



**CONSULTATION PAPER ON THE ELECTRICITY
(DECOMMISSIONING POWER SYSTEM
INSTALLATIONS) GUIDELINES 2017**

January 2017

The Electricity Regulatory Authority is in the process of preparing THE ELECTRICITY (DECOMMISSIONING POWER SYSTEM INSTALLATIONS) GUIDELINES 2017
(Under section 49 of the Electricity Act, 1999)

A Draft Copy of the Guidelines is herewith appended.

Electricity Regulatory Authority is requesting the public for input in form of written comments, observations and opinions in response to the draft guidelines on decommissioning of electrical installation.

You can send them to us by email to era.registry@era.or.ug

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**THE ELECTRICITY (DECOMMISSIONING
POWER SYSTEM INSTALLATIONS)
GUIDELINES 2017**

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(Under section 49 of the Electricity Act, 1999)

In exercise of the powers conferred upon the Electricity Regulatory Authority by section 49 of the Electricity Act, 1999 these guidelines are made this..... day of2017

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List of Acronyms used

EIA Environmental Impact Assessment

EMP Environmental Management Plan

ERA Electricity Regulatory Authority

NEA National Environment Act

NEMA National Environment Management Authority

PCB Polychlorinated Biphenyls

POPs Persistent Organic Pollutants

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1 INTRODUCTION

The Electricity Regulatory Authority is responsible for regulating decommissioning of all power plants in the Electricity Supply Industry of Uganda.

The decommissioning of electrical installations used for the generation, transmission and distribution of electricity in Uganda must be undertaken by the Licensee upon the expiry of license and/ or expiry of the subject electrical installation according to section 49 of the Electricity Act.

This is to ensure that the electrical installations do not become a hazard and/or pollutant in the environment. The process of decommissioning must take into account the National laws, the applicable international agreements and conventions ratified by Uganda and international best practices. Therefore, the Licensee must ensure that the decommissioning process of any electrical installation complies with both national and international regulations and best practices.

2 OBJECTIVE OF THE GUIDELINES

- (1) To operationalize section 49 of the Electricity Act, 1999.
- (2) To provide an approach to decommissioning power system installations that assures the public and environment are adequately protected.
- (3) To guide licensees in preparing decommissioning plans and in carrying out decommissioning activities using environmentally friendly methods to minimize impact of the subject installation on the social and biophysical environment.
- (4) To ensure that facilities do not pose unacceptable risks to the public, to workers or the environment.
- (5) To release facilities and sites for new uses.

3 SCOPE

Decommissioning refers to the administrative and technical action taken to allow the removal of all or any installations from a facility.

Installations have a finite life beyond which it is not economically or environmentally feasible to operate them and at the end of an installations life, it needs to be decommissioned, decontaminated and demolished so that the site is made available for other uses.

The guidelines cover the decommissioning of all power system installations for the business of generation, transmission and distribution of electricity in Uganda as provided under the Electricity Act, 1999.

4 LEGAL FRAMEWORK

4.1 The Constitution of the Republic of Uganda, 1995

Article 39 of The Constitution of the Republic of Uganda provides for the Right to a clean and healthy environment, thus “Every Ugandan has a right to a clean and healthy environment”.

This Constitutional provision imposes a duty on all Licensees to uphold the right to a clean and healthy environment in the execution and operation of their licensed activities.

4.2 The Electricity Act, 1999, Cap 145

Section 49 of the electricity act, 1999 requires a licensee, “...on expiry of the License, to remove at his or her own expense and to the satisfaction of the Authority, all installations considered by the Authority as in appropriate for further operations” and that the removal of installations shall be in accordance with the National Environment Act, 1995 and any other relevant law.

4.3 The National Environment Act, Cap 153

4.3.1. Environmental Principles

The proponent shall ensure that the decommissioning activity complies with the general principles of environmental management provided for under section 2 the National Environment Act. The two key principles are:-

- i. To assure all people living in the country the fundamental right to an environment adequate for their health and well-being (right to a decent environment). Thus everyone has a duty to maintain and enhance the environment. The proponent has a duty to maintain and enhance the environment during a decommissioning process/activity, given that power

system installation decommissioning activities have the potential to have significant impacts on the environment.

