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Environmental Protection Agency

P. O. Box M 326
Ministries Post Office
Accra, Ghana

Email: support@epaghana.org

Permit No. CE0018780141

ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL PERMIT

ENVIRONMENTAL ASSESSMENT REGULATIONS 1999 (LI 1652)

This is to authorize

VOLTA RIVER AUTHORITY

**To commence the proposed 220MW Thermal Power Plant Project as per
attached schedule**

Located at the Kpone, Tema Community 25 in the Tema Metropolis

Date Issued: November 12, 2012

Expiry Date: May 11, 2014

D. S. AMLALO
Ag. Executive Director

NB: This Permit is only valid with the Seal of the Environmental Protection Agency and conditioned upon obtaining other permits from relevant institutions among others

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SCHEDULE TO THE ENVIRONMENTAL PERMIT

- | | | | |
|-----|---|---|---|
| 1.0 | CONTACT | : | THE CHIEF EXECUTIVE |
| 2.0 | COMPANY | : | VOLTA RIVER AUTHORITY
P. O. BOX MB 77
ACCRA |
| 3.0 | REGISTRATION NO | : | CE: 1878/01/41 |
| 4.0 | PERMIT NO. | : | CE0018780141 |
| 5.0 | EIA OF PROPOSED 220MW KPONE THERMAL POWER PLANT PROJECT AT
KPONE, TEMA COMMUNITY 25 IN THE TEMA METROPOLIS | | |

In pursuance of the Environmental Protection Agency 1994, Act 490 (Sections 2 (i) and 12 (1)) and the Environmental Assessment Regulations, 1999 (LI 1652) and on the basis of the information provided in the Environmental Impact Statement (EIS) (August 2012), this Environmental Permit is issued authorizing **VOLTA RIVER AUTHORITY** to commence the proposed Kpone Thermal Power Plant project in the Tema Metropolis of the Greater Accra Region.

6.0 CONDITIONS OF PERMIT

6.1 Commitment to Project Specification

- Comply with all project specifications, mitigation, and monitoring and other environmental management provisions as indicated in the project Environmental Impact Statement (EIS).
- The project involves the generation of 220MW thermal power plant with the following facilities:
 - 2 (No) 110 MW Alstom GT11N2 (EV) Gas Turbine Generators GTGs (simple cycle)
 - 500m 161kV single circuit transmission line between KTPP site to GRIDCO Akosombo-Tema transmission line
 - 11.5km natural gas pipeline from Regulatory & Metering Substation of the West Africa Gas Pipeline to KTPP site
 - 2km diesel oil pipeline from the storage depot of BOST to the KTPP site

6.2 Project Locations

- The proposed Thermal Power Plant is located at Kpone, Tema Community 25 in the Tema Metropolis of the Greater Accra Region.
- Total land take-75 acres

6.3 CONSTRUCTIONAL PHASE CONDITIONS

6.3.1 Dust Management

- Dust from construction activities should be suppressed by frequent watering of exposed surfaces.

- Install and use dust collectors or water spray systems to limit dust from batching processes.
- All vehicles carrying materials (gravel, sand and chippings) to the project site should be covered with tarpaulin to prevent dust emission.
- Control vehicle speeds on unpaved local roads
- Stockpiled top soil should be covered or re-vegetated

6.3.2 Vehicular Traffic Management

- Appropriate road signs should be posted 50m, 100m and 200m to warn motorists of construction work and movement of heavy-duty vehicles.
- Long vehicles for transporting plant parts should be clearly and adequately labelled to warn other road users.
- Vehicular traffic to deliver construction material and equipment should be limited to daytime.
- All vehicles should maintain the 40km/hr speed limit imposed by management in the project vicinity.
- Plan and manage site preparation and construction activities to minimize disruption to local traffic

