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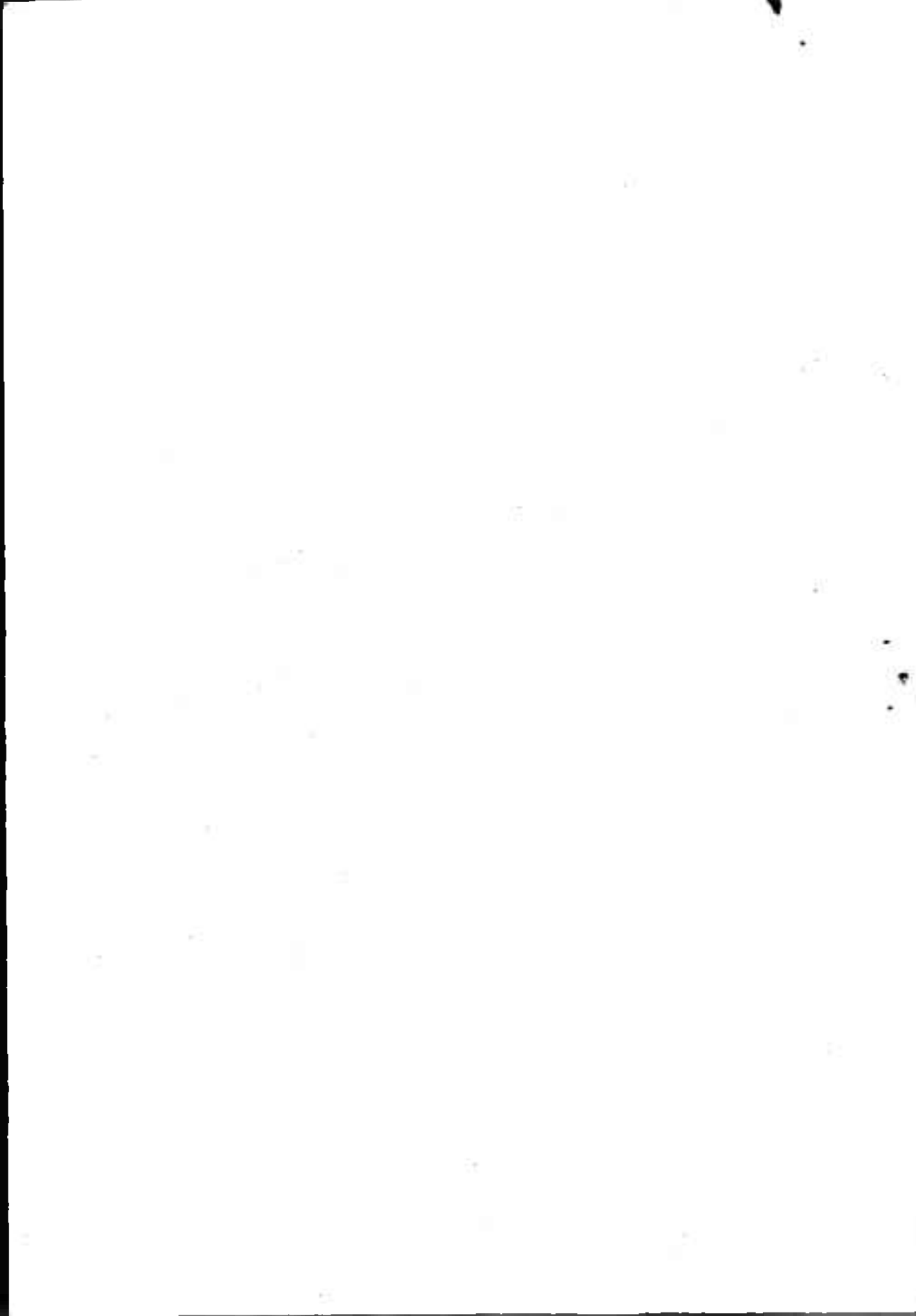
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**NATIONAL ENVIRONMENTAL STANDARDS AND
REGULATIONS ENFORCEMENT AGENCY
(ESTABLISHMENT) ACT, 2007**

**NATIONAL ENVIRONMENTAL (ENERGY SECTOR)
REGULATIONS, 2014**



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S. I. No. 63 of 2014

**NATIONAL ENVIRONMENTAL STANDARDS AND
REGULATIONS ENFORCEMENT AGENCY
(ESTABLISHMENT) ACT, 2007**

**NATIONAL ENVIRONMENTAL (ENERGY SECTOR)
REGULATIONS, 2014**

In exercise of the powers conferred on me by Sections 34 of the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007 and all other powers enabling me in that behalf, I, MRS. LAURENTIA LARABA Mallam, Honourable Minister of Environment, make the following Regulations—

[9th Day of December, 2014]

Commence-
ment.

PART I—PURPOSE AND SCOPE

1.—(1) The purpose of these Regulations is to prevent or minimize pollution and encourage energy efficiency in all operations and ancillary activities of the energy sector in achieving sustainable economic development in Nigeria.

Purpose.

(2) These Regulations shall cover power generation, transmission and distribution from the following—

(a) combustion processes fueled by gaseous, liquid and solid fossil fuels designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type ;

(b) renewable(hydro, wave, wind, solar, geothermal, biomass) sources ; and

(c) nuclear sources.

2—(1) This sector shall deploy energy efficient processes that are cost effective and meet the following requirements—

Scope and
Guiding
Principles.

(a) provide greater energy security through the use of indigenous energy resources ;

(b) encourage green investment in renewable energy and energy efficiency in line with the Kyoto Protocol ;

(c) reduce emissions of greenhouse gases (GHGs) ;

(d) address the problems of environmental degradation resulting from pollution, deforestation and vegetation loss ; and

(e) ensure that energy sources are ecologically sustainable.

(2) These Regulations shall encourage electrical power efficiency in all electrical appliances by adopting green technologies on the basis of life cycle approach, anchored on the 5Rs ('reduce, reuse, repair, recover and recycle') from cradle to cradle as stated in the National Environmental (Electrical/Electronic Sector) Regulations, 2011.

(3) Where environmental damage occurs as a result of any incident, operators of facilities shall be required, to take appropriate remedial actions as approved by NESREA.

Statutory
Requirements.

3.—(1) Every power (generation, transmission and distribution) facility shall—

(a) submit an Environmental Impact Statement for new projects or modification of the original state of a facility or project including expansion of existing ones before the commencement of activities ;

(b) submit an Environmental Audit Report (EAR) of an existing facility every 3 years ;

(c) without prejudice to sub-regulation 3(b) of this regulation, where a facility is to be decommissioned, transferred or alienated for any reason whatsoever, conduct an environmental assessment and submit the report to NESREA for verification and approval ;

(d) submit an Environmental Management Plan for existing facility every 3 years ;

(e) without prejudice to this regulation, the power transmission and distribution facilities shall submit a right-of-way maintenance plan to the relevant town planning authority and NESREA ;

(f) submit a copy of their licence from Nigerian Nuclear Regulatory Authority (NNRA) to NESREA where the organisation or facility generates and manages radioactive waste ; and

(g) in addition to the requirements of Regulation 7 of the Nigerian Radioactive Waste Management Regulations, organisations and facilities generating and managing waste shall submit their radioactive waste management plan approved by NNRA to NESREA.

