procedures;
- Provide evidence of competency, certification, and insurance before commencing works;
- Comply with the facility owner's PTW, LOTO, and emergency response procedures at all times;
- Report all incidents, near-misses, and unsafe conditions immediately to the facility owner/operator.

4.6 County Governments

County governments shall issue the following approvals, which are pre-conditions for commissioning:

- Building approval/development permission for facility construction;
- County fire safety certificate from the county fire service;
- Public health certificate;
- Trade licence;
- Demolition approval for decommissioning activities (where applicable);
- Approval of road closures, hazardous waste transport, and works within public rights of way.

5. OVERARCHING PRINCIPLES

All commissioning and decommissioning activities shall be conducted in accordance with the following principles:

- **Compliance:** All activities shall comply with applicable Kenyan legislation, EPRA licence conditions, NEMA requirements, DOSHS requirements, county permits, and applicable KEBS and international standards;
- **Life, Health and Environment First:** Protect personnel, the public, and the environment through the hierarchy of controls: elimination, substitution, engineering controls, administrative controls, and PPE — in that order;
- **Risk-Based Approach:** Focus resources on the highest-consequence hazards; conduct proportionate HAZID/HAZOP studies before any major activity;
- **Process Safety Management:** Apply recognized process safety elements at all times, including MOC, PSSR, PHA, mechanical integrity, and PTW;
- **Financial Provisioning:** Adequate financial assurance for full decommissioning and site restoration shall be established before operations commence and maintained throughout the facility lifecycle;
- **Competency:** All safety-critical roles shall be performed by persons with appropriate qualifications, certification, and demonstrated competency as specified in Section 6.1;
- **Transparency and Stakeholder Engagement:** Engage EPRA, NEMA, DOSHS, county governments, and affected communities openly throughout the facility lifecycle;
- **Documentation and Traceability:** Full records of all commissioning, operational, and decommissioning activities shall be retained for the operational life plus a minimum of ten years after decommissioning;
- **Continuous Improvement:** Lessons learned from incidents, near-misses, audits, and industry experience shall be formally reviewed and incorporated into procedures and practices.

6. GENERAL REQUIREMENTS

Applies to all commissioning and decommissioning activities.

6.1 Competency and Certification Requirements

A competency and certification matrix for all personnel shall be submitted to EPRA prior to commencement of works. The following minimum qualifications apply to safety-critical roles:

ROLE	MINIMUM QUALIFICATION / CERTIFICATION	REGULATORY / CERTIFYING AUTHORITY
Commissioning/Decommissioning Engineer (Lead)	Registered Professional Engineer (PE) EBK	EBK
Above-ground storage tank inspector	API 653 Certified Inspector (current)	API
Pressure vessel inspector	DOSHS approved	DOSHS
LPG installer	EPRA-licensed LPG installer/contractor	EPRA
Electrical inspector — hazardous areas	EPRA-licensed electrical worker	EPRA
NDT personnel (UT, RT, MPI, DPI)	PCN Level II or ASNT Level II	BINDT / ASNT / KEBS recognition
Welder (pressure-containing joints)	AWS D1.1 / ASME Section IX / EN ISO 15614-1	KEBS / AWS / ASME
Gas tester / atmospheric monitor	Trained per EI IP Model Code Pt 15 or equivalent	DOSHS
Tank cleaning supervisor	EI IP Model Code Pt 15 competency or equivalent	DOSHS
Crane operator	DOSHS-certified + current medical certificate	DOSHS
Scaffold inspector	Scaff tag / CISRS or equivalent	DOSHS
Functional safety engineer (SIS/SIL)	TÜV Functional Safety Engineer (FS Eng) or equivalent	TÜV / or equivalent recognition
EIA / environmental expert	NEMA-registered EIA Lead Expert	NEMA
Fire marshal	Trained in fire safety and emergency response	County Fire Service / DOSHS
First aider	Qualified per First Aid in the Workplace Regulations 2024	DOSHS

6.2 Management of Change (MOC)

MANDATORY REQUIREMENT: A formal Management of Change (MOC) system shall be established and fully operational BEFORE any commissioning activities commence. No change to process design, safety-critical equipment, software, P&IDs, or operating

conditions shall be implemented without a completed and approved MOC — during construction, commissioning, or operations.

The MOC system shall include at minimum:

- A written MOC request describing the proposed change, technical justification, and scope of impact;
- A hazard review appropriate to the scale of the change: screening for minor changes; HAZID for moderate; full HAZOP for significant process or safety-system changes;
- Review and approval by a designated authority — minimum a Registered Professional Engineer for process or safety-critical changes;
- Re-validation of affected P&IDs, safety case, SIL assessments, operating procedures, and hazardous area classification drawings before implementation;
- Communication of the change to all affected personnel, with training records maintained;
- Temporary MOC (T-MOC) for time-limited changes, with a defined expiry date and reversion plan;
- A MOC register maintained and auditable for the operational life of the facility.

6.3 Contractor Management

Contractors shall be pre-qualified before engagement. Pre-qualification shall verify:

- Competency and certification of all key personnel per Section 6.1;
- HSE performance record: LTIFR, major incidents, enforcement actions, and HSE audit results for the previous three years minimum;
- Current public liability insurance and workers' compensation insurance;
- Availability of appropriate plant, equipment, tools, and PPE;
- Risk Assessment and Method Statements (RAMS) for each major activity;
- Written confirmation of compliance with the facility owner's PTW, LOTO, and emergency response procedures.

6.4 Emergency Preparedness and Response

The following minimum emergency preparedness measures shall be in place before any commissioning or decommissioning activity commences:

- Trained fire marshals and qualified first aiders on site at all times;
- Emergency response equipment: fire extinguishers, first aid kits, eyewash stations, and spill response kit at designated locations;

- Written Emergency Response Plan (ERP) covering fire, explosion, toxic gas release, liquid hydrocarbon spill, medical emergency, and vehicle incidents;
- Designated, clearly marked muster points, assembly areas, and primary and secondary evacuation routes;
- Emergency contact list posted at site access points: county fire service, county hospital, EPRA, NEMA, and DOSHS;
- Medical evacuation plan with the nearest appropriate hospital confirmed, including route and estimated travel time;
- Emergency response drills conducted before operations commence and at minimum once per month during the commissioning/decommissioning period.

6.5 Permit-to-Work (PTW) System

A formal PTW system shall be established and operated throughout all commissioning and decommissioning activities. The following permit categories shall be available at minimum:

PERMIT CATEGORY	MANDATORY PRE-CONDITIONS	ADDITIONAL CONTROLS
Hot Work	LEL <1% at work location; fire blanket; extinguisher; fire watcher	Maximum 4-hour validity; re-test after any interruption
Confined Space Entry	O ₂ 19.5–23.5%, LEL <10%, H ₂ S <1 ppm, CO <25 ppm; forced ventilation; rescue plan; standby attendant	Continuous monitoring; SCBA at entry point
Electrical Isolation (LOTO)	Written isolation certificate; individual personal padlock per worker; dead-test confirmation	Isolation register; lock removal requires written authority from Permit Issuer
Excavation	Underground services CAT scan; safe-dig clearance	Trench barriers; shoring if >1.2 m depth; daily inspection
Lifting Operations	Approved lift plan; equipment certificate; DOSHS-certified rigger; exclusion zone	Brief all nearby workers; never lift over personnel
Work at Height (>2 m)	Scaffold TAG inspection; fall arrest harness; edge protection confirmed	Stop work in wind >15 m/s
Radiography (RT)	DOSHS Radiation Protection Board notification; exclusion zone; radiation monitor deployed	Licensed RPO on site throughout
Cold Work — Process Pipework	Isolation and LOTO confirmed; drain and depressurize confirmed	PPE for chemical exposure; product disposal plan

Additional PTW requirements:

- A SIMOPS conflict check shall be conducted against all active permits before each new permit is issued;
- All permits shall cross-reference the LOTO isolation register;
- Gas test records shall be signed by the qualified gas tester before and at intervals not exceeding two hours during permit validity;
- Maximum permit validity is one work shift (12 hours). Renewal requires re-assessment, physical re-check, and re-signing by the permit issuer;
- The permit issuer shall physically verify all pre-conditions before signing;
- All active permits shall be displayed on a central PTW board at the site office.

6.6 Energy Isolation and Lockout/Tagout (LOTO)

The LOTO procedure shall address all forms of hazardous energy: electrical (AC and DC, including UPS and battery backup); pneumatic; hydraulic; mechanical; and process energy (pressure, vacuum, thermal, residual hydrocarbons).

The LOTO procedure shall require:

- Individual personal padlocks: each worker shall apply their own lock to each isolation point. No multi-hasps arrangement shall permit one person to remove all locks simultaneously;
- Written isolation certificates listing each energy source, isolation method, and confirmation of zero-energy state;
- Verification of zero-energy state before work commences: attempt-to-start 'try-out' procedure plus calibrated instrument reading;
- An isolation register maintained and audited throughout commissioning/decommissioning;
- De-isolation only with written authority from the Responsible Person, after physical confirmation that all workers have removed their personal locks.

6.7 Confined Space Entry Standards

MANDATORY REQUIREMENT: All confined space entry during commissioning and decommissioning is a high-risk activity. No worker shall enter a confined space without a valid Confined Space Entry PTW signed by a qualified gas tester.

Minimum requirements:

- All confined spaces shall be classified as permit-required unless a documented assessment demonstrates no hazardous atmosphere can develop;

- Atmospheric testing sequence before entry — in this order: (1) Oxygen: 19.5%–23.5% v/v; (2) Flammable gas (LEL): <10%; (3) Hydrogen sulphide (H₂S): <1 ppm TLV-TWA; (4) Carbon monoxide (CO): <25 ppm TLV-TWA; (5) Benzene: <0.5 ppm for petroleum tank entry;
- A qualified gas tester using calibrated instruments shall perform all tests and document results;
- Instruments shall be calibrated against reference gas before each day of use;
- Forced ventilation: minimum 20 air changes per hour, verified as adequate before entry;
- A standby attendant shall be stationed at the entry at all times and shall NOT enter the space under any circumstances;
- A written non-entry rescue plan with rescue equipment (tripod, winch, harness, lifeline) shall be assembled at the entry point before any entry;
- SCBA shall be worn for entry where the atmosphere is unknown or O₂ is below 19.5%;
- A personal multi-gas detector (O₂, LEL, H₂S, CO) shall be worn by each entrant throughout;
- If the LEL reading exceeds 10% at any time during entry, all workers shall immediately evacuate.

