

	Standard	Transmission System Operator National Operations
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1. INTRODUCTION

The main objective of outage co-ordination is to ensure optimal operation of the IPS, which shall be achieved by the System Operator co-ordinating scheduled outages of generators, equipment of the TNSPs, associated metering, communication and control facilities that affect IPS operation.

2. SUPPORTING CLAUSES

2.1 SCOPE

This Standard covers outage management for the National Transmission Company, relating to the use of the Outage Co-ordination Management Application within Phoenix.

2.1.1 Purpose

This Standard provides a high-level description of the activities, interrelations and defines the requirements for the outage management process.

2.1.2 Applicability

This Standard is applicable to the outage scheduling process for the Transmission network service provider's equipment. It covers the process during the use of the Outage Co-ordination Management application within Phoenix and is applicable within the National Transmission Company.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] The South African Grid Code, Preamble, Version 10.0, August 2019
- [3] The South African Grid Code, System Operation Code, Version 10.0, August 2019

2.2.2 Informative

- [4] [32-630] Commissioning Procedure Requirements.
- [5] [41-475] Transmission Maintenance Planning, Scheduling and Control Standard.
- [6] [32-847] National Control & Operating Business Continuity Plan for Phoenix Energy and Outage Coordination Modules
- [7] [240-102715273] Outage Leader Checklist

2.2.3 Classification

a. Controlled Disclosure

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2.3 ABBREVIATIONS

Abbreviation	Description
Dx	Distribution
Gx	Generation
KCE	Key Customer Executive
NC	National Control
NCC	National Control Centre
Ops Planning	Operations Planning
PSM	Power System Manager
SAPP CC	Southern African Power Pool Coordination Centre
SO	System Operator
SOC	System Operating Control
TOC	Transmission Operating Control
T&RD	Trade and Regional Development
Tx	Transmission
WMC	Works Management Centre
TNSP	Transmission Network Service Provider
NTC	National Transmission Company
PPA	Power Purchase Agreement

2.4 DEFINITIONS

Participant

A legal entity registered with or licenced by NERSA in terms of the Electricity Act, and as listed in the Governance Code.

SO Scheduler

The SO scheduler is a person appointed by SO to assess the viability of a scheduled outage and either approves or turns it down. The Scheduler shall optimise plant utilisation by evaluating network capabilities as well as different system configurations and risk factors. It is also the responsibility of the SO Scheduler to co-ordinate international customer outages.

TNSP Outage Scheduler

A TNSP Outage Scheduler is a person appointed by Transmission and granted user access by SO for the scheduling of outages in the Phoenix database.

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SO Outage Scheduler Agent

A SO Outage Scheduler Agent is a person appointed by the Network Management Centre (NMC) to manage/coordinate outages between the distributor and TNSP by requesting, scheduling and confirming outages in the Phoenix database for plant demarcated to the relevant NMC.

Risk - related Outage

A planned outage where the next credible contingency would result in a loss of load, loss of supply, voltage slide, equipment overload or dynamic stability constraint.

Forced Outage

A *Forced Outage* is an outage that is not a *planned* outage.

Emergency outage

An outage when plant has to be taken out of service immediately to prevent further damage or loss.

Loss of Load Probability

A calculated risk of loss of generation capacity or loss of customer load.

Opportunity Maintenance

The maintenance taken as a result of the network configuration changing in such a way that the plant can be taken out of service without impacting on the required generation or system security.

Outage Requester

An Outage Requester is a *participant*, requesting an outage on plant for projects, planned maintenance, repairs, auditing, emergency repairs, construction, refurbishment, inspection, testing, training and to provide safety clearance for other activities such as servitude clearance, line crossings, underpasses, etc.

Planned Interruption

A planned outage that will interrupt customer supply.

Planned Outage

An outage of equipment that is requested, negotiated, scheduled and confirmed a minimum of 14 (28 days for generators) days prior to the maintenance or repairs taking place.

Unplanned Outage (Planned (Short Notice) Outage)

An outage that is not requested, negotiated, scheduled and confirmed 14 days before taking place. This type of outage, which must still have been requested and approved, is not a *forced outage*, *emergency outage* or *opportunity maintenance*.