- ii. To ensure that the true and total costs of environmental pollution are borne by the polluter (polluter pays principle). The decommissioning activity shall be financed and executed by the proponent, as provided for under section 49 (1) of the Electricity Act, 1999 and the environmental management principle above, under the National Environment Act, Cap 153.

4.3.2. Conservation

The Proponent/Licensee is required to take measures for the conservation of energy and to plant trees and woodlots.

4.3.3. Environmental Impact Assessment of the decommissioning activity

The proponent is guided that the decommissioning of electrical infrastructures as described in the Third Schedule of the National Environment Act, is subject to an environmental impact assessment and report submitted to NEMA for approval in accordance with section 19.

4.3.4 Environmental Compliance Audit

The proponent shall undertake an environmental audit at the end of the decommissioning and site cleanup exercise to confirm how far the decommissioning exercise has complied with the approved environmental impact assessment. The report shall be submitted to NEMA and ERA for approval.

4.4. **Applicable regulations and standards**

The proponent is guided to follow and make use of the regulations and standards made under the National Environment Act(NEA) such as

- The National Environment (Minimum Standards for discharge of effluents into water or land) Regulations,
- The National Environment (Audit) Regulations,
- The National Environment (Minimum Standards for Management of soil quality) Regulations,

- The National Environment (Access to Genetic Resources and Benefit Sharing) Regulations,
- The National Environment (Noise Standards and Control) Regulations.

~~4.3.3. Environmental Impact Assessment of the decommissioning activity~~

~~The proponent is guided that electrical infrastructures are described in the Third Schedule of the National Environment Act, 1995 and thus Section 19 requires that the decommissioning activity is subjected to an environmental impact assessment and report submitted to NEMA for approval.~~

~~4.3.4 Environmental Compliance Audit~~

~~The proponent shall undertake an environmental audit at the end of the decommissioning and site cleanup exercise to confirm how far the decommissioning exercise has complied with the approved environmental impact assessment. The report shall be submitted to NEMA and ERA for approval.~~

4.4 The Occupational Safety and Health Act, 2006

Pursuant to the Occupational Safety and Health Act, Licensees have a responsibility to protect workers and the general public from the dangerous aspects of any licensed activity at his/or her own cost and ensure that the working environment especially during any decommissioning is free from any hazard due to pollution or other harmful agents.

4.5 Applicable International policy, legislation and industry best practice

The proponent is guided that the decommissioning exercise shall be executed in conformity to industry best practice, International policy and legislations and conventions ratified by Uganda such as the Stockholm Convention on Persistent Organic Pollutants, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs). This convention is relevant in the decommissioning and management of polychlorinated biphenyls (PCB) contaminated electrical apparatuses.

5 GENERAL GUIDELINES AND REQUIREMENTS

5.1 Decommissioning Plan or program approved by ERA and NEMA.

Section 49 of the electricity act, 1999 requires a licensee, “...on expiry of the License, remove at his or her own expense and to the satisfaction of the Authority, all installations considered by the Authority as inappropriate for further operations”. A list of power system installations that may be decommissioned is given in **annex 1** to these guidelines.

It should be noted that not all decommissioning and cleanup exercises will involve large installations or structures. Therefore, it is important to begin decommissioning planning as early as possible, at least one year in advance of the actual decommissioning, during the operation stage of the power system installation.

The objective of the planning exercise is to assess the options available for successful decommissioning of the installation, determine the activities necessary, resources and timeframe required.

The licensee shall prepare a decommissioning plan and shall maintain it throughout the lifetime of the facility, in order to show that decommissioning can be accomplished safely to meet the defined end state.

The plan should describe in detail the technical nature of the installation, the removal process activities envisaged and the likely wastes (both non-hazardous and hazardous; liquid and solid) to be generated.