6.3.3 Noise Management

- Install noise reducing fixtures to vehicles and plant equipment
- Noise generated from the operation of heavy equipments should be restricted to daylight hours.
- Provide noise awareness training to workers
- Schedule steam blows during commissioning to limit disturbance and provide advance warning to neighbours of such activities
- Limit the build up of debris in the pipe work during construction to reduce length of steam blows
- Comply with the existing Tema Metropolitan Assembly byelaws on noise.
- Comply with the EPA Guidelines on noise.
- Provide earmuffs for construction crew working with noisy machines and power tools
- Ensure periodic maintenance and lubrication of equipment to minimise noise

6.3.4 Occupational Health and Safety Management

- Construction workers should be trained in the proper handling and use of construction equipment and safety measures prior to construction.
- Provide protective clothing/gear such as helmets, steel boots, earmuffs, nose masks and hand gloves for construction workers.
- Suitable equipment like scaffolding and safety harnesses should be provided at the work site.
- First aid kit stuffed with the necessary medications should be provided at the work site.
- Carryout daily safety briefing of workforce prior to commencement of work.

6.3.5 Reduce Soil Erosion and Destabilization

- Mechanically stabilize the soil in order to reduce potential of erosion;
- Avoid excavation and burial in steeply sloped ground and avoiding creation of grade breaks;
- Provide siltation ponds in areas subject to heavy erosion;
- Rehabilitate sites after work, including restoring beds, banks, and flow of waterways as necessary;
- At the completion of the work, disturbed soil should be leveled and seeding immediately or re-planted in order to control soil erosion.
- Stone pitch of slab steep slopes on site to reduce erosion

6.3.6 Bundling of Fuel Storage Tanks

- Ensure that the diesel storage tanks are appropriately banded with the void space / volume equivalent to 110% of the volume of the biggest tank.

6.3.7 Construction Phase Environmental Monitoring

- Ensure the implementation and enforcement of the Monitoring Plan covering the construction phase of the project as provided in the EIS.
- Submit to the Agency phased work programme for the construction phase 30 days before the commencement of the project to enable the Agency monitor critical stages of the construction process (particularly in environmentally sensitive sites) to ensure that adequate safeguards are implemented.
- Monitor the following parameters and activities during the **construction phase** of the project:
 - Construction traffic
 - Dust
 - Noise
 - Soil Erosion
 - Occupation health and safety
 - Oil Spills

6.3.8 Site Meetings

- Invite EPA Regional Representative to all relevant site meetings during the construction phase to ensure environmental safeguards are implemented.

6.4 OPERATIONAL PHASE CONDITIONS

6.4.1 Occupational and Public Health and Safety

- Staff operating the plant should be provided with required protective clothing such as hard hats, earmuffs, padded gloves, overalls, protective non-slip footwear, goggles and safety belts.
- Workers should be trained in the proper handling of equipments and the identification of fire hazard signals.
- Implement safety and emergency action plans and related training programme to ensure the safety of workers and of the surrounding communities.
- Ensure that all employees adhere to the safety programme
- Provide for the establishment of emergency plans and action plans in the event of fire, explosions, accidents causing injury, accidental spills of contaminants, or gas leaks;
- Keep on hand a supply of absorbent materials as well as properly designated recipients designed to contain petroleum residue and wastes in the event of a spill;
- Observe applicable standards in site selection and disposal methods when it is necessary to remove or contain pollutants or contaminated substances;
- Provide for storage areas for contaminated products and equipping them with devices designed to protect against any accidental spills;
- Communicate with local communities regarding the operations, hazards, and response plans of the facilities
- Over burning of wastes or other materials are prohibited within your premises or immediate surroundings.

6.4.2 Solid Waste Management

- Institute appropriate measures to ensure the effective segregation of solid waste to facilitate reuse, recycle and safe disposal of the unusable constituents aimed at enhancing efficient resource utilization and conservation.