6.8 Gas Testing Acceptance Criteria

ACTIVITY	REQUIRED ATMOSPHERIC CONDITION	REFERENCE STANDARD
Confined space entry	O ₂ : 19.5–23.5% LEL: <10% H ₂ S: <1 ppm CO: <25 ppm Benzene: <0.5 ppm	EI IP Model Code Pt 15; OSHA 1910.146
Hot-work adjacent to petroleum/LPG	LEL: <1% at work location and within 1 m radius O ₂ : <23.5%	NFPA 51B; EI IP Model Code Pt 1
LPG vessel — initial LPG introduction	O ₂ : <2% v/v at ALL designated sample points after N ₂ inerting	NFPA 58
Gas-freeing before maintenance	O ₂ : 19.5–23.5% LEL: <1% H ₂ S: <1 ppm at ALL monitoring points	API 2015; EI IP Model Code Pt 15
Cold cutting on decommissioned piping	LEL: <10% at work location O ₂ : 19.5–23.5%	EI IP Model Code Pt 1
Excavation near buried	Continuous: LEL <10% H ₂ S <1 ppm during excavation	EI IP Model Code; OSHA 1926

petroleum/LPG pipes		
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6.9 Hazardous Area Classification Verification

Before commissioning any petroleum or LPG facility, an as-installed area classification survey shall be conducted by a person competent in IEC 60079-17 to verify the installed facility matches approved hazardous area classification drawings:

- Confirm all installed electrical equipment carries valid Ex certification for the designated zone (Zone 0, 1, or 2 per IEC 60079-10-1);
- Verify equipment installation per IEC 60079-14;
- Verify earthing and bonding continuity per IEC 60364, with formal test records;
- Produce a survey report listing all non-compliant items as Category A punch-list items;
- Any subsequent physical change within a hazardous area shall trigger an MOC and re-survey of the affected zone.

6.10 SIMOPS Management

Where commissioning or decommissioning activities are conducted simultaneously at or adjacent to operating facilities, a formal SIMOPS management process shall be implemented:

- A SIMOPS register shall list all planned concurrent activities, locations, durations, and interface hazards;
- A SIMOPS risk matrix shall identify inherently incompatible concurrent activities. At minimum, the following are prohibited simultaneously within the same bunded area or within 15 metres: hot-work and any LPG delivery or transfer; tank cleaning with solvents and hot-work; confined space entry and functional testing of pressure relief devices in the same system;
- A designated SIMOPS Coordinator shall be appointed with authority to halt or defer any conflicting activity;
- A daily SIMOPS coordination meeting shall be held during all high-activity periods.

6.11 Monitoring, Auditing, and Enforcement

- Periodic EPRA surveillance and inspection during commissioning and decommissioning;
- Environmental monitoring schedule for air quality, soil, and groundwater per NEMA requirements;

- All reportable incidents and near-misses reported to EPRA within 48 hours for major incidents;
- Root cause analysis conducted for all reportable incidents, with corrective action plans tracked to closure;
- Enforcement measures including stop-work orders, fines, restoration orders, and prosecution for non-compliant cases.

7. COMMISSIONING

Requirements for placing petroleum and LPG facilities into operational service.

7.1 Pre-Commissioning Planning

7.1.1 Regulatory Approvals – Pre-Conditions for Commissioning

The following approvals are mandatory before any hydrocarbon introduction:

APPROVAL REQUIRED	ISSUING AUTHORITY
Environmental Compliance Certificate (ECC)	NEMA
Construction Permit	EPRA
Workplace Registration Certificate	DOSHS
Pressure Vessel Examination Certificates (each vessel)	DOSHS
County Building Approval	County Government
County Fire Safety Certificate	County Fire Service
Public Health Certificate	County Public Health Office
Trade Licence	County Government
Major Hazard Installation Notification Acknowledgement	DOSHS — for facilities above MHI thresholds

7.1.2 Technical Documentation

Before commissioning commences, compile and confirm accuracy of:

- Commissioning Management Plan (CMP) — see Annex I for template;
- P&IDs reflecting as-built condition — frozen before HAZOP;
- Process Flow Diagrams (PFDs), hazardous area classification drawings, electrical single-line diagrams;
- Instrument loop diagrams and cause-and-effect matrices;
- Civil, structural, and mechanical as-built drawings;
- Mill test certificates, weld maps, and NDT records;
- Factory Acceptance Test (FAT) records for all major equipment;

- Pressure vessel design documentation and DOSHS registration certificates;
- Vendor operation and maintenance (O&M) manuals;
- SIS design specification and SIL assessment report (where applicable).

7.1.3 Hazard Studies and Risk Assessments

- Commissioning HAZID/HAZOP led by a qualified, independent HAZOP leader. P&IDs shall be frozen before the HAZOP. All HAZOP actions shall be tracked and closed before commissioning approval;
- SIMOPS analysis and register per Section 6.10;
- Emergency Response Plan specific to the commissioning phase;
- RAMS for each major commissioning activity.

7.2 Commissioning Sequence Control and Punch-list

7.2.1 Mandatory Commissioning Sequence

The following sequence shall be followed. No step shall be bypassed:

1. Mechanical completion: all piping, equipment, structures, and instruments installed per drawings; construction punch-list issued;
2. Utility systems commissioned: electrical power, instrument air, water, nitrogen supply;
3. Fire water and fire protection systems fully commissioned and operational — **before any hydrocarbon introduction** (see Section 7.8);
4. Gas and flame detection systems online and alarming to control room;
5. Safety Instrumented System (SIS) commissioned, loop-tested, and SIL-verified per IEC 61511 (see Section 7.9);
6. Emergency shutdown (ESD) system functionally tested end-to-end;
7. All Category A punch-list items closed and verified;
8. Pre-Startup Safety Review (PSSR) completed and signed — see Section 7.12;
9. All regulatory approvals confirmed received;
10. Hydrocarbon introduction — controlled and supervised.

MANDATORY REQUIREMENT: Steps 3 through 9 must ALL be completed before Step 10 (hydrocarbon introduction). The PSSR (Step 8) is the final mandatory gate. No hydrocarbon shall enter any system while any Category A punch-list item affecting that system remains open.

7.2.2 Punch-list Classification

All incomplete or deficient items shall be recorded and classified as:

CATEGORY	DEFINITION	EXAMPLES
A — Safety-Critical	Must be closed and independently verified BEFORE hydrocarbon introduction	ESD valve not functional; fire detector not commissioned; earthing incomplete; Ex-certified equipment not installed; SIS loop test not completed; fire pump not operational; LPG inerting not completed
B — Non-Safety	May be deferred to within an agreed period after hydrocarbon introduction, subject to written approval by the facility owner's Registered PE and notified to EPRA	Minor insulation incomplete; non-critical instrument calibration outstanding; painting incomplete; minor civil defects

7.3 Testing and Verification — Above-Ground Storage Tanks

All new above-ground storage tanks shall be designed, fabricated, and tested per API 650 (atmospheric), API 620 (low-pressure), or ASME BPVC Section VIII (pressure vessels), as appropriate.

7.3.1 Minimum Tank Labelling

Each tank shall be permanently labelled with: tank identification number; contents (product name, grade, hazard classification); working and design capacity (m³); MAWP and design temperature (where applicable); date of installation; and date of last inspection and next scheduled inspection.

7.3.2 Hydrostatic Testing

The hydrostatic test shall be conducted using water at a temperature not lower than 20°C and not less than 5°C above the Minimum Design Metal Temperature (MDMT) of the tank steel (whichever is higher).

Maximum water filling rates during hydrostatic testing:

Bottom Course Plate Thickness	Tank Zone	Maximum Filling Rate
Less than 22 mm	Top course	300 mm/hr

Bottom Course Plate Thickness	Tank Zone	Maximum Filling Rate
Less than 22 mm	Below top course	450 mm/hr
22 mm or greater	Top third of shell	225 mm/hr
22 mm or greater	Middle third of shell	300 mm/hr
22 mm or greater	Bottom third of shell	450 mm/hr

Additional hydrostatic test requirements:

- Settlement monitoring at minimum 8 perimeter points before fill, at each 25% fill increment, at full capacity, and after emptying;
- Continuous inspection throughout filling — leaks repaired with water level at least 300 mm below the repair point;
- Tanks showing bottom leakage shall be emptied immediately; source identified, repaired, and foundation integrity assessed;
- All hydrostatic test records retained for the operational life of the tank.

7.3.3 Floating Roof Tanks — Additional Tests

- Flootation test throughout full height of shell; pontoon compartments checked for leaks;
- Roof drain functional test throughout full range of roof travel;
- Seal mechanism tested over full shell height.

7.3.4 NDT Requirements

- Tank shell, bottom, and roof welds: UT thickness, RT, MPI, and DPI per API 653;
- Tank bottom: MFL scan or equivalent ultrasonic scan;
- Tank-to-shell junctions, nozzles, and reinforcement plates: RT and MPI per API 650;
- Pipeline weld joints: RT per ASME B31.3 acceptance criteria;
- All NDT records retained for the operational life of the facility.

7.3.5 Cathodic Protection Commissioning

- All CP systems inspected and functionally tested by an EPRA-licensed electrical worker;
- Minimum protection criterion: -0.85 V vs Cu/CuSO₄ (CSE) per ISO 15589-1 and NACE SP0169;
- Commissioning CP report issued and retained.