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Cancelled Outage

A *Cancelled* outage is an outage where stakeholders, normally the initial requesters, decides not to take the outage due to well-grounded reasons, bearing in mind the impact it may have on the remainder of the outage plan.

If the outage is *Cancelled* **more than 24 hours** prior to the outage planned start time (except over weekends), the person requesting the cancellation should contact the relevant Grid Scheduler to cancel the outage in Phoenix.

If the outage is *Cancelled* on the day of the outage or over a weekend, the person requesting the cancellation should contact the relevant control centre directly to cancel the outage. The person requesting the cancellation shall make note of the controller's details.

For all the above cases, the reason and the name of the person requesting the cancellation must be logged in Phoenix by the control staff. This type of outage is **not** a *Turned Down* outage.

Not taken outage

A *Not Taken* outage is where an intended outage was "*Not Taken*" with the relevant Control centre, neither was the relevant control centre contacted with a valid reason on the day of the outage, for not taking the outage.

Turned down outage

A *Turned Down* outage is an outage that is not granted due to valid reasons as listed below but not limited to:

- Incorrect use of the outage management tool, i.e. outage information logged in Phoenix incorrect
- Violation of outage process, e.g. all requirements for *Scheduled* state not met
- Phoenix corridors were ignored by the NC/Dx/SOC/NMC Scheduler
- Network constraints due to system changes or forced outages

When an outage is Turned Down, an accurate description is to be added in Phoenix as to why the outage was *Turned Down*.

Postponed outage

A *Postponed* outage is a multiple day outage where the outage could not be *Taken* on any one of the days other than the last day of the outage. If the outage cannot be *Taken* on the last day of the outage and the work has not been completed, the outage must be either *Cancelled* or *Extended*. The Outage requestor must request an outage extension with the relevant control centre, if the control centre approves the outage extension, the control centre must update Phoenix accordingly or conversely make the outage *Cancelled* in Phoenix with a valid reason.

Requested Outage

A *Requested* outage is an outage booked in Phoenix where all the required fields are filled in on the *Schedule new Outage* window in the Outage Browser of the Outage Coordination Management application within Phoenix. This type of outage is to be requested **42 days prior** to the outage execution date.

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Scheduled Outage

A *Scheduled* outage within Phoenix, is an outage that has met all the requirements for a *Requested* outage and the status in Phoenix is changed to *Scheduled*. The outage is to be *Scheduled* in Phoenix a **minimum of 14 days prior** to the outage planned start date.

Confirmed Outage

A *Confirmed* outage within the Phoenix coordination environment is an outage that has met all the requirements for a *Scheduled* outage. A planned outage is to be *Confirmed* in Phoenix preferably a **minimum of 14 days prior** to the outage planned start date.

2.5 ROLES AND RESPONSIBILITIES

2.5.1 Outage requester

Is the participant requiring an outage on plant for planned maintenance, repairs, auditing, emergency repairs, construction, refurbishment, projects, inspection, testing or to provide safety clearance for other activities such as servitude clearance, line crossings and underpasses to request the outage from the TNSP.

During the requesting phase, the outage requester is responsible for but not limited to the following actions:

- Current outage plans checked
- Initiate Customer negotiations
- Arrange resources and equipment
- Ensure works order is available
- Request contingency plans
- Request plant/lines risk assessment reports
- Ensure that project related outages, all drawings, system diagrams and in/out commissioning sheets have been submitted to relevant departments & PWP have Added/Updated New Bays on SAP/ Phoenix and has ensured SCADA has been updated.
- Ensure that outage date extensions required for an outage are motivated/communicated to relevant control centres or grid schedulers taking into account the effect to the original outage plan
- Ensure that outages which cannot be executed on the day of the outage for any reason are *Postponed* (multiple day outage) or *Cancelled* directly with the relevant control centre
- Determine if a Site Restoration Plan is required

2.5.2 TNSP Outage Scheduler

The TNSP shall ensure that all outages for a particular bay(s)/plant are optimised by coordinating with relevant parties to combine outage requests where possible. In the case of conflicting outages (simultaneous outages which may increase the risk of loss of supply to a substation or area), the TNSP outage scheduler shall consider the priority, urgency and risks posed by the individual outages when scheduling. The TNSP outage scheduler is also responsible for ensuring that necessary resources are available for the outage and that negotiations of risk-related outages have taken place with relevant

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stakeholders. The TNSP outage scheduler is responsible for ensuring that the requested outages can physically be executed from a plant perspective.

