Generation Dispatch – BAAL (Balancing Authority ACE Limit)

Operational Procedure relevant to NERC Reliability Standards:

BAL-001-2 R2 (Effective July 1, 2016)

Effective Date – March 1, 2021

Version 9
Effective March 1, 2021

Signatures

Generation Dispatch – BAAL (Balancing Authority ACE Limit)

Procedure Title

March 1, 2021

Effective Date

Preparer(s) Signatures

Expired certificate

X

Linn Oelker
Manager - Market Compliance
Signed by: Linn Oelker

Expired certificate

X Charlie Martin

Charlie Martin (Document Owner)
Manager - Generation Dispatch and Trading
Signed by: Charlie Martin

Expired certificate

X John Jackson

John Jackson
Manager System Control Center
Signed by: John Jackson

Required Approval Signatures

Expired certificate

X Chuck Schram

Chuck Schram
Director - Power Supply
Signed by: Chuck Schram

Expired certificate

X David Sinclair

David Sinclair
Vice President - Energy Supply & Analysis
Signed by: David Sinclair

Revision History

Version No. **9.0**	Effective – **03/01/2021**
Summary of Changes: 1. Minor formatting and grammar edits 2. Removed reference to BA document in Section 1.3 3. Removed BAAL formula as it is documented in BAL-001-2 Attachment 2	
Version No. **8.0**	Effective – **01/01/2020**
Summary of Changes: 1. Replaced RGD with Generation Dispatcher throughout the document 2. Replaced company definitions and acronyms section with definitions section and added definition of Generation Dispatcher 3. Removed references to FAL and FRL as they are no longer needed.	
Version No. **7.0**	Effective – **09/01/2017**
Summary of Changes: Errata changes only 1. Frequency Abnormal Limit and Frequency Relay Limit Sections switched 2. FTL Low in Section 2.2.2 corrected	
Version No. **6.0**	Effective – **10/01/2016**
Summary of Changes: 1. Updated for BAAL information into BAL-001-2 2. Moved information classification to the footer	
Version No. **5.1**	Effective – NA
Summary of Changes: 1. No review needed for 2015. Changes will be needed for BAL-001-2	
Version No. **5.0**	Effective – **11/03/2014**
Summary of Changes: 1. Added 5th alarm to section 1.1 2. Minor changes 3. Annual review	
Version No. **4.0**	Effective – **01/01/2013**
Summary of Changes: 1. Added company definition of "Annual" to Definitions. 2. Minor changes. 3. Annual review.	
Version No. **3.0**	Effective – **08/01/2011**
Summary of Changes: 1. Incorporated NERC-required reference to Louisville Gas and Electric Company and Kentucky Utilities Company.	
Version No. **1.0 – 2.0**	Effective – **Varies**
See Version 2.0 for revisions prior to Version 3.0.	

Louisville Gas and Electric Company and Kentucky Utilities Company
Generation Dispatch – BAAL (Balancing Authority ACE Limit)

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Purpose

The purpose of the document is to describe the Balancing Authority ACE Limit (BAAL) and the process that the Generation Dispatcher may use to respond to BAAL alarms.

NERC Terms

ACE - Area Control Error
BA - Balancing Authority
BAAL - Balancing Authority ACE Limit
TOP - Transmission Operator

Definitions

The following terms are used frequently in this document:

Generation Dispatcher – A NERC Certified System Operator who has completed training to perform generation dispatch as defined in the Generation Dispatch Training Program document and has obtained approval from the Manager – Generation Dispatch and Trading.

SECTION 1 BAAL Overview

BAAL is the Area Control Error value beyond which the Balancing Authority will incur more than its share of Interconnection frequency control reliability risk. This definition applies to a high limit ($BAAL_{High}$) and a low limit ($BAAL_{Low}$).

1.1 BAAL Alarming

1.1.1 BAAL Alarms (for $BAAL_{High}$ and $BAAL_{Low}$). The BAAL alarm is activated when ACE has been outside of the respective BAAL parameters for one (1) consecutive clock minute. The BAAL alarm will reset once the value is within the respective parameters for one (1) consecutive clock minute.

1.1.2 A BAAL alarm is activated at 10 consecutive minutes.

1.1.3 A BAAL alarm is activated at 15 consecutive minutes.

1.1.4 A BAAL alarm is activated at 20 consecutive minutes.

1.1.5 A BAAL alarm is activated at 25, 26, 27, 28, and 29 consecutive minutes.

1.1.6 A BAAL alarm is activated at 30 consecutive minutes indicating a BAAL violation has occurred

1.1.7 A BAAL return to normal alarm will indicate a BAAL event or violation is no longer in progress

1.2 BAAL Violation

1.2.1 A BAAL Violation occurs when the BA clock-minute average ACE exceeds BAAL for more than thirty (30) consecutive clock-minutes.

1.3 BAAL Reporting

1.3.1 Generation Dispatch coordinates with the BA on BAAL monthly data submittals.

1.3.2 Generation Dispatch coordinates with Corporate Compliance and the BA for reporting any BAAL violations.

SECTION 2 BAAL Concepts and Calculation

2.1 Concepts

2.1.1 BAAL allows for time to implement mitigation plans during short term transient balancing events and assists in reducing excessive unit regulation and equipment cycling when those actions do not support grid frequency integrity.

2.1.2 BAAL is a measurement of how an entity is balanced in relationship to grid frequency support and can allow the Generation Dispatcher time to place optimal balancing actions in place. It is not intended to take the place of balancing to load obligations.

2.1.3 The Generation Dispatcher monitors System Frequency, ACE, Control Performance Standard 1 and Inadvertent performance and controls BAAL deviation to avoid contribution to grid frequency error.

2.1.4 Generation Dispatch plans and implements actions to ensure resource to load balance and ACE minimization takes place. Operating Reserves are carried and restored upon utilization in the required time frames.

2.1.5 The Generation Dispatcher logs all BAAL alarms greater than ten minutes in the Generation Dispatch Resource Database shift log.

2.1.6 The Generation Dispatcher logs directives from the Reliability Coordinator associated with BAAL alarms, and communicates details of such directives to the BA/TOP without intentional delay.

2.1.7 The BAAL standard is pass/fail. A BAAL violation occurs when a BAAL limit has been exceeded for 30 consecutive minutes.

2.2 BAAL calculations and measurements

2.2.1 The BAAL calculations and measurements are defined in Attachment 2 of the NERC BAL-001-2 standard.

2.2.2 Frequency Trigger Limits (FTLs) (59.95 Low / 60.05 High Alarm) monitored by the Reliability Coordinator

SECTION 3 BAAL Alarm Response

3.1 BAAL Alarm Response – General Information

3.1.1 BAAL alarms triggered by exceeding a BAAL limit for 10 minutes or longer are logged in the Generation Dispatch Resource Database with a short explanation of the event.

3.1.2 Each member of Generation Dispatch reviews and completes training on this BAAL document once each calendar year.

3.2 $BAAL_{Low}$ Limit Exceeded Alarm Response[1]

3.2.1 Upon receiving a $BAAL_{Low}$ Limit Exceeded Alarm, the Generation Dispatcher will evaluate the reason for the $BAAL_{Low}$ Limit Exceeded Alarm and start corrective action including but not limited to the following:

a. Utilization of spinning reserves,
b. Utilization of supplemental reserves,
c. Commitment of stand-by generation,
d. Utilization of ARS, and
e. Upcoming scheduled NSI changes, load curve and grid integrity information communicated to the Generation Dispatcher by the BA/TOP will be considered in the decision process for timely execution.

3.2.2 Evaluation of all available options shall include ensuring timing allows for the executed option(s) to be implemented, in order to clear the $BAAL_{Low}$ Limit Exceeded Alarm in time to avoid a $BAAL_{Low}$ Limit Violation.

3.2.3 In the event the $BAAL_{Low}$ Limit Exceeded Alarm has not been cleared and the $BAAL_{Low}$ Limit Exceeded Alarm Timer reaches 20 minutes a call to the BA/TOP will be made by the Generation Dispatcher to advise them of our plans to restore balance in time to avoid a $BAAL_{Low}$ Limit Violation.

3.2.4 If at any time during the BAAL violation it is clear the recovery is not possible, ARS will be executed at that time without delay.

3.3 $BAAL_{High}$ Limit Exceeded Alarm Response[2]

3.3.1 Upon receiving a $BAAL_{High}$ Limit Exceeded Alarm

a. The Generation Dispatcher will evaluate the reason for the $BAAL_{High}$ Limit Exceeded Alarm and start corrective action including but not limited to the following;

[1] BAL-001-2 R2
[2] BAL-001-2 R2

b. Utilization of on-line regulation room to restore balance

c. Removal of low operational SCR limits

d. Short term reduction of Ghent Station minimum Operating limits

e. Utilization of supplemental fuel to allow generation unit(s) to reduce capacity to below minimum stabilization points for balance restoration

f. De-commitment of generation unit(s)

g. Scheduled NSI change, load curve, and grid integrity will be considered in the decision process for timely execution

3.3.2 Evaluation of all available options shall include ensuring timing allows for the executed option(s) to be implemented, in order to clear the $BAAL_{High}$ Limit Exceeded Alarm in time to avoid a $BAAL_{High}$ Limit Violation.

3.3.3 In the event the $BAAL_{High}$ Limit Exceeded Alarm has not been cleared and the $BAAL_{High}$ Limit Exceeded Alarm Timer reaches 20 minutes a call to the BA/TOP will be made by the Generation Dispatcher to advise them of our plans to restore balance in time to avoid a $BAAL_{High}$ Limit Violation.

3.3.4 In the event supplemental fuel is required to reduce a unit's capacity below its stabilization point, the unit that best meets the needs (magnitude of MW's, timeliness, etc.) will be chosen. (This should be used as an interim solution to allow for other options to be implemented to restore the ability to balance both from a compliance/reliability and an economic perspective.)

SECTION 4 Frequency Parameters and Response

4.1 System Operations – EMS alarming parameters

4.1.1 The Generation Dispatcher will implement corrective action as needed for the following EMS alarms:

a. 59.95 (alarms after 1 minute)
b. 59.91 (immediate alarm)
c. 60.05 (alarms after 1 minute)
d. 60.2 (immediate alarm)
e. 60.3 (immediate alarm)

4.2 Steam Turbines

4.2.1 Steam Turbine Operating-time durations (based on frequency):

a. 60.0 to 59.5 – unlimited
b. 59.5 to 58.5 – 30 minutes until unit isolation
c. 58.5 to 58.2 – 7 minutes until unit isolation
d. 58.2 – unit isolation

Generation Dispatch – Balancing Authority and Transmission Operator (BA/TOP) Operational Protocol

Operational Procedure relevant to NERC Reliability Standards:

BAL-001-2	R1, R2	(Effective 07/01/2016)
TOP-001-5	R3, R4, R5, R6, R11	(Effective 04/01/2021)
IRO-001-4	R2, R3	(Effective 04/01/2017)
IRO-010-4	R3	(Effective 04/01/2023)
TOP-003-5	R5	(Effective 04/01/2023)

Effective Date – August 15, 2023

Signatures

Generation Dispatch –
Balancing Authority and Transmission Operator (BA/TOP) Operational Protocol

Procedure Title

August 15, 2023

Effective Date

Preparer(s) Signatures

James Frank – Lead Power Supply Analyst

Print Name & Title

DocuSigned by:
James Frank
968598B1A3AC4D6...
7/27/2023 | 1:36 PM EDT

Signature & Date

Linn Oelker – Manager, Generation Dispatch and Trading

Print Name & Title (Document Owner)

DocuSigned by:
2E258A736DF44BE...
7/27/2023 | 2:14 PM EDT

Signature & Date

John Jackson – Manager, System Control Center

Print Name & Title

DocuSigned by:
John Jackson
5C02FCED378B4CF...
7/27/2023 | 2:19 PM EDT

Signature & Date

Required Approval Signatures

Keith Steinmetz – Director, Transmission Operations

Print Name & Title

DocuSigned by:
Keith Steinmetz
E7F92E0B542240A...
7/28/2023 | 8:55 AM EDT

Signature & Date

Chuck Schram – Director, Power Supply

Print Name & Title

DocuSigned by:
Chuck Schram
59C3B324FAD7402...
7/28/2023 | 9:12 AM EDT

Signature & Date

David Sinclair – Vice President, Energy Supply & Analysis

Print Name & Title

DocuSigned by:
David Sinclair
A190914FB090474...
7/28/2023 | 11:35 AM EDT

Signature & Date

Beth McFarland – Vice President, Transmission

Print Name & Title

DocuSigned by:
Beth McFarland
83F6602353E143E...
8/14/2023 | 3:41 PM EDT

Signature & Date

Revision History

Version No. 13	Effective – **08/15/2023**
Summary of Changes: 1. Updated signatories to reflect organizational changes 2. Updated references to IRO-010-3 and TOP-003-4 to IRO-010-4 and TOP-003-5 3. Clarifying language edits	
Version No. 12	Effective – **07/15/2022**
Summary of Changes: 1. Replaced Charlie Martin with Brian Limberg as signatory 2. Removed reference to Paddy's Run 11 (retired 3/31/2021) 3. Minor clarifying edits	
Version No. 11	Effective – **07/12/2021**
Summary of Changes: 1. Updated references to TOP-001-4, IRO-010-2, and TOP-003-3 to TOP-001-05, IRO-010-3, and TOP-003-4 2. Updated Operational Reliability Data document references in Sections 1.1.1.h and 1.1.2.m 3. Updated Cumulative Inadvertent file reference in Section 4.1.2.b 4. Minor grammatical edits	
Version No. 10	Effective – **06/01/2020**
Summary of Changes: 1. Updated titles and signatories to reflect organizational changes 2. Updated definition of Contingency Reserve to align with NERC Glossary 3. Replaced "PSG" with "Power Supply Group" throughout 4. Replaced "biological" with "restroom" in Section 1.2.8 5. Updated Section 2 to allow the BA/TOP to validate the LSE NSI as necessary 6. Updated procedure references in Section 3.1.5 and 7.1.1 7. Updated Section 5 to reflect the elimination of the TSL export process 8. Minor grammatical edits	
Version No. 9	Effective – **05/01/2019**
Summary of Changes: 1. TOP-001-3 references changed to TOP-001-4 (effective 7/1/2018) 2. EOP-005-2 R15 references moved to Generator Commitment, Coordination, and Communication Section 3.3.2.j and updated to EOP-005-3 R13 (effective 4/1/2019) 3. Updated references to Position Tool in Sections 6.1.1.d. and 6.1.2.d. to reflect new worksheet names in the Position Tool 4. Updated Section 6.1 to more accurately detail the process for annual updates 5. Replaced references to RGD and RGDG with Generation Dispatch 6. Errata changes in Section 7 to correct paragraph letters, add PR11 reference, and update reference to Generation Commitment, Coordination, and Communication document	
Please see Version 9 for revision history prior to version 9.	