7.4 Safety System Testing

All safety systems shall be tested and confirmed operational before hydrocarbon introduction. Test records shall form part of the PSSR package:

- Pressure relief valves: pop-test at set pressure; blowdown test; re-seat test; records include set pressure, accumulation pressure, and blowdown pressure;
- ESD valves: full-stroke functional test; closure time per design; position feedback to control room confirmed;
- Gas and flame detection: response time test for each detector; alarm and ESD integration confirmed;
- HLA and HHLA: functional test; confirmed annunciation in control room;
- ATG: calibration verification; integration with control room;
- Leak detection systems (where fitted): sensitivity test; response time; false-alarm baseline;
- Interlock logic: every initiator in the cause-and-effect matrix tested to confirm correct final element action.

7.5 Commissioning of Petroleum Bulk Storage Facilities

In addition to Sections 7.2–7.4:

Tank Integrity Testing: NDT per Section 7.3.4; hydrostatic testing per Section 7.3.2; settlement monitoring per API 650 Appendix B; earthing and bonding continuity test; cathodic protection commissioning per Section 7.3.5.

Piping and Manifold Commissioning: Hydrostatic pressure testing of all process piping per ASME B31.3 (minimum $1.5 \times$ design pressure; 10-minute hold); liquid petroleum pipelines per ASME B31.4 (minimum $1.25 \times$ MAOP; 4-hour hold); valve functionality testing; product colour coding and labelling; manifold valve identification to prevent product crossover.

Instrumentation and Control: ATG calibrated and verified; tank strapping charts issued; HLA and HHLA functional tests; pressure gauges, temperature sensors, and flow meters calibrated by KEBS-accredited laboratory.

Environmental Systems: Oil-water separators functional test; bunds and spill containment water-tested; stormwater diversion valves operational and labelled.

Initial Tank Filling: Introduce the first 1,000 litres individually per tank to create a seal before bulk filling; all tank vents open during filling; vapour monitoring at tank vents during initial fill.

7.6 Commissioning of Petroleum Retail Stations and Consumer Sites

In addition to general requirements:

- Storage tanks installed per approved design; UST tightness testing per Section 7.10 before first product introduction;
- All fuel pipelines and fittings hydrostatically tested before backfilling;
- Dispensers and metering systems calibrated and certified by a KEBS-accredited calibration laboratory;
- Vapour recovery systems commissioned and functional where required;
- Overfill prevention device tested and certified before first delivery;
- Electrical installations verified against hazardous area classification drawings per IEC 60079-14;
- Emergency shutdown system tested: E-stop buttons at dispenser islands and kiosk; product flow cessation confirmed.

7.7 Commissioning of LPG Bulk Storage, Filling, Autogas, and Consumer Facilities

MANDATORY REQUIREMENT: LPG facilities present unique and severe hazards. LPG forms explosive vapour-air mixtures (propane 2.0–9.5% v/v; butane 1.5–8.5% v/v) that are heavier than air. A flash fire or BLEVE can be catastrophic. The requirements in this Section are non-negotiable.

Before commissioning any LPG facility, verify construction completeness: LPG vessels designed per ASME BPVC Section VIII with DOSHS inspection and registration completed; all piping pressure-tested before vessel connection; electrical installations verified per IEC 60079-14; fire protection systems pre-commissioned per Section 7.8; SIS/ESD system wired and powered up; gas and flame detection system installed and calibrated.

7.7.1 LPG Pressure Testing — Critical Safety Requirement

MANDATORY REQUIREMENT: Hydrostatic pressure testing of LPG vessels and pipelines is MANDATORY. Pneumatic testing with **AIR** is **PROHIBITED**. The stored energy in a pneumatically-pressurized LPG vessel creates a catastrophic explosion risk if a defect causes failure.

LPG pressure testing requirements:

- LPG storage vessels: hydrostatic test at $1.5 \times \text{MAWP}$ using clean inhibited water; minimum 30-minute hold; continuous visual inspection; test records signed by the responsible inspector;
- LPG process and transfer piping: hydrostatic test at $1.5 \times \text{design pressure}$ per ASME B31.3; minimum 10-minute hold;

- LPG mainline pipelines: hydrostatic test per ASME B31.8 at minimum $1.25 \times \text{MOP}$; 8-hour hold; temperature-corrected acceptance criterion;
- Pneumatic testing with INERT GAS ONLY (nitrogen — never air) is permitted exclusively where hydrostatic testing would cause irreparable damage, and ONLY with: written justification signed by a Registered Professional Engineer; documented risk assessment with blast exclusion zone; staged pressurization in 10% increments with 10-minute hold at each stage.

7.7.2 LPG System Inerting and Initial Charging — Step-by-Step Procedure

Before introducing LPG into any vessel, pipeline, or plant for the first time, the system shall be inerted with dry nitrogen (N_2). This procedure is mandatory.

STEP	REQUIRED ACTION
1	Confirm all instrumentation, drain valves, sample connections, and vent points are installed and functionally tested before beginning inerting
2	Confirm all pressure test records are complete and accepted. Ensure no open flanges or connections remain
3	Connect a dry nitrogen supply: dewpoint $\leq -40^\circ\text{C}$; purity $\geq 99.5\% \text{ v/v}$; supply pressure adequate for system design pressure
4	Introduce nitrogen at a controlled rate (maximum 7 kPa/min) until system pressure reaches 0.1 barg above atmospheric
5	Vent slowly to atmosphere through the designated vent point. Monitor O_2 concentration at the vent outlet continuously using a calibrated electrochemical oxygen analyzer
6	Repeat the pressure-and-vent cycle a MINIMUM of THREE (3) times for vessels up to 5 m^3 . For vessels larger than 5 m^3 or pipelines longer than 100 m , complete a minimum of FIVE (5) cycles
7	After the final vent cycle, measure O_2 at ALL designated sample points. The O_2 reading must be LESS THAN $2\% \text{ v/v}$ at every sample point before LPG introduction is authorized
8	Document all O_2 readings with sample point location, time, reading, and instrument ID. The supervising competent person shall sign the inerting record
9	LPG INTRODUCTION SHALL NOT COMMENCE until the Step 7 acceptance criterion is achieved and the inerting record is signed. This is a Category A gate
10	Introduce the first LPG charge slowly under continuous supervision. Vapour recovery shall be fully operational. Monitor all connections with an electronic leak detector immediately after first charging

7.7.3 LPG Cylinder Filling Plant Commissioning

Additional requirements for cylinder filling plants:

- Filling carousel: FAT records confirmed; SAT including simulation of all alarm conditions (overweight, underweight, cylinder valve fault);
- Weighing scales: calibrated by the Department of Weights and Measures; calibration certificates retained and displayed at each filling station;
- Excess flow valves: individually function-tested at rated flow to verify shutoff;
- Cylinder rejection system: tested for detection and rejection of out-of-specification cylinders;
- Vapour recovery from filling area: verified functional before first cylinder fill;
- Emergency stop (E-stop) buttons at all operator stations: tested and response confirmed.

7.7.4 Autogas Refueling Facilities

- Dispenser: metering accuracy verified;
- Breakaway coupling: pull-test with test record retained;
- Dispenser bonding cable: continuity test between vehicle connector and earth;
- Remote emergency shut-off: tested from dispenser and remote position; LPG flow cessation confirmed within 10 seconds.

7.8 Fire Protection System Commissioning

MANDATORY REQUIREMENT: All fire protection systems shall be fully commissioned, tested, and operational **BEFORE** any hydrocarbon introduction. Tests shall be witnessed by EPRA and the county fire service.

Mandatory fire protection commissioning tests:

- **Fire water main:** Pressure and flow test at the hydraulically most remote location; test flow to 120% of design demand; minimum pressure 7 barg at design demand;
- **Fire pumps (electric and diesel):** Rated flow at design pressure; auto-start on pressure drop; 2-hour continuous run; diesel-to-electric changeover test;
- **Water spray/deluge systems:** Full-flow functional test per zone; nozzle coverage verification; drainage capacity confirmed;
- **Fixed foam systems:** Proportioning accuracy test ($3\% \pm 0.3\%$ for 3% AFFF; $6\% \pm 0.6\%$ for 6% AFFF); expansion ratio measurement; 25% drainage;
- **Hydrants and monitors:** Flow test; valve operation; coverage distance confirmed;

- **Fixed gas detection:** Response time test for each detector; alarm level and ESD integration confirmed;
- **Flame detection:** Response test using UV/IR source; response time within specification;
- **Fire alarm panel:** Zone identification, control room and local annunciation, and external fire service notification interface tested;
- **Passive fire protection (PFP):** Inspection report; dry film thickness measurements at minimum 5 locations per coated member.

All test records shall be signed by the lead commissioning engineer and the EPRA inspector, and compiled into the PSSR package.

7.9 Safety Instrumented System (SIS) Commissioning

For LPG bulk storage, petroleum bulk terminals, and any facility with process hazards requiring Safety Instrumented Functions (SIFs), SIS commissioning shall comply with IEC 61511:

- SIS Design Specification defining all SIFs, safety functions, SIL targets, and required PFD values;
- **Factory Acceptance Test (FAT):** Full testing of the SIS logic solver covering all I/O points, interlock logic, diagnostics, and communication interfaces — witnessed by client's representative;
- **Site Acceptance Test (SAT):** End-to-end loop test from each field instrument to each final element; closure time, alarm annunciation, and position feedback confirmed;
- **Cause-and-Effect matrix validation:** Every initiating cause tested to confirm all required effects are triggered;
- **SIL verification report** produced by a competent Functional Safety Engineer (TÜV FS Eng or equivalent);
- **Bypass management:** All SIS bypasses during commissioning logged in a bypass register with timestamp, reason, time limit, approval authority, and close-out confirmation. No SIF shall remain in bypass at PSSR;
- Proof-test intervals documented and entered into the CMMS before handover.

7.10 Underground Storage Tank (UST) Commissioning

The following tests are mandatory before first product introduction:

- **Tank tightness test:** Vacuum decay method — apply 0.03–0.07 barg vacuum; maximum allowable pressure rise over 60 minutes = 0.007 barg; or hydrostatic method;

- **Interstitial monitoring system:** Functional test for all double-wall USTs — sensor response and alarm annunciation confirmed;
- **Overfill prevention device:** Functional test at 95% capacity shutoff and 90% capacity alarm;
- **Cathodic protection continuity test** for steel USTs;
- **Spill containment:** Spill buckets at all fill connections — water leak test; capacity verified;
- **Vapour recovery:** Functional test at fill points.