The TNSP Outage Scheduler is responsible for scheduling a planned outage, a **minimum of 14 days prior** to the outage planned start date in Phoenix. During the scheduling phase, the following actions take place but are not limited to these:

The **TNSP outage scheduler** is to:

- Verify the correctness of outage requests and prioritise/negotiate risk related outages
- Work in consultation with the Grid appointed Outage Leader for all risk related outages
- Advise all stakeholders (e.g. Dx Field Services or Works Management Centre (WMC), Key Customer Executive (KCE), Network Management Centre, Generation Scheduler, Peaking, Southern African Power Pool (SAPP) members, IPP Representatives, etc.) with respect to the viability of outages and requirements/process
- Ensure all the roles and responsibilities of an Outage Requester are met
- Highlight all network abnormalities and risks associated with the respective grid
- Ensure conflicts are evaluated
- Request load studies from SO Agent/TOC Scheduler should downstream networks/IPP's be affected
- Check/verify Participant networks for constraints based on load studies received
- Ensure that for all *Scheduled* outages, the Contingency Plans, Site Restoration Plans, line/plant risk assessments and commissioning procedures have been submitted to the relevant control centres and persons
- Ensure in and out commissioning details for all plant have been updated in SAP/Phoenix/SCADA where relevant
- Ensure plant utilisation has been optimised
- Confirm stakeholder/customer negotiations have taken place
- Confirm resources (People & Equipment) are arranged
- KCE feedback obtained where applicable
- Evaluate Unplanned (*Planned (Short Notice)*) outages
- Coordinate all outage management meetings within the Grid
- Ensure that all project related outage schedules for the next 3 months are available and discussed at the relevant Grid meetings
- Represent the Grid at stakeholder outage management meetings and where applicable to negotiate outages
- Follow up on *Turned Down* or *Cancelled* outages and give feedback and/or advice where required
- Verify and provide information for the consolidated Tx National outage stats report
- Should site Restoration/Contingency plans require IPS load studies, it should be requested via the NC Scheduler

2.5.3 SO Outage Scheduler Agent (NMC)

The SO Outage Scheduler Agent is to:

- Ensure the *Scheduled* criteria is met
- Assess the viability of all *Scheduled* outages on the plant or equipment demarcated to TOC for operating purposes
- Ensure that Dx and Tx outages do not conflict and outages per feeder or plant item are optimized
- Request Network studies where relevant

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- Ensure that executable contingency plans, line risk assessment reports, load flow studies are available in the control room and have been discussed with NMC senior supervisors for all risk related outages
- Evaluate and recommend commissioning programs
- Add risk information and abnormalities in the Ops comments section in Phoenix
- Verify that the load at risk and the load shedding indicated in the contingency plan are correct
- Evaluate unplanned (*Planned (Short Notice)*) outages
- Confirm outages of the TNSP's plant demarcated to TOC

2.5.4 SO outage scheduler (SOC)

The SO Scheduler is appointed by System Operator to assess the viability of a scheduled outage and either to allow or turn down the request. This scheduler shall optimise plant utilisation by evaluating network capabilities, different system configurations and risk factors

The SOC outage Scheduler is to:

- Ensure the *Scheduled* criteria is met
- Assess the viability of all *Scheduled* outages demarcated to SOC for operating purposes
- Ensure that executable contingency plans, line/plant risk assessment reports, load flow studies are available in the control room and have been discussed with SOC senior advisors for all risk related outages
- Optimise plant utilisation by evaluating network load capabilities, different system configurations and risk factors that are obtained from Ops planning/Dx Network Optimisation and information supplied by the relevant schedulers
- Prioritise outages, identify optimal windows and provide advice to outage schedulers
- Request Network studies where relevant
- Ensure that the corridors of plant demarcated to SOC are updated in Phoenix
- Verify that the load at risk indicated in the contingency plan is correct
- Add risk information and abnormalities in the Ops comments section in Phoenix
- Verify that the load at risk and the load shedding indicated in the contingency plan are correct
- Evaluate and recommend commissioning programs
- Confirm outages of the TNSP's plant demarcated to the SOC

2.5.5 SO Outage Scheduler (NC outage scheduler)

The SO Scheduler is appointed by System Operator to assess the viability of a scheduled outage and either to allow or turn down the request. This scheduler shall optimise plant utilisation by evaluating network and generation capabilities, different system configurations and risk factors. It is also the responsibility of the scheduler to co-ordinate and schedule plant that affects international customers.