Louisville Gas and Electric Company and Kentucky Utilities Company
Generation Dispatch –
Balancing Authority and Transmission Operator (BA/TOP) Operational Protocol

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Purpose

This document provides a description of the services the LG&E/KU Power Supply Department provides to the LG&E/KU Balancing Authority and Transmission Operator (BA/TOP), and a description of some of the coordination protocols and processes that are conducted to perform system operations of the Bulk Electrical System (BES). This procedure also outlines the protocols that are required for the Power Supply Group to fulfill its obligations as Ancillary Services Provider (ASP) to the LG&E/KU BA/TOP.

The Power Supply Group functions as the LG&E/KU LSE, the LG&E/KU PSE, and the ASP to the LG&E/KU BA/TOP and LG&E/KU GO/GOP.

NERC Terms

ACE - Area Control Error
BA - Balancing Authority
BAA - Balancing Authority Area
BES - Bulk Electric System
GO - Generator Owner
GOP - Generator Operator
LSE - Load Serving Entity
NSI - Net Scheduled Interchange
PSE - Purchasing and Selling Entity
RC - Reliability Coordinator (TVA)
RE - Regional Entity
TC - Transmission Customer
TOP - Transmission Operator

Ancillary Service - Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Service Provider's transmission system in accordance with good utility practice.

Automatic Generation Control (AGC) - Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction.

Contingency Reserve - The provision of capacity that may be deployed by the Balancing Authority to respond to a Balancing Contingency Event and other contingency requirements (such as Energy Emergency Alerts as specified in the associated EOP standard). A Balancing Authority may include in its restoration of Contingency Reserve readiness to reduce Firm Demand and include it if, and only if, the Balancing Authority:

- is experiencing a Reliability Coordinator declared Energy Emergency Alert level, and is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.
- is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.

Demand - 1. The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time. 2. The rate at which energy is being used by the customer.

Disturbance - 1. An unplanned event that produces an abnormal system condition. 2. Any perturbation to the electric system. 3. The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.

Frequency Bias - A value, usually expressed in megawatts per 0.1 Hertz (MW/0.1 Hz), associated with a Balancing Authority Area that approximates the Balancing Authority Area's response to Interconnection frequency error.

Inadvertent Interchange - The difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange. ($I_A - I_S$)

Interchange Schedule - An agreed-upon Interchange Transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of power and energy between the Source and Sink Balancing Authorities involved in the transaction.

Load - An end-use device or customer that receives power from the electric system.

Most Severe Single Contingency – The Balancing Contingency Event, due to a single contingency identified using system models maintained within the Reserve Sharing Group (RSG) or a Balancing Authority's area that is not part of a Reserve Sharing Group, that would result in the greatest loss (measured in MW) of resource output used by the RSG or a Balancing Authority that is not participating as a member of a RSG at the time of the event to meet Firm Demand and export obligation (excluding export obligation for which Contingency Reserve obligations are being met by the Sink Balancing Authority).

Net Scheduled Interchange - The algebraic sum of all Interchange Schedules across a given path or between Balancing Authorities for a given period or instant in time.

Non-spinning Reserve - 1. That generating reserve not connected to the system but capable of serving demand within a specified time. 2. Interruptible load that can be removed from the system in a specified time.

Operating Instruction - A command by operating personnel responsible for the Real-time operation of the interconnected Bulk Electric System to change or preserve the state, status, output, or input of an Element of the Bulk Electric System or Facility of the Bulk Electric System. (A discussion of general information and of potential options or alternatives to resolve Bulk Electric System operating concerns is not a command and is not considered an Operating Instruction.)

Operating Process - A document that identifies general steps for achieving a generic operating goal. An Operating Process includes steps with options that may be selected depending upon Real-time conditions. A guideline for controlling high voltage is an example of an Operating Process.

Operating Reserve – That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.

Regulating Reserve - An amount of reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin.

Spinning Reserve - Unloaded generation that is synchronized and ready to serve additional demand.

Company Terms

ASP - Ancillary Services Provider
ESC - Electric System Coordinator
GDRD - Generation Dispatch Resource Database
ICCP - Inter-control Center Communications Protocol
OSI - Open System International
TSL - Total System Log

SECTION 1 - Services

1.1 Services provided by Generation Dispatch to the BA/TOP on supply and demand issues

The LG&E/KU Power Supply Department, as the ASP, performs or provides the following services associated with supply and demand balancing to the LG&E/KU BA/TOP. Unless otherwise noted, these services relate to resources directly controlled by and loads served by the LG&E/KU GOP and LSE.

1.1.1 Day Ahead and Short Term

a. Provides hourly, daily, weekly, and monthly load forecast.

b. Provides generation unit commitment and planned dispatch data to the BA/TOP and the RC.

c. Implements generator commitment and dispatch for the LG&E/KU LSE and GOP.

d. Submits generation unit maintenance outage, de-rate, and status information to the BA/TOP and RC.

e. Plans for Operating Reserve requirements, including Contingency and Regulating Reserves.

f. Plans for adequate ramping capability for LG&E and KU LSE load Operating Reserve deployment and any other ramping requirements per Operating Instructions from the BA/TOP, if available.

g. Considers any "must-run" unit commitment criteria, planned localized transmission redispatch, and Operating Instructions from the RC and/or BA/TOP and communicates back to the RC and/or BA/TOP if such Operating Instructions violate safety, equipment, regulatory or statutory requirements.[1, 2]

h. Provides data to the BA/TOP and RC in compliance with the data specifications in the LG&E and KU BA/TOP Operational Reliability Data Specification document and TVA Reliability Coordinator Data and Information Specification respectively.[3, 4]

1.1.2 Real Time

a. Provides load forecast revisions.

b. Monitors, executes and maintains Operating Reserve requirements, including Contingency and Regulating Reserves.

c. Monitors Balancing ACE, balances supply to demand to support interconnection frequency[5], ensures compliance with NERC and industry standards, and minimizes accumulated inadvertent.[6]

d. Communicates generator dispatch and commitment information to the BA/TOP and RC.

e. Submits generation unit forced outage, de-rate, and status information to the BA/TOP and RC.

f. Monitors real time ramping capability to meet LG&E and KU LSE load, Operating Reserve deployment and any other ramping requirements per Operating Instructions from the BA/TOP.

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[1] IRO-001-4 R2, R3
[2] TOP-001-5 R3, R4, R5, R6
[3] TOP-003-5 R5
[4] IRO-010-4 R3
[5] TOP-001-5 R11
[6] BAL-001-2 R1, R2

g. Executes Curtailable and Direct Load Control interruptions in accordance with retail tariffs.

h. Follows "must-run" unit commitment criteria, localized transmission redispatch, reliability and Operating Instructions from the RC and/or BA/TOP, unless such Operating Instructions violate safety, equipment, regulatory or statutory requirements, which will be communicated back to the RC and/or BA/TOP without intentional delay.[7, 8]

i. Maintains generation parameters in the Energy Management System (EMS) (e.g., Fuel pricing, incremental heat rate curves (via EMS support staff), operating limits, and operating parameters).

j. Informs the BA/TOP and RC of any foreseen or actual capacity and energy emergency events.

k. Implements the LSE Capacity and Energy Emergency Plan related to supply and demand.

l. Serves as the primary point of contact for LG&E and KU generation coordination during normal, emergency and system restoration events.

m. Submits data as required by the BA/TOP and RC in compliance with the data specifications of the LG&E and KU BA/TOP Operational Reliability Data Specification document and TVA Reliability Coordinator Data and Information Specification.[9, 10]

1.2 Generation Dispatch relies on the BA/TOP to provide the following:

1.2.1 Maintenance and upkeep of the EMS and backup processes for loss of the EMS and manual ACE calculation.

1.2.2 Validation that ACE is correct in real time.

1.2.3 Validation and monitoring of BA NSI and that available BA ramp limits are not exceeded.

1.2.4 Maintenance of correct NSI in the EMS.

1.2.5 Validation of real time and historical data for load served by Generation Dispatch.

1.2.6 Necessary and appropriate information in a timely manner, in accordance with LG&E and KU Standards of Conduct, about the magnitude and duration of LG&E and KU Balancing Authority Area (BAA) imbalance events outside the LG&E and KU Power Supply Group direct control, so Generation Dispatch may meet Operating Reserve requirements during such events.

1.2.7 Timely notification, in accordance with LG&E and KU's Standards of Conduct, of unforeseen events that restrict generation capacity or may cause re-dispatch or "must-run" unit commitment criteria.

1.2.8 Monitoring and control, as necessary, of Automatic Generation Control during restroom breaks or if evacuation of the Power Supply Control Center is needed.

1.2.9 Notification of any Geomagnetic Disturbance activity or concerns as related to operations and planning of the BES.

1.2.10 Communication of Time Error Correction events to Generation Dispatch.

1.2.11 Implementation of inadvertent payback as requested by Generation Dispatch.

1.2.12 Notification to Generation Dispatch of the loss of LG&E/KU LSE load as outlined in Section 9.

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[7] IRO-001-4 R2, R3
[8] TOP-001-5 R3, R4, R5, R6
[9] TOP-003-5 R5
[10] IRO-010-4 R3

1.2.13 Guidance to Generation Dispatch on coordinating loading of resources during system restoration events

SECTION 2 - EMS and NSI Validation

2.1 NSI

2.1.1 Generation Dispatch relies on the BA/TOP to ensure a current and accurate aggregate BA NSI is in the EMS.

2.2 Generation Dispatch monitors LGE-KU NSI targets

2.2.1 Generation Dispatch is supplied the BA aggregate NSI. Generation Dispatch also receives the LSE NSI and compares that to the LSE NSI calculated by the Position Tool.

2.3 The BA/TOP is responsible for validation of the NSI with Generation Dispatch.

2.3.1 The BA/TOP calls Generation Dispatch to validate the LSE NSI as necessary.

SECTION 3 - ACE

3.1 ACE Validation

3.1.1 In the event the ACE indication experiences a change that Generation Dispatch cannot validate against generation, interchange or load variation, Generation Dispatch will call the BA/TOP and report the ACE variance.

3.1.2 The BA/TOP will inform Generation Dispatch when a known invalid ACE occurs (such as tie line telemetry errors, network customer imbalance, BA NSI error, etc.).

3.1.3 The BA/TOP will investigate and communicate back to Generation Dispatch if the ACE indication is correct, and if not, the BA/TOP will communicate the expected time frame for correction.

a. If the time frame for correction is beyond a few minutes, Generation Dispatch will verify with the BA/TOP the backup ACE validity, and if valid, balance the system manually using the backup ACE (MicroSCADA).

b. In the event the backup ACE is invalid or not available, Generation Dispatch will request a manual ACE calculation to be supplied by the BA/TOP.

c. If the BA/TOP cannot calculate a manual ACE, Generation Dispatch will use the "Manual Balance Sheet" to manually record LSE load estimate, each generator's status and output, track reserves, and manually balance ACE until the EMS or MicroSCADA is back in service or until the BA/TOP can calculate a manual ACE (see Section 3.2 below).

3.1.4 Generation Dispatch will coordinate with the BA/TOP any manual AGC operations while the EMS is down as necessary. Generation Dispatch will log ACE deviation events, outside transient issues (few minutes), in the GDRD.

3.1.5 Generation Dispatch will refer to the LG&E/KU BA, TOP, and Generation Dispatch Energy Management System document as necessary.

3.2 Manual Balance Sheet

3.2.1 On the "uPS" drive there is a folder entitled "Manual Balance Sheet (ACE)".

3.2.2 There are two master spreadsheets in the folder: one for hourly calculations and one for half hour calculations.

3.2.3 Based on time of day, seasonal load curve and system conditions, Generation Dispatch will decide which sheet to use.

3.2.4 Open the appropriate master spreadsheet and save in the appropriate year folder as "mm_dd_yyyy_Balance Sheet" (example 09_05_2011_Balance Sheet).

3.2.5 Go to the tab entitled "Balance Work Sheet" and clear out any data in the yellow highlighted fields and enter the correct date in the appropriate field.

3.2.6 Go to the tab entitled "Net Generation Calc HE01" and run the "Clear Sheet" macro.

3.2.7 Go to the tab entitled "Load Forecast" and paste the hourly net combined system load forecast in the "LGE-KU Net Load Forecast" fields.

3.2.8 As applicable use the forecast adjustment column to correct any known load forecast deviation.

3.2.9 Go to the appropriate hour ending tab (example: if calculating the ACE for hour ending 06:00 go to the "HE06 tab").

3.2.10 Update the unit parameters (Unit state (on/off / na), any derate volume, actual gross and actual net generation (call the plant to obtain the actual gross and actual net generation).

3.2.11 Available capacity above seasonal rating can be reflected by placing a negative derate value in the appropriate field (derate column).

3.2.12 Go to the tab entitled "Balance Work Sheet" input the LGE/KU NSI value in the "LGE-KU Net Scheduled Interchange" field for the appropriate hour.

3.2.13 Have the BA supply the known present or projected aggregate imbalance of the TCs that purchase Ancillary Services provided by the Power Supply Group and enter the value in the "LGE-KU IB" field.

3.2.14 The sheet will calculate estimated ACE, the estimated amount of spinning reserves and the projected amount of operating margin.

3.2.15 Spinning Reserve projection is the LG&E/KU Net Generation Capacity on line minus the LG&E/KU actual Net Generation.