The plan should outline decommissioning options in which the installations removed will be disposed of safely and how the waste generated will be handled and disposed of safely and in accordance with the law. The plan should demonstrate the feasibility of decommissioning, and identify categories and estimate quantities of waste that will be generated during decommissioning.

The plan should be submitted to ERA and NEMA for approval.

5.2 Environmental Impact Assessment of the decommissioning plan/program

The proponent shall undertake an environmental and social impact assessment (EIA) of the proposed decommissioning plan/program/activity and prepare a statement including an Environmental Management Plan (EMP) in accordance with the provisions of the National Environment Act.

The level of the EIA required shall be appropriate to the nature, scale, and possible effects of the proposed removal of installation(s) and to the nature of the site for its location. For avoidance of doubt, the level of the EIA required shall be in accordance with the Guidelines for Environmental Impact Assessment in Uganda, 1997.

The results of the environmental impact assessment and studies and the resultant reports should be submitted to NEMA approval and a certificate obtained. A copy of the certificate should be submitted to ERA.

The proponent is required to comply with the terms and conditions of the EIA approval issued by NEMA all through the power system installation decommissioning process. The proponent must keep records and documentation relating to how far the provisions of the Act and certificate of approval issued have been complied with.

The record and documentations above should be submitted to NEMA and ERA twice, that is, midway through the removal process and at the end of the process.

5.3 Waste handling, transportation and disposal plan approved proponent

The proponent will submit a copy of a waste handling, transportation and disposal plan to ERA and also to NEMA. The plan should give details of wastes (both non-hazardous and hazardous; liquid and solid) to be handled during the power system installation decommissioning process. The plan should outline the methods or means in which the wastes shall be treated, stored and/ or transported and disposed of safely, in accordance with the National Environment (waste management) Regulations.

5.4 Site cleanup plan approved by NEMA and ERA.

Where applicable, the proponent shall submit a site cleanup plan to ERA and NEMA for approval. The site cleanup plan should describe all the power system installations above ground and below ground that may pollute the environment. The processes and methods for removal, treatment, and disposal or secure isolation and/or treatment of contaminated materials or installation, to the extent necessary to comply with applicable environmental standards. The plan should also describe measures, procedures or controls, for gaining access to physical structures/installations remaining on-site that are unsafe or hazardous to humans or animals. The plan should also cover the measures for remediation of aesthetically unacceptable portions of the site (such as filling of pits, removal of stained soil and odorous materials, levelling of mounds, disposal of waste soil/rubble) and cleanup of the site to a level that will provide long-term environmental protection and will be safe for the intended future use.

The proponent must keep records and documentation relating to the site cleanup process how far the provisions of the Act and certificate of approval issued by NEMA have been complied with.

5.5. **Protection of People and protection of the environment**

The Proponent shall conduct a safety assessment for all facilities for which decommissioning is planned and for all facilities undergoing decommissioning. The safety assessment shall address the planned decommissioning actions and incidents, including accidents that may occur or situations that may arise during decommissioning.

The Proponent shall take measures to protect workers and members of the public from any exposure during decommissioning and provision shall be made for protection against/reduction of any incident. In the event of an incident, the Proponent shall immediately take remedial action.

Laws and regulations on the protection of the environment and the constitutional requirement to address protection of the environment shall be complied with during decommissioning.

5.6. Decommission close out report submitted to NEMA and ERA for approval.

The proponent shall compile a detailed end of decommissioning close out report. Three copies each of the decommissioning closure report shall be submitted to the ERA and NEMA, within 30 working days after decommissioning. The report shall describe and give details on the decommissioning process and shall include but not limited to the following:-