7.11 Pipeline Commissioning

Petroleum and LPG pipelines shall be commissioned per ASME B31.4 (liquid petroleum), ASME B31.8 (gas/LPG transmission), or ASME B31.3 (process piping) as applicable.

Pre-commissioning Cleaning: Pig runs to remove debris, weld splatter, and mill scale: mandrel pig, then brush pig, then foam pig. Gauging pig run to confirm no dents exceeding design limits.

Hydrostatic Testing: Liquid petroleum (ASME B31.4): test pressure $\geq 1.25 \times \text{MAOP}$; hold minimum 4 hours. Gas/LPG transmission (ASME B31.8): test pressure $\geq 1.25 \times \text{MOP}$; hold minimum 8 hours. Temperature correction applied throughout hold period.

Post-Test Dewatering: Displace by pig; dry to dewpoint $\leq -10^{\circ}\text{C}$ at pipeline outlet before gas or LPG service.

Nitrogen Commissioning (Gas/LPG Pipelines): Displace residual air to $\text{O}_2 < 2\% \text{ v/v}$ before first gas or LPG introduction — using the method in Section 7.7.2 adapted for pipeline geometry.

Line fill (Liquid Pipelines): Controlled slug introduction; interface tracking by volume and time; air elimination at high points; product sampling at receiving terminal.

Cathodic Protection Commissioning: Impressed current system energized; pipe-to-soil potentials measured at minimum every 1 km; minimum protection criterion -0.85 V (CSE) .

Leak Detection System (LDS) Commissioning: Sensitivity test; response time test; false-alarm rate baseline established over minimum 72-hour clean test period.

7.12 Pre-Startup Safety Review (PSSR)

MANDATORY REQUIREMENT: The PSSR is the final safety gate before hydrocarbon introduction. No petroleum or LPG shall be introduced into any new, modified, or recommissioned facility without a completed, signed, and submitted PSSR certificate. EPRA will not issue an operating licence without receipt of the signed PSSR certificate.

A formal PSSR shall be led by a Registered Professional Engineer independent of the design and construction team, conducted with the EPRA inspector present.

The PSSR shall physically verify and confirm on site that:

- All Category A punch-list items have been formally closed and independently verified — no outstanding Category A items;
- P&IDs accurately reflect the as-built condition — confirmed by physical field walkdown;
- All Safety Instrumented Functions have been loop-tested and the SIL verification report is signed;
- Emergency shutdown system has been functionally tested end-to-end;
- Fire water is available at rated pressure and flow; fire pumps are in auto-start mode;
- All gas and flame detectors are online, calibrated, and alarming to the control room;
- Fire suppression systems are charged and operational;
- All MOC actions arising during the commissioning period are formally closed — MOC register shows zero open actions;
- All SIS bypasses have been removed — bypass register shows all bypasses reinstated;
- All required regulatory approvals confirmed received (EPRA licence, NEMA ECC, DOSHS factory registration, DOSHS pressure vessel certificates, county fire certificate);
- All personnel have been trained and competency verified for critical operational roles;
- Operating procedures, Emergency Response Plan, and Maintenance Procedures are approved, printed, and distributed on site;
- For LPG facilities: inerting completed and $O_2 < 2\%$ v/v confirmed at all sample points — inerting record signed;
- Area classification survey completed and all non-compliant electrical items rectified.

The PSSR Completion Certificate (Annex VII) shall be signed by: the PSSR lead engineer (PE); the facility owner's designated representative; and the attending EPRA Inspector. The signed certificate shall be submitted to EPRA before the operating licence is activated.

8. COMMISSIONING HANDOVER AND DOCUMENTATION

On completion of all commissioning activities, including the PSSR:

- The commissioning contractor and facility owner shall jointly sign the Commissioning Completion Report. This shall include: NDT records; as-built

drawing set; instrument calibration certificates; O&M manuals; FAT/SAT records; SIS functional test records; fire protection test records; PSSR checklist and certificate; and regulatory approval copies;

- The commissioning engineer and operations team shall jointly sign a Fitness of Installation Statement confirming the facility is fit for its intended service;
- An Operational Readiness Review shall confirm: SOPs distributed and signed off; maintenance plan loaded in CMMS; critical spares in store; all operators trained and assessed; emergency response drill conducted;
- The signed PSSR Completion Certificate (Annex VII) shall be submitted to EPRA; EPRA shall confirm receipt before operating licence activation;
- The Commissioning Completion Report shall be submitted to EPRA, NEMA, and the county fire service;
- A formal Handover Certificate signed by an PE shall be issued; a copy submitted to EPRA for the facility file;
- The MOC register, punch-list close-out records, all commissioning test records, and regulatory approval copies shall be retained for the operational life of the facility.

9. DECOMMISSIONING

Requirements for permanent cessation, isolation, gas-freeing, cleaning, and site restoration.

9.1 Conditions Requiring Decommissioning

Decommissioning shall be required when:

- A facility, tank, pipeline, pump, or handling equipment is permanently taken out of service with no intent to return to service;
- EPRA determines a facility is unsafe for continued operation and cannot be remediated within a reasonable timeframe;
- The facility owner decides not to renew the operating licence.

Where a facility owner determines that a facility will not be returned to service, they shall:

- Notify EPRA in writing within 30 days of that decision, using the Intent-to-Decommission Notice form (Annex XIV);
- Submit a costed Decommissioning Plan (DP) to EPRA within 90 days of the notification.

Where a facility is declared inactive but decommissioning has not commenced, the facility owner shall implement a formal Out-of-Service Preservation Plan covering: product

recovery; full isolation with LOTO; inspection schedule; fire protection maintenance; site security; and environmental monitoring. The Preservation Plan shall be submitted to EPRA.

9.2 Decommissioning Strategy and Options Assessment

The facility owner shall prepare a Decommissioning Options Assessment considering:

- Full removal vs partial removal vs in-situ abandonment;
- Safety, environmental, technical feasibility, cost, and legal obligations for each option;
- Long-term liability, land use plans, contamination risk, and community impact;
- Financial assurance adequacy — the available decommissioning fund shall be verified against the estimated full decommissioning cost before the strategy is finalized.

A costed Decommissioning Plan (DP) shall be prepared — see Annex II for the required template and checklist. The DP shall include: detailed scope; ESMP; HAZID and RAMS for each major activity; engineering drawings; waste management plan; stakeholder engagement plan; detailed cost estimates; funding mechanism; and schedule.

A baseline soil and groundwater sampling study shall be conducted before decommissioning commences.

9.3 Financial Assurance for Decommissioning

All petroleum and LPG facility licensees shall:

- Prepare a Decommissioning Cost Estimate (DCE) at the time of initial licence application, covering 100% of estimated costs for full facility decommissioning, site remediation, and environmental restoration, including cost escalation provision;
- Review and update the DCE at minimum every five years, or within 12 months of any material change to the facility;
- Lodge an acceptable financial assurance instrument with EPRA before the operating licence is issued. Acceptable instruments: unconditional bank guarantee from a CBK-registered bank; surety bond from a licensed insurer; escrow account with EPRA-approved trustee; or EPRA-approved insurance policy;
- Maintain the financial assurance equal to 100% of the current DCE at all times;
- Accept that EPRA may draw on the financial assurance to fund decommissioning where a licensee fails to fulfil its obligations after formal notice.

9.4 Approvals and Notifications Before Decommissioning

NOTIFICATION/APPROVAL REQUIRED	AUTHORITY	TIMING
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Intent-to-Decommission Notice (Annex XIV)	EPRA	Minimum 90 days before commencing
Approval of Decommissioning Plan	EPRA	Before works commence
Decommissioning Environmental Audit approval	NEMA	Before works commence
Closure of environmental licences	NEMA	As part of DP approval
Major Hazard Installation decommissioning notification	DOSHS	Minimum 30 days before, if MHI
Hazardous waste transport approval	NEMA / County	Before waste removal
Road closure / utility disconnection approvals	County Government / utility	As scheduled

9.5 Risk Management and Environmental Health and Safety

Before and throughout decommissioning works:

- Conduct detailed HAZID, HAZOP (where applicable), and JSA for the decommissioning scope. Develop RAMS for each major activity;
- Conduct a Pyrophoric Iron Sulphide (FeS) Risk Assessment before opening any vessel, tank, or pipeline that has handled H₂S-bearing hydrocarbons — see Section 9.7;
- Establish controlled exclusion zones around work areas with physical barriers and safety signage;
- Install and maintain continuous gas monitoring for LEL, O₂, H₂S, and CO;
- Activate the commissioning-phase Emergency Response Plan; confirm medical evacuation arrangements;
- Conduct emergency response drills at the start of decommissioning and at minimum monthly thereafter.

9.6 Isolation and Energy Control

The isolation plan shall document and address:

- All process connections: tank suction and discharge lines, pump connections, instrument lines;
- All energy sources: electrical (including UPS, battery backup, solar PV), mechanical, pneumatic, hydraulic, and thermal;
- Cathodic protection systems: deenergize impressed current rectifiers; record final pipe-to-soil potentials;
- Vapour recovery systems: isolated and depressurized before any opening;
- LOTO implemented per Section 6.6; individual personal locks for every worker;
- Written isolation certificate signed by the Responsible Person and verified by the work supervisor before any work on decommissioned equipment.

9.7 Pyrophoric Iron Sulphide (FeS) Hazard Management

MANDATORY REQUIREMENT: Pyrophoric FeS is a leading cause of tank fires and explosions during decommissioning of crude oil, sour crude, heavy fuel oil, and H₂S-bearing gas facilities. FeS deposits ignite spontaneously when wet surfaces dry on exposure to air. This section is mandatory for ALL facilities that have handled H₂S-bearing or sour hydrocarbon streams.