(2) The National Standards for effluent or emission limitations represent minimum standards and different effluent standards shall be required based on the condition of the receiving medium.

(3) Power sector facilities shall comply with current and future extant regulations and guidelines on renewable energy power plants and others from the relevant agencies.

Transmission
and
Distribution
Lines.

4.—(1) The power transmission and distribution lines shall not be installed directly above residential buildings in conformity with the Nigerian Electricity Regulatory Commission (NERC) transmission and distribution codes.

(2) Installation of power distribution poles and power lines shall have a minimum Right-of-Way (RoW) as stated in the NERC codes as—

(a) transmission lines—

(i) 330KV—50m (25 meters both ways).

(b) distribution lines—

(i) 132KV—25m (12.5meters both ways).

5.—(1) A wooden electric poles shall be treated to ensure chemical fixation to prevent leaching and to impede the formation of surface residues at the right-of-way.

Wooden
Electric Pole
Maintenance
and
Management.

(2) A facility shall not use banned chemicals as listed in Schedule III to these Regulation in the treatment of electric poles.

6.—(1) A facility shall ensure—

(a) the replacement of existing transformers and other electrical equipment containing PCBs with other environment friendly alternatives on or before 2020 ;

Control of
PCB-
containing
Materials or
Units.

(b) that transformers and equipment containing PCBs are stored on an impermeable pad or base with bund walls sufficient to contain the liquid contents in the event of leakage or spillage ; and

(c) that the storage area is roofed to prevent wash off.

(2) A facility with transformer equipment which is more than 15 years old shall contact the Ministry responsible for environmental matters for appropriate storage, disposal of contaminated units and decontamination of the site.

PART II—GENERAL PROVISIONS

7. A facility shall plan and set up machinery for combating all accidental discharges and have an emergency plan, which shall be readily accessible and available to combat pollution hazards.

Emergency
Response
plan.

8.—(1) A facility shall install anti-pollution equipment for the detoxification or treatment of effluent and emission so as to meet the prescribed effluent and emission standards.

Installation
of Anti-
Pollution
Equipment.

(2) The installation of anti-pollution equipment made pursuant to sub-regulation (1) of this regulation shall be based on the Best Available Technology (BAT) or the Best Practicable Technology (BPT).

9.—(1) Every facility shall put in place an organizational system for pollution control and it shall assign a Pollution Control Manager (PCM) who shall oversee pollution control and prevention duties as specified in Schedule IV to these Regulations.

Pollution
Control
Organisational
System.

(2) Lectures, courses and assessments shall be conducted in addition to capacity building schemes to help environmental PCMs and operators to obtain required qualifications and certification by NESREA.

Chemical
use.

10.—(1) A facility shall submit to the nearest office of NESREA the following information—

- (a) a list of the chemicals used in the manufacture or assemblage of its products ;
- (b) details of stored chemicals and storage conditions ;
- (c) a list of obsolete or abandoned chemicals and the proposed plan for their environmentally sound management ; and
- (d) a declaration of hazardous chemicals contained in the power generation, transmission and distribution equipment.

(2) A facility shall ensure—

- (a) the minimization of organic solvents ;
- (b) that the use of ozone-depleting substances are in accordance with the provisions of the Montreal Protocol and Kyoto Protocol or any other relevant Multilateral Environmental Agreement (MEA) ratified and domesticated by Nigeria.

Restricted
Chemicals.

11. Use of restricted chemicals listed in Schedule III to these Regulations shall be approved by NESREA.

Management
of Oil
Stations and
Fuel Dump
Sites.

12. Every facility shall ensure that there is no contamination arising from leakage of surface or underground, oil or fuel, or chemicals storage tank likely to cause pollution of the environment including surface water and groundwater.

Effluent
Limitation
Standard.

13.—(1) The National Environmental Standards in relation to effluent limitations for the sector shall be as set out in Schedule II to these Regulations.

(2) An effluent shall be deemed to be non-compliant and polluted if—

- (a) the concentration of any of its parameters exceeds the permissible limits as specified in Schedule II to these Regulations ; and
- (b) it is discharged from a facility without pre-treatment.

Restriction
on the
release of
toxic
effluent.

14.—(1) A facility shall not discharge effluent onto land, into a watercourse or into a water body unless the facility ensures that the parameters of the effluent do not exceed the permissible limits set out in Schedule II to these Regulations.

(2) Notwithstanding sub-regulation (1) of this regulation, a facility shall not discharge or cause to be discharged any effluent into a water system used or earmarked as source of potable water supply.

Discharge of
Hazardous
Waste.

15. Disposal of hazardous waste on water or land without prior treatment is prohibited.

16. A facility shall not discharge sludge directly into any water body and any discharge to any part of the environment is prohibited except under a sludge disposal license issued by NESREA.

Sludge
Disposal.

17.—(1) A facility shall comply with the prescribed emission standards in Schedule I to these Regulations.

Emission
Standards.

(2) A facility shall be required to quantify and report sources and emissions data and also undertake emission reduction and implementation plan which shall be reviewed every 3 years by NESREA.

18. A facility with any source or potential source of emission shall measure the emission of every priority air pollutant emitted, develop and implement a plan to control such emission in accordance with the standards as prescribed in Schedule I to these Regulations.

Priority Air
Pollutants.

19. A facility, which emits gaseous substances, shall treat such to the permissible limits as prescribed in Schedule I to these Regulations using the appropriate treatment technologies.

Pollution
Abatement
for Air
Emissions.

20.—(1) A facility shall adopt best practices to minimize exposure of personnel to occupational hazards as prescribed in Schedule V to these Regulations.

Best
Practices.

(2) Every facility shall apply—

(a) the BAT and best practices in the management of energy conversion technologies ;

(b) the BAT that shall be environmentally friendly with emission levels not exceeding the permissible limits as contained in Schedule I to these Regulations ; and

(c) alternative fuels, processes and environmentally friendly methods that shall result in the significant reduction of emission.

21. All operators, importers, exporters, manufacturers, assemblers and distributors of various brands of electrical power products or equipment shall subscribe to the extended producer responsibility programme for end-of-life, discarded electrical power products as prescribed in Schedule VI to these Regulations.

Extended
Producer
Responsibility
Programme.

22. A facility shall conform with the guidelines for permissible noise levels as outlined in the National Environmental (Noise Standards and Control) Regulations, 2009.

Noise
Control.

23. A facility shall apply appropriate techniques in power plants to minimize vibrations to the environment and adjacent facilities.

Vibration
Control.

**Emission
Control.**

24. A facility shall ensure that emission levels from all power plants conform to permissible limits for National Environmental (Air Quality Control) Regulations, 2014.

**Waste
Control.**

25.—(1) Every facility shall ensure that all waste including waste oil, sludge and oil filters from the power generating plants are handled and disposed as prescribed in the National Environmental (Sanitation and Waste Control) Regulations, 2009.

