

**TD-OP-S03**



# **POWER SYSTEM EQUIPMENT OUTAGE PLANNING PROCESS**

**GHANA GRID COMPANY LTD**

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## 1. PURPOSE

This procedure specifies the processes and timelines to be followed by all grid participants to ensure effective equipment outage planning and coordination of maintenance activities on the Ghana Power System.

## 2. DEFINITIONS

1. Applicant      A person who is applying for a Protection Guarantee on an NITS equipment;
2. Contingency    The possibility of a fault or equipment failure in a power system;
3. ETU      The entity charged with operation of the NITS by virtue of the Energy Commission Act, 1997 (Act 541);
4. Grid Code      The code that contains the technical and operational rules of practice and standards of performance rules developed and approved by the Board of the Energy Commission to facilitate the operations related to the bulk transmission of electricity within the NITS;
5. Grid Participant      A Wholesale Supplier, Distribution Company, Bulk Customer or an NITS asset owner;
6. Hold Off      A limited type of protection which prohibits the re-energisation of apparatus in the proximity of which men are working and which they might inadvertently make contact;
7. Major NITS Equipment      All primary NITS equipment such as transmission lines, power transformers, capacitor banks, etc and every equipment whose outage could result in interruption of customer supply;
8. NITS      National Interconnected Transmission System;
9. Planned Outage      The removal of an equipment from service availability for inspection or the general overhaul of a major equipment and is usually scheduled well in advance;
10. Power System      The interconnected system of generating units, transmission and distribution networks operated as an integrated arrangement for the supply of electricity.
11. Station Guarantee      A type of Protection Guarantee which carries with it assurance that specified isolating devices or de-energizing devices, or both, are in a specified guaranteed position and that they will remain in that position until the holder surrenders it, in conformity with the Rules;
12. Work and Test Permit      A form of protection guarantee issued by a master station to a qualified person or safety supervisor under which specified work and tests are authorised on specified apparatus;

13. Work Permit A form of protection guarantee issued by a master station to a qualified person or safety supervisor under which specified work is authorised on specific apparatus.

### 3. INTRODUCTION

The Ghana Grid Company (GRIDCo), being the Electricity Transmission Utility (ETU) on the Ghana Power System is responsible for:

- The control and operation of the NITS to ensure security of the network within its technical limits and in accordance with the provisions of the Grid Code.
- Undertaking **outage planning and coordinating maintenance activities** of all equipment and facilities that will or are likely to impact on the reliability of the NITS.

Towards fulfilling these responsibilities, the Grid Code obliges GRIDCo to review, assess, coordinate, control and manage the impact of equipment outage schedules on the reliability of supply and the stability of the power system to minimise equipment down-time, maximise resource utilisation and to minimize any negative impact on supply to consumers.

To enable technical contingency measures to be implemented, the **planning for equipment shutdown should be undertaken sufficiently in advance**. The Grid Code accordingly requires:

- the preparation of annual Committed Outage Plans by the first day of December each preceding year; and
- Monthly equipment outage/maintenance coordination.

### 4. POWER SYSTEM EQUIPMENT OUTAGE PLANNING PROCESS

#### 4.1. Preparation of Committed Outage Plan

4.1.1. All grid participants are required to submit their annual equipment outage needs to the System Control Centre (SCC) by October 31 of the preceding year. The submission shall detail the following:

4.1.2. The NITS equipment required to be taken out of service;

4.1.2.1. The purpose/nature of work intended to be carried out that requires an outage on the NITS equipment;

4.1.2.2. The preferred start date and time for the outage;

4.1.2.3. The expected completion date and time for the work;

4.1.2.4. The applicant's name and details;

- 4.1.2.5. Information indicating whether or not power supply to any customer would be interrupted during the period of outage; and
- 4.1.2.6. Whether the equipment would be restored to service at the end of each day's work (where the duration of work is more than a day).