- i. The methods and how the power system installations were removed/decommissioned and disposed of safely.
- ii. The description and evidence of compliance with the terms and conditions of the EIA approval issued by NEMA in respect of the decommissioning plan/activity.
- iii. Methods and how the waste generated during the removal of the power system installation were handled, treated, stored and/ or transported and disposed of safely, in accordance with the National Environment (waste management) Regulations.
- iv. Describe the site cleanup process, all the power system installations above ground and below ground that are involved, the processes and methods for removal, treatment, and disposal or secure isolation and/or treatment of contaminated materials or installation, to the extent necessary to comply with applicable environmental standards, describe measures, procedures or controls, for gaining access to physical structures/installations remaining on-site that are unsafe or hazardous to humans or animals, where applicable, measures used in the remediation of aesthetically unacceptable portions of the site (such as filling of pits, removal of stained soil and odorous materials, levelling of mounds, disposal of waste soil/rubble) and cleanup of the site to a level that provide long-term environmental protection and will be safe for the intended future use.
- v. Statement describing how the decommission process has complied with all applicable laws and standards.
- vi. Statement on liabilities to other parties (evidence and fulfillment of duty to the public, workers and the environment).

- vii. Proponent's statement of commitment in respect of the duty to maintain and enhance the environment, in respect for the right to a decent environment.

6 DECOMMISSIONING PROCESS

6.1 Pre-Decommissioning

- Prepare and submit decommissioning plan to the ERA and NEMA for approval and obtain a clearance and/ or no objection.
- Procure a waste handling service provider, who is licensed by the National Environment Management Authority (NEMA). Ensure that the service provider selected has a license valid for the decommissioning period. The service provider should submit a **waste handling, transportation and disposal plan** to the proponent for consideration and approval. A copy of this plan should be included in the decommissioning plan as an annex attachment.
- Determine the type (partial, complete and closure) and level of decommission to be undertaken.
- Conduct an assessment of the safety of the decommissioning process
- Ensure that you identify a team and/ or consultants with the necessary skills and experience to execute all the plans (general decommissioning plan, environmental management plan, waste handling, transportation and disposal plan and site cleanup plan, etc) under the decommission activity successfully.
- Ensure that there is sufficient management support and adequate financial resources to finance all activities under the decommissioning activity and to cover the costs associated with safe decommissioning.
- Ensure that all the necessary internal and external consents have been obtained from the relevant lead agencies before commencement of the decommission exercise.

6.2 Decommissioning execution

The actual execution of the decommission activity by the proponent shall be conducted according to the approved general decommissioning plan and other

associated plans such as the environmental management plan, waste handling, transportation and disposal plan and site cleanup plan.

The proponent shall ensure that execution of each specific plan under the decommission activity shall be by a competent person with the necessary skills and experience. The competent person shall in addition be responsible for all activities and processes under the subject plan, documenting those activities and processes and results and ensure records are kept. The proponent shall monitor the decommission process.

Technical decommissioning shall involve the removal and safe disposal of the subject power system installation (civil, electrical and mechanical components etc). Further disposal of the subject scrap (removed) component - ***if it's a public property/asset***- shall be undertaken in accordance with the Public Procurement and Disposal of Public Assets Act 2003, specifically the Public Procurement and Disposal of Public Assets (disposal of public assets) Regulations.

Wastes generated (nonhazardous, hazardous, liquid and solid) during the technical installation decommissioning processes and activities, shall be handled, stored, treated, transported and disposed of in accordance with the approved waste handling, transportation and disposal plan, National Environment (waste management) Regulations, and/ or best industry practice, whichever is stringent.

To successfully decommission a power system installation or structure; the proponent shall assign a capable program/decommission activity manager who should have access to corporate policy and financial matters to ensure that appropriate resources are available in a timely manner. The program/decommission activity manager shall plan and implement the decommission activity/program in a logical manner within the framework of the overall approved decommissioning plan.

It is important to note that not all decommissioning and cleanup exercises involve large installations or structures, but the rationale for managing the

decommission activity/program is similar to that utilized in the design, construction, and commissioning of a new installation.

6.3 Post-Decommissioning

7.3.1 Close out Report

The proponent shall prepare a detailed close out report on the decommission activity. The program/decommission activity manager, assisted by competent persons appointed to lead the execution of each specific plan under the decommission activity, shall assist the proponent in the compilation of the decommission activity close out report.