(2) Without prejudice to the extant Regulations, a power generating facility is not permitted to discharge waste in solid, liquid or gaseous form without satisfying the conditions of these Regulations.

**Community
Relations
Programme.**

26. Every facility shall have a sustainable community relations programme as part of compliance with corporate social responsibility.

PART III—SAMPLING FOR ANALYSIS

**Collection
and Analysis
of Samples.**

27.—(1) For the purposes of determining license classification and license compliance, the facility shall examine samples according to standard analytical methods in a laboratory accredited by NESREA and the Ministry responsible for environmental matters as well as NNRA in the case of a nuclear fallout.

(2) The whole sample volume is to be taken at one time, at the point of discharge or, if the discharge has stopped, at the nearest practicable point within 1 kilometre upstream and downstream of the point of discharge.

(3) The sample shall be analysed immediately after collection where possible or within 24 hours after taking the sample and the whole sample volume shall be used.

(4) A composite sample for the purpose of analysis for all tests other than those for temperature and pH shall be taken by combining individual samples as follows—

(a) a minimum of 5 samples of equal volume of not less than 500 ml each shall be taken at the point of discharge or, if the discharge has stopped, at the nearest practicable point within 1 kilometre upstream and downstream of the point of discharge, at approximately equal intervals of time over a minimum period of 4 hours within any 24 hour period ;

(b) two of the composite samples collected when the discharge has been stopped, will be used to prove the source and extent of pollution ;

(c) the samples shall be kept as cool as at site conditions licence and sample analysis shall commence not later than 24 hours after taking the last sample ;

(d) where the discharge has stopped or is intermittent, two grab samples shall be collected at the nearest practicable point within one kilometre upstream and downstream each of the point of discharge.

28.—(1) Measurements of air quality parameters shall take place at any facility, downwind and upwind as listed below—

(a) measurement of total suspended particulate matter shall be by gravimetric method using air sampler or by any other recommended scientific method ;

(b) a minimum of 2 sampling periods (both 1-hour and 8-hour) shall be adopted ; and

(c) the heavy metals level of total suspended particulate matter shall be determined using any referenced standard method with atomic absorption spectrometer.

(2) Gaseous pollutants shall be measured by passive sampling, active sampling or continuous sampling.

(3) Passive sampling method shall require the submission of analysis certificate along with results. A minimum of 3 sampling periods (1-hour, 24-hour and 72-hour) shall be adopted.

(4) Active sampling for NO_x shall use the Saltzman or any other recommended standard method.

(5) Active sampling for SO_2 shall use the West-Gaeke, hydrogen peroxide or conductimetry or any other recommended standard method.

(6) Active sampling for hydrocarbons shall use the adsorption on activated charcoal method.

(7) Continuous sampling of any gaseous air pollutant shall use instruments with detection range accommodating the maximum allowable limit of measured parameter and the measurement shall last for at least 1 hour in every sampling location.

29.—(1) Noise levels shall be measured with instrument having both A and C weighting, a resolution not more than 0.1 dB and fast or slow responses.

Noise
Measurements.

(2) Measurement shall be taken at least 3 m from any barrier or other sound reflecting sources, at about 1.2 – 1.5 m above ground level or working platform and shall last for at least 10 seconds.

(3) Daytime and night time measurements shall be taken at the fence line of any facility.

(4) In this regulation—

“Day Time” means 07:00-22:00 hours ; and

“Night Time” means 22:00-07:00 hours.

PART IV—SPECIFIC REQUIREMENTS FOR POWER PLANTS

Hydro
Power
Plants.

30.—(1) The National Environmental (Wetlands, River Banks and Lake Shores) Regulations, 2009 National Environmental (Coastal and Marine Area Protection) Regulations, 2011 and National Environmental (Surface and Ground Water Quality Control) Regulations, 2011 shall apply for the purpose of energy generation from hydro power plants.

(2) Without prejudice to regulation 3(1)a of these Regulations all Hydro Power facilities shall be sited in accordance with the existing national guidelines provided by the Ministry responsible for environmental matters and the Ministry responsible for water resources.

Nuclear
Power
Plants.

31.—(1) Nuclear power plants shall be sited in locations in accordance with International Atomic Energy Agency guidelines as may be adapted by the Nigeria Atomic Energy Commission (NAEC) and Nigeria Nuclear Regulatory Agency (NNRA).

(2) Nuclear facilities shall install pollution abatement equipment to prevent environmental damages that may result from—

- (a) tailings and waste rock at mines and mills ;
- (b) releases of any radioactive isotope during reactor operation ; and
- (c) releases of radioactive materials in case of accidents.

(3) Clean up and remediation of radioactive contaminated sites shall be carried out in accordance with the NNRA Regulations.

(4) All radioactive waste generated in the country shall be stored in NNRA licensed designated radioactive waste management facilities and depositories established by the Government in accordance with the Nigerian Radioactive Waste Management Regulations and such facilities shall be monitored jointly by NNRA and NESREA.

(5) The operator of a nuclear facility shall be liable for damages to the environment in the event of a nuclear accident except for acts of armed conflicts, hostilities, civil war, insurrection or in the event of grave natural disaster of an exceptional character.

(6) Subject to sub-regulation (5) of this regulation, the operator of the facility shall carry out remedial actions in the environment, in addition to appropriate compensation in accordance with existing national policy on nuclear accidents.

(7) The national permissible limits for gaseous, liquid and solid nuclear waste shall be as determined by NNRA.

(8) The transport of radioactive waste within Nigeria's territory is prohibited unless with the approval of NNRA and NESREA in accordance with the provisions of the Nigerian Transportation of Radioactive Sources Regulations.

(9) A facility producing radioactive material or waste shall submit a decommissioning plan to NAEC, NNRA and NESREA for approval and the plan shall comply with the Nigerian Radioactive Waste Management Regulations.

(10) A facility shall ensure that, after the closure of a nuclear reactor or plant, relevant records are maintained, radioactivity is monitored and intervention measures are taken to contain unplanned release of radioactive particles into the environment.

(11) At close out, facilities shall monitor the plant during the cooling-off period and ensure that reactors are dismantled and are packed in containers for final disposal in compliance with the Nigerian Radioactive Waste Management Regulations and the Nigerian Transportation of Radioactive Sources Regulations.

32.—(1) The fossil power plants are the facilities that use hydrocarbon as fuels in their reactors.

Fossil Fuel
Power Plant.

(2) The National Environmental (Mining and Processing of Coal Ores and Industrial Minerals) Regulations, 2009 shall apply for extraction of coal for the purposes of energy generation.

(3) Facilities shall take considerable measures to reduce noise pollution from turbines and other power generators including auxiliaries.

(4) Facilities shall take measures to conserve water in their utility operations such as cooling towers and demineralization systems.

(5) A facility shall comply with the prescribed emission standards in Schedule I to these Regulations.

(6) A facility shall not release high temperature water containing high dissolved solids, residues of biocides, residues of other cooling system anti-fouling agents into the environment without treatment.

(7) Discharges of process wastewater, sanitary wastewater, wastewater from utility operations or storm water to surface water shall not exceed the national permissible limits in Schedule II to these Regulations and the National Environmental (Surface and Groundwater Control) Regulations, 2011.