Controls:

- Conduct a written FeS Risk Assessment before opening any vessel, tank, or pipeline that has been in contact with H₂S-bearing hydrocarbons;
- Keep all internal surfaces continuously wetted during opening, inspection, and cleaning. Never allow FeS-contaminated surfaces to dry while exposed to air;
- Maintain an inert atmosphere (nitrogen blanket at positive pressure) inside vessels during all hot-work and cutting where FeS risk exists;
- FeS-contaminated sludge shall be classified as potentially hazardous waste. Keep moist during removal, transfer, and transport. Dispose of at a NEMA-licensed hazardous waste facility;
- Continuously monitor H₂S during all FeS-related work. Workers in areas with confirmed FeS deposits shall use supplied-air breathing apparatus (SABA) or Self-Contained Breathing Apparatus (SCBA);
- Hot-work near or inside vessels with FeS deposits is prohibited unless: FeS deposits have been fully removed and verified; or a nitrogen purge maintains O₂ < 2% v/v inside the vessel during cutting.

9.8 Removing Recoverable Product

- Recover all recoverable product through normal product lines; by vacuum truck; or through open manholes with a valid PTW;
- LPG cylinders shall be returned to the registered cylinder supplier; product disposal certificates retained;
- Volume accounting: recovered product volumes documented and reconciled against tank inventory records;
- Exclusion zone established; all ignition sources removed; non-essential electrical equipment isolated before product removal commences.

9.9 Vapour and Gas-Freeing

Gas-freeing shall commence after all recoverable product and residues have been removed and equipment is fully isolated:

- LPG vessels, piping, and associated plant: empty of all liquid LPG; then nitrogen-purge per Section 7.7.2 in reverse until LEL < 1% at all sample points and O₂ > 19% v/v;
- Petroleum storage tanks: gas-free using forced air ventilation — minimum 20 air changes per hour — until LEL < 1% and O₂ 19.5–23.5% at all monitoring points;
- Gas testing acceptance criteria per Section 6.8 — all criteria must be met simultaneously before entry or hot-work;
- Continuous gas monitoring maintained throughout all gas-freeing operations;
- All gas test results documented with location, time, instrument ID, reading, and the gas tester's signature.

9.10 Tank Cleaning

Tank cleaning shall be conducted only by specialist tank cleaning contractors pre-qualified per Section 6.3:

- Sludge characterization: representative samples tested before cleaning commences;
- FeS risk assessment per Section 9.7 completed before opening the tank;
- Forced ventilation: minimum 20 air changes per hour confirmed before entry; maintained continuously throughout cleaning;
- Worker personal exposure monitoring for benzene, H₂S, CO, and VOCs;
- Water washing and high-pressure jetting;
- Effluent management: all wash water to licensed oil-water separator; treated effluent discharge only with valid NEMA and county water authority consent;

- Sludge and residue disposal: via licensed hazardous waste transporter to a NEMA-licensed disposal facility; waste tracking manifest per Annex IV maintained for every load;
- All confined space entry during tank cleaning shall comply with Section 6.7.

9.11 Cutting and Dismantling

- Cold-cutting is preferred for all steelwork near or inside hazardous areas. Hot-work only after: gas-free certificate issued ($LEL < 1\%$); FeS risk assessment completed; standby fire marshal and wet canvas in position; continuous gas monitoring confirmed;
- For cutting on vessels with FeS risk: maintain nitrogen purge ($O_2 < 2\% \text{ v/v}$) inside the vessel during cutting;
- Crane lift plans for every lift: crane capacity certificate, ground stability assessment, rigging plan, exclusion zone, and weather limits; DOSHS-certified rigger on site;
- Scaffolding inspected and tagged by a competent scaffold inspector before use; re-inspection after any adverse weather;
- Asbestos survey before demolition of any building constructed before 2000. Asbestos removal by a DOSHS-licensed contractor; disposal with waste manifest retained.

9.12 Pipeline Decommissioning

Pipeline decommissioning shall comply with API 1185 and the applicable ASME B31 standard:

- **Product displacement:** Displace all residual product using batch push or nitrogen; full volume accounting required;
- **Cleaning pig runs:** Mandrel pig, brush pig, foam pig sequence; continue until pigs return clean;
- **Option A — Full Removal:** Excavate, remove, and dispose; assess and remediate contamination;
- **Option B — Abandonment-in-Place** (approved by EPRA and county): displace product; clean; fill with nitrogen or inhibited water; cap and blind at all tie-in points; remove all above-ground appurtenances; seal and permanently mark above-ground markers at buried fittings;
- **Cathodic protection:** Record final pipe-to-soil potentials before deenergizing; close out all CP rectifier stations;
- Submit pipeline abandonment notification to EPRA and DOSHS.

9.13 Underground Storage Tank (UST) Decommissioning

UST decommissioning shall comply with API 1604 and NEMA requirements:

- Remove all product from UST and connected lines; reconcile volumes;
- Gas-free the tank: LEL < 1% and O₂ 19.5–23.5%;
- Soil vapour monitoring before and during excavation at tank ends and along all product pipelines;
- **Option A — Tank Removal:** Excavate using non-sparking tools within 1 m of tank; remove tank; assess soil beneath and around tank;
- **Option B — Permanent Closure-in-Place** (with NEMA and EPRA approval): fill tank completely with approved solid inert material (sand-cement slurry, minimum 7 MPa at 28 days per API 1604); weld-cap all penetrations; cut off vent pipes 300 mm below grade;
- **Soil contamination assessment:** Samples from corners and centre beneath each tank; laboratory analysis for TPH and BTEX; compare against NEMA soil quality guidelines;
- Submit UST Closure Report with soil assessment to NEMA and EPRA before site is released for other use.

9.14 Decommissioning of LPG Facilities

9.14.1 LPG Product Recovery

- All LPG evacuated from storage vessels, pipelines, dispensers, pumps, and compressors; product disposal/transfer certificate retained;
- LPG cylinders returned to brand owner; documentation retained.

9.14.2 LPG Vessel Depressurization, Gas-Freeing, and Inerting

- Depressurize in a controlled manner through the pressure relief pathway or dedicated controlled vent — never vent liquid LPG or large vapour slugs to atmosphere near ignition sources;
- After depressurization, purge with nitrogen until O₂ > 18% v/v and LEL < 1% at all sample points — using the reverse of the inerting procedure in Section 7.7.2;
- Continuous gas monitoring throughout;
- Before any maintenance, entry, or cutting: confirm LEL < 1% and O₂ 19.5–23.5% at all monitoring points.

9.14.3 LPG Vessel Removal or Rendering Unusable

- **Tank reuse:** A written recommissioning plan confirming DOSHS inspection, repair, new hydrostatic test, new DOSHS registration, and PSSR shall be submitted to EPRA before reuse;
- **Tank scrapping:** Conducted at a NEMA-licensed scrap facility; DOSHS registration closed; disposal certificate submitted to EPRA and NEMA;
- Associated equipment (dispensers, piping, pumps, compressors, electrical): removed or permanently mechanically disabled; disposed per waste management plan.

9.14.4 LPG Site Restoration

- All excavated areas restored and compacted to design grade; topsoil replaced; erosion protection installed;
- Environmental monitoring: soil and groundwater monitoring for minimum 12 months post-completion;
- Environmental Closure Certificate obtained from NEMA on satisfactory completion.

9.15 Decommissioning of Petroleum Retail Stations and Consumer Sites

- All petroleum products safely removed; volumes reconciled; disposal certificates retained;
- Recovered products transported and disposed of via licensed hazardous waste transporter;
- UST decommissioning per Section 9.13 including soil vapour monitoring;
- Above-ground tanks gas-freed, cleaned, and tested per Sections 9.9 and 9.10;
- Vapour recovery system isolated, gas-freed, and removed;
- Dispensers, canopy, electrical infrastructure, and signage removed unless otherwise agreed with county government;
- Final site clean-up, reinstatement, and soil assessment.

9.16 Subsurface Works and Site Restoration

- Excavation works shall only commence after an Excavation PTW is issued. Underground service survey (CAT scan plus drawing review) completed before any excavation;
- Contaminated soil: segregated, classified per TCLP test, disposed via licensed hazardous waste transporter with waste tracking manifest;
- Land rehabilitation: fill, compact, and grade to design level; topsoil replaced and re-seeded; erosion control installed;

- Post-restoration environmental monitoring: soil, surface water, and groundwater for minimum 12 months after completion, or longer if required by NEMA;
- Final site restoration assessment conducted by a NEMA-registered EIA Lead Expert;
- Environmental Closure Certificate issued by NEMA upon satisfactory completion of monitoring and restoration.

10. DECOMMISSIONING HANDOVER AND DOCUMENTATION

On completion of all decommissioning activities:

- Facility owner/operator shall prepare and submit a Decommissioning Completion Report to EPRA, NEMA, and DOSHS, including: as-executed scope; waste disposal manifests and certificates; soil and groundwater assessment results; environmental monitoring data; photographic record; and copies of all regulatory approvals;
- NEMA Environmental Closure Certificate shall be obtained and copies submitted to EPRA and DOSHS;
- EPRA shall revoke the facility operating licence upon receipt of the Decommissioning Completion Report, NEMA Environmental Closure Certificate, and confirmation that the financial assurance obligation has been fully discharged;
- The facility owner may apply to EPRA for release of the financial assurance instrument only after EPRA has accepted the Decommissioning Completion Report and the NEMA Environmental Closure Certificate has been issued;
- All decommissioning records shall be retained by the former facility owner for a minimum of 5 years after decommissioning completion.

11. REVIEW

These Guidelines shall be reviewed by EPRA at minimum every three years, or earlier where:

- Significant changes are made to applicable Kenyan legislation or regulations;
- Material new international standards are published that affect the content of these Guidelines;
- Significant petroleum or LPG incidents (in Kenya or internationally) identify gaps in these Guidelines;
- EPRA receives substantive feedback from industry stakeholders identifying inaccuracies or gaps.

Suggested revisions may be submitted in writing to EPRA. EPRA shall acknowledge receipt within 30 days and advise on the outcome within 12 months.