The Close out report shall be consistent with the decommissioning plan submitted to ERA and NEMA and it shall describe the decommissioning activities including the timeframe; the end-state of the decommissioning project and the content of the individual phases or approach used. The report shall also describe the management of residual material and waste and the human resource applied during the decommissioning.

The proponent shall review and approve the report and submit copies to the ERA and NEMA for consideration and approval. The submission shall be done within **30 working days** after closing out the decommissioning exercise.

7.3.2 Post-Decommissioning Monitoring Requirement

The proponent shall put in place and maintain an appropriate post-decommission activity monitoring system, on the key areas of concerns (public health and the environment) under the respective plans including but not limited to the general decommissioning plan, environmental management plan, waste handling, transportation and disposal plan and site cleanup plan, etc). The objective of the post-decommission activity monitoring system shall be to ensure that no omissions from the decommission activity are likely to have a significant impact on public health and the environment. The proponent shall maintain the post-decommission activity monitoring system until ERA and NEMA are satisfied that there is no foreseeable risk to public health and the environment.

ANNEXES

Annex 1: List of power system installations

The decommissioning of power system installations involve removal and safe disposal of civil structures, electro-mechanical structures and other support structures. The following list of power systems installations must be considered when considering a decommissioning activity.

1.1 Hydropower generation installations

- A. Powerhouse systems
 - 1. Generators
 - 2. Circuit breakers
 - 3. Governors
 - 4. Dewatering pumps and sumps
 - 5. Transformers
 - 6. Lubricating systems
 - 7. fuel tanks
 - 8. Compressed air systems
 - 9. Emergency diesel generators
 - 10. Control room
 - 11. Main units (hydraulic turbines)
 - 12. Cranes
 - 13. Heating and ventilation systems
 - 14. Elevators
 - 15. Fish diversion screens
 - 16. Lighting systems
 - 17. Carbon dioxide (CO₂) system
 - 18. Station batteries
 - 19. Oil storage in the powerhouse
 - 20. Storage (warehouse, paint, etc.)
 - 21. Domestic water wells and treatment
 - 22. Wastewater treatment plant
- B. Navigation lock systems
 - a. Upstream navigation lock gate

- b. Downstream navigation lock meter gate
 - c. Navigation lock drain and fill valves
 - d. Navigation lock low level dewatering systems
 - e. Navigation lock floating guide wall
- C. Spillway systems
- 1. Spillway gates
 - 2. Gate operating machinery
 - 3. Miscellaneous systems
 - 4. Fish way equipment
 - 5. Fish entrances
 - 6. Transportation and collection channel
 - 7. Attraction water supply
 - 8. Diffusers
 - 9. Counting station
 - 10. Fish way system control
 - 11. Fish collection system
 - 12. Visitor and viewing building
 - 13. Fingerling bypass
 - 14. Fish way watering and dewatering equipment
 - 15. Telephone system
 - 16. Radio base station
 - 17. Mobile cranes
 - 18. Power distribution system
 - 19. Juvenile fish hold and load facility
- D. Station Service Power requirements
- a Energy from public utility
 - b Switchyard
- 1.2 Components of a thermal (HFO) and biomass power generation facilities
- 1. Cooling systems
 - 2. Electricals generator system
 - 3. Steam systems
 - 4. Turbine and accessories
 - 5. Boiler systems
 - 6. Air heating system
 - 7. Boiler feed pump

8. Condenser system
 9. Flue gas and precipitator systems
 10. Fuel offloading and Storage systems
 11. Fuel preparation system
 12. Oil system
 13. Monitoring and alarm system
 14. Battery-supplied emergency lighting and communication
 15. Fuel testing laboratories
 16. Effluent and wastewater treatment system
 17. Power transformers
 18. Conductors and cables
 19. Switching apparatus and protection accessories
 20. Control house and civil structures
 21. Fire detection and suppression equipment
 22. Ash handling system
- 1.3 Components of a biomass power generation facilities
1. Fuel supply system
 2. Fuel storage area
 3. Fuel conveyor system
 4. Chipper/grinder
 5. Boiler system
 6. Turbine and accessories
 7. Generator and accessories
 8. Condenser
 9. Pollution control devices
 10. Smokestack
 11. Cooling system
 12. Electrical substation/switchgear;
 13. Administrative buildings
 14. Monitoring and control system
- 1.4 Components of a solar power generation facilities
1. Electricity meter
 2. Isolators (AC and DC)
 3. Fuse boxes
 4. Inverters