(8) Temperature of wastewater prior to discharge shall not result in an increase greater than 3-5°C of ambient temperature at the edge of a scientifically established mixing zone.

33.—(1) Operators of renewable energy power plants shall ensure that :

(a) construction or installation activities are not detrimental to the environment and human health ;

Renewable
Energy
Power
Plants.

(b) construction or installation activities do not interfere with the use of public space, land and airport facilities ;

(c) bio-fuel fired power plants shall be designed in such a way that gaseous emissions associated with the energy production are minimized ; and

(d) in line with sustainable development, every tree felled for the purpose of power generation shall be in conformity with the provisions of the National Environmental (Control of Bush, Forest Fire and Open Burning) Regulations, 2011 and the National Environmental (Desertification Control and Drought Mitigation) Regulations, 2011.

Efficiency of
electrical
power
equipment.

34.—(1) This regulation shall apply to power generation, transmission and distribution equipment as well as household electrical appliances in accordance with the National Environmental (Electrical and Electronic Sector) Regulations, 2011.

(2) All power equipment used in the electrical grid shall be operated at optimum efficiency in line with the NERC approved codes, standards and regulations.

(3) Importers of electrical devices shall take cognizance of the power needs of the country and adopt best technologies to achieve maximum efficiency of 90% power rating.

(4) Manufacturers and importers of electrical appliances shall adopt energy efficiency labels to the environmental friendliness of the appliances.

(5) All sectors of the economy shall adopt green practices in the use of electrical appliances and be encouraged to use only appliances with higher energy efficiency rating.

(6) The use of energy efficient devices including bulbs shall be promoted and the use of incandescent light bulbs shall be phased out within 10 years.

PART V—PERMITS, INDUSTRIAL EFFLUENT MONITORING AND REPORTING

Applicable
Permits.

35.—(1) The permitting procedures shall be as applied in the National Environmental (Electrical and Electronic Sector) Regulations, 2011 and the National Environmental (Permitting and Licensing Systems) Regulations, 2009.

(2) Facilities shall obtain the underlisted permits as applicable—

(a) the Bio-diversity conservation permit ;

(b) the Air quality permit ;

(c) the Waste and toxic substances permit ;

(d) the Power generation, transmission and distribution equipment import permits ; or

(e) the Power equipment installation permit by the National Electricity Regulatory Commission (NERC).

36.—(1) The permittee shall comply with the reporting requirements under NESREA's permit including incidence report and monthly effluent or emission data sheet by submitting the documents to NESREA's field offices.

(2) The permittee shall, on a quarterly basis, submit to NESREA (on dates specified) a description of the nature, concentration and flow of the pollutants in the monthly effluent data sheet required to be reported.

(3) The report shall be based on sampling analysis performed in the period covered by the report.

(4) The permittee shall report all sampling results for parameters listed on the effluent limitations and monitoring requirement, on the industrial or commercial discharge monitoring report forms as in Schedule VII to these Regulations.

(5) The permittee shall, at its own cost, install monitoring equipment approved by NESREA to facilitate the accurate observation, sampling and measurement of the quality of waste discharges in accordance with the permit conditions.

(6) The monitoring equipment, whether owned by public or private organisation shall be installed according to the specifications given by NESREA.

(7) The plans and specifications for the installation shall be submitted to NESREA for review before construction and a permittee who discharges effluents shall have in place—

- (a) flow meters ;
- (b) point inspector chambers ;
- (c) recording apparatus ; and
- (d) sampling test points or points of inspection.

(8) The Permittee discharging or proposing to discharge effluent to a general sewer or treatment plant shall maintain the following—

- (a) records of production ;
- (b) water consumption and discharge flow records ;
- (c) complete monitoring records as specified in these Regulations ;
- (d) process monitoring records ;
- (e) incident reports ;
- (f) waste handling records ; and
- (g) any other records necessary to show compliance with these Regulations.

37.—(1) The permittee shall sign the report and attach a copy of the certificate of analysis from a laboratory accredited by NESREA.

Permittee to
sign Report.

(2) Each report shall be signed by—

(a) a responsible corporate officer, if the permittee submitting the reports is a corporation ; and

(b) for the purpose of this regulation any person who performs similar policy or decision making functions for the corporation.

(3) Each report shall include the following certification statement—

“I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information herein submitted is to the best of my knowledge and belief, true, accurate and complete”.

Records to be made available.

38. Each record shall be made available to NESREA and shall be retained for a minimum of 5 years and throughout the course of any pertinent related legal proceeding.

Fees.

39.—(1) National Environmental Standards and Regulations Enforcement Agency (NESREA) shall charge fees—

(a) for processing application for permit ;

(b) for reviewing discharge permits, prevention procedures and construction ; and

(c) it deems necessary to carry out the requirements contained herein which may include emergency incident response and cost of personnel and equipment.

(2) The fees referred to in sub regulation (1) of this regulation relate solely to matters covered by these Regulations and are separate from all other fees chargeable by NESREA which are subject to review from time to time.

PART VI—ENFORCEMENT

Duty of NESREA on Enforcement.

40.—(1) NESREA is responsible for enforcing all applicable standards and requirements and on the basis of any information available to it, it may take any enforcement action at any time as appropriate.

(2) While a permit is in force, it shall be the duty of NESREA to take such action under these Regulations as may be necessary for the purpose of ensuring that the conditions of the permit are complied with.

Enforcement Notice.

41.—(1) An enforcement notice shall be served if NESREA is of the opinion that a facility has contravened, is contravening or is likely to contravene any condition of the permit.

(2) An enforcement notice shall specify the—

(a) activities or matters constituting the contravention or making it likely that the contravention will arise ;

(b) steps that shall be taken to remedy the contravention or to remedy the activities or matters making it likely that the contravention will arise ; and

(c) period within which those steps shall be taken.

(3) The provisions of sub-regulation (1) of this regulation shall apply whether or not the particular manner of operating the facility in question, is regulated by or contravenes a condition of the permit.

(4) An officer of NESREA may, in the course of his duty under these Regulations, at any reasonable time—

(a) enter and search any premises or facility to take samples for analysis and measurements in length or of level of standards to which these Regulations relate ; and

(b) seize and detain for such time as may be necessary for the purpose of these Regulations any article by means of or in relation to which he reasonably believes any provision of these Regulations has been contravened.

42.—(1) Where a person fails to comply with the enforcement notice within the specified period given under Regulation 41 (2) of these Regulations a second notice shall be served.

Failure to
comply
with
Enforcement
Notice.

(2) Failure to comply with the second notice within the specified time limit will lead to the issuance of a suspension notice, sealing of the facility or premises or any other punitive action as may be necessary.

(3) Where a suspension notice is served pursuant to these Regulations the permit shall, on the service of such notice cease to have effect as stated in the notice.

(4) National Environmental Standards and Regulations Enforcement Agency (NESREA) may withdraw a suspension notice after verification of compliance.

(5) Notwithstanding the provisions of these Regulations, NESREA shall have the power to enter and seal any facility found contravening any of the provision of these Regulations.