The NC outage scheduler is to:

- Assess the viability of all *Scheduled* outages that are demarcated to NC
- Request and evaluate load studies and recommendations from System Ops Planning for all risk related IPS outages
- Ensure mitigations are in place based on load studies and recommendations
- Advise on Security linking options. Based on recommendations from System Ops Planning and PSM/Shift Advisors
- Ensure that executable contingency plans, site restoration plans, load flow studies are available in the control room and have been discussed with PSM/NC Senior Advisors for all risk related outages

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- Optimise plant utilisation by evaluating network load capabilities, different system configurations and risk factors obtained from Operations planning & Network Optimisation
- Prioritise outages, identify optimal windows and provide advice to outage schedulers
- Compile and discuss with the PSM/NC advisor on duty an IPS maintenance report on a daily basis
- Ensure that the Phoenix outage management tool is utilised optimally by all users, i.e. ensuring that corridors and labelling are updated
- Co-ordinate and sanction international related outage requests
- Advise the project managers with respect to project related outages, requirements and the process to be followed
- Evaluate and recommend commissioning programs
- Conduct regular outage meetings with stakeholders as determined by the National Operations Manager at System Operator (SO)
- Add risk information and abnormalities in the Ops comments section in Phoenix
- Verify that the load at risk and the load shedding indicated in the contingency/Site restoration Plan are correct
- Confirm the TNSP's outages on plant that are demarcated to NC

Note that outages can be *Turned Down* on short notice due to generation constraints or restrictions.

2.5.6 SO (PSM/SOC Advisor/NMC Senior Supervisor)

The System Operator shall in real time be responsible for finally sanctioning (or alternatively refusing) an outage and ensuring that the relevant operating instructions are issued.

The SO (PSM/SOC Senior Advisor/NMC Senior Supervisor) is to:

- Ensure that Phoenix is updated with respect to the execution of outages
- Sanction any unplanned outages (*Planned (Short Notice)*), *Emergency Outages* and *Forced Outages* that are requested on the day of the outage, also ensuring that these outages are captured in Phoenix

2.6 PROCESS FOR MONITORING

Outage Management Workshops

The controlled copy of this document is kept with System Operator Documentation Centre. Any copies used will be regarded as uncontrolled copies. The document will be reviewed every 3 years to ensure the practicability of the document; however, the document might be updated when significant changes are required.

2.7 RELATED/SUPPORTING DOCUMENTS

[32-630] Commissioning Procedure requirements

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3. PLANT MANAGERS RESPONSIBILITIES FOR UNPLANNED OUTAGES (PLANNED (SHORT NOTICE) OUTAGES).

Plant Managers must sanction unplanned outages (planned (short notice))/Emergency Outages and give approval for accelerating outage requirements such as risk assessments, customer negotiation etc. The respective Plant manager will take responsibility for any plant failure that he/she has sanctioned under planned (short notice).

4. PROCESS OF A PLANNED OUTAGE REQUEST

When the need for an outage is first identified, it is entered into Phoenix **at Least 42 Days** as a requested outage with planned dates, description of outage, planned times, booking type, outage type, outage requirements, shortest return time and the urgency assigned to the request.

The outage requester shall enter this request into the Phoenix outage management tool under the Outage Co-ordination section.

Note that the *planned date out* is the starting time of the outage and refers to the time when the relevant Control Room starts to prepare the network for the specific outage. Scope of work discussion between the Engineering Assistant (EA) and the relevant NMC/NC, setting up the voltage profile or issuing of instructions for security linking purposes in preparation for the outage is all regarded as preparing for the outage.

The *planned date in* is the end time for the outage and is regarded as the report back time after the network has been normalised again subsequent to the outage. This should be taken into consideration when outages are getting booked as the time available for the Grids to do the actual work is only from handout to handback.