*(See the format in **Appendix 1**)*

- 4.1.3. The submissions from all grid participants shall be collated and harmonised by Operations Planning engineers at SCC.
- 4.1.4. Operations Planning Engineers at SCC shall exercise coordinating responsibility in harmonising the outage request submissions such that where it is likely that two or more requests conflict with each other, the submitted date(s) for the outage requests could be revised in consultation with the applicant(s).
- 4.1.5. SCC shall generate the Committed Outage Plan which shall be issued to all grid participants by the first day of December of the preceding year.

## 4.2. Monthly Transmission Equipment Outage Coordination

- 4.2.1. All maintenance and engineering units as well as grid participants are required to submit updated outage needs for each month by the first day of the preceding month. The format shall be same as used for the Committed Outage Plan.

Operations planners at SCC shall endeavour to accommodate each applicant's particular dates submitted for equipment outage. However, it must be understood that such dates submitted for outage needs requests only represent a preference which shall be subject to the scheduling considerations of operations planners at SCC.

In that regard where it is likely to conflict with other planned outages the preferred date for an outage request could be revised in consultation with the applicant;

- 4.2.2. SCC shall carry out contingency analysis on all outages to determine the potential impact these outages could have on the power system;
- 4.2.3. Where the analysis shows that an outage will pose significant challenges to the security/reliability of supply or safety of the NITS, SCC shall:

4.2.3.1. *either* recommend technical contingency measures to be taken to minimise the challenges to enable the outage to be granted;

4.2.3.2. *or* postpone/decline the outage request, citing reasons.

#### 4.3. Approving Authority

4.3.1. When the analysis by SCC is completed, necessary approvals for the equipment outage shall be sought as follows:

TYPE OF EQUIPMENT	APPROVING AUTHORITY
Transmission Line (in loop)	Chief Executive, GRIDCo
Transmission Line (radial)	Manager, SCC/DO
Feeder, Transformer	Manager, SCC/DO
Minor substation Equipment	Area Manager, MDO

4.3.2. When approval for an outage request is granted, SCC shall advise the applicant of the approval by the 21<sup>st</sup> day of the preceding month of the outage.

4.3.3. The applicant is required to confirm a minimum of 1-day before the approved date of outage that the work would take place as scheduled.

4.3.4. On the day approved for the outage, the necessary permits for the intended work shall be issued to the applicant. There are different types of permit as follows:

- 4.3.4.1.1. Hold-off;
- 4.3.4.1.2. Work Permit;
- 4.3.4.1.3. Work and test permit; and
- 4.3.4.1.4. Station Guarantee.

4.3.5. The outage cannot be granted until the relevant permits are completed and issued.

A detailed account on the types of permit can be obtained from the “Standard Protection Code”.

4.3.6. SCC may deny a previously approved outage from going ahead if it determines, in accordance with system reliability, security or safety criteria that the planned outage poses a significant risk to the satisfactory operation of the NITS;



Where a planned outage is denied from proceeding, the applicant shall be informed as soon as practical and arrangements for the rescheduling of the activity at the work group's earliest convenience shall immediately be put in place.

#### 4.4. Other Equipment Outage Requests

All planned NITS equipment outages shall be arranged as detailed above except for the following instances:

##### 4.4.1.1. Urgent outages

These are emergent contingencies that come up and would require urgent attention. Such URGENT equipment outage needs should be applied for at least **two (2) weeks** before the date of the required outage.

##### 4.4.1.2. Critical outages

A critical outage refers to a need for equipment outage emerging from a quickly deteriorating condition on an NITS equipment (e.g. A Hotspot at 120 degrees Celsius). Critical outage needs should be applied for at least **three (3) days** before the date of the required outage.

##### 4.4.1.3. Emergency outages

An emergency outage is one that needs to be attended to immediately to prevent damage to or loss of critical NITS equipment (e.g. When there is a fire outbreak on an NITS equipment).

A need for emergency outage needs does not require prior approval, however the responsible personnel shall promptly inform SCC of the reasons for emergency outage just before or immediately after taking the equipment out of service, in accordance with Prudent Utility Practice.