43. An enforcement notice shall be delivered by hand, registered post or courier, pasting at the facility or registered premises of the organization or by publication in a newspaper.

Mode of
Delivery.

PART VII—OFFENCES AND PENALTIES

44.(1) It is an offence for manufacturers, importers, assemblers and distributors or operators of power facilities not to provide collection centres for take-back of their wastes or end -of-life equipment in Nigeria.

Contravention
of
Operator's
Permit.

(2) It is an offence for an operator of any power generating facility to—

(a) discard any used or waste equipment except in designated collection centres or points ;

(b) burn used or waste equipment in the Nigerian environment ;

(c) dispose of electrical equipment alongside domestic or municipal waste ;

(d) dispose of used or waste power equipment at any dump site, land-fill site, water body or any other place except at the designated recycling plant ;

(e) fail to supply information as required for approval to operate the facility ;

(f) fail to maintain the facility in an environmentally-sound manner ;

(g) fail to comply with the decommissioning conditions of power as prescribed by NESREA ;

(h) fail to submit to NESREA within a specified period, information or data about materials received at the facility ; or

(i) fail to submit an Environmental Audit Report (EAR) as required by NESREA.

**Contravention
of Permit
Condition.**

45. It is an offence for a facility to contravene—

(a) a condition of a permit ;

(b) the requirements of an enforcement notice, or a closure notice under these Regulations.

(c) any requirement imposed by a notice served by NESREA.

**False
Statement.**

46.—(1) It is an offence for a facility to make a statement which is known to be false or misleading particularly, where the statement is made—

(a) in purported compliance with a requirement to furnish any information imposed by or under any provision of these Regulations ;

(b) for the purpose of obtaining a permit for the facility for variation, transfer or surrender of a permit ;

(c) to falsify an entry in any record pertaining to the permit ; or

(d) with intent to deceive, forge or use a document issued or authorized to be issued under a condition of a permit or required for any purpose under a condition of the permit.

(2) It shall be an offence to make a statement or have in possession a document that is likely to mislead or deceive NESREA.

**Failure to
comply with
Guidelines
and
Standards.**

47.—(1) It shall be an offence if a facility fails to—

(a) take measures to remove or otherwise treat and dispose of any effluent to minimize adverse effects ;

(b) remediate the environment to the standard prescribed by NESREA ;

(c) furnish all information to NESREA ;

(d) remove equipment or contain materials released into the environment when requested by NESREA ;

(e) produce document when requested by NESREA ; and

(f) comply with the guidelines with respect to the handling, storing and transport of effluent generated.

48.—(1) It is an offence if a facility—

(a) handles effluent in a manner which causes adverse effect to human health and the environment ;

(b) obstructs NESREA from performing its duties ;

(c) transports effluent and sludge which are not covered by the manifest ;

(d) transports effluent and sludge which are not completely enclosed, covered and secured ; or

(e) transports hazardous effluent and sludge in bulk without prior authorization from NESREA.

Failure to handle Effluent and Sludge in a proper manner.

49.—(1) A facility commits an offence if it fails to—

(a) maintain records of all discharges ; or

(b) file quarterly and annual reports of all discharges.

Failure to maintain and file Reports.

50.—(1) It shall be an offence for a facility to—

(a) release effluent and sludge into the environment beyond the permissible level ;

(b) fail to report the release of effluent into the environment in excess of the permissible level as contained in Schedule II to these Regulations ; or

(c) fail to take measures to prevent, reduce or remedy the adverse effect of effluent, sludge and emissions released into the environment.

Discharge of effluent beyond permissible level

51.—(1) Any person who violates the provisions of these Regulations commits an offence and shall upon conviction, be liable to a fine not exceeding N200,000 or to imprisonment for a term not exceeding 1 year or to both and an additional fine of N5,000 for every day the offence subsists.

Penalties.

(2) Where an offence under these Regulations is committed by a facility, it shall upon conviction, be liable to a fine not exceeding N1,000,000 and an additional fine of N50,000 for every day the offence subsists.

Interpretation.

52. In these Regulations—

“*Act*” means the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007 ;

“*Air Emission*” means any emission or entrainment process emanating from a point, non-point or mobile source resulting in air pollution ;

“*Ambient Air*” means air occurring at a particular time and place out of structure ;

“*Appropriate Authority*” means, for the purposes of any provision of these Regulations, NESREA and other relevant environment agency ;

“*Assembler*” means a person or group of persons who bring, fix together separate parts of electrical power equipment ;

“*Best Available Technology*” means an emission limitation based on the maximum degree of emission reduction which (consisting energy, environmental and economic impact and other costs) is achievable through application of production processes and available methods, systems and techniques ;

“*Best Practicable Technology (BPT)*” means best practicable environmental option ;

“*Close Out*” means activity describing completion of a project and transfer of completed project ;

“*Collection centres or points*” means centres or points where wastes are collected and stored temporarily for the purpose of recycling ;

“*Distributors*” means persons that provide electrical or electronic equipment on a commercial basis to the party who is going to use it ;

“*Effluent*” means treated or untreated waste water that is discharged from a treatment plant, sewer, or industrial outfall resulting from the commercial or industrial use of water ;

“*Electrical Electronic Equipment (EEE)*” means equipment which is dependent on electric currents or voltage or electromagnetic fields to function ;

“*Electrical Power Equipment (EPE)*” means electrical power equipment, equipment for the generation, transmission, distribution and measurement of these currents and fields, including the components necessary for the cooling, heating, protection, etc., of the electrical or electronic components ;

“*Electrical Power Efficiency (η)*” means output power divided by the input power

$$(\eta) = 100\% * P_{out} / P_{in} ;$$

“*Electromagnetic Fields (EMF)*” mean invisible lines of force emitted by and surrounding any current carrying component (e.g. Power Lines and Electrical Equipment) ;

"End-of-Life" means Electrical Power Equipment (EPE) that have come to the end of their usefulness ;

"Enforcement" means actions to obtain compliance with environmental laws, rules, regulations or agreements or obtain penalties or criminal sanctions for violations ;

"Enforcement Notice" means letters of compliance concerns or abatement notices informing the facility of observed violations and the need to remedy the same within a time limit, failure of which the facility shall be sanctioned as provided in these Regulations ;

"Environment" means the sum of all external conditions affecting the life, development and survival of an organism ;

"Environmental Audit (EA)" means a systematic, documented, periodic and objective evaluation of how well organisation's management and equipment are performing with the aim of safeguarding the environment and human health ;

"Environmental Friendliness" means information provided by the manufacturers on the product to minimize environmental impact ;

"Environmental Impact Assessment (EIA)" means a systematic process for identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of developmental projects prior to major decisions being taken and commitments made ;

"Environmental Impact Statement (EIS)" means a document that arises from an EIA, issued by the Federal Ministry of Environment stating the environmental impacts and the mitigation measures put in place ;

"Environmental Management Plan (EMP)" means the process that an organization will follow to maximize its compliance and minimize harm to the environment. This plan also helps an organization to map its progress toward achieving continual improvements ;