The TNSP Outage Scheduler must ensure that all the criteria for the scheduled status have been met prior to changing the outage status to *Scheduled* in Phoenix.

As soon as the TNSP Outage Scheduler has changed the outage status **more than 14 Days** to the *Scheduled* state, the NC/SOC/SO Agent Outage Scheduler must again verify that all the requirements for the *Scheduled* state have been met.

With all the *Scheduled* state criteria being met, the NC/SOC/SO Agent Scheduler will then further evaluate the *Scheduled* outage with respect to system constraints and system integrity.

For plant demarcated to them for operating purposes, the SOC/SO Agent Scheduler will change the outage status to *Confirmed* if it satisfies all the necessary requirements after they have logged operational comments for the specific outage in Phoenix.

The NC scheduler will change the status of all the other *Scheduled* outages to *Confirmed* a minimum of **14 Days Prior to Execution**, after he has logged operational comments for the specific outage in Phoenix.

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These operational comments must include, but are not limited to security linking and other abnormalities pertaining to the specific outage.

If an outage request cannot be accommodated or if the outage criteria for the *Scheduled* status has not been met, the outage status is changed from *Scheduled* to *Turned Down* or *On Hold* with the associated reason being logged in Phoenix.

If the outage is *Turned Down*, then it will have to be re-scheduled by the TNSP Outage Scheduler.

On the evening prior to the day that the confirmed booking is to be executed, the night shift PSM/Senior Supervisor will evaluate the IPS maintenance program for viability.

The IPS maintenance program must be discussed in detail between NC, SOC and NMC at 23:00.

All outages must furthermore be discussed with the day PSM/SOC Senior Advisor/NMC Senior Supervisor with the shift hand over.

If the *Confirmed* outage cannot be *Taken* due to network constraints, then the outage will be *Turned Down* by the PSM/SOC Senior Advisor/NMC Senior Supervisor, with the associated reason being logged in Phoenix.

If the PSM/SOC Senior Advisor/NMC Senior Supervisor sanctions the outage to go ahead, depending on the nature of the outage, the NC controller will inform SOC/NMC that the outage has been sanctioned.

It is the responsibility of the controller who opens/closes the breaker, or who instructs field staff to do so, to update the outage status in Phoenix to the *Taken* status.

It is recommended that while a multiple day outage is in progress, the responsible parties may report the actual state of the progress to the controller who enters this information into the operational comment section in Phoenix.

The controller must ensure that these new comments do not in any way override or delete the original operational comments. This allows for the progress of the outage to be monitored by those concerned.

When the outage is completed, it is the responsibility of the controller who opens/closes the breaker, or instructs field staff to do so, to update the outage status in Phoenix to the *Completed* status.

If an outage is *Cancelled* prior to or after being *Taken* it is the responsibility of the person cancelling the outage to furnish the reasons for the cancellation.

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The person receiving the cancellation will then enter this information into the system when changing the status to *Cancelled*. This also applies to outages that are *Postponed* after being *Taken*.

5. CANE FIRE BOOKINGS AND PLANT FAILURE

On-the-day outages such as cane fire bookings, faults, *Forced Outages* and Unplanned Outages(Planned(Short Notice)), must be negotiated directly with the relevant control room. The PSM/NMC Senior Supervisor/SOC Senior Advisor will sanction the outage and it is his/her responsibility to ensure that the controller logs this outage in Phoenix.

6. RISK RELATED OUTAGES

All risk related outages must be *Scheduled* a minimum of **14 days prior** to execution with an executable contingency plan in place. These contingency plans are outage specific and must be accompanied by load profiles prepared for these specific outages.

Contingency plans must consider the following but are not limited to the following:

- Risk analysis - different contingencies
- Confirmation of customer notification
- Details of load at risk e.g. type of load and amount of load affected
- Load profiles
- Preventative actions e.g. by pass schemes, security linking
- Corrective actions e.g. restoration, load shed, etc.
- Shortest time to return equipment to service
- Load shedding schedule if applicable
- Up to date list of contact persons and their contact details

RESPONSIBILITIES

- It is the responsibility of the field staff of the relevant TNSP to supply the information relating to returning the plant back into service.
- The relevant TNSP compiles by-pass schemes with assistance from NC/SOC and the NMC's.