3.2.16 Operating Margin is Spinning Reserve calculation plus Manual ACE Calculation.

3.2.17 Manually dispatch actual generation as applicable to balance system and maintain Operating Reserves.

3.2.18 Note any off-line standby reserves (quick start CTs) will need to be factored in for reserves manually.

3.2.19 When ready to calculate the next hour run the "Copy to next hour" macro on the appropriate HE tab, this will carry over the unit state and derates to the next HE tab.

3.2.20 Continue the process of calling the plants to obtain the actual gross and net generation and filling in the appropriate HE tab, load forecast adjustments as applicable and the Balance Work Sheet.

3.2.21 Log the use of the Manual Balance Sheet in the GDRD and inform the on-call person.

3.2.22 The Balance Sheet half hour is very similar to the Balance Sheet. However, it allows calculation of balance for each half hour.

3.2.23 The Balance Sheet half hour gives the ability to calculate the load curve per hour based on:
a. Equal rate of change for both halves of the hour
b. 75 % of the change to occur in the top half of the hour
c. 75% of the change to occur in the second half of the hour

3.2.24 Refer to the Balance Sheet half hour Instructions tab for deviations between the "Manual Balance Sheet" and the "Balance Sheet half hour".

3.2.25 After each entry save appropriate sheet so the BA/TOP can review.

SECTION 4 - Inadvertent Energy

4.1 Inadvertent Payback

4.1.1 Generation Dispatch balances resource to load demand to minimize Inadvertent Interchange accumulation.

4.1.2 Generation Dispatch monitors hourly, daily and accumulative inadvertent.

a. Hourly and daily inadvertent viewed in the TSL.

b. Accumulative inadvertent viewed on the Cumulative Inadvertent file (located on the 'uPS on fs3' drive, in the ESOC Folder/Cumulative Inadvertent Folder).

4.1.3 The Automated Cumulative Inadvertent File is kept up to date by the BA/TOP.

4.1.4 Generation Dispatch maintains cumulative inadvertent within reasonable limits.

4.1.5 Generation Dispatch requests the BA/TOP to place an inadvertent payback schedule in the EMS, including magnitude and time frame as necessary.

a. Inadvertent payback will generally be conducted via "unilateral payback".

4.1.6 Generation Dispatch will call BA/TOP in the event the TSL hourly inadvertent does not appear reflective of actual system operations.

SECTION 5 - TSL

5.1 TSL

5.1.1 Generation Dispatch uses the Total System Log (TSL) screen of the EMS Energy Accounting software to view integrated combined utility and individual (LG&E and KU) utility actual hourly loads and hourly total and on/off peak accumulated inadvertent.

5.1.2 Generation Dispatch checks the TSL on an hourly basis and reports to the BA/TOP any questionable hourly load, hourly inadvertent or ACE numbers. Generation Dispatch investigates and corrects any questionable generation numbers in the EMS Energy Accounting software.

5.1.3 Load data from the TSL is exported nightly via automatic process to the Generation Dispatch Load Forecasting site. It is also periodically archived in the EMS Historical Database (EMSNTDB) and subsequently used by Generation Dispatch's load forecasting models.

5.1.4 At the end of each day Generation Dispatch verifies with the BA/TOP that the TSL data has been checked out.

5.1.5 In the event the TSL data is changed after checkout the BA/TOP will call and inform Generation Dispatch.

5.1.6 In the event the BA/TOP reports the TSL data has been changed after checkout, Generation Dispatch will update the appropriate tools.

SECTION 6 - Annual Updates

6.1 Annual updates provided to Generation Dispatch from the BA/TOP

The BA/TOP will provide annual updates (or more frequent as necessary) to Generation Dispatch including the following:

6.1.1 Frequency Bias (Updated in EMS and MICRO SCADA and coordinated with Generation Dispatch as applicable)

6.1.2 L10 Value (Updated in EMS and MICRO SCADA and coordinated with Generation Dispatch as applicable)

6.1.3 Forecasted annual BA peak net hourly load as requested by Generation Dispatch

6.1.4 Validation of the BA Most Severe Single Contingency (with input from Generation Services) either as requested by Generation Dispatch or when the MSSC changes

6.2 Annual updates provided to the BA/TOP from Generation Dispatch

Generation Dispatch will provide annual updates (or more frequent as necessary) to the BA/TOP including the following:

6.2.1 Contingency Reserve Sharing Group obligation

a. Contingency Reserve allowable spinning and supplemental mix

6.2.2 LG&E and KU net peak hourly load

SECTION 7 - System Restoration

7.1 System Restoration

Responsibilities during system restoration events (see BA/TOP, EOP-005 System Restoration document for details):

7.1.1 Transmission Control Center

a. The TOP ESC will assume all switching activity on the KU and LG&E systems in relation to cranking paths for start-up from black start units to start-up units.

b. The BA ESC will work with Generation Dispatch to get black start units on-line and prepare to supply power to start-up units.

c. Engineering support staff is to assist the ESC with switching duties when needed.

d. The Group Leader – Electric System Coordination will assume overall control of the LG&E and KU transmission system and will coordinate all switching and reconnection of the system to neighboring utilities.

e. The BA/TOP will complete the necessary emergency reporting to the Department of Energy, NERC and SERC as described in the EOP-004 Event Reporting Operating Plan.

7.1.2 Generation Dispatch

a. Generation Dispatch will coordinate unit start-up with the generator operator as directed by the BA ESC.

b. Generation Dispatch will provide the ESC with detailed unit availability status regarding the system disturbance event.

c. Generation Dispatch will coordinate generation pickup to balance load with the BA ESC.

d. Generation Dispatch will coordinate fuel supply needs with gas suppliers, gas control, and power plants.

e. Generation Dispatch will rely on the BA/TOP to provide guidance on which generator to designate as the primary frequency response resource during restoration or islanding or coordinate such based on the needs of the BA/TOP.

7.1.3 Brown generator operator

a. Generator operators are to prepare hydro units for startup and bring online per Operating Instructions, following in-place protocol with Generation Dispatch (see Generator Commitment, Coordination, and Communication Protocol, §3).

b. Generator operators are to prepare combustion turbines for startup and bring online per Operating Instructions, following in-place protocol with Generation Dispatch (see Generator Commitment, Coordination, and Communication Protocol, §3).

c. Plant electrical and instrumentation group are to assist operations group if needed.

7.1.4 Cane Run/Paddy's Run generator operator

a. Generator operators are to prepare black start units for startup and bring on per Operating Instructions, following in-place protocol with Generation Dispatch (see Generator Commitment, Coordination, and Communication Protocol, §3).

b. Generator operators are to prepare Paddy's Run 12, and 13 units for startup and bring online per Operating Instructions, following in-place protocol between Generation Dispatch (see Generator Commitment, Coordination, and Communication Protocol, §3).

c. Plant electrical and instrumentation group are to assist operations group if needed

7.1.5 Transmission Control Center EMS team

a. Team will be on standby to assist Transmission and Power Supply Control Center staff should any problems arise.

SECTION 8 - Automatic Generation Control

8.1 EMS Automatic Generation Control Mode

8.1.1 AGC operations are maintained by Generation Dispatch and the EMS AGC Control Mode is operated in the Tie Line Frequency Bias Mode (TLB), unless system or grid integrity is compromised and a change in AGC Control Mode is directed by the BA/TOP or RC.

8.1.2 In the event the EMS AGC Control Mode is taken out of TLB mode, Generation Dispatch has the ability to manually dispatch generation to balance ACE if needed.

8.1.3 The EMS will alarm when a change is made to the AGC Control Mode.

8.1.4 Generation Dispatch will log any changes made to the AGC Control Mode in the GDRD Shift Log.

8.1.5 In the event of system islanding or restoration operations Generation Dispatch will discuss the appropriate AGC Control Mode to be used with the BA/TOP.

SECTION 9 - Load Contingencies

9.1 Loss of Load

During loss of load and load restoration events outside system wide Disturbances:

9.1.1 BA/TOP will inform Generation Dispatch of load loss due to system contingencies including the estimated time frame, if available.

9.1.2 BA/TOP will coordinate load restoration with Generation Dispatch to ensure the Generation Dispatch has adequate resources available to meet the load.

9.1.3 Generation Dispatch will log the event in the GDRD Shift Log.

LG&E and KU
Generation Operating Reserves

Operational Process relevant to NERC Reliability Standards:

BAL-001-2	**R1**	**Effective 07/01/2016**
BAL-002-3	**R1, R1.1, R1.2, R1.3, R2, R3**	**Effective 04/01/2019**

Effective Date – October 1, 2022

Signatures

LGE and KU Generation Operating Reserves

Procedure Title

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Effective Date

Preparer(s) Signatures

Brian Limberg – Manager, Generation Dispatch and Trading

Print Name & Title (Document Owner)

DocuSigned by:
Brian Limberg 9/21/2022 | 11:21 AM EDT
F1C2851F2DF1482...

Signature & Date

Linn Oelker – Manager, Market Compliance

Print Name & Title

DocuSigned by:
Linn Oelker 9/21/2022 | 11:35 AM EDT
2E258A736DF44BE...

Signature & Date

John Jackson – Manager, System Control Center

Print Name & Title

DocuSigned by:
John Jackson 9/22/2022 | 8:00 AM EDT
5C02FCED378B4CF...

Signature & Date

Required Approval Signatures

Julie Hostrander – Manager, Compliance & Document Management

Print Name & Title

DocuSigned by:
Julie Hostrander 9/23/2022 | 10:51 AM EDT
5C90B045569F48E...

Signature & Date

Chuck Schram – Director, Power Supply

Print Name & Title

DocuSigned by:
Chuck Schram 9/23/2022 | 11:39 AM EDT
59C3B324FAD7402...

Signature & Date

David Sinclair – Vice President, Energy Supply and Analysis

Print Name & Title

DocuSigned by:
David Sinclair 9/26/2022 | 9:20 AM EDT
A190914FB090474...

Signature & Date

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Version No. **13**	Effective – **10/1/2022**
Summary of Changes: 1. Signatory changed to reflect personnel changes. 2. Added Supervisor – Generation Dispatch as reviewer of Balancing Contingency Events in Section 3.2.1.i. 3. Minor language and grammar edits	
Version No. **12**	Effective – **09/01/2021**
Summary of Changes: 1. Removed references to INT-010-2.1 as it has been retired and not replaced 2. Removed references throughout to being "active" or "inactive" in the TCRSG and replaced with references to requesting or not requesting Contingency Reserves from the TCRSG 3. Section 4.9 – added footnote reference to NAESB WEQ-004-1.7.1 4. Immaterial grammar and syntax edits throughout	
Version No. **11**	Effective – **09/01/2020**
Summary of Changes: 1. Titles and signatories changed to reflect organizational changes 2. Updated definition of Contingency Reserve to align with NERC Glossary 3. Corrected footnote typos in Section 1 4. Section 3.1 and 3.3 - added instruction to activate TCRSG if resource loss is greater than 550 MW 5. Minor language and grammar edits	
Version No. **10**	Effective – **08/06/2019**
Summary of Changes: 1. Removed references to BA modifying NSI for external TCRSG events in Section 4.3 as Generation Dispatch uses the Manual NSI Offset in EMS 2. Moved footnote for INT-010-2.1 R1 in Section 4.7	
Version No. **9**	Effective – **04/01/2019**
Summary of Changes: 1. Replaced RGD and RGDG with Generation Dispatch throughout document 2. Changed references from BAL-002-2 to BAL-002-3 (effective 2019-04-01) 3. Added Section 3.2.3.a.iv to address the additional requirement of BAL-00-2-3 R1, Part 1.3.1 for the exception to BAL-002-3 R1, Part 1.1	
Version No. **1-8**	See previous versions

Louisville Gas and Electric Company and Kentucky Utilities Company
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Purpose

The purpose of this document is to outline processes and responsibilities related to managing and deployment of operating reserves by the LG&E/KU Power Supply department on behalf of the LG&E/KU BA for the LG&E/KU BA Area. This document supports initiatives and responses found in the NERC reliability standards for balancing and contingency reserves. The planning process and the real time deployment of operating reserves are described within this document.

Terms

ACE - Area Control Error
AGC - Automatic Generation Control
CRR - Contingency Reserve Requirement
EEA - Energy Emergency Alert
EMS - Energy Management System
ESC - Electric System Coordinator
F7 - Firm Point-To-Point Transmission Service Priority 7
MSSC - Most Severe Single Contingency
NH2 - Hourly Transmission Service Priority 2
NSI - Net Scheduled Interchange
OEC - Other Extreme Condition
PTP - Point-To-Point
TCRSG - Tennessee Valley Authority, and LG&E and KU Contingency Reserve Sharing Group
TRM - Transmission Reliability Margin
TVA - Tennessee Valley Authority

NERC Definitions

Balancing Contingency Event - Any single event described in Subsections (A), (B), or (C) below, or any series of such otherwise single events, with each separated from the next by one minute or less.

A. Sudden loss of generation:
  a. Due to
    i. unit tripping, or
    ii. loss of generator Facility resulting in isolation of the generator from the Bulk Electric System or from the responsible entity's System, or
    iii. sudden unplanned outage of transmission Facility;
  b. And, that causes an unexpected change to the responsible entity's ACE;
B. Sudden loss of an Import, due to forced outage of transmission equipment that causes an unexpected imbalance between generation and Demand on the Interconnection.
C. Sudden restoration of a Demand that was used as a resource that causes an unexpected change to the responsible entity's ACE.

Contingency Event Recovery Period - A period that begins at the time that the resource output begins to decline within the first one-minute interval of a Reportable Balancing Contingency Event, and extends for fifteen minutes thereafter.

Contingency Reserve - The provision of capacity that may be deployed by the Balancing Authority to respond to a Balancing Contingency Event and other contingency requirements (such as Energy Emergency Alerts as specified in the associated EOP standard). A Balancing Authority may include in its restoration of Contingency Reserve readiness to reduce Firm Demand and include it if, and only if, the Balancing Authority:

• is experiencing a Reliability Coordinator declared Energy Emergency Alert level, and is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.

• is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.

Contingency Reserve Restoration Period - A period not exceeding 90 minutes following the end of the Disturbance Recovery Period.