"Environmentally Sound Manner" means practice that does not pose a threat to the environment ;

"Facility" means any power or energy generating company registered with the corporate affairs commission for the purposes of participating in the energy industry ;

"Gaseous Pollutants" means substances discharged in the form of gas that are toxic to the environment ;

"Grave Natural Disaster of an Exceptional Character" means non-man made occurrences such as earthquake and landslide ;

"Green Practices" means practices that improve environmental quality ;

"Green Technologies" are electrical electronic equipment that do not use hazardous chemicals ;

"Hydropower" means power derived from the energy of falling and running water which may be harnessed for electricity generation ;

"ICNIRP" means the International Commission for Non Ionization Radiation Protection ;

"Importer" means a person or body corporate who, in the ordinary course of conduct of a trade, occupation or profession, imports power generation equipment ;

"MEA" means Multilateral Environmental Agreement ;

"Minister" means the Minister responsible for environmental matters or the appropriate government structure operating at that time ;

"Modification" means a change in any activity that may cause an adverse effect if not properly mitigated and includes, but not limited to, the expansion of the same process, addition of product lines and replacement of equipment with different technology other than that presently in use ;

"NESREA" means the National Environmental Standards and Regulations Enforcement Agency ;

"Nuclear Facility" means any facility using nuclear sources for the generation of energy ;

"Posting" means the posting of a notice at the address of the owner or occupant of the premises or facility ; or the putting of a notice in a public or conspicuous place so that people including those the notice is meant for, can see it ;

"PCBs" means polychlorinated biphenyls ;

"Permit" means an official document, authorization, license, or equivalent control document issued by NESREA to implement the requirements of these Regulations to discharge effluent especially for a limited period of time ;

"Permittee" means an individual or group of individuals, organizations or facilities that have been empowered by the permit to discharge effluent ;

"PIH" means scale measuring the degree of acidity, alkalinity and neutrality of a substance ;

"Priority Air Pollutant" means the set of chemicals that affect air quality covered under these Regulations ;

"Producer" means anyone who on a commercial basis imports, sells or manufactures electrical electronic equipment on a commercial basis for the Nigerian market ;

"Radiation" means energy propagated in space which includes wave and particles ;

"Radioactive" means the tendency of a nuclei of a particle to disintegrate, releasing ionization radiations ;

"Recovery" means any practice that leads to the creation of a value of a dysfunctional equipment ;

"5Rs" means reduce, repair, reuse, recover and recycle ;

"Recycle" means the reprocessing in a production process of the waste materials for the original purpose or for other purposes but excluding energy recovery which means the use of combustible waste as a means of generating energy through direct incineration with or without other waste but with recovery of the heat, and "recycled" and "recycling operation" shall be construed accordingly ;

"Reuse" means any operation by which parts or components thereof are used for the same purpose for which they were conceived, including the continued use of the equipment or components thereof which are returned to collection centres, distributors, recyclers or manufacturers, and "reused" shall be construed accordingly ;

"Right-of-way, way Leave or Easements" mean access ways created for facility, transmission or location ;

"Renewable Energy" means energy that comes from resources which are continually replenished such as sunlight, wind, rain, tides, waves and geothermal heat ;

"Sludge" means liquid or solid sediments and other residue from a municipal sewage collection and treatment system and liquid or solid and other septic from septic or holding tank pumping from commercial, industrial or residual establishments ;

"Spot Sampling" means sample of liquid or sediments obtained at a specific depth inside a tank using a bottle. Spot samples are analyzed to determine the gravity of the oil, base sediment and water of the fluid in the tank ;

"Standards" means a consensus document with limits ;

"Thermal Power" means energy generated per time through combustion processes fueled by gaseous, liquid and solid fossil fuels and biomass and designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type ;

"Treatment" means any activity after the waste from power generation has been handed over to a facility for depollution, disassembly, shredding, recovery or preparation for disposal and any other operation carried out for the recovery or disposal or both ;

"Water Body" includes underground water, river, stream, spring, canal, reservoir, well, lake, lagoon, ocean etc ;

"Watercourse" means any natural or artificial channel, pipe or conduit, excluding the sewerage system, carrying, or that may carry, and discharging water directly or indirectly into a water body ;

"Waste" means spent materials (ionizing or non ionizing) from power generating facilities ;

"Wastewater" means effluent originating from the washing and general maintenance of a facility ;

"Year" means a calendar year commencing from 1st January.

Citation.

53. These Regulations may be cited as the National Environmental (Energy Sector) Regulations, 2014.

SCHEDULE I

EMISSION STANDARDS FOR NEW FOSSIL FUEL POWER PLANTS

No.	Pollutants	Types of Fuel		
		Coal	Oil	Gas
1.	Sulphur Dioxide (SO ₂) (ppm)			
	Power Plant Size > 500MW	320	320	20
	300 - 500MW	450	450	20
	< 300MW	640	640	20
2.	Oxides of Nitrogen (as NO _x) (ppm)	350	180	120
3.	Particulates (mg)/m ³)	120	120	60

Note : reference conditions are at 1atm or 760mmHg dry basis, excess air of 50% or excess O₂ of 7%.

SCHEDULE II

EFFLUENT LIMITATIONS GUIDELINES FOR POWER PLANTS

S/N	Parameter	mg/l, except pH and temp
1.	pH	6-9
2.	TSS	50
3.	Oil & Grease	10
4.	Total residue Chlorine	0.2
5.	Chromium – Total (Cr)	0.5
6.	Copper (Cu)	0.5
7.	Iron (Fe)	1.0
8.	Zinc (Zn)	1.0
9.	Lead (Pb)	0.5
10.	Cadmium (Cd)	0.1
11.	Mercury (Hg)	0.005
12.	Arsenic (As)	0.5
13.	Temperature increase by thermal discharge from cooling system	± 3 of the ambient temperature of the receiving medium

SCHEDULE III

RESTRICTED AND BANNED CHEMICALS IN ELECTRICAL EQUIPMENT

PART A—RESTRICTED

1. Antimony Compounds.
2. Arsenic Compounds.
3. Arsine.
4. Arsenical Substances.
5. Carbon Tetrachloride.
6. Chlorine.
7. Chromic Acids.
8. Carbon Tetrafluoride.
9. Dioxins.
11. Dichlorotetrafluoroethane.
12. Furans.
13. Hydrochloric Acid.
14. Hydrofluoric Acid.
15. Methyl Chloride.
16. Methyl Chloroform.
17. Tetraethyl Lead.
18. Tetramethyllead.
19. Tris (2, 3 dibromopropyl) Phosphate.
20. 1,1,1 Trichloroethane.
21. Tetrachloromethane.
22. Phenols.
23. Phenol Ethoxylate.
24. Polybrominated Biphenyls (PBBs).
25. Polychlorinated Biphenyls (PCBs).
26. Polybrominated Diphenyl ethers.
27. Polychlorinated Terphenyls (PCTs).
28. Pentachlorophenol (PCP).
29. Perfluoro Octane Sulfonates (PFOS).
30. Phosphine.
31. Phosphorus Compounds Sulphur Hexafluoride (SF_6).