ANNEXES

ANNEX I – COMMISSIONING MANAGEMENT PLAN (CMP) TEMPLATE

*Submit to EPRA before commissioning commences. Fields marked * are mandatory.*

Part A – Facility Identification

FIELD	DETAIL
Facility Name *	
EPRA Licence Number *	
Physical Location / GPS Coordinates *	
Facility Type *	
Design Capacity *	
Owner / Operator Name and Contact *	
Lead Commissioning Engineer – Name and PE Number *	
Planned Commissioning Start Date *	
Planned PSSR Date *	

Part B – Regulatory Approvals Status

APPROVAL	AUTHORITY	CERTIFICATE NO.	DATE ISSUED	STATUS
Environmental Compliance Certificate	NEMA			
Construction Permit	EPRA			
Workplace Registration Certificate	DOSHS			
Pressure Vessel Examination	DOSHS			
County Building Approval	County Government			
County Fire Safety Certificate	County Fire Service			
MHI Notification Acknowledgement	DOSHS			

Part C – Hazard Studies Status

STUDY	LEAD / AUTHOR	COMPLETION DATE	ACTIONS CLOSED?	SIGNED OFF BY
Commissioning HAZID			Yes / No	

Commissioning HAZOP			Yes / No	
SIS / LOPA Study			Yes / No	
SIMOPS Analysis			Yes / No	
Emergency Response Plan			Yes / No	

Part D – Commissioning Sequence Schedule

STEP	DESCRIPTION	TARGET DATE	RESPONSIBLE	PREREQUISITE	COMPLETED / VERIFIED
1	Mechanical Completion			—	
2	Utility Systems			Step 1	
3	Fire Protection Systems — FULLY operational			Step 2	
4	Gas / Flame Detection online			Step 2	
5	SIS commissioned and SIL-verified			Steps 2–4	
6	ESD end-to-end functional test			Step 5	
7	All Category A punch-list items closed			Steps 1–6	
8	PSSR completed and signed (Annex VII)			Steps 1–7	
9	All regulatory approvals confirmed				
10	Hydrocarbon Introduction			Steps 1–9 ALL complete	

ANNEX II – DECOMMISSIONING PLAN (DP) TEMPLATE AND CHECKLIST

Submit to EPRA minimum 90 days before decommissioning commences.

Part A – Facility Identification

FIELD	DETAIL
Facility Name *	
EPRA Licence Number *	
Location / GPS Coordinates *	
Facility Type and Capacity *	
Owner / Operator Name *	
Lead Decommissioning Engineer — Name and PE Number *	
Planned Decommissioning Start Date *	
Planned Completion Date *	
Reason for Decommissioning *	

Part B – Waste Management Plan

WASTE STREAM	NEMA CLASSIFICATION	ESTIMATED QUANTITY	LICENSED TRANSPORTER	LICENSED DISPOSAL FACILITY
Product-contaminated sludge	Hazardous			
Petroleum-impacted soil	Hazardous (if TCLP fails)			
Hydrocarbon-contaminated water	Hazardous			
LPG residues	Hazardous			
Asbestos-containing materials	Hazardous			

WASTE STREAM	NEMA CLASSIFICATION	ESTIMATED QUANTITY	LICENSED TRANSPORTER	LICENSED DISPOSAL FACILITY
Scrap steel and metal	Non-hazardous			
Electrical waste	Special / hazardous			
Concrete rubble and masonry	Non-hazardous			

Part C — Decommissioning Plan Completeness Checklist

- ☐ Detailed scope description with engineering drawings
- ☐ Environmental and Social Management Plan (ESMP)
- ☐ HAZID and RAMS for each major decommissioning activity
- ☐ Waste Management Plan completed (Part B above)
- ☐ Stakeholder Engagement Plan
- ☐ Decommissioning Cost Estimate (DCE) — see Annex XVI
- ☐ Confirmation of financial assurance adequacy relative to DCE
- ☐ Detailed schedule with critical path
- ☐ Baseline soil and groundwater sampling results
- ☐ Intent-to-Decommission Notice submitted to EPRA (Annex XIV)
- ☐ NEMA Decommissioning Environmental Audit application submitted
- ☐ DOSHS notification submitted (if Major Hazard Installation)
- ☐ County demolition permit obtained or application in progress

ANNEX III — PERMIT-TO-WORK FORMS

A separate permit shall be issued for each category. Permits issued ONLY by the designated Permit Issuer after physical verification of all pre-conditions.

Form III-A: Hot Work Permit

FIELD	DETAIL
Permit Number	
Date and Shift	
Precise Location of Work	
Description of Work	
Permit Issuer — Name and Signature	
Work Supervisor — Name and Signature	
Validity: Start Time	
Validity: End Time (MAXIMUM 4 hours)	
Gas Test Result — LEL % (must be <1%)	
Gas Test Time and Tester Name	
Gas Instrument ID and Calibration Date	

Hot Work Pre-conditions — ALL must be confirmed before the Permit Issuer signs:

- ☐ LEL confirmed <1% at work location and within 1 m radius in all directions
- ☐ Gas test instrument bump-tested today and within calibration interval
- ☐ Fire blanket or wet canvas positioned within 1 m of work point
- ☐ 9 kg DCP fire extinguisher positioned within 3 m of work
- ☐ Trained fire watcher on station for the full duration of the permit
- ☐ All drains within 5 m sealed and covered
- ☐ Nearest fire hydrant confirmed operational and accessible
- ☐ No smoking enforced; all ignition sources removed within 15 m radius
- ☐ LOTO applied to prevent inadvertent opening of product valves near work
- ☐ SIMOPS conflict check completed — no conflicting permits active in the same area

Form III-B: Confined Space Entry Permit

GAS	REQUIRED VALUE	ACTUAL READING	TIME	RESULT	TESTER SIGNATURE
Oxygen (O ₂)	19.5% to 23.5%			Pass / Fail	
Flammable Gas (LEL)	Less than 10%			Pass / Fail	
Hydrogen Sulphide (H ₂ S)	Less than 1.0 ppm TLV-TWA			Pass / Fail	
Carbon Monoxide (CO)	Less than 25 ppm TLV-TWA			Pass / Fail	
Benzene (petroleum tanks only)	Less than 0.5 ppm			Pass / Fail	

Confined Space Entry Pre-conditions:

- ☐ Forced ventilation confirmed operational: minimum 20 air changes per hour
- ☐ Standby attendant stationed at entry point — briefed that they will NOT enter under any circumstance
- ☐ Rescue equipment at entry point: tripod, winch, harness, and lifeline in place
- ☐ SCBA available at entry point; all entrants trained in SCBA use
- ☐ Each entrant wearing a personal multi-gas detector (O₂, LEL, H₂S, CO)
- ☐ Communication confirmed between entrant and standby attendant
- ☐ LOTO confirmed — all energy sources isolated before entry
- ☐ Emergency rescue plan communicated to all site workers on shift
- ☐ SIMOPS check: no pressure testing or product movements in connected systems

Form III-C: Electrical Isolation / LOTO Permit

LOTO Pre-conditions:

- ☐ All energy sources identified: electrical (AC, DC, UPS, battery), pneumatic, hydraulic, mechanical, thermal
- ☐ Each isolation point locked with individual personal padlocks — lock numbers listed below

- ☐ Attempt-to-start 'try-out' completed: equipment does not start when start command given
- ☐ Voltmeter/ammeter confirms zero energy at all isolated terminals
- ☐ Written isolation certificate attached to each isolation point
- ☐ Isolation register updated
- ☐ No lock shall be removed until all workers confirm work complete and personally sign off

Form III-D: Lifting Operations Permit

Lifting Pre-conditions:

- ☐ Approved Lift Plan signed by competent person — attached to this permit
- ☐ Ground stability assessment completed; bearing capacity adequate for outrigger loads
- ☐ All slings, shackles, and rigging inspected; current inspection certificates confirmed
- ☐ Exclusion zone established and physically barricaded
- ☐ Pre-lift briefing conducted: all personnel within 50 m made aware of lift
- ☐ Weather checked: wind speed less than 15 m/s; visibility adequate
- ☐ No personnel under suspended load at any point during lift

ANNEX IV — HAZARDOUS WASTE TRANSFER NOTE AND MANIFEST

Required for every movement of hazardous waste from site. Retain original for minimum 10 years.

FIELD	DETAIL
Manifest Number (unique)	
Date of Transfer	
Generating Facility Name, Address, and EPRA Licence No.	
Full Waste Description	
UN Hazard Class / NEMA Classification	
Total Quantity (kg or litres)	
Container Type and Number of Containers	
Licensed Transporter Name	
Transporter NEMA Licence No. and Expiry Date	
Transport Vehicle Registration Number	
Licensed Disposal Facility Name and Location	
Disposal Facility NEMA Licence No. and Expiry Date	
Generator Representative — Name and Signature	
Transporter Driver — Name and Signature	
Receipt at Disposal Facility — Name, Signature, and Date	

Original: retain by generator. Copy 1: travels with waste. Copy 2: returned by disposal facility within 30 days.

ANNEX V – SITE RESTORATION VERIFICATION CHECKLIST

Complete before applying to NEMA for Environmental Closure Certificate.

Physical Restoration Works

- ☐ All above-ground structures and equipment removed or formally agreed to remain with county government
- ☐ All USTs removed or permanently closed — closure report submitted to NEMA
- ☐ All product pipelines removed or abandoned-in-place
- ☐ All bunds, foundations, and hard standings removed or retained as agreed
- ☐ All contaminated soil excavated, classified, and disposed per NEMA requirements — waste manifests retained
- ☐ All excavations backfilled and compacted to design specification
- ☐ Drainage reinstated and confirmed functional
- ☐ Site graded to pre-existing or agreed final level
- ☐ Topsoil replaced to minimum 150 mm depth and re-seeded or replanted
- ☐ Erosion control measures installed and operational
- ☐ All site waste removed and disposed per waste management plan

Environmental Monitoring Verification

- ☐ Baseline soil sampling study completed pre-decommissioning — results filed
- ☐ Post-decommissioning soil samples: minimum 4 samples per tank footprint; TPH and BTEX below NEMA soil quality guidelines
- ☐ Groundwater sampling at minimum 3 monitoring points at 0, 6, and 12 months post-completion; results below NEMA guideline values
- ☐ All environmental monitoring results compiled and submitted to NEMA
- ☐ No unresolved NEMA enforcement orders outstanding

Documentation and Regulatory Close-out

- ☐ Decommissioning Completion Report submitted to EPRA, NEMA, and DOSHS
- ☐ All hazardous waste disposal manifests compiled and copies submitted to NEMA
- ☐ DOSHS pressure vessel and factory registration closure submitted
- ☐ EPRA operating licence closure application submitted
- ☐ NEMA Environmental Closure Certificate received — copy attached
- ☐ Financial assurance release application submitted to EPRA

- ☐ All site records archived for minimum 10 years post-decommissioning by EPRA, NEMA, and DOSHS

ANNEX VI — LPG VESSEL REMOVAL CHECKLIST

NOTE: All activities shall be supervised by a person demonstrably competent in LPG handling, inerting, and confined space entry. A PTW shall be in place for each phase. Gas testing records shall be attached.