Most Severe Single Contingency - The Balancing Contingency Event, due to a single contingency identified using system models maintained within the Reserve Sharing Group (RSG) or a Balancing Authority's area that is not part of a Reserve Sharing Group, that would result in the greatest loss (measured in MW) of resource output used by the RSG or a Balancing Authority that is not participating as a member of a RSG at the time of the event to meet Firm Demand and export obligation (excluding export obligation for which Contingency Reserve obligations are being met by the Sink Balancing Authority).

Operating Reserve - That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.

Operating Reserve – Spinning - The portion of Operating Reserve consisting of: Generation synchronized to the system and fully available to serve load within the Disturbance Recovery Period following the contingency event; or Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

Operating Reserve – Supplemental - The portion of Operating Reserve consisting of: Generation (synchronized or capable of being synchronized to the system) that is fully available to serve load within the Disturbance Recovery Period following the contingency event; or Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

Non-Spinning Reserve – 1. That generating reserve not connected to the system but capable of serving demand within a specified time. 2. Interruptible load that can be removed from the system in a specified time.

Regulating Reserve - An amount of reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin.

Reportable Balancing Contingency Event - Any Balancing Contingency Event occurring within a one-minute interval of an initial sudden decline in ACE based on EMS scan rate data that results in a loss of MW output less than or equal to the Most Severe Single Contingency, and greater than or equal to the lesser amount of: (i) 80% of the Most Severe Single Contingency, or (ii) the amount listed below for the applicable Interconnection. Prior to any given calendar quarter, the 80% threshold may be reduced by the responsible entity upon written notification to the Regional Entity.
• Eastern Interconnection – 900 MW
• Western Interconnection – 500 MW
• ERCOT – 800 MW
• Quebec – 500 MW

Spinning Reserve - Unloaded generation that is synchronized and ready to serve additional demand.

SECTION 1 - Reserves

1.1 Required Contingency Reserves[1]

LG&E and KU is a member of the TCRSG. The TCRSG is administered by TVA. The amount of total CRR is set forth by the TCRSG Operating Committee (see TCRSG Agreement – Operating Protocols). The CRR in place is referenced for operations personnel in the Position Tool – Position Summary tab and the EMS LGE Area MW Reserves Summary. When the LG&E/KU BA experiences a reportable contingency event and does not request Contingency Reserves from one or more other TCRSG members, it must meet a CRR based on the MSSC of the LG&E/KU BA Area, or as defined in the applicable NERC Reliability Standard. See Section 2.2 for further details.

1.2 Required Contingency Reserves Allocation[2]

Contingency Reserves are carried via Operating Reserves - Spinning or Operating Reserves - Supplemental. The minimum Contingency Reserve carried by Operating Reserves - Spinning is established by the TCRSG Operating Committee and shall be the amount required by the applicable Reliability Standard or 0% of each Party's CRR, whichever is greater (see TCRSG Agreement – Operating Protocols).

1.3 Contingency Reserve Restoration

Generation Dispatch will restore the CRR within the Contingency Reserve Restoration Period. Any Balancing Contingency Event that occurs before the end of a Contingency Reserve Restoration Period resets the beginning of the Contingency Reserve Restoration Period.[3]

1.4 Regulating Reserves[4]

1.4.1 Generation Dispatch targets sufficient Regulating Reserve controlled by AGC to meet Control Performance Standards and real time operating conditions. Regulating reserves can be deployed manually as well.

1.4.2 The amount of Regulating Reserves can vary hour by hour based on real time conditions such as: load curve, weather, real time Control Performance Standard compliance, generation status, generation commitment mix, reliability, available transfer capability, ramping requirements, and fuel conditions.

1.4.3 Regulating Reserves have no restoration period as they are designed for use around load forecast error, frequency response, transient issues etc. Generation Dispatch proactively targets to maintain and restore Regulating Reserves for real time application around system needs, compliance with Control Performance Standards, and actual real time operating conditions. The Regulating Reserve targeted by Generation Dispatch is reviewed by Power Supply management and updated as operational performance dictates.

1.5 Operating Reserves

A minimum total Operating Reserve is targeted daily; the target is in the Position Tool - Position Summary tab and the EMS LGE Area MW Reserves Summary (Contingency

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[1] BAL-002-3 R2
[2] BAL-002-3 R2
[3] BAL-002-3 R3
[4] BAL-001-2 R1

Reserves and Regulating Reserves combined). Generation Dispatch can change the total Operating Reserve target around real-time operating conditions. The Operating Reserve target will not be below the sum of the CRR and spinning reserve targets.

1.6 EMS Displays

1.6.1 The EMS calculates and displays the following reserve parameters in the LGE AREA AGC Summary Display:

Capacity block

a. ***Available*** on-line generation by unit class including variance (Total, Coal, Primary CT, Secondary CT and Hydro)
b. ***Plan Cap*** (Total Spinning Reserves not restricted by a timed ramp rate)
c. ***Spin Res*** – defined as Spinning Reserves (10-minute obtainable)

1.6.2 The EMS displays the following reserve parameters in the LGE Area MW Reserves Summary Display:

Operating Reserves block

a. ***Operating Reserves*** (EMS calculation - total Operating Reserves)
b. ***Operating Reserves Target*** (Manual entry)
c. ***Operating Reserves Variance*** (EMS calculation - alarms on negative variance)

Spinning Reserves block

a. ***Total Spinning Reserves*** – Defined as Spinning Reserves (EMS calculation - 10-minute obtainable)
b. ***Spinning Reserves Required*** (Manual entry)
c. ***Spinning Reserves Variance*** (alarms on negative variance)
d. ***Spinning Reserves on AGC*** (EMS calculation – Spinning Reserves under AGC control (10-minute obtainable))
e. ***Spinning Reserves on AGC Required*** (Manual Entry)
f. ***Spinning Reserves on AGC Variance*** (alarms on negative variance)
g. ***Spinning Reserves off AGC*** (EMS calculation - Spinning Reserves not under AGC control)

Contingency Reserves block

a. ***Contingency Reserves*** (EMS calculation – total Contingency Reserves)
b. ***Contingency Reserves Required*** (Manual entry)
c. ***Contingency Reserves Variance*** (alarms on negative variance "audible and visual")
d. ***Contingency Reserves Spinning*** (EMS calculation – Contingency Reserves under AGC control)
e. ***Contingency Reserves Spinning Required*** (Manual entry)
f. ***Contingency Reserves Spinning Variance*** (alarms on negative variance "audible and visual")
g. ***Contingency Reserves Non-Spin*** (EMS calculation – Non-Spinning Reserves available in 15 minutes)

SECTION 2 – Responsibilities

2.1 Generation Dispatch Responsibilities

2.1.1 Generation Dispatch is responsible for updating the EMS LGE Area MW Reserves Summary fields as they change including the following:

a. ***Operating Reserves Target*** - This entry is the total amount of Operating Reserves targeted

b. ***Spinning Reserves Required*** - This entry is the total amount (based on percentage) of CRR, and Regulating Reserves required to be carried as Spinning Reserves

c. ***Spinning Reserves on AGC Required*** – This entry is total amount (based on percentage) of CRR required to be carried on AGC

d. ***Contingency Reserves Required*** – The total amount of CRR

e. ***Contingency Reserves Spinning Required*** – This entry is the total amount (based on percentage) of CRR required to be carried as Spinning Reserves on AGC.

f. Keeping all generation unit parameters up to date to allow EMS to properly calculate reserves available (example – high operating limits, quick start availability and unit ramp rate). This allows Generation Dispatch and BA/TOP the ability to monitor real time Operating Reserve status. The EMS will alarm in the event an actual reserve field has decreased below the requirement.

2.1.2 Generation Dispatch is responsible for monitoring, activation of, and restoration of CRR within industry standards.

2.1.3 The Manager - Generation Dispatch and Trading or Supervisor – Generation Dispatch performs daily after the fact analysis using 4-second EMS data scans to validate CRR were available.

2.2 LG&E/KU BA/TOP, Generation and Generation Services Responsibilities (see LG&E/KU Most Severe Single Contingency Operating Process)

2.2.1 At least annually and more frequently if updated, the LG&E/KU BA/TOP and Generation will provide the Manager – Generation Dispatch and Trading the MSSC as calculated in compliance with BAL-002-3 for the LG&E/KU BA Area.

2.2.2 The Manager – Generation Dispatch and Trading will submit the LG&E/KU BA Area MSSC to the TCRSG Operating Committee and LG&E/KU Generation Planning.

2.2.3 The LG&E/KU BA/TOP and Generation will inform Generation Dispatch when they become aware of changes that might increase the resource output impacted by a single point of failure (e.g., when a bus outage increases the number of generation units on a single bus).

a. Generation Dispatch will evaluate the change and may adjust the CRR if the MSSC increases or limit the output of impacted units such that the MSSC is not increased.

b. If the MSSC increases due to such a change, Generation Dispatch may inform the

TCRSG administrator.

2.2.4 Additional LG&E/KU BA/TOP responsibilities are listed in Sections 4.3 and 4.4 of this document.

SECTION 3 – Contingency Response

3.1 LG&E/KU Balancing Authority Operator Resource Contingency Response

Generation Dispatch is in control of AGC Desk Functions.

3.1.1 If the LG&E/KU resource contingency causes an immediate reliability impact (e.g., MVAR support, overload of a transmission facility or device), the ESC will call Generation Dispatch and inform them of any concerns or limitations that the need to be factored into the mitigation response.

3.1.2 If the LG&E/KU resource contingency does not cause an immediate reliability impact (e.g., MVAR support, overload of a transmission facility or device), the ESC will allow Generation Dispatch to respond to the resource contingency before calling.

3.1.3 Generation Dispatch will call the ESC within approximately five minutes of the resource contingency and inform them of their mitigation plan (if applicable), the reason for the contingency (if known) and the initial projection of the resource loss time frame (if applicable and if known).

a. If Generation Dispatch has not contacted the ESC within approximately five minutes of the contingency, the ESC should call Generation Dispatch to obtain the mitigation plans Generation Dispatch has put in place.

3.1.4 Generation Dispatch will evaluate the magnitude of the resource loss

a. If the magnitude of the resource loss is greater than 550 MW, Generation Dispatch will request activation of contingency reserves from the TCRSG.

b. If the magnitude of the resource loss is less than 550 MW, use of the TCRSG is discretionary based on real time conditions.

3.1.5 Generation Dispatch will respond to the contingency (refer to Section 3.2)

3.1.6 Generation Dispatch will update the ESC as necessary.

3.2 Generation Dispatch Resource Contingency Response Reference List

3.2.1 Generation Dispatch will respond to all Balancing Contingency Events within the Contingency Event Recovery Period[5] except as described in Section 3.2.3.

a. Generation Dispatch will deploy operating reserves[6] and mitigation plan without intentional delay. The mitigation plan includes but is not limited to the items described in Section 3.2.2.

b. After deployment of operating reserves and mitigation plan, Generation

[5] BAL-002-3 R1, R1.1
[6] BAL-002-3 R1.3

Dispatch will:

i. Call and inform the LG&E/KU ESC of the contingency, the mitigation response put into place and any known information about the contingency such as the reason for the contingency and the initial projection of the resource loss time frame (if applicable), within five minutes from time of the contingency.

ii. If Generation Dispatch foresees that recovery will not be achieved within the Contingency Event Recovery Period, Generation Dispatch will inform the LG&E/KU ESC without intentional delay.

iii. Generation Dispatch will call and inform the TVA RC of the contingency, the mitigation response put into place and any known information about the contingency such as the reason for the contingency and the initial projection of the resource loss time frame (if applicable), without intentional delay.

c. Generation Dispatch will enter the contingency (if applicable) into the TVA generation outage and derate portal.

d. Generation Dispatch will ensure restoration of Contingency Reserves is considered in the mitigation response plan.

e. Generation Dispatch will target to meet the CRR by the end of the Contingency Reserve Restoration Period.

f. If Generation Dispatch foresees that reserve restoration will not be achieved within the Contingency Reserve Restoration Period, Generation Dispatch will inform the LG&E/KU ESC without intentional delay.

g. Generation Dispatch will update the ESC as necessary.

h. Generation Dispatch will log Balancing Contingency Events in the shift log.

i. The Manager – Generation Dispatch and Trading or Supervisor – Generation Dispatch will review all Balancing Contingency Events, complete the Disturbance Control Standard log entry, and perform after the fact analysis.

j. When the LG&E/KU BA experiences a Reportable Balancing Contingency Event and requests Contingency Reserves from one or more other TCRSG members, the process below will be followed.[7]

i. The Manager – Generation Dispatch and Trading will collect and review the data.

ii. The Manager – Generation Dispatch and Trading will review the data with the Manager – Market Compliance.

iii. The Manager – Generation Dispatch and Trading will submit the data to the TCRSG through the appropriate process and copy the LG&E/KU BA.

k. When the LG&E/KU BA experiences a Reportable Balancing Contingency Event and does not request Contingency Reserves from one or more other TCRSG members, the process below will be followed:[8]

i. The Manager – Generation Dispatch and Trading will prepare the CR

[7] BAL-002-3 R1.2
[8] BAL-002-3 R1.2

Form 1.

ii. The Manager – Generation Dispatch and Trading, Manager – Market Compliance, and the LG&E/KU BA/TOP will review the form.

iii. When all parties approve the form, Corporate Compliance will file the report with NERC.

l. When the LG&E/KU BA receives a request for additional data beyond CR Form 1, the process below will be followed:

i. Generation Dispatch will provide the TCRSG additional data for any event(s) that occur when the LG&E/KU BA requests Contingency Reserves from one or more other TCRSG members.

ii. Generation Dispatch will provide the LG&E/KU BA additional data for any event(s) that occur when the LG&E/KU BA does not request Contingency Reserves from one or more other TCRSG members in the TCRSG, and the LG&E/KU BA will submit the data.