PART B—BANNED CHEMICALS

1. Captafol.
2. Ethylene Dichloride.
3. Mercury Compounds.

SCHEDULE IV

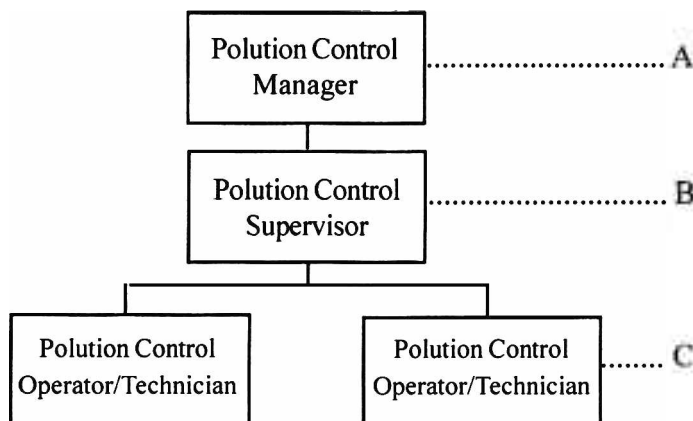
ORGANIZATIONAL SYSTEM AND THE FUNCTIONS OF POLLUTION CONTROL MANAGER

Every facility shall have an organizational system that will carry out internal environmental auditing of the facility and liaise with NESREA and other relevant Government authorities. The organizational system shall consist of a—

- (a) pollution control supervisor ;
- (b) pollution control manager ; and
- (c) pollution control chief manager ;

who shall be appointed as appropriate and they shall be certified by NESREA through a qualifying examination.

Organization for Pollution Prevention



Functions

- (a) Manages the pollution control issues of the facility.
- (b) Assists the manager and directs the operators or technicians.
- (c) Deals with technical operations of the pollution abatement equipment.

Note : (c) depends on the size of the facility, for a large facility there shall be PCM for air, land and water.

The specific duties of the pollution control manager (PCM) are to—

- (a) ensure that the staff involved in pollution control have clearly defined responsibilities ;
- (b) ensure that daily pollution control practices are complied with ; and
- (c) maintain proper environmental and safety communications within the facility and the regulatory authorities as well as the host community.

POLICIES CONCERNING INDUSTRIES' POLLUTION CONTROL

1. Pollution control management at facilities shall include—

- (a) the improvement and operation of effective environmental management systems;
- (b) communication with NESREA headquarters;
- (c) the ability to know when a system is malfunctioning;
- (d) the documentation of the environmental management procedure and control of the records and documents; and
- (e) cooperation with interested parties such as other related companies.

2. Addressing corporate-wide environmental measures includes—

- (a) recognition of the business risk relative to the environmental management system;
- (b) resource management including maintenance of human resources for pollution control and their competency;
- (c) establishing a corporate-wide environmental management system including risk information feed-back system;
- (d) establishing a redundant monitoring, assessment and self-improvement system; and
- (e) establishing a contingency plan and its verification.

SCHEDULE V

BEST PRACTICES TO MINIMIZE OCCUPATIONAL HAZARDS

Combustion facility workers may be exposed to dangers in the course of their activities and some measures have been proffered to mitigate the hazards that may arise from the under listed concerns—

1. Non-Ionizing Radiation

Workers may have a higher exposure to electromagnetic fields (EMF) than the general public due to working in proximity to electric power generators, equipment and connecting high-voltage transmission lines. Exposure should be prevented or minimized through the preparation and implementation of an EMF safety programme that has the following components—

(a) identification of potential exposure levels in the work place, including surveys of exposure levels in new projects and the use of personal monitors during working activities ;

(b) training of workers in the identification of occupational EMF levels and hazards ;

(c) establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers ;

(d) implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the Institute of Electrical and Electronics Engineers (IEEE) ;

(e) personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels ; and

(f) action plans to address occupational exposure may include—

(i) limiting exposure time through work rotation ;

(ii) increasing the distance between the source and the worker, when feasible ; or

(iii) the use of shielding materials.

2. Heat

Recommended prevention and control measures to address heat exposure at thermal power plants include—

(a) regular inspection and maintenance of pressure vessels and piping ;

(b) provision of adequate ventilation in work areas to reduce heat and humidity ;

(c) reducing the time required for work in elevated temperature environments and ensuring access to drinking water ;

(d) shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc ; and

(e) use of warning signs near high temperature surfaces and personal protective equipment (PPE) as appropriate, including insulated gloves and shoes.

3. Noise

Recommendations to prevent, minimize, and control occupational noise exposures in thermal power plants include—

(a) provision of sound-insulated control rooms with noise levels below 60dBA ;

(b) design of generators to meet applicable occupational noise levels ;

(c) identify and mark high noise areas and request that personal noise protecting gear is used all the time when working in such high noise areas (typically areas with noise levels >85dBA) ; and

(d) proper installation of equipment with dampers to prevent vibration.

4. Electrical Hazards

Recommended measures to prevent, minimize, and control electrical hazards at thermal power plants include—

(a) installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization ;

(b) use of voltage sensors prior to and during workers' entrance into enclosures containing electrical components ;

(c) deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them ;

(d) provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits. This training includes training in basic electrical theory, proper safe work procedures, hazard awareness and identification, proper use of PPE, proper lockout or tagout procedures and proper rescue procedures ; and

(e) provisions for periodic retraining as necessary.

5. Fire and Explosion Hazards

Recommended measures to prevent, minimize, and control physical hazards at thermal power plants include—

(a) use of automated combustion and safety controls ;

(b) proper maintenance of boiler safety controls ;

(c) implementation of startup and shutdown procedures to minimize the risk of suspending hot coal particles (e.g. in the pulverizer, mill, and cyclone) during startup ;

(d) regular cleaning of the facility to prevent accumulation of coal dust (e.g. on floors, ledges, beams, and equipment) ;

(e) removal of hot spots from the coal stockpile (caused by spontaneous combustion) and spread until cooled, never loading hot coal into the pulverized fuel system ; and

(f) use of automated systems such as temperature gauges or carbon monoxide sensors to survey solid fuel storage areas to detect fires caused by self-ignition and to identify risk points.

6. Chemical Hazards

Recommended measures to prevent, minimize, and control physical hazards at thermal power plants include the—

(a) generation of ammonia on site from urea or use of aqueous ammonia in place of pure liquefied ammonia ; and

(b) use of sodium hypochlorite in place of gaseous chlorine.

7. Dust

Recommended measures to prevent, minimize, and control occupational exposure to dust in thermal power plants include the—

(a) use of dust controls (e.g. exhaust ventilation) or wherever free silica levels in airborne dust exceed 1 percent ; and

(b) regular inspection and maintenance of asbestos containing materials (e.g., insulation in older plants may contain asbestos) to prevent airborne asbestos particles.

SCHEDULE VI

GUIDELINES FOR EXTENDED PRODUCER RESPONSIBILITY PROGRAMME

1. As part of the strategic alliance programme of NESREA, all private individuals, retailers, manufacturers and importers of electrical power equipment (EPE) shall partner with NESREA to establish an effective extended producer responsibility programme.