- The company should keep record of the amount/ quantity of scrap metals and empty metal drums generated and sold out for recycling.
- Sludge should be appropriately managed and disposed of at approved sites to prevent pollution.
- All other solid wastes should be disposed of appropriately at the site approved by the district authorities.
- Incineration of hazardous wastes shall take into consideration emissions associated with the incineration processes and shall provide appropriate mitigation for all such emissions.
- Ensure that all staff are trained in effective waste handling and management procedures of the company.
- Ensure that the company complies with the waste management requirements of the Tema Metropolitan Assembly (TMA).
- Ensure that all sludge generated from the oily waste treatment system shall be dewatered, dried and disposed off appropriately in accordance with the Tema Metropolitan Assembly's (TMA) guidelines.
- This permit strictly prohibits any form of open burning of wastes onsite/offsite the premises of Kpone Thermal Power Plant Limited.
- All hazardous wastes including sludge, contaminated soils, and contaminated fuels/oil among others, generated on site shall be collected in appropriate containment, stored under a shed in a bunded area, if need be, and disposed appropriately in accordance with the best practice procedures as contained in the company's standard operating procedures. The disposal of all such wastes shall be done in consultations with the Chemicals Control and Management Center of the EPA.
- Submit an inventory of all wastes generated on site, and the disposal approaches used, to the Agency at the end of each year in your annual environmental report.

6.4.3 Wastewater Treatment and Management

- Construct an appropriate wastewater treatment facility to treat all wastewater from the premises to meet EPA effluent discharged guideline limits under the Akoben Programme before discharge.
- The wastewater treatment plant shall be completed, operationalised and commissioned together the thermal power plant.
- The design of the wastewater treatment plant (WWTP) shall take into consideration the phase development (*past, current and future expansion of operations*) capacity of the plant over the next ten (10) years.
- Ensure that the wastewater management option selected, when implemented, shall meet the EPA Sector Specifics Effluent Quality Guidelines under the Akoben Programme.
- During the operational phase, ensure that all wastewater/effluent discharges from the premises of *Kpone Thermal Power Plant Limited* shall comply with the EPA sector specific effluent quality guidelines under the Akoben Programme before discharge.

6.4.4 Pipeline Protection

- Implement a comprehensive pipeline management system to ensure the integrity of the pipeline
- Submit a detailed corrosion control plan to be adopted for the pipeline protection including crossings
- Implement a comprehensive safety management system for the pipeline to avoid accidents
- Implement a leak detection and repair (LDAR) programme that controls fugitive emissions by regularly monitoring to detect leaks and implementing repairs within a predetermined time period
- Consider the use of Supervisory Control and Data acquisition (SCADA)

6.4.5 Chemical Imports, Handling and Management

- Obtain chemical clearance permit from the EPA for all your chemical imports into the country.
- Submit an inventory of obsolete chemicals (and chemical containers) to the Agency at the end of each year in your annual environmental report. The disposal of all obsolete chemicals and chemical containers (if any) should be done in accordance with their respective material safety data sheets (MSDS) and in consultation with the Chemicals Control Management Center (CCMC) of the EPA.
- Ensure that all chemicals used on site (including obsolete chemicals and their containers) are properly stored under appropriate conditions as directed in their respective material safety data sheets (MSDS) to maximize safety.
- Ensure adequate ventilation in the chemicals and hazardous/chemical waste storage areas to maximize safety.
- Ensure that warning signs are erected and unauthorized access restricted in the chemicals and hazardous/chemical wastes storage areas.

6.4.6 Fire Prevention and Management

- An internal fire protection system complete with hydrocarbon sensing and thermal detectors should be put in place.
- Adequate alarms, signage, warnings and notices should be put in place.
- Adequate fire protection should be provided for gas pipelines, which will be buried 2.0m underground.
- Modern communication systems should be provided to ensure efficient collaboration with the Ghana National Fire Service (GNFS) and other agencies whenever there is a fire outbreak.
- Smoking and use of naked flames should not be permitted on site and notice of such restrictions should be boldly displayed.
- An Emergency Response and Preparedness Plan for fire incidents should be developed and implemented in consultation with the GNFS.