3.2.2 Reference list for Generation Dispatch to consider (not in any specific order):

a. Deployment of Spinning Reserves

i. Remove non-curtailing derates such as low load tests and de-slags.

b. Use of Fluctuating Load Service contingency button

c. TCRSG assistance

d. Cancelation of planned derates or maintenance outages as applicable.

e. Commitment of available Combustion Turbines

i. Up to two Brown N2s with quick load option (synchronization in 5 minutes, up to approximately 100 MWs within 15 minutes)

ii. Additionally, up to two Brown N2s can be quick loaded approximately 5 minutes after initiating a start on the first pair of N2s.

iii. Inlet Cooling on Brown 5, 8, 9, 10 and 11 (additional 15 to 25 MWs (seasonal))

iv. Brown 5, 6, or 7 (if staffed on within 15 to 25 minutes)

v. Evaporative coolers for in service Brown 6 and 7 (seasonal)

vi. Trimble County CT 8 and 10, if available for Fast Start, can be on in 9 minutes and loaded up to approximately 100 MWs 6 minutes after coming online

vii. Trimble County CT (on in 20 to 25 minutes)

viii. Evaporative coolers for in service Trimble County CTs (seasonal)

ix. Paddy's Run CT (if site is staffed, on within 15)

x. Evaporative coolers for in service Paddy's run 13 CT (seasonal)

3.2.3 Every effort will be made to comply with the Contingency Event Recovery Period; however, compliance is not required under the following scenarios:[9]

[9] BAL-002-3 R1.3

a. Scenario 1
   i. The LG&E/KU BA is experiencing an EEA
   ii. Generation Dispatch is utilizing Contingency Reserve to mitigate an operating emergency in accordance with the Power Supply Capacity and Energy Emergency Plan
   iii. In doing so, has depleted the Contingency Reserve to a level below the CRR, and
   iv. To qualify for this exception to the recovery period, Generation Dispatch must notify the RC of conditions ii. and iii. above and provide the RC with an ACE recovery plan, including target recovery time.

b. Scenario 2
   i. The LG&E/KU BA experiences multiple Contingencies where the combined MW loss exceeds the CRR that are defined as a single Balancing Contingency Event

c. Scenario 3
   i. The LG&E/KU BA experiences multiple Balancing Contingency Events within the sum of the Contingency Event Recovery Period and the Contingency Reserve Restoration Period whose combined magnitude exceeds the CRR.

3.3 Transfer of AGC Control

If Generation Dispatch has transferred control of AGC Functions to the ESC:

3.3.1 The ESC will evaluate the magnitude of the resource loss.

a. If the magnitude of the resource loss is greater than 550 MW, the ESC will request activation of contingency reserves from the TCRSG.

b. If the magnitude of the resource loss is less than 550 MW, use of the TCRSG is discretionary based on real time conditions.

3.3.2 The ESC will function as the generation dispatcher and deploy Operating Reserves as shown in Section 3.2.1 above.

3.3.3 When Generation Dispatch calls to resume control of AGC Functions, the ESC will inform Generation Dispatch of the mitigation plans executed.

3.4 LG&E/KU BA Area Non-LG&E/KU Resource Contingency

Generation Dispatch is in control of AGC Functions.

3.4.1 Without intentional delay, the ESC will call Generation Dispatch and inform them that a network customer has had a “contingency”, including the contingency magnitude in MW, and that Generation Dispatch needs to deploy reserves. No non-public transmission data or contingency specific data outside the contingency magnitude in MW and time frame are to be communicated to Generation Dispatch by the ESC.

a. If the resource contingency causes an immediate reliability impact (e.g., MVAR support, overload of a transmission facility or device), the ESC will

inform Generation Dispatch of any concerns or limitations that Generation Dispatch needs to factor into their mitigation response.

b. If the network customer's contingency occurs within the same clock minute of a contingency of a LG&E/KU-owned resource, the ESC will ensure this is communicated to Generation Dispatch as the contingencies may add up to a Reportable Balancing Contingency Event.

3.4.2 Generation Dispatch will respond to the contingency (refer to Section 3.2).

If Generation Dispatch has transferred control of AGC Functions to the ESC, the ESC will follow Section 3.3.

3.4.3 After following protocol with other entities within the LG&E/KU BA Area, the ESC will inform Generation Dispatch of the projected time frame of the contingency response.

3.4.4 Generation Dispatch will target to meet its CRR by the end of the Contingency Reserve Restoration Period.

3.4.5 If Generation Dispatch foresees that reserve restoration will not be achieved within the Contingency Reserve Restoration Period, Generation Dispatch will inform the LG&E/KU ESC without intentional delay.

SECTION 4 - TCRSG Process

This section describes the process and protocol used for execution and response to a TCRSG event request. (Refer to the TCRSG Agreement – Operating Protocols for detailed descriptions).

4.1 LG&E and KU TCRSG obligation

4.1.1 The CRR in place for LG&E and KU is located in the Position Tool – Position Summary tab and the EMS LGE Area MW Reserves Summary.

4.1.2 The value of the MSSC Loss is listed in Attachment A of the TCRSG Agreement. (LG&E/KU BA and TCRSG)

4.1.3 See Section 2.2 for details regarding the roles of the BA and GO/GOP informing Generation Dispatch of the MSSC value.

4.1.4 The value of the Reportable Balancing Contingency Event for the TCRSG is listed in Attachment A of the TCRSG Agreement and in the Position Tool on the Position Summary Tab.

4.2 TCRSG Portal

4.2.1 Generation Dispatch monitors the TCRSG Production version through the TCRSG portal.

4.2.2 Generation Dispatch will log into the TCRSG portal each shift.

4.2.3 If the TCRSG portal is inaccessible, the information will be communicated via the backup process specified by the TCRSG admin.

4.3 External TCRSG event response

4.3.1 Generation Dispatch will validate and acknowledge the external TCRSG request.

4.3.2 LG&E/KU BA/TOP will call Generation Dispatch if Generation Dispatch fails to acknowledge an active external TCRSG request event alarm (after approximately one minute).

4.3.3 Generation Dispatch will enter an NSI offset into the EMS (Current NSI Manual Offset – located on the LGE AREA AGC Summary) equal to the scheduled amount of external TCRSG assistance to be provided by LG&E and KU for the duration of the event unless the event will be 60 minutes or greater, in which case see Section 4.9 Scenario 1, item 8. The NSI offset will be manually ramped out at the end of the event.

4.3.4 Generation Dispatch will deploy Contingency Reserves requested for assistance and compliance, returning ACE to the pre-contingent level.

4.3.5 In the event of a manually deployed TCRSG event:

a. TVA will inform Generation Dispatch.

b. Generation Dispatch will enter an NSI offset into the EMS (Current NSI Manual Offset – located on the LGE AREA AGC Summary) equal to the scheduled amount of external TCRSG assistance to be provided by LG&E/KU for the duration of the event unless the event will be 60 minutes or greater, in which case see Section 4.9 Scenario 1, item 8. The NSI offset will be manually ramped out at the end of the event.

c. Generation Dispatch will contact the LG&E/KU BA/TOP and inform them of the manual external TCRSG event including the total MW.

4.3.6 Generation Dispatch will restore CRR by the end of the Contingency Reserve Restoration Period.

4.4 Internal TCRSG event response

4.4.1 When an internal event triggers a need for TCRSG assistance Generation Dispatch calculates the magnitude of assistance that will be requested from the TCRSG.

4.4.2 Generation Dispatch will enter the TCRSG assistance request in the TCRSG portal in a timely manner.

a. There is a three-minute time frame from the start of the actual contingency during which the TCRSG assistance request must be made.

4.4.3 Generation Dispatch will validate and acknowledge the TCRSG request

a. LG&E/KU BA/TOP will call Generation Dispatch if Generation Dispatch fails to acknowledge an active internal TCRSG request event alarm, *after approximately one minute*

4.4.4 Generation Dispatch will enter an NSI offset into the EMS (Current NSI Manual Offset – located on the LGE AREA AGC Summary) equal to the scheduled amount of external TCRSG assistance to be provided by LG&E and KU for the duration of the event unless the event will be 60 minutes or greater, in which case see Section 4.9 Scenario 1, item 8. The NSI offset will be manually ramped out at the end of event.

a. Generation Dispatch will deploy available Contingency Reserves for assistance and compliance, returning ACE to pre-event level.

b. Generation Dispatch will call TVA and inform them if a TCRSG event cannot be entered into the TCRSG portal (423-697-4124).

c. Generation Dispatch will contact the LG&E/KU BA/TOP and inform them of the manual internal TCRSG event including the total MW value

d. Generation Dispatch will enter an NSI offset into the EMS (Current NSI Manual Offset – located on the LGE AREA AGC Summary) equal to the scheduled amount of external TCRSG assistance to be provided by LG&E and KU for the duration of the event unless the event will be 60 minutes or greater, in which case see Section 4.9 Scenario 1, item 8. The NSI offset will be manually ramped out at the end of event. Generation Dispatch will restore CRR by the end of the Contingency Reserve Restoration Period.

e. If CRR is utilized for response to an internal event that does not require external assistance, the event will still need to be entered into the TCRSG portal.

4.5 Restrictions

Repetitive use of TCRSG

4.5.1 For the Contingent Type "Loss of Generation" or "Loss of Schedule", activation of the TCRSG shall be limited to one execution plus extension per event.

4.5.2 For Contingent Type "Loss of Generation" or "Loss of Schedule", the amount entered into the TCRSG request cannot exceed the total capacity of the unit(s) lost or the total amount of the schedule lost.

4.5.3 For the OEC Contingent Type, the Automatic Reserve Sharing System may be activated when such Contingency Reserves Activation is needed by a Party for OEC such as to prevent the curtailment of firm load, or to restore its ACE within acceptable limits as required to maintain compliance with applicable Reliability Standards. The use of OEC more than once in the same day by the Contingent System Party for events that do not meet or exceed the Reserve Group Reportable Disturbance level is only allowed after the TCRSG has re-established its Contingency Reserves Obligation, which means that the Contingent System must have restored its Contingency Reserves Requirement. If the Contingent System Party cannot restore its Contingency Reserves Requirement within the Contingency Reserve Restoration Period, the responsible BA will request an EEA3.

4.5.4 The TCRSG assistance is limited to the loss of an LG&E/KU resource (generation or schedule) or OEC.

If Generation Dispatch cannot restore the CRR, Generation Dispatch will discuss with the LG&E/KU BA/TOP all other options to balance the system including, conferencing in the Reliability Coordinator if necessary to request the appropriate EEA level be declared, without delay.

4.6 Alarms

4.6.1 The TCRSG portal will provide an alarm in the following instances:

a. When a new event is initiated
b. When an event is extended
c. When an event is canceled (terminated)
d. When an event is about to expire (5 min before)
e. When the ability to extend an event is about to expire for the party who initiated the event and the TCRSG admin (alarm will start 15 min before expiring)
f. When a party's EEA status has changed
g. When a party's EEA status and BA adjustment have changed
h. When a party's BA is offline (audible)
i. When the TCRSG admin offline (audible)
j. When the application is offline
k. When an event is extended more than 60 min (tag required)
l. When requesting extra Contingency Reserve (when Reserve pool is deficient -

visual notification type alarm) (15 minutes after event initiation)

m. Actual contingency loss time (pop up box) (15 minutes after event initiation)

n. When the event is greater than the TRM

4.6.2 15 minutes after the start time of a CRSG event, the TCRSG portal will request the Actual Loss Time. The time of the contingency is to be entered in Eastern Standard Time.

4.6.3 In the event the Administrator remains offline beyond a short time period, Generation Dispatch will call the Administrator.

4.7 Extra Contingency Reserves

When the TCRSG Contingency Reserves are below the CRR, Generation Dispatch will offer in additional Contingency Reserves if available.

4.8 EEA 2 or 3

4.8.1 Internal EEA 2 or 3

In the event the TVA RC has declared an EEA level 2 or 3 as requested by LG&E and KU, Generation Dispatch will select the appropriate EEA level status flag in the TCRSG portal and inform the TCRSG administrator. If applicable, Generation Dispatch will use the BA Adjustment Field in the TCRSG portal to reduce or zero out our CRR and inform the TCRSG administrator.

4.8.2 External EEA 2 or 3

In the event TVA has declared an EEA level 2 or 3 and the external BA has pulled their reserves from the TCRSG for a TCRSG event, Generation Dispatch will take the following actions:

a. Increase operating reserves to maintain Control Performance Standard compliance and carry the LG&E/KU MSSC

b. Coordinate the immediate commitment of resources (combustion turbines) and/or the purchase of power

c. Inform the BA of the situation and the mitigation plan

d. Inform Manager – Generation Dispatch and Trading of the situation without intentional delay

e. Return to the normal targeted CRR once TVA restores their CRR contribution

4.9 TCRSG Tagging

Any power flowing as part of a TCRSG event beyond 60 minutes from the time of the "resource loss" must be tagged. The tag must be submitted within 60 minutes from the time of the resource lost.[10] The following procedures detail the actions needed in possible scenarios:

[10] NAESB WEQ-004-1.7.1

Scenario 1: ***The LG&E/KU TCRSG request is less than or equal to the LGE TRM available from TVA into LG&E/KU*** (The available LGE TRM is recorded on the Position Summary of the Position Tool.)

1. Generation Dispatch will immediately deploy Contingency Reserves for the Balancing Contingency Event.
2. Generation Dispatch will inform the Trader of the MW value of TCRSG assistance from TVA and the start time and end time of a possible extension that would cause the event to be greater than 60 minutes or if the initial TCRSG event will be greater than 60 minutes from the resource loss time.
3. The Trader will prepare *but not submit* an emergency tag covering the time period identified by Generation Dispatch. This tag will include F7 Transmission for TVA with "TRM" in the place of an OASIS number and F7 Transmission for LGEE with 11111113 as the OASIS number.
    a. The start and end time of the tag will be the start and end time of the extension even if the extension starts premature of the beyond 60-minute mark as long as the extension takes the event beyond 60 minutes in total.
    b. If an extension is not needed and the event will breach the 60-minute mark from the time the resource is lost a tag still must be submitted with the initial TCRSG event start and end time.
4. As soon as possible, Generation Dispatch will communicate to the Trader the MW value needed to be tagged for the event which results in flows beyond 60 minutes from the time of the "resource loss". The maximum request must be no greater than the LGE TRM. Generation Dispatch has the option to reduce the MW value if the event is extended.
5. The Trader will enter the volume requested by Generation Dispatch on the tag and submit it.
6. Generation Dispatch will call the LG&E/KU BA to inform them of the extension, new tag(s) and the MW value of the extension, or that the original event will be beyond 60 minutes in duration and a tag has been submitted.
7. Generation Dispatch will call the TCRSG administrator to inform them of the extension, new tag(s) and the MW value of the extension, or that the original event will be beyond 60 minutes in duration and a tag has been submitted.
8. Once the tag is picked up in the EMS NSI, Generation Dispatch will remove the NSI Offset.