2. Manufacturers and importers of EPE shall submit an extended products responsibility proposal along with the relevant permit in these Regulations and such proposal shall—

(a) cover all brands of equipment for power generation, transmission and distribution ;

(b) establish a process for the collection, handling, transportation and final treatment of post-consumer EPE regardless of who the original brand owner is ; and

(c) incorporate the principles of a pollution prevention hierarchy by moving progressively from disposal to reduce, reuse, repair, recover and recycle of post-consumer products.

3. Manufacturers and importers of EPE shall submit on or before June 30 in each year to NESREA, an annual report on their extended products responsibility program during the previous fiscal year which shall include—

(a) information relating to the total amount of EPE sold and post-consumer products collected ;

(b) information relating to the total amount of post-consumer EPE processed or in storage ;

(c) information relating to the percentage of post-consumer EPE that were treated or contained, reused, recycled, recovered and repaired ;

(d) information relating to the types of processes used to repair, reuse, recycle or recover post-consumer EPE, including details of efforts to incorporate the priorities of a pollution prevention hierarchy by moving progressively from disposal to reduction, repair, reuse and recycle of post-consumer products ;

(e) information relating to the location of any long-term containment or final treatment and processing facilities for post-consumer product ;

(f) information relating to the process of internal accountability used to monitor environmental effectiveness ; and

(g) any other information requested by NESREA.

4. Manufacturers of EPE shall provide along with the equipment—

(a) a detailed manual on handling of the equipment in case of accidental breakage or damage ;

(b) details on the disposal of the end use of the product ;

(c) list of collection centres or organisations for deposition of the end – of-life EPE after giving contact details of the collection centres such as address, telephone no, 24hrs helpline and e-mail ; and

(d) details of pick-up services.

SCHEDULE VII

FORM I

MONTHLY DISCHARGE MONITORING REPORT (MDMR)

[NESREA Discharge Monitoring Report]

*Please Complete and Submit One Copy each Month.**This Report Shall be Postmarked not later than the
28th of the following Month*

FACILITY NAME AND ADDRESS :

Facility e-mail address :

Mail to : National Environmental
Standards and Regulations
Enforcement Agency (NESREA),
4, Oro-Ago Crescent,
Garki II,
Abuja.

SAMPLING POINT LOCATION :

MONTH YEAR

SAMPLING DATES AND TIME :

TYPE OF SAMPLING							
PARAMETERS	WEEKLY RESULTS						NESREA Regulatory Limits
	UNITS	1ST	2ND	3RD	4TH	AVERAGE	
PHYSICAL :							
Appearance							
Odour							
Temperature	°C						
pH							
Conductivity	µs/cm						
Turbidity	NTU						
Dissolved Oxygen (DO)	mg/l						
Total Suspended Solids (TSS)	mg/l						
Total Dissolved Solids (TDS)	mg/l						
BOD	mg/l						
COD	mg/l						
INORGANIC :							
Chloride	mg/l						
Nitrate	mg/l						

ANNEX I

BEST PRACTICES FOR CONTROL OF AIR EMISSIONS

Recommended measures to prevent, minimize, and control air emissions from power plants include—

(a) use of the cleanest fuel economically available (natural gas is preferable to oil, which is preferable to coal) if that is consistent with the overall energy and environmental policy of the country or the state where the plant is proposed. Fuels, combustion technology and pollution control technology should be evaluated very carefully upstream of the project to optimize the project's environmental performance ;

(b) when burning coal, giving preference to high-heat-content, low-ash, and low-sulfur coal ;

(c) considering beneficiation to reduce ash content, especially for high ash coal ;

(d) selection of the best power generation technology for the fuel chosen to balance the environmental and economic benefits. The choice of technology and pollution control systems will be based on the site-specific environmental assessment (some examples include the use of higher energy-efficient systems, such as combined cycle gas turbine system for natural gas and oil-fired units, and supercritical, ultrasupercritical or integrated coal gasification combined cycle (IGCC) technology for coal-fired units) ;

(e) designing stack heights according to good international industry practice (GIIP) to avoid excessive ground level concentrations and minimize impacts, including acid deposition ;

(f) considering use of combined heat and power (CHP, or cogeneration) facilities. By making use of otherwise wasted heat, CHP facilities can achieve thermal efficiencies of 70-90 percent, compared with 32-45 percent for conventional thermal power plants ; and

(g) ensuring that emissions from a single project should not contribute more than 25% of the applicable ambient air quality standards to allow additional, future sustainable development in the same air shed.

BEST PRACTICES FOR ENERGY EFFICIENCY AND GHG EMISSIONS

Carbon dioxide, one of the major Greenhouse Gases (GHGs) under the UN Framework Convention on Climate Change is emitted from the combustion of fossil fuels. Recommendations to avoid, minimize, and offset emissions of carbon dioxide from new and existing thermal power plants include—

(a) use of less carbon intensive fossil fuels (i.e., less carbon containing fuel per unit of calorific value — gas is less than oil and oil is less than coal) or co-firing with neutral fuels (i.e., biomass) ;

- (b) use of combined heat and power plants (CHP) where feasible ;
- (c) use of higher energy conversion efficiency technology ;
- (d) considering efficiency-relevant trade-offs between capital and operating costs involved in the use of different technologies. For example, supercritical plants may have a higher capital cost than subcritical plants for the same capacity, but lower operating costs. On the other hand, characteristics of existing and future size of the grid may impose limitations in plant size and hence technological choice. These tradeoffs need to be fully examined in the EA ;
- (e) use of high performance monitoring and process control techniques, good design and maintenance of the combustion system so that initially designed efficiency performance can be maintained ;
- (f) where feasible, arrangement of emissions offsets (including the Kyoto Protocol's flexible mechanisms and the voluntary carbon market), including reforestation, afforestation, or capture and storage of CO₂ or other currently experimental options ;
- (g) where feasible, include transmission and distribution loss reduction and demand side measures. For example, an investment in peak load management could reduce cycling requirements of the generation facility thereby improving its operating efficiency. The feasibility of these types of off-set options may vary depending on whether the facility is part of a vertically-integrated utility or an independent power producer ; and
- (h) considering fuel cycle emissions and off-site factors (e.g., fuel supply, proximity to load centers, potential for off-site use of waste heat, or use of nearby waste gases (blast furnace gases or coal bed methane) as fuel.

ANNEX II

BEST PRACTICES FOR WATER USAGE

Recommended management measures to prevent or control impacts to water resources and aquatic habitats include conserving water resources, particularly in areas with limited water resources, by—

- (a) use of a closed-cycle, recirculating cooling water system (e.g., natural or forced draft cooling tower), or closed circuit dry cooling system (e.g., air cooled condensers) if necessary to prevent unacceptable adverse impacts. Cooling ponds or cooling towers are the primary technologies for a recirculation cooling water system. Once-through cooling water systems may be acceptable if compatible with the hydrology and ecology of the water source and the receiving water and may be the preferred or feasible alternative for certain pollution control technologies such as seawater scrubbers ;