Phase 1 — Product Recovery and Vessel Preparation

- ☐ All liquid LPG transferred out — volume accounted; product disposal or transfer certificate obtained
- ☐ Intent-to-Decommission Notice submitted to EPRA (Annex XIV) — acknowledgement received
- ☐ Vessel depressurized in a controlled manner to atmospheric through the designated vent point
- ☐ All valves closed and LOTO applied to all connections — isolation certificate issued
- ☐ Initial LEL and O₂ reading recorded at vent outlet before nitrogen inerting begins

Phase 2 — Nitrogen Gas-Freeing

- ☐ Nitrogen supply connected: confirmed dewpoint $\leq -40^{\circ}\text{C}$, purity $\geq 99.5\%$
- ☐ Purge cycle 1: N₂ introduced; vented; LEL: ____% — O₂: ____% — Time: ____ — Tester: ____
- ☐ Purge cycle 2: N₂ introduced; vented; LEL: ____% — O₂: ____% — Time: ____ — Tester: ____
- ☐ Purge cycle 3: N₂ introduced; vented; LEL: ____% — O₂: ____% — Time: ____ — Tester: ____
- ☐ Final result at all sample points: LEL $<1\%$ AND O₂ 19.5–23.5% — recorded and signed by gas tester
- ☐ Gas-freeing confirmed acceptable — supervisor signature authorizing work to proceed

Phase 3 — Vessel Inspection and Entry (if required)

- ☐ Confined Space Entry PTW issued — atmospheric test record attached
- ☐ Forced ventilation confirmed at minimum 20 air changes per hour
- ☐ Standby attendant positioned at entry point
- ☐ Non-entry rescue equipment assembled at entry point

- ☐ Internal inspection complete — no residual liquid; no unusual deposits; FeS risk assessed
- ☐ If FeS risk confirmed: wetting regime implemented before any cutting or hot-work

Phase 4 — Vessel Removal and Disposition

- ☐ Lift plan approved; DOSHS-certified rigger and crane with current inspection certificate on site
- ☐ All vessel nozzles blanked; vessel identification removed before scrapping
- ☐ If REUSE: DOSHS re-inspection scheduled; new hydrostatic test planned; PSSR required
- ☐ If SCRAPPING: transported to NEMA-licensed scrap facility; waste manifest issued; DOSHS registration closed
- ☐ EPRA notified of vessel removal completion — disposal or transfer certificate submitted
- ☐ Site cleared and restoration commenced per Annex V

ANNEX VII — PRE-STARTUP SAFETY REVIEW (PSSR) CERTIFICATE

Operations shall NOT commence until EPRA confirms receipt and acceptance of this signed certificate. This certificate is a legal condition for activation of the EPRA operating licence.

FIELD	DETAIL
Facility Name and EPRA Licence Number	
Type of Review (New / Recommissioning / Post-major MOC)	
PSSR Lead Engineer — Full Name, Qualifications, and PE Number	
PSSR Review Date(s) — Physical Walkdown Date(s)	
EPRA Inspector Name and Designation	

PSSR Mandatory Checklist — ALL items must be physically verified before signing

- ☐ ALL Category A punch-list items formally closed and independently verified — signed punch-list attached
- ☐ P&IDs verified against as-built conditions by physical field walkdown — P&IDs updated to Rev. ____
- ☐ All Safety Instrumented Functions loop-tested and SIL-verified — signed SIL verification report attached
- ☐ ESD system tested end-to-end: all initiators trigger correct final element responses — test records attached
- ☐ All SIS bypasses removed — bypass register shows zero open bypasses at PSSR date
- ☐ Fire water system operational at rated pressure and flow — fire pump test records attached
- ☐ Fire pumps in auto-start mode — confirmed by control room
- ☐ All fixed gas and flame detectors calibrated, online, and alarming to control room
- ☐ Fixed fire suppression systems charged and operational — test records attached
- ☐ All pressure relief valves pop-tested and reinstalled at correct set pressure — test records attached
- ☐ EPRA operating licence confirmed — copy attached

- ☐ NEMA Environmental Compliance Certificate (ECC) confirmed — copy attached
- ☐ DOSHS factory registration certificate confirmed — copy attached
- ☐ DOSHS pressure vessel registration certificates for all vessels confirmed — copies attached
- ☐ County fire safety certificate confirmed — copy attached
- ☐ All MOC actions arising during commissioning formally closed — MOC register showing zero open actions attached
- ☐ Operating procedures approved, printed, and distributed on site
- ☐ Emergency Response Plan approved, printed, and distributed; muster points marked on site
- ☐ All operators trained and competency assessments completed and on file
- ☐ Initial product receipt / first delivery plan approved and communicated
- ☐ LPG ONLY: N₂ inerting completed; O₂ <2% v/v at ALL sample points confirmed — inerting record (Annex XII) attached
- ☐ Area classification survey completed; all non-compliant electrical items rectified — survey report attached
- ☐ Emergency response drill conducted within 30 days before PSSR — drill record attached

Signatures

SIGNATORY	FULL NAME	QUALIFICATION / DESIGNATION	SIGNATURE	DATE
PSSR Lead Engineer (PE)		Reg. No.:		
Facility Owner's Representative		Title:		
EPRA Inspector		Badge / ID No.:		

ANNEX VIII – MANAGEMENT OF CHANGE (MOC) FORM AND REGISTER

Part A – MOC Request Form

FIELD	DETAIL
MOC Number (from register)	
Date Initiated	
Initiated By — Name and Position	
Change Title	
Full Description of Proposed Change	
Justification and Technical Basis for Change	
Systems / Equipment / P&IDs / Procedures Affected	
Proposed Implementation Date	
Temporary Change? If YES, state expiry date and reversion plan	

Part B – Hazard Review Summary

QUESTION	RESPONSE / DETAILS
Does this change introduce or increase process hazards?	
Does this change affect any SIF or SIL assignment?	
Does this change affect the hazardous area classification?	
Does this change affect operating or emergency procedures?	
Level of hazard review required (Screening / HAZID / HAZOP)	
Summary of hazard review findings and residual risks	

Part C – MOC Approval

APPROVER	NAME	SIGNATURE	DATE
Technical Reviewer			
Registered Professional Engineer (PE)			
HSE Reviewer			

APPROVER	NAME	SIGNATURE	DATE
Final Approval Authority			

MOC Close-out Checklist

- ☐ P&IDs updated and reissued — new revision number and date confirmed
- ☐ Safety case / risk assessment updated
- ☐ SIL assessment re-validated (if any SIF was affected)
- ☐ Operating procedures updated, reissued, and signed off
- ☐ All affected personnel informed and training completed
- ☐ Area classification re-surveyed (if physical change in hazardous area)
- ☐ Re-commissioning or PSSR conducted if required
- ☐ MOC register updated with close-out date and reference documents

ANNEX IX – COMPETENCY AND CERTIFICATION MATRIX

Submit to EPRA with commissioning and decommissioning applications.

ROLE	ASSIGNED PERSON(S)	QUALIFICATION REQUIRED	CERTIFICATE / LICENCE NO.	EXPIRY DATE	VERIFIED BY
Lead Commissioning / Decommissioning Engineer		Registered Professional Engineer – EBK			
SIS / Functional Safety Engineer		TÜV FS Eng or equivalent			
Above-Ground Storage Tank Inspector		API 653 (current) / DOSHS approved			
Pressure Vessel Inspector		DOSHS approved			
LPG Installer		EPRA LPG Installer Licence			
Electrical Inspector – Hazardous Areas		EPRA Electrical Licence			
NDT Technician – UT		ASNT Level II or PCN Level II			
NDT Technician – RT		ASNT Level II or PCN Level II			
Qualified Welder		AWS D1.1 / ASME IX / EN ISO 15614-1 / KEBS			
Qualified Gas Tester		EI IP Model Code Pt 15 or equivalent			
Tank Cleaning Supervisor		EI IP Model Code Pt 15 competency			
DOSHS-Certified Crane Operator		DOSHS Certificate + current medical			
Scaffold Inspector		Scaff tag / CISRS or equivalent			

NEMA EIA Lead Expert		NEMA Registration			
Fire Marshal		Recognized fire safety training			
First Aider		Recognized First Aid training			

ANNEX X — COMMISSIONING PUNCH-LIST

Category A items must be closed before hydrocarbon introduction. Category B items must be closed within the agreed deferred period.

N O.	CA T. (A/ B)	SYSTE M / TAG	DESCRIPTI ON OF DEFICIENC Y	RAISE D BY	RESPONSI BLE	TARG ET DATE	CLOS E- OUT DATE	VERIFI ED BY
	A/B							
	A/B							
	A/B							

ANNEX XI – SIS / ESD COMMISSIONING TEST RECORD

Complete for every Safety Instrumented Function – attach to PSSR package.