Scenario 2: ***The LG&E/KU TCRSG request is greater than the LGE TRM available from TVA into LG&E/KU*** (The available LGE TRM is recorded on the Position Summary of the Position Tool.)

1. Generation Dispatch will immediately deploy Contingency Reserves for the Balancing Contingency Event.
2. Generation Dispatch will inform the Trader of the MW value of TCRSG assistance from TVA that is over the TRM amount and the start time and end time of the

possible extension that would cause the event to be greater than 60 minutes or if the initial TCRSG event will be greater than 60 minutes from the resource loss time.

3. The Trader will purchase PTP transmission on the LG&E/KU transmission system to deliver the MW value above the LGE TRM requested by Generation Dispatch covering the time of the possible extension or event.
    a. If not enough LGE PTP transmission is available to cover the TCRSG volume above the LGE TRM, the Trader will purchase the volume available and communicate the volume of transmission purchased to Generation Dispatch.
        i. In the case of inadequate volume of LGE PTP transmission, Generation Dispatch will only be able to receive the *sum of* the MW value allowed from the LGE TRM Transmission and the MW value from the purchased PTP Transmission.
4. The Trader will prepare, but not submit, two tags covering the time period defined by Generation Dispatch.
    a. The first tag will be an <u>emergency</u> tag using F7 Transmission for TVA with "TRM" in the place of an OASIS number and F7 Transmission for LGEE with 11111113 as the OASIS number. The volume on this tag will be equal to the LGE TRM.
    b. The second tag will be an <u>emergency</u> tag from TVA to LGE for the additional volume that may be requested by Generation Dispatch above the LGE TRM.
    c. The start and end time of the tag will be the start and end time of the extension even if the extension starts premature of the beyond 60-minute mark as long as the extension takes the event beyond 60 minutes in total.
    d. If an extension is not needed and the event will breach the 60-minute mark from the time the resource is lost a tag still must be submitted with the initial TCRSG event start and end time.
5. As soon as possible, Generation Dispatch will communicate to the Trader the MW value needed to be tagged for the event which results in flows beyond 60 minutes from the time of the "resource loss". The max request must be no greater than the sum of the LGE TRM and the PTP Transmission purchased by the Trader. Generation Dispatch <u>has the option to reduce the MW value if the event is extended.</u>
    a. The Trader will enter the volume on the first tag equal to Generation Dispatch requested volume but no greater than the available LGE TRM and submit this tag.
    b. The Trader will enter the volume on the second tag to cover the volume requested by Generation Dispatch in excess of the volume already tagged on the first tag. The Transmission on this second tag will use F7 Transmission for TVA with "TRM" in the place of an OASIS number and NH2 Transmission for LGEE with the OASIS number from the NH2 PTP reserved earlier.

6. Generation Dispatch will call the LG&E/KU BA to inform them of the extension, new tag(s) and the MW value of the extension, or that the original event will be beyond 60 minutes in duration and a tag has been submitted.
7. Generation Dispatch will call the TCRSG administrator to inform them of the extension, new tag(s) and the MW value of the extension, or that the original event will be beyond 60 minutes in duration and a tag has been submitted.
8. Once the tags are picked up in the EMS NSI, Generation Dispatch will remove the NSI Offset.

The TCRSG Software will ask for the resource loss time 15 minutes after a TCRSG event has been requested and alerts the user when a tag is required. If it is not clear that a tag is needed for an event, the Trader may consult with the TCRSG Administrator after the 15-minute recovery period.

Generation Dispatch – Generator Commitment, Coordination, and Communication Procedure

Operational Procedure relevant to NERC Reliability Standards:

COM-002-4	R1.1, R1.2, R1.3, R1.4, R1.5, R1.6, R5, R6, R7	(Effective 07/01/2016)
EOP-005-3	R13	(Effective 04/01/2019)
EOP-008-2	R1	(Effective 04/01/2019)
IRO-001-4	R2, R3	(Effective 04/01/2017)
IRO-010-4	R3, R3.1, R3.2, R3.3	(Effective 04/01/2023)
IRO-017-1	R2	(Effective 04/01/2017)
TOP-001-5	R3, R4, R5, R6	(Effective 04/01/2021)
TOP-003-5	R5, R5.1, R5.2, R5.3	(Effective 04/01/2023)
VAR-002-4.1	R2.2	(Effective 09/26/2017)

Effective Date – November 1, 2023

Version 16
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Signatures

Generator Commitment, Coordination, and Communication Procedure

Procedure Title

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Effective Date

Preparers Signatures

Linn Oelker – Manager, Generation Dispatch and Trading

Print Name & Title (Document Owner)

DocuSigned by: 2E258A736DF44BE... 10/25/2023 | 2:55 PM EDT

Signature & Date

James Frank – Lead Power Supply Analyst

Print Name & Title

DocuSigned by: 968598B1A3AC4D6... 10/25/2023 | 1:26 PM EDT

Signature & Date

Required Approval Signatures

Michael Sebourn – Manager, Generation Planning

Print Name & Title

DocuSigned by: 1A565A9424F8464... 10/25/2023 | 3:11 PM EDT

Signature & Date

Julie Hostrander – Manager, Compliance & Document Management

Print Name & Title

DocuSigned by: 5C90B045569F48E... 10/26/2023 | 8:04 AM EDT

Signature & Date

Required Approval Signatures (continued)

John Jackson – Manager, System Control Center

Print Name & Title

DocuSigned by:
Felipe Ramos D.O.A. for John Jackson 10/26/2023 | 12:23 PM EDT
04D545E6A5A948E...

Signature & Date

Dave Luckett – Manager, Fleet Operations Performance & Reliability

Print Name & Title

DocuSigned by:
David Allen Luckett 10/30/2023 | 1:00 PM EDT
62F0094905A6465...

Signature & Date

Chuck Schram – Director, Power Supply

Print Name & Title

DocuSigned by:
Chuck Schram 10/31/2023 | 10:06 AM EDT
59C3B324FAD7402...

Signature & Date

David Sinclair – Vice President, Energy Supply and Analysis

Print Name & Title

DocuSigned by:
David Sinclair 10/31/2023 | 10:54 AM EDT
A190914FB090474...

Signature & Date

Steven Turner – Vice President, Power Generation

Print Name & Title

DocuSigned by:
Steven B. Turner 10/31/2023 | 11:55 AM EDT
8AD647306F3F4A0...

Signature & Date

Revision History

Version No. **16**	Effective – **11/01/2023**
Summary of Changes: 1. Changed signatories to reflect organizational changes 2. Changed IRO-010-3 references to IRO-010-4 (effective 4/1/2023) 3. Changed TOP-003-4 references to TOP-003-5 (effective 4/1/2023) 4. Changed deadline in Section 2.1.3 to 09:00 EST to align with other unit coordination requests 5. Modified language in Section 3.2.1 to change requirement from "call" Generation Dispatch to "report to" Generation Dispatch 6. Removed reference to "Power Supply Compliance" in Section 3.3.2.m 7. Removed reference to "Manager – Market Compliance" in Section 6.1.2	
Version No. **15**	Effective – **11/01/2022**
Summary of Changes: 1. Removed "Geomagnetic Disturbance" section as notifications of Geomagnetic Disturbances will now be sent from the LG&E/KU BA/TOP to the appropriate generator contacts	
Version No. **14**	Effective – **05/01/2022**
Summary of Changes: 1. Replaced Charlie Martin with Brian Limberg as signatory 2. Transitioned signatures for DocuSign process 3. Added "Control Center" to NERC Terms section 4. Replaced "dispatch center" with Control Center in Section 3.3.19 5. Removed reference to Zorn (retired 11/30/2021) 6. Minor spelling, language, and grammar edits	
Version No. **13**	Effective – **05/01/2021**
Summary of Changes: 1. Added Manager, Fleet Ops Performance & Reliability to signatories. 2. Changed IRO-010-2 references to IRO-010-3 (effective 4/1/2021) 3. Changed TOP-001-4 references to TOP-001-5 (effective 4/1/2021) 4. Changed TOP-003-3 references to TOP-003-4 (effective 4/1/2021) 5. Added requirement that GOP leave generator in AGC control mode unless otherwise reported to Generation Dispatch 6. Added language pertaining to Generation Dispatch's communication with the natural gas pipelines 7. Added language clarifying that derates are based on primary fuel source capability 8. Added Black Start Generator Availability Reporting section 9. Adjusted Electronic Messages section to reflect new software changes	
Version No. **1-12**	Effective – **Various**
See version 12 for previous changes.	

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Purpose

The purpose of this document is to outline the communication procedures associated with generator commitment, coordination, and generator status reporting between the Generation Dispatcher, Generator Operator and the Balancing Authority and Transmission Operator. This communication is necessary for prudent planning of economic dispatch, reliability, and compliance with reporting regulations.

NERC Terms

The following terms are used in this document:

BA - Balancing Authority
GO - Generator Owner
GOP - Generator Operator
MSSC - Most Severe Single Contingency
TOP - Transmission Operator

Control Center – One or more facilities hosting operating personnel that monitor and control the Bulk Electric System (BES) in real-time to perform the reliability tasks, including their associated data centers, of: 1) a Reliability Coordinator, 2) a Balancing Authority, 3) a Transmission Operator for transmission Facilities at two or more locations, or 4) a Generator Operator for generation Facilities at two or more locations.

Operating Instruction – A command by operating personnel responsible for the Real-time operation of the interconnected Bulk Electric System to change or preserve the state, status, output, or input of an Element of the Bulk Electric System or Facility of the Bulk Electric System. (A discussion of general information and of potential options or alternatives to resolve Bulk Electric System operating concerns is not a command and is not considered an Operating Instruction.)

Definitions

Generation Dispatcher – A NERC Certified System Operator who has completed training to perform generation dispatch as defined in the Generation Dispatch Training Program document and has obtained approval from the Manager – Generation Dispatch and Trading or Supervisor – Generation Dispatch.

SECTION 1 - **Generation Outage Guideline**

The following is a guideline for generator outage coordination. Actual generation outage coordination may deviate from this guideline as conditions warrant. Generator outages are reported to the Reliability Coordinator (RC) and Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E and KU) BA/TOP by the Generation Dispatcher. Generator outages are entered into the TVA SDX Portal and updated as conditions change in compliance with the TVA Outage Coordination document.[1,2] Generator outage data is entered into the Generation Dispatch Resource Database for retention and reference.

1.1 Generation outage decision guidelines

1.1.1 Generation outage decisions can include the following items (excluding immediate forced outages)

a. Safety
b. Environmental compliance
c. System reliability including black start generator availability
d. Regional generation to load balance
e. Regional MVAR support
f. Resource to load balance (capacity adequacy)
g. Fuel inventory management
h. Replacement capacity or purchased power availability
i. Collateral damage to generator
j. Generator risk(s)
k. Impacts to other generator outages
l. Forward load and weather patterns
m. Economic Impact

1.2 Submittal to TVA SDX Portal

1.2.1 Generation outages are entered into the TVA SDX Portal by the Generation Dispatcher as they become known and without intentional delay.

1.2.2 The Generation Dispatcher keeps the TVA SDX Portal updated.

[1] IRO-010-4 R3, R3.1, R3.2, R3.3
[2] IRO-017-1 R2

1.2.3 In addition to keeping the TVA SDX Portal up to date, the Generation Dispatcher and GOP will follow verbal communication procedures on generator outages as referenced in Section 3 of this document.

1.3 Outage Delay

1.3.1 If issued an Operating Instruction by either the RC or BA/TOP to delay or defer generation outages or derates, re-dispatch generation out of economic merit, or commit or de-commit generation, the Generation Dispatcher will issue an Operating Instruction to the plant and the plant will comply without intentional delay unless such an Operating Instruction would violate safety, equipment, regulatory, or statutory requirements.[3, 4] If the Operating Instruction can be accommodated, entries in the TVA SDX Portal will be updated as applicable by the Generation Dispatcher. If the Operating Instruction cannot be accommodated due to the fact that such an Operating Instruction would violate safety, equipment, regulatory, or statutory requirements, the plant will inform the Generation Dispatcher without intentional delay and the Generation Dispatcher will inform the RC or BA/TOP without intentional delay and other options will be explored if applicable.[5,6]

[3] TOP-001-5 R3
[4] IRO-001-4 R2
[5] TOP-001-5 R4
[6] IRO-001-4 R3

SECTION 2 - **Generation Coordination Event Guideline**

The following is a guideline for generator coordination events. This is for reference only; actual coordination issues will be evaluated in real time. Generator derates are reported to the RC and BA/TOP by the Generation Dispatcher. Generator derates are entered into the TVA SDX Portal and updated as conditions change. Generator derate data is entered into the Generation Dispatch Resource Database available for viewing by the BA/TOP, GO/GOP and Generation Dispatcher for retention and reference.

2.1 Planned Generation Coordination Events

2.1.1 Planned generation coordination events will be coordinated with Generation Dispatch prior to 09:00 EST the preceding day by the GOP.

2.1.2 Generation coordination decision guidelines can include (excluding immediate forced outages or derates);

a. Safety
b. Environmental compliance
c. System reliability including black start generator availability
d. Regional generation to load balance issues
e. Regional MVAR support
f. Resource to load balance (capacity adequacy)
g. Fuel inventory management
h. Replacement capacity or purchased power availability
i. Collateral damage to generator
j. Generator risk(s)
k. Impacts to other generator coordination events
l. Forward load and weather patterns
m. Economic impact

2.1.3 The BA/TOP will give Generation Dispatch as much notice as practical (minimum of one day notice prior to 09:00 EST) for any planned generator test or data validation the BA/TOP requests. Unit testing will be subject to limitations due to seasonal conditions and fleet status.