7. INTERNATIONAL OUTAGES

It is the responsibility of the NC outage scheduler to co-ordinate international outages.

The utility requesting an outage must request the outage via fax and/or electronic mail **14 days prior** to the outage from the other utility's outage scheduler/co-ordination centre.

Once an outage request has been received, the NC outage scheduler will assess the viability of the outage from a system constraint point of view. The TNSP Scheduler will then *Request & Schedule* the outage in Phoenix and inform the NC scheduler.

The request will follow the normal outage process from here and when all the criteria for the *Scheduled* state have been met, the outage status will be changed to the *Scheduled* status

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The NC outage scheduler will change the outage status to *Confirmed* and will inform the requesting utility scheduler/T&RD/SAPP Co-ordination Centre via electronic mail and/or fax that the outage request has been sanctioned.

8. ACCEPTANCE

This document has been seen and accepted by:

Name	Designation
Wendel Mackay	Planning & Performance Manager - Transmission (South Grid)
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9. REVISIONS

Date	Rev.	Compiler	Remarks
May 2021	4	S. Pillay	Emergency Outage definition removed. Forced outage definition changed. Unplanned outage changed to Planned (short notice). Planned outages >= 14 days. Grid Scheduler will request and schedule international outages. TX outage Management Flow process updated.
May 2018	3	L.K. du Plessis	Added description for planned date out and planned date back under section 3. Updated Tx Outage Management System – Flow Process.
October 2013	2	G. Fourie	Change 32-650 Procedure to Guideline [Phoenix Outage Management Procedure to Phoenix Outage Management Application Guideline.

10. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- Nozuko April
- Louis du Plessis
- Kevin Flint
- Gert Fourie
- Pumeza Mhaka
- Dasen Moodley
- Tiny Salaze
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11. ACKNOWLEDGEMENTS

N/A

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ANNEXURE A: PHOENIX OPERATIONAL GUIDELINES

Status	Notes	Required action
Confirmed	Normal outage – one-day outage.	Change status to taken and log start and end times. Change status to complete at end of day and log times.
Confirmed	Normal outage – multiple day outages on daily basis.	Change status to taken and log start and end times on a daily basis. Change status to complete on the last day of the outage and log times.
Confirmed	Normal outage – multiple day outage on daily basis but could not be taken for a reason on one of outage days due to, e.g. rain.	Change status to taken and log start and end times on a daily basis. Change status to postponed if the outage cannot be taken on any one of the days other than the last day of the outage. Change status to complete on the last day of the outage and log times.
Confirmed	Normal outage – multiple day outage on stay out basis.	Change status to taken and log start and end times at the beginning and end of the outage. Change status to complete on the last day of the outage and log times.
Confirmed	Normal outage – on daily or multiple day outage which is not taken and no reason is given.	Change status to not taken and log as no reason given.
Confirmed	Normal outage – on daily or multiple day outage, which is not taken and reason is given.	Change status to cancelled and log with a reason given & the person's name who cancelled the outage.
Confirmed	System constraints.	Change status to turned down and log a reason.

CONTROLLED DISCLOSURE

When downloaded from the EDC and System Operator database, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the database.

Scheduled	Office hours.	Contact scheduler and request him to evaluate outage, if in order to confirm . Treat as normal outage.
Scheduled	After hours.	Senior supervisor to evaluate outage, if in order to confirm . Treat as normal outage.
Requested	Office and after hours.	Refer outage to NC/TNSP/SO Agent Outage Scheduler. This outage has not been evaluated and no customer negotiations have taken place.
Turned down	Outage request has been turned down with a valid reason.	None, outage must not be given. Refer outage to NC/TNSP/SO Agent Scheduler, This outage has not been evaluated and no customer negotiations have taken place.
Cancelled	Outage request has been cancelled with a valid reason.	None, outage is not required anymore.
Not in Phoenix	Forced outage	Outage to be discussed with PSM/SOC Senior Advisor/NMC Senior supervisor. Controller to request, schedule, confirm in Phoenix. The Controller to change status to taken/completed and log all details.

CONTROLLED DISCLOSURE

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ANNEXURE B: TX OUTAGE MANAGEMENT SYSTEM - FLOW PROCESS

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Tx Outage Management System - Flow Process