FIELD	DETAIL
Facility Name and EPRA Licence Number	
SIF Reference Number	
SIF Description	
SIL Target (SIL 1 / 2 / 3)	
PFD Target	
Initiating Element(s) – Tag Numbers	
Final Element(s) – Tag Numbers	
Logic Solver ID and Firmware Version	
Test Date	
Test Lead Engineer – Name and Qualification	

TEST ACTIVITY	EXPECTED RESULT	ACTUAL RESULT	PASS / FAIL
FAT record reviewed and accepted	FAT signed		
Initiating instrument simulation confirmed correct input to logic solver	Input confirmed		
Logic solver output on trip activates	Output confirmed		
ESD valve closure within design stroke time	Stroke time within spec		
ESD valve position feedback at HMI/DCS	Confirmed closed		
Control room alarm annunciation on trip	Alarm confirmed		
Reset procedure and reset inhibit confirmed	Correct reset confirmed		
Bypass function: activates alarm and log	Alarm and log confirmed		

SIF not in bypass at test completion	Bypass removed confirmed		
SIL verification report signed — Ref: ____	SIL report signed		

SIGNATORY	NAME	SIGNATURE	DATE
Test Lead Engineer			
EPRA Inspector			

ANNEX XII – GAS TESTING RECORD

Required for every confined space entry, hot-work permit, LPG inerting, and gas-freeing operation.

FIELD	DETAIL
Facility Name	
Date	
Location / Equipment Tag Number	
Activity Type (CSE / hot-work / inerting / gas-freeing)	
Instrument Make, Model, and Serial Number	
Calibration Due Date	
Bump Test Conducted Today? (Yes / No)	

TIM E	SAMPLE LOCATIO N	O ₂ (%V/V)	LE L (%)	H ₂ S (PPM)	CO (PPM)	BENZEN E (PPM)	PASS/FAI L	TESTER INITIAL S

Acceptance Criteria (Section 6.8):

ACTIVITY	O ₂	LEL	H ₂ S	CO	BENZENE
Confined space entry	19.5–23.5%	<10%	<1 ppm	<25 ppm	<0.5 ppm
Hot-work	<23.5%	<1%	<1 ppm	<25 ppm	<0.5 ppm
LPG inerting (before LPG intro)	<2%	—	—	—	—
Gas-freeing (before maintenance)	19.5–23.5%	<1%	<1 ppm	<25 ppm	<0.5 ppm

SIGNATORY	NAME	SIGNATURE	DATE
Qualified Gas Tester			
Work Supervisor			

ANNEX XIII – HYDROSTATIC TEST RECORD AND ACCEPTANCE CERTIFICATE

FIELD	DETAIL
Facility Name	
Equipment / System ID and Tag Number	
Equipment Type	
Design Pressure (barg)	
MAWP or MAOP (barg)	
Test Pressure Applied (barg)	
Applicable Standard	
Test Medium	
Water Temperature at Start of Test (°C)	
MDMT of Steel (°C) – confirm test temp is $\geq$ MDMT + 5°C	
Test Start Date and Time	
Test End Date and Time	
Total Hold Duration (hours)	
Maximum Pressure Recorded During Hold (barg)	

OBSERVATION	DETAILS / FINDINGS
Leaks or distortion during fill?	Yes / No
Leaks or pressure drop during hold period?	Yes / No
Settlement readings taken? (tanks – attach survey sheet)	Yes / No
Repairs made and re-test conducted?	Yes / No
Post-test inspection findings	
Final Test Result	PASS / FAIL / CONDITIONAL

SIGNATORY	NAME	QUALIFICATION	SIGNATURE	DATE
Test / Inspection Engineer		API 653 / API 510 / PE		
DOSHS Inspector (pressure vessels)		DOSHS Appointment		
EPRA Inspector		EPRA Designation		

ANNEX XIV – INTENT-TO-DECOMMISSION NOTICE

Submit to EPRA minimum 90 days before decommissioning commences.

Part A – Operator Information

FIELD	DETAIL
Facility Name	
EPRA Operating Licence Number	
Facility Type and Capacity	
Physical Location and GPS Coordinates	
Owner / Operator Name	
Authorized Signatory – Name and Position	
Contact Telephone and Email	

Part B – Decommissioning Details

FIELD	DETAIL
Reason for Decommissioning	
Intended Decommissioning Commencement Date	
Intended Decommissioning Completion Date	
Summary of Decommissioning Scope	
Proposed Post-Decommissioning Land Use	
Financial Assurance Instrument – Type, Provider, Amount (KES), Reference No.	
DCE Amount (KES)	
NEMA Environmental Audit Status	
DOSHS Major Hazard Installation Status (Yes / No)	

Attachments – check all enclosed

- ☐ Draft Decommissioning Plan (Annex II) – attached or submission date: ____
- ☐ Current Decommissioning Cost Estimate (DCE) – attached or EPRA reference: ____
- ☐ Copy of current financial assurance instrument
- ☐ Evidence of NEMA Decommissioning Environmental Audit application or approval
- ☐ Draft Environmental and Social Management Plan (ESMP)
- ☐ Site location map and facility layout drawing

Authorized Signatory — Name, Title, and Signature	Date

FOR EPRA USE ONLY:

Date Received	EPRA Reference	Acknowledged By	Decision
			Approved / Approved with Conditions / Rejected

ANNEX XV — REGULATORY APPROVAL TRACKER

Update throughout facility lifecycle.

Section A — Commissioning Phase Approvals

APPROVAL REQUIRED	AUTHORI TY	APPLICATI ON DATE	APPROV AL DATE	CERTIFIC ATE NO.	EXPI RY DATE	STAT US
Environmental Compliance Certificate	NEMA					
Construction Permit	EPRA					
Factory Registration Certificate	DOSHS					
Pressure Vessel Registration	DOSHS					
County Building Approval	County Governme nt					
County Fire Safety Certificate	County Fire Service					
Public Health Certificate	County Public Health					
Trade Licence	County Governme nt					
MHI Notification Acknowledge ment	DOSHS					
PSSR Certificate — submitted to EPRA	EPRA					
Operating Licence	EPRA					

Section B — Decommissioning Phase Approvals

APPROVAL REQUIRED	AUTHORITY	APPLICATION DATE	APPROVAL DATE	CERTIFICATE NO.	STATUS
Intent-to- Decommission Notice	EPRA				
Decommissioning Plan Approval	EPRA				
NEMA Decommissioning Environmental Audit	NEMA				
DOSHS MHI Decommissioning Notification	DOSHS				
Hazardous Waste Transport Approval	NEMA / County				
Environmental Closure Certificate	NEMA				
Operating Licence Closure	EPRA				
Financial Assurance Release	EPRA				

ANNEX XVI – FINANCIAL ASSURANCE DECLARATION

FIELD	DETAIL
Facility Name and EPRA Licence Number	
Facility Type and Capacity	
Owner / Operator Name and Contact	
Decommissioning Cost Estimate (DCE) – Total Amount (KES)	
DCE Preparation Date	
DCE Prepared / Verified By – Name and Professional Qualification	
Next Scheduled DCE Review Date (max 5 years or post-material change)	
Financial Assurance Type	Bank guarantee / surety bond / escrow / insurance
Financial Institution / Provider Name	
Financial Assurance Total Amount (KES) – must equal 100% of DCE	
Reference Number of Assurance Instrument	
Assurance Instrument Expiry / Annual Renewal Date	
Authorized Signatory – Name, Title, and Signature	
Date of Declaration	

FOR EPRA USE ONLY:

Date Received	EPRA Officer Verifying	DCE Accepted	Assurance Instrument Accepted
		Yes / No / Queries	Yes / No

ANNEX XVII – STANDARDS REFERENCE

STANDARD / CODE	ISSUING BODY	SUBJECT
API 1185	API	Pipeline Public Engagement
API 1604	API	Closure of underground petroleum storage tanks
API 1631	API	Interior Lining and Periodic Inspection of USTs
API 2000	API	Venting of atmospheric and low-pressure tanks
API 2015	API	Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks
API 2016	API	Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks
API 2510	API	Design and Construction of LPG installations
API 510	API	Pressure vessel inspection
API 650	API	Welded tanks for oil storage
API 653	API	Tank inspection, repair, alteration, and reconstruction
API RP 2003	API	Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents
API RP 750	API	Management of process hazards
ASME B31.3	ASME	Process piping
ASME B31.4	ASME	Liquid petroleum pipeline systems
ASME B31.8	ASME	Gas transmission and distribution
ASME BPVC Sec. VIII	ASME	Pressure vessel design and fabrication
EI IP Model Code Pt 1	EI	The Selection, Installation, Inspection, And Maintenance Of Electrical And Non-Electrical Apparatus In Hazardous Areas

EI IP Model Code Pt 15	EI	Area Classification For Installations Handling Flammable Fluids
IEC 60079-10-1	IEC	Classification of areas – Explosive gas atmospheres
IEC 60079-14	IEC	Explosive Atmospheres - Electrical installations design, selection, and installation of equipment, including initial inspection
IEC 60079-17	IEC	Explosive Atmospheres - Electrical installations inspection and maintenance
IEC 61511 Pts 1–3	IEC	Functional safety – SIS for process industry sector
IEC 61882	IEC	HAZOP studies
ISO 14001	ISO	Environmental management systems
ISO 15589-1	ISO	Cathodic protection of pipeline systems
ISO 45001	ISO	Occupational health and safety management
KS 1968: 2006	KEBS	The petroleum industry – Electrical installations in the distribution and marketing sector – Code of practice
KS 2965:2022	KEBS	Siting of Liquefied Petroleum Gas (LPG) automotive retail outlets – Requirements
KS EAS 924 Parts 1 -3	KEBS	Handling, storage, and distribution of Liquefied Petroleum Gas (LPG) in domestic, commercial, and industrial installations – Code of practice
KS EAS 977:2020	KEBS	Petroleum industry – Installation of underground storage tanks, pumps/dispensers and pipe work at service stations and consumer installations – Code of practice

NFPA 11	NFPA	Low/medium/high-expansion foam systems for fire protection
NFPA 15	NFPA	Water spray fixed systems for fire protection
NFPA 20	NFPA	Installation of Stationary Pumps for Fire Protection
NFPA 30	NFPA	Flammable and combustible liquids code
NFPA 51B	NFPA	Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 58	NFPA	Liquefied Petroleum Gas Code
NFPA 72	NFPA	National Fire Alarm and Signaling Code
OSHA 29 CFR 1910.119	US OSHA	Process Safety Management
OSHA 29 CFR 1910.146	US OSHA	Permit-required confined spaces