5. Batteries
 6. Charge controller
 7. Generation meters
 8. Cabling
 9. Mounting and fittings
 10. Tracking systems
- 1.5 Components of a wind power generation facilities
1. Tower and foundation
 2. Rotor and rotor blades
 3. Nacelle
 4. Gearbox
 5. Pitch
 6. Brake
 7. Shaft
 8. Generator
 9. Controller
 10. Yaw drive and motor
 11. Wind monitoring system
 12. System for feeding electricity into the grid
 13. Generator sensors and monitoring system
 14. Cooling system
 15. Lightning protection
 16. Fire protection
 17. Cranes and elevators
- 1.6 Components of a transmission and distribution substations
1. Power transformers (either core type, or shell type)
 - a. Laminated core
 - b. Windings
 - c. Insulating materials
 - d. Transformer oil
 - e. Tap changer
 - f. Conservator
 - g. Breather
 - h. Cooling tubes
 - i. Buchholz Relay

- j. Explosion vent
 - k. Gaskets
 - l. Surge arrestors
 - m. Switches and fuses
 - n. Oil flow valves, gauges and indicators
 - o. Insulators and connectors
2. Instrument transformers (Current and Potential transformer)
 3. Distribution transformers
 - a. Coils/windings
 - b. Magnetic core;
 - c. Tank (Casing)
 - d. Tap changer
 - e. Bushing equipment
 - f. Gaskets
 - g. Oil gauges
 4. Conductors and supply lines
 - a. Overhead lines
 - b. Underground lines
 5. Insulators
 - a. suspension type,
 - b. strain type,
 - c. stray type,
 - d. shackle,
 - e. Pin type etc.
 6. Isolators
 - a. Single-break isolator,
 - b. Double-break isolator,
 - c. Bus isolator,
 - d. Line isolator, etc.
 7. Bus bars
 - a. single bus,
 - b. double bus; and
 - c. ring bus
 8. Lightning arrestors, surge arresters and grounding

- a. Earthing/grounding materials;
 - b. Lightning rods;
 - c. Gapless metal oxide (Zinc oxide) arrestors;
 - d. Gapped surge arrestor etc.
9. Relays
- a. Over current relays,
 - b. Definite time over current relays,
 - c. Voltage relays,
 - d. Auxiliary relays,
 - e. Reclosing relays,
 - f. Solid state relays,
 - g. Directional relays,
 - h. Inverse time over current relays,
 - i. Microcontroller relays, etc.
10. Switching apparatus and protection
- a. Switches
 - b. Fuses
 - c. Circuit breakers
 - i. Oil circuit breaker,
 - ii. Air circuit breaker,
 - iii. SF6 circuit breaker,
 - iv. Vacuum Circuit Breaker, etc
11. Capacitor banks
12. Metering equipment
13. SCADA system
- a. Client layer
 - b. Data server layer
14. Substation bay and fencing
15. Control house and civil structures
- a. Lighting (internal and external lighting)
 - b. Heating, ventilation and air conditioning equipment
 - c. Fire detection and suppression equipment

- d. Cables, control panels and power supplies.
 - e. DC supplies and accessories
 - f. AC supplies and accessories;
- 1.7 Components of a transmission and distribution lines
- A. Structures, Towers and Poles and fittings
 - B. Overhead and underground line conductors
 - C. Switching and protective apparatus
 - D. Insulators and grounding system
 - E. Communication system
 - F. Access roads and clearance
 - G. Concrete foundations, anchor bolts and reinforcements
 - H. Transformers
 - I. Lightning and surge arrestors

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