6.4.7 Noise Management

- Maintain transportation vehicles and machinery in good working state in order to minimize noise;
- Comply with the appropriate EPA permissible noise levels. Ensure that the noise levels comply with the EPA ambient noise levels for heavy industrial areas.
- This notwithstanding noise impacts from the operation of the plant on receptors outside the boundary of the project should meet residential/institutional/educational value of 55dB(A) during the day i.e. 06:00hrs-22:00hrs and 48dB(A) at night between 22:00hrs-06:00hrs. Commercial value of 70dB (A) at both day and night.
- Install the necessary silencers/mufflers on equipment and machinery to meet the above values
- Comply with existing Tema Metropolitan Assembly bye-laws on noise

6.4.8 Air Emissions

- Effectively control and manage operational air emissions in accordance with following relevant ambient air quality guidelines:

Substance	Time Weighted Average (TWA)		Averaging Time
Sulphur Dioxide (SO ₂)	900 µg/m ³	Industrial	1 hour
	150 µg/m ³	Industrial	24 hours
	80 µg/m ³	Industrial	1 year

Nitrogen Oxides (Measured as NO ₂)	400 µg/m ³	Industrial	1 hour
	150 µg/m ³	Industrial	24 hours
Total Suspended Particulate	230 µg/m ³	Industrial	24 hours
	75 µg/m ³	Industrial	1 year
PM ₁₀	70 µg/m ³		24 hours
Smoke	150 µg/m ³	Industrial	24 hours
	50 µg/m ³	Industrial	1 hour
Carbon Monoxide	100 mg/m ³		15 min
	60 mg/m ³		30 min
	30 mg/m ³		1 hour
	10 mg/m ³		8 hours

6.4.9 Operational Phase Environmental Monitoring

- Monitor the following parameters and activities during the Operational Phase of the project:
 - Fire Preparedness Monitoring
 - Ambient Noise Monitoring (100m from source/impact points)
 - Wastewater Monitoring (including quantitative and qualitative Discharges into the Sea (pH, Temperature, Oil and Grease)
 - Stack Emissions (NO_x)
 - Sludge management
 - Waste oil management
 - Use of personal protective equipment (PPE)
 - Solid waste generation and disposal
 - Accidents, worker injury and health
 - Spill Containment systems
 - Fire Risk
 - Traffic management and Vehicular Accidents
 - Occupational and Public Health and Safety
- Install an online continuous monitoring system as part of the instrumentation and monitor atmospheric emissions (PM₁₀, TSP, NO_x, SO_x and total hydrocarbons) and then fallout on foliage
- Submit half-yearly Monitoring Reports to the Agency for review and comments.
- Environmental Performance Rating and Public Disclosure Scheme;
 - The renewal of environmental permit/certificate is subject to the company's participation in the AKOBEN Environmental Performance Rating and Public Disclosure Programme

6.4.10 Emergency Response Plan

- Implement an emergency response plan in coordination with the relevant authorities in the event of emergencies (such as oil spills, fires, incidents etc) during the operational phase.
- Work with emergency response organizations and authorities to refine emergency response plans and enhance response capabilities in the area and to ensure emergency response readiness particularly during project operations.
- Report on such collaboration in the Annual Environmental Reports submitted to the Agency

6.4.11 Stakeholder Consultations

- Set up a permanent structure for consultation with stakeholders during the operational phase to deal with emerging matters and new developments.

6.5 OTHER REGULATORY REQUIREMENTS AND PERMITS

6.5.1 Comply with Factories, Offices and Shops Act, 1970

- Comply with the requirements of the Factories, Offices and Shops Act, 1970 (Act 328). Consult with the Factories Inspectorate Department in order to satisfy the requirements of the Department and the Act.