2.1.4 The GOP will give Generation Dispatch as much notice as practical for requesting unit testing. Unit testing will be subject to limitations due to seasonal conditions and fleet status.

2.2 Unplanned Generation Coordination Events

2.2.1 Unplanned or transient generator coordination events are handled by the Generation Dispatcher in real time.

2.2.2 During normal business hours the Generation Dispatcher will keep the Manager – Generation Dispatch and Trading and Supervisor – Generation Dispatch updated on unplanned generator coordination events.

2.2.3 Outside normal business hours, the Generation Dispatcher will keep the on call contact up to date on unplanned generator coordination events.

2.3 Generation Dispatcher Authority

2.3.1 The on-duty Generation Dispatcher has the authority to take actions and execute mitigation plans that are required to ensure resource to load balance is maintained and reliability and compliance are upheld within industry and internal operational standards and requirements within the Generation Dispatch line of business responsibilities without obtaining additional approval.

2.4 Submittal to TVA SDX Portal

2.4.1 Generation derates outside short term transient generator derates are entered into the TVA SDX Portal by the Generation Dispatcher as they become known and without intentional delay.[7]

2.4.2 Each shift, a cross reference is made by the Generation Dispatcher to check generator derates entered into the TVA SDX Portal for validity.

2.4.3 The Generation Dispatcher keeps the TVA SDX Portal updated with forward known generator derates.

2.4.4 If the TVA SDX Portal is inaccessible, the information will be communicated via telephone, and logged in the Generation Dispatch Resource Database. The TVA SDX Portal will be updated when it becomes accessible.

2.5 Delay

2.5.1 If issued an Operating Instructions by either the RC or BA/TOP to delay or defer generation outages or derates, re-dispatch generation out of economic merit or commit or de-commit generation, the Generation Dispatcher will issue an Operating Instruction to the plant, and the plant will comply without intentional delay unless such an Operating Instruction violates safety, equipment, or regulatory or statutory requirements.[8, 9] If the Operating Instruction can be accommodated, entries in the TVA SDX Portal will be updated as applicable by the Generation Dispatcher. If the Operating Instruction cannot be accommodated due to the fact that such an Operating

[7] IRO-010-4 R3, R3.1, R3.2, R3.3
[8] TOP-001-5 R3, R5
[9] IRO-001-4 R2

Instruction would violate safety, equipment, regulatory, or statutory requirements, the plant will inform the Generation Dispatcher without intentional delay and, the Generation Dispatcher will inform the RC or BA/TOP without intentional delay and other options will be explored.[10, 11]

[10] TOP-001-5 R4, R6
[11] IRO-001-4 R3

SECTION 3 – **Communication and Reporting Procedure**

The following section is in reference to communication and reporting procedures to be used by the Generation Dispatcher and the Generator Operator (GOP) when communicating generator status, outage, and coordination events; and by Generation Dispatcher when communicating to the RC and BA/TOP. The respective communication procedure is to be followed during normal, emergency, and system restoration operations.

3.1 Telephone Communication Procedure

3.1.1 Telephone communication procedure is to ensure clear and concise communication prevails. The following telephone communication procedure is to be used when communicating issues related to the operation of the bulk electric system.

a. All communication between Generation Dispatch and the GOP and/or BA/TOP pertaining to the operation of the Bulk Electric System will be conducted over recorded phone line unless the communication is being conducted over a backup communication device (cellular phone) due to failure of the primary and back up Satellite Phone communication links, in which case the Generation Dispatcher will log the call in the Generation Dispatch Resource Database Daily Log.

b. All parties will clearly state their name and location for all communications. This includes station name and unit number for unit operators.

c. All communications will be in English.[12]

d. Any party to any telephone communication (including informational) between Generation Dispatch, GOP, and/or BA/TOP may request the three-part communication protocol be used for clarity as described in Section 3.1.2.

3.1.2 Operating Instructions

a. When issuing an Operating Instruction, the Generation Dispatcher will wait for a response from the receiver. Once a response is received, or if no response is received, the Generation Dispatcher will take one of the following actions:[13]
- Confirm the receiver's response if the repeated information is correct.
- Reissue the Operating Instruction if the repeated information is incorrect or if requested by the receiver.
- Take an alternative action if a response is not received or if the Operating Instruction was not understood by the receiver.

b. When receiving Operating Instructions, the Generation Dispatcher shall take one of the following actions:[14]
- Repeat, not necessarily verbatim, the Operating Instruction and receive confirmation from the issuer that the response was correct

[12] COM-002-4 R1.1
[13] COM-002-4 R1.2
[14] COM-002-4 R1.3

- Request that the issuer reissue the Operating Instruction.

c. When issuing Operating Instructions, references to generating units must include at a minimum, generator name (station name) and generator unit number.[15] Abbreviations of generator names will not be used. The following are acceptable examples:
   - Trimble County 1
   - Paddy's Run 13

d. Operating Instructions will include a time reference only when the Operating Instruction requires delayed action.[16] The following are acceptable examples:
   - Bring on Trimble County 1 at the top of the hour
   - Bring on Trimble County 1 at 09:00

e. It will be understood that all numerical time references will be in Eastern Standard Time (EST).

f. If the Generation Dispatcher issues a burst Operating Instruction, they will confirm receipt with at least one of the intended recipients.[17]

g. All parties are responsible for adhering to this communication procedure at all times including during emergencies.[18]

h. The Generation Dispatcher will verbally acknowledge the receipt of an Emergency Operating Instruction when issued by the TVA RC.

3.2 Daily Generator and Load Updates[19]

3.2.1 Each business day, by 09:00 EST, the primary plant contact or designee for each generation station will report to Generation Dispatch its current and next day(s) generator status including, but not limited to: generator availability, generator available capacity, generator minimum operating parameters, generator AGC operations (control mode), generator ramping capability and generator ramp rate changes, generator start-up or shut-down schedules, generator risks, coordination needs, and any fuel restrictions or concerns. This data is filed electronically by the Generation Dispatcher.

3.2.2 Each non-business day, the Generation Dispatcher will call each generating station prior to 09:00 EST for updates on current and next day(s) generator status including, but not limited to: generator availability, generator available capacity, generator minimum operating parameters, generator AGC operations (control mode), generator ramping capability and generator ramp rate changes, generator start-up or shut-down schedules, generator risks, coordination needs, and any fuel restrictions or concerns. This data is filed electronically by the Generation Dispatcher and sent to the "RGD Saturday-Sunday Update" contact list, which includes Generation Dispatch leadership and the BA/TOP, in real time.

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[15] COM-002-4 R1.6
[16] COM-002-4 R1.5
[17] COM-002-4 R1.4, R7
[18] COM-002-4 R5, R6
[19] TOP-003-5 R5, R5.1, R5.2, R5.3

a. Each station responsible for operation of an unmanned generator will provide the status of that generator. For Cane Run, this includes Cane Run, Paddy's Run, and the Ohio Falls units. For Brown, this includes Brown coal, Brown CTs, Dix, and Haefling units.

3.2.3 Generation Dispatch will update the 14-day load file each business day with individual company and aggregate hourly net load forecast up to 14 days out, forecasted Net Scheduled Interchange, targeted Operating Reserves, weekly and monthly aggregate net peak load forecast, 14-day generator commitment, and 14 days of resource to load position variance. This file is made accessible to the BA/TOP in real time. The BA/TOP updates the data to the RC SDX system as applicable.

3.2.4 Generation Dispatch will submit the next day(s) hourly generator dispatch and commitment profile and the next 13-day peak load hour unit commitment to the BA/TOP for submittal to the RC by 12:00 EST normal business days (off normal business day(s) are submitted the preceding normal business day) in accordance with established process and the Transmission Strategy and Planning - Operational Reliability Data specification document.

3.3 Real Time Communication and Reporting Procedure

3.3.1 Single Point of Failure

a. Anytime the GOP or BA/TOP become aware of a single point of failure that could affect the availability of 2 or more units, they will call and inform the Generation Dispatcher without intentional delay. An example of this would be a bus outage that makes multiple units susceptible to a single bus failure.

b. Generation Dispatch will evaluate the impact of such an event to the LG&E/KU MSSC and any change to the Contingency Reserve requirement.

c. See Section 2.2 of the Generation Operating Reserves document for further details.

3.3.2 Generator Status Change

a. The GOP will call the Generation Dispatcher on any change of generator status including, but not limited to: generator availability, generator available capacity (including any day-to-day additional capacity the unit may achieve due to ambient or other conditions), generator minimum operating parameters, generator AGC operations (control mode), generator ramping capability and generator ramp rate changes, generator risks, generator start-up or shut-down schedules, aborted startups, delays in coordination or start up events, and any fuel restrictions or concerns without intentional delay.

b. The Generation Dispatcher reporting will be based on information provided by the generators and any conditions made known to the Generation Dispatcher.

c. Unless otherwise reported by the GOP to Generation Dispatch, the GOP will allow the generator to be economically dispatched by keeping the generator in Automatic Generation Control mode and allowing the unit to regulate between the seasonal available minimum and maximum ratings.

- The GOP will not place AGC blocks or holds on generators unless

communicated to the Generation Dispatcher without intentional delay.

- The GOP may call the Generation Dispatcher on estimated dispatch levels in real time

d. The GOP will inform the Generation Dispatcher any time stabilization fuel (fuel oil or natural gas) is utilized outside testing and normal operations (coal mill commitment, etc.).

e. When possible, the Generation Dispatcher and GOP will work together to avoid the use of stabilization fuel for flame stabilization by adjusting dispatch to keep the generator loadings at a level where stabilization fuel is not required.

f. The Generation Dispatcher will inform RC and BA/TOP of any generator status change without intentional delay by entry into the TVA generator outage portal or by verbal communication as applicable.

g. If a generator changes outage classifications (example from maintenance to reserve), a new entry into the TVA generator outage portal is required with the appropriate "status" type selected.

h. If a generator maintenance outage, planned outage, or planned derate is extended, it must be recorded as an extension in the Generation Dispatch Resource Database and the TVA generator outage portal end time must be updated.[20]

i. If a TVA generator outage portal entry will be made after 12:00 the current day and will change a unit's status for the next day from in service to out of service or vice versa, the Generation Dispatcher will call the TVA RC in addition to informing the BA/TOP, updating the portal, and following internal logging and electronic messaging processes.[21]

j. The Generation Dispatcher will inform RC and BA/TOP of any generator status change without intentional delay by entry in the TVA generator outage portal and verbal communication to the BA/TOP for generators specifically requested in real time by the RC or BA/TOP.[22]

k. The Generation Dispatcher will send an electronic message to the unit information group on generator status changes.

l. All reported generator status changes are recorded by the Generation Dispatcher in the Generation Dispatch Resource Database, the Position Tool, and the appropriate EMS fields as applicable.

m. In the event the GOP has a material delay in communicating any unit status change times to the Generation Dispatcher, the recorded time will be the time the Generation Dispatcher was informed of the change. These events will be reported to the Manager – Generation Dispatch and Trading, who will review and communicate to the GOP management team and Corporate Compliance as applicable.

n. See the following sections (3.3.3 through 3.3.9) for specific reporting types of generator status change details.

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[20] IRO-017-1 R2
[21] IRO-017-1 R2
[22] EOP-005-3 R13

3.3.3 Generator Commitment – Steam Generator and Combined Cycle

a. The Generation Dispatcher will call the GOP with generator commitment Operating Instructions.
b. For coal units, the GOP will call the Generation Dispatcher once fires are established in boiler and provide the Generation Dispatcher with estimated synchronization time.
c. The GOP and/or Generation Dispatcher will follow in-place procedures associated with taking gas from the associated gas pipeline.
d. The GOP will call the Generation Dispatcher prior to synchronization of generator.
e. The GOP will call the Generation Dispatcher without intentional time delay once generator is synchronized and communicate to the Generation Dispatcher if time to generator dispatchable state is estimated to be greater than the normal start up to dispatchable state time.
f. The Generation Dispatcher will notify the RC and BA/TOP of generator synchronization without intentional time delay.
g. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and appropriate EMS fields.
h. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[23]
i. The GOP will call the Generation Dispatcher once generator is dispatchable.
j. In the event the GOP has a material delay in communicating unit commitment times to the Generation Dispatcher, the event will be reported to the Manager – Generation Dispatch and Trading, who will review and communicate to the GOP management team and Corporate Compliance.

3.3.4 Generator Commitment - Combustion Turbine (CT)

a. The Generation Dispatcher will call the GOP with generator commitment Operating Instructions including any requested deviation from a normal start up (e.g., quick load or fast start) and if secondary fuel operations are required.
b. The Generation Dispatcher will secure fuel and notify the appropriate Gas Pipeline Controller (GC).
c. The GOP will not take fuel from the interstate pipeline without verbal approval from the Generation Dispatcher.