6.5.2 Comply with the requirements of the EPA Act 1994, Act 490 Part II on Chemical Control and Management.

- Comply with the requirements of the EPA Act 1994, Act 490 Part II on Chemical Control and Management by obtaining clearance/permit from the EPA for any chemical imported or used in the construction and operation of the power plant.

6.5.3 Comply with the requirements of the Energy Commission Act 1997, Act 541

- Comply with the requirements of the Energy Commission Act, 1997 (Act 541) by obtaining necessary licence to construct and operate

6.5.4 Compliance with Ghana National Fire Service Requirements 2003, LI 1724

- Provide appropriate fire prevention/fighting equipment on site as recommended by the Ghana National Fire Service (GNFS) Regulations given in the fire report and all other recommendation in that report.
- Provide appropriate fire fighting training for station attendants and all key personnel.
- Install fire alarms at the project site.
- Obtain Fire Certificate from the GNFS.

6.5.5 Other Permits

- Notwithstanding this Permit, the project is further subject to other relevant regulations and permits pertaining to the sector and must be observed.

6.6. NOTIFICATIONS

6.6.1 Notification of Works, Accidents and Changes

- Notify EPA of special operations such as maintenance and /or modification works and other installations two-four weeks prior to commencement of such works
- Notify relevant authorities including EPA of malfunctions/accidents/incidents within 24 hours of such occurrences
- Notify EPA of any major changes in the planned development contrary to the information provided in the EIS.

6.6.2 Commencement and Completion Notice

- Notify EPA on the completion of the expansion project infrastructure development.
- Submit a completion report within 14 days of completion

6.7 REPORTING

6.7.1 Annual Environmental Report

- Submit Annual Environmental Report of the company's retooled operations after 12 months from the commencement of operations and every 12 months thereafter to the Agency in accordance with Regulation 25 of LI 1652. The first report should be submitted by **November 12, 2013**. The report should indicate among other things progress made in implementing the project EMP.

- Submit quarterly Akoben Data Forms (environmental quality reports) on the external environment in accordance with EPA reporting guidelines.

6.7.2 Environmental Management Plan

- Submit an Environmental Management Plan within eighteen months of commencement of project operations and thereafter every three years in accordance with Regulation 24 of LI 1652.

6.7.3 Environmental Certificate

- An Environmental Certificate must be obtained within 24 months (**before November 12, 2014**) of submission of annual environmental report and satisfactory performance and compliance with relevant permit conditions, in accordance with Regulation 22 of LI 1652.

6.8 PERMIT VALIDITY & RENEWAL

6.8.1 Permit Transferability

- This permit is not transferable and covers only **Volta River Authority's** thermal power plant project located at Tema Community 25 in the Tema Metropolis.

6.8.2 Validity Period

- Failure to commence operations within eighteen (18) months shall render the permit invalid after the period.

6.8.3 Permit Renewal

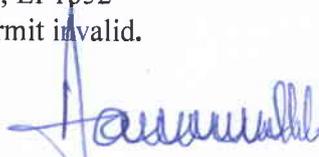
- The permit may be renewed by submitting the necessary application to the Agency.

6.8.4 Penalty for Breach of Conditions of Environmental Permit

Failure to comply with any or all of the permit conditions above shall

- Attract administrative penalties as shall be presented by the Agency
- Attract the necessary fines as prescribed under Regulation 26 of the Environmental Assessment Regulations 1999, LI 1652
- Render this Environmental Permit invalid.

7.0 AG. EXECUTIVE DIRECTOR


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D. S. AMLALO

NOVEMBER 12, 2012
DATE ISSUED

8.0 NOTIFICATION

The Hon. Minister, Ministry of Environment, Science and Technology, Accra

The Hon. Minister, Ministry of Energy, Accra

The Executive Secretary, Energy Commission, Accra.

The Chief Inspector of Factories, Factories Inspectorate Dept., Accra.

The Chief Executive, Tema Metropolitan Assembly, Tema

The Regional Director, EPA East Region, Tema