[23] IRO-017-1 R2

- Does not include support fuel associated with coal unit operation
- Includes pipeline packing at the Brown station

d. The Generation Dispatcher will call the appropriate interstate or LDC pipeline to obtain verbal permission prior to taking gas when starting a generator (other than during a Fast Start deployment of contingency reserves)

e. The Generation Dispatcher may provide verbal updates to the pipeline on material changes in gas usage during a commitment window.

f. The Generation Dispatcher will adhere to specific pipeline contract requirements on communication.

g. The GOP will call the Generation Dispatcher once generator is synchronized without intentional time delay.

h. The Generation Dispatcher will notify the RC and BA/TOP of generator commitment without intentional time delay.

i. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and EMS fields.

j. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[24]

k. The GOP will call the Generation Dispatcher once the generator is dispatchable.

l. The Generation Dispatcher will issue an Operating Instruction to the GOP if additional capacity is required from the combustion turbines such as use of evaporative cooling, inlet cooling or peaking power option

3.3.5 Generator Commitment – Dix Hydro

a. The Generation Dispatcher will call the GOP with generator commitment Operating Instructions.

b. The GOP will call the Generation Dispatcher once generator is synchronized without intentional time delay.

c. The Generation Dispatcher will notify the RC and BA/TOP of generator commitment without intentional time delay.

d. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and appropriate EMS fields.

e. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[25]

3.3.6 Generator Commitment - Ohio Falls (Run of River)

a. The GOP will call the Generation Dispatcher with generator commitment information (Run of river).

b. The GOP will call the Generation Dispatcher once generator is synchronized without intentional time delay.

c. The Generation Dispatcher will notify the RC and BA/TOP of generator

[24] IRO-017-1 R2
[25] IRO-017-1 R2

synchronization without intentional time delay.

d. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and appropriate EMS fields.

e. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[26]

3.3.7 Generator De-Commitment Event

a. The Generation Dispatcher will call the GOP to issue an Operating Instruction for generator de-commitment or GOP to call the Generation Dispatcher for imminent generator de-commitment.

b. The Generation Dispatcher will coordinate optimal window per criteria in section 1.

c. The Generation Dispatcher will call and advise the RC and BA/TOP of generator de-commitment.

d. The Generation Dispatcher will follow up with the GOP as needed.

e. If issued an Operating Instruction by either the RC or BA/TOP to delay or defer generation outages or derates, re-dispatch generation out of economic merit or commit or de-commit generation the Generation Dispatcher will issue an Operating Instruction to the plant and the plant will comply without intentional delay unless such an Operating Instruction violates safety, equipment, regulatory or statutory requirements. If the Operating Instruction can be accommodated, entries in the TVA SDX portal will be updated as applicable by the Generation Dispatcher. If the Operating Instruction cannot be accommodated due to the fact that it would violate safety, equipment, regulatory, or statutory requirements, the plant will inform the Generation Dispatcher without intentional delay, the Generation Dispatcher will inform the RC or BA/TOP without intentional delay, and other options will be explored if applicable.

f. The GOP will call the Generation Dispatcher once generator has been removed from the grid without intentional time delay.

g. The Generation Dispatcher will call the appropriate interstate or LDC pipeline to communicate when gas is no longer being utilized.

h. The Generation Dispatcher will call the RC and BA/TOP without intentional time delay (pending time variance of notification made in 3.3.7(a) or 3.3.7(d)).

i. The Generation Dispatcher and/or the GOP will follow in-place procedures associated with gas flow change from the associated gas pipeline.

j. The Generation Dispatcher will update, as applicable, the TVA SDX portal, Generation Dispatch Resource Database, Position Tool, and EMS fields.

k. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[27]

l. In the event the GOP has a material delay in communicating unit de-commitment

[26] IRO-017-1 R2
[27] IRO-017-1 R2

times to the Generation Dispatcher, the event will be reported to the Manager – Generation Dispatch and Trading, who will review and communicate to the GOP management team and Corporate Compliance.

3.3.8 Generator Trip Event

a. The GOP will call the Generation Dispatcher without any intentional time delay.
b. The Generation Dispatcher will call the RC and BA/TOP, after implementing mitigation plan without intentional time delay (within five minutes of generator contingency) and inform the BA/TOP of the mitigation plan in place for response to the unit trip.
c. The GOP will call the Generation Dispatcher once generator trip details and return to service time projection are known.
d. The Generation Dispatcher will call the RC and BA/TOP and update.
e. The Generation Dispatcher and/or the GOP will follow in-place procedures associated with gas flow change from the associated gas pipeline.
f. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and EMS fields.
g. The Generation Dispatcher will provide additional notices as described in 3.3.2.i if applicable.[28]

3.3.9 Derate and Coordination events

a. The GOP to call the Generation Dispatcher for planned or unplanned derates or coordination needs without intentional delay. Information to be provided includes (but is not limited to) available capacity, estimated time frame required, and any options. For planned derate events, the Generation Dispatcher will schedule the start and stop times for the planned event and communicate times to the GOP.
b. The GOP will report all derates without intentional delay including when the unit capacity level is dispatched below the level of the derate.
c. The Generation Dispatcher will coordinate optimal window per criteria in section 2.
d. The GOP will call the Generation Dispatcher prior to removal or tagging out equipment from service for event start time coordination, regardless of generator dispatch levels or if the window was planned ahead of time (e.g. Planned Derate off peak and generator is dispatched below equipment point).
e. The GOP and Generation Dispatcher will ensure derate start time, level of available capacity, derate estimated end time (if known) are discussed, the Generation Dispatcher will update the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and appropriate EMS fields as applicable.
f. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and EMS fields without intentional time delay.

[28] IRO-017-1 R2

g. The GOP will inform the Generation Dispatcher of all derate or coordination extensions, overruns, or changes without intentional time delay.

h. The Generation Dispatcher will update, as applicable, the TVA generator outage portal, Generation Dispatch Resource Database, Position Tool, and EMS fields. The GOP will inform the Generation Dispatcher upon completion of derates or coordination events without intentional time delay.

i. The GOP and Generation Dispatcher will ensure derate end time is communicated. The Generation Dispatcher will update, as applicable and without intentional delay, the TVA generator outage portal, and Generation Dispatch Resource Database, Position Tool, and EMS fields.

j. Derate magnitudes are based on the seasonal capacity rating of the unit utilizing its' primary fuel source (derates are not adjusted for the use of supplemental fuel).

k. For some transient conditions (example, wet coal, boiler chemistry during start up (as long as the unit is steadily increasing)) where the unit output is continually changing a variable derate may be logged and must meet the following criteria.
   - The GOP and Generation Dispatcher agree the steady output of the unit cannot be determined in real time.
   - The GOP verbally informs the Generation Dispatcher for all significant changes to the units in real time
   - Significant changes can be decided by the Generation Dispatcher in real time (example report all changes greater than 20 MW).
   - The Generation Dispatcher keeps the EMS high operating limit up to date in real time.
   - The Generation Dispatcher keeps the TVA SDX Portal up to date in real time of unit derate (example report all changes greater than 20 MW).
   - The Generation Dispatcher places a comment in the TVA SDX Portal "Misc information" field that the unit is in a transient state and the derate is variable.
   - Once the unit stabilizes, the variable derate is removed and a fixed MW derate is placed on the unit.

l. If a derate coordination event meets the non-curtailing derate criteria, the GOP must inform the Generation Dispatcher at the start of the derate event and include the operational parameters associated with the non-curtailing derate event for the Generation Dispatcher to properly record and report the non-curtailing event.

m. A non-curtailing event must meet the following two criteria:
   1. The availability of the unit is not reduced below what is required by system dispatch, the work can be stopped or completed, and the unit can reach its net dependable capability level within its normal ramp-up time. A single event for a unit cannot be reported as both a non-curtailing and a derate event.
   2. Unit available capacity is based on the "regularly" used type and quality of fuel.

3.3.10 Black Start Generator Availability Reporting

a. If a generator or generator site that is designated as a black start resource becomes unavailable, and that status change is reported to the BA/TOP and RC per 3.3.2(f), that reporting shall serve as notification to the BA/TOP and RC that a black start resource is unavailable.
b. If a generator or (partial) generator site is available, but the black start path is compromised and unavailable, the GOP will inform the Generation Dispatcher. The Generation Dispatcher will log and report to the BA/TOP and RC (e.g. the diesel starting generators associated with Cane Run 7).
c. The GOP will coordinate any planned maintenance of the black start path that does not impact the availability of the black start resource with Generation Dispatch.

3.3.11 AGC Telecom, RTU and communication channel outages as related to AGC operations

a. The GOP will coordinate all generator Telecom, RTU, and communication channel maintenance with the Generation Dispatcher.
b. The Generation Dispatcher will communicate all known generator Telecom, RTU, and communication channel maintenance to the BA/TOP.
c. The GOP will communicate all generator Telecom, RTU, and communication channel failures to the Generation Dispatcher.
d. The Generation Dispatcher will communicate all generator Telecom, RTU, and communication channel failures to the BA/TOP.
e. The BA/TOP will coordinate all Telecom, RTU, and communication channel maintenance impacting AGC operations with the Generation Dispatcher.
f. The BA/TOP will communicate all Telecom, RTU, and communication channel failures impacting AGC operations to the Generation Dispatcher.
g. Any GOP station bus voltage or AVR status, indication, or control, impacted due to the loss of a Telecom, RTU, and communication channel outages, will be the responsibility of the GOP to inform the BA/TOP per their established processes.

3.3.12 Loss or failure of the EMS

a. The Generation Dispatcher will inform the BA/TOP of an EMS loss or failure and follow appropriate response process.
b. The BA/TOP will inform the Generation Dispatcher of the EMS loss or failure and follow appropriate response process.
c. If the backup ACE is available (MicroSCADA), the Generation Dispatcher will validate with the BA/TOP the accuracy of the backup ACE and manually dispatch against the back up ACE.
d. If available, certain PI displays may be used by the Generation Dispatcher to assist in monitoring the generation fleet.
e. The Generation Dispatcher will use the “Balance Sheet” to manually record each generators output and track reserves until the EMS is back in service as needed.
f. If the backup ACE (MicroSCADA) is not available, the Generation Dispatcher will inquire from the BA/TOP if a manual ACE can be calculated.
g. If the BA/TOP cannot calculate a manual ACE, the Generation Dispatcher will

use the "Balance Sheet" to manually record LGE-KU load estimate, each generator's status and output, track reserves, and manually balance ACE, until the EMS or MicroSCADA is back in service or until the BA/TOP can calculate a manual ACE.

h. The Generation Dispatcher will coordinate, with the BA/TOP, any manual AGC operations while the EMS is down as needed.

i. If Area Control Error (ACE) calculation is lost (primary EMS and back up ACE (MicroSCADA)), the Generation Dispatcher will log in the Generation Dispatch Resource Database Daily Log.

j. The Generator will stay at the last dispatch instruction (AGC or verbal), unless the generator has a safety, environmental, or reliability event resulting in the need to change loading; Operating Instructions are issued from the Generation Dispatcher or BA/TOP to the generator to manually change loading; or EMS AGC functionality resumes.

k. The Generation Dispatcher will electronically message on call contact of any EMS loss or failure.

l. The Generation Dispatcher will consider moving operations to the backup location pending EMS failure, EMS site specific failure, and the projected time frame if known.

3.3.13 Loss of Communications[29]

In the event communications cannot be established between the Generation Dispatcher and GOP via land line, satellite, cellular phones, or other means of communication (e-mail, communication relay, etc.), the following should be adhered to:

a. If the EMS is operational, allow the EMS to dispatch the generator.

b. If the EMS is not operational, the generator should stay at the last dispatch instruction (see item 3.3.11 above).

c. If the generator has a safety, environmental, or reliability event resulting in a change in generator loading, GOP communications to the Generation Dispatcher will take place as soon as a communication path has been reestablished.

d. It is possible the BA/TOP may still have a communication path with the Generation Dispatcher or GOP. The Generation Dispatcher and GOP will verify this option upon loss of communications between them.

e. The Generation Dispatcher will report the loss of communication to with a generator facility to the Service Desk if a communication path is available.

f. The Generation Dispatcher will contact on call support and report the loss of communications to a generation facility if a communication path is available.

g. The Generation Dispatcher will consider moving operations to the backup location pending communication failure, communication devices impacted and the projected time frame if known.

h. The Generation Dispatcher will fill out Loss of Primary Phone log and follow process

[29] EOP-008-2 R1

3.3.14 MVAR support

a. MVAR and voltage operations are covered via processes between the BA/TOP and GOP.

b. The GOP will call and inform the Generation Dispatcher in the event the BA/TOP requires generator loading change to adhere to MVAR or voltage schedules, however the GOP will not intentionally delay the TOP Operating Instruction.

c. Reactive resources are self-supplied by LG&E and KU GOP resources. The generators receive and follow voltage schedule(s) supplied by the TOP. If for any reason the generator(s) cannot follow the voltage schedule(s), they are to inform the TOP under procedures established between the TOP and each generator. Voltage control is handled by the TOP.[30]

d. The Generation Dispatcher follows Operating Instructions from the RC and/or BA/TOP pertaining to reducing generator(s) capacity to satisfy increased MVAR output needs and/or commitment of specific generation for voltage support.

3.3.15 Emergency operations

a. The Generation Dispatcher will inform the GOP if a capacity or energy emergency event is foreseen or exists.

b. The Generation Dispatcher may issue an Operating Instruction to the GOP to reduce internal aux power supply consumption per each generator's reduction plan.

c. The Generation Dispatcher may issue an Operating Instruction to the GOP to load generator to available maximum capacity level as determined by the GOP.

d. The GOP to inform the Generation Dispatcher in the event neither 3.3.14b nor 3.3.14c can be accomplished without intentional time delay.

e. The Generation Dispatcher will communicate with the RC and BA/TOP per the Capacity and Energy Emergency Plan procedures.

f. If issued an Operating Instruction by either the RC or BA/TOP regarding emergency assistance requests from other entities, the Generation Dispatcher will comply without intentional delay unless such an Operating Instruction violates safety, equipment, regulatory or statutory requirements. If the Operating Instruction cannot be accommodated because it would violate safety, equipment, regulatory, or statutory requirements, the Generation Dispatcher will inform the RC or BA/TOP without intentional delay, and other options will be explored.[31, 32]

3.3.16 Specific communication from the GO/GOP to the BA/TOP and/or RC

If there is specific information not listed above that is associated with an event that the GO/GOP is required to report to the BA/TOP and/or RC, the GO/GOP will ensure such information is communicated. If the GO/GOP coordinates such communication through the Generation Dispatcher, the GO/GOP will make the Generation Dispatcher aware of the GO/GOP's responsibility, and the Generation Dispatcher will log such communication in the Generation Dispatch Resource Database.

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[30] VAR-002-4.1 R2.2
[31] TOP-001-5 R3, R4, R5, R6
[32] IRO-001-4 R2, R3

3.3.17 System power usage

a. The GO/GOP shall inform the Generation Dispatcher anytime a generator is using power from the system (i.e. not self-supplied from the generators main aux transformers) when the generator would normally be self-supplying.
    - This information must include the reason, expected max MWH's, and expected time frame.

b. This excludes normal generator start up, shut down and trip events.

c. The Generation Dispatcher will log the reason and expected time frame and ensure the load forecast reflects this condition.

3.3.18 MSSC

a. The BA and GO/GOP shall inform the Generation Dispatcher of the MSSC. See Section 2.2 of the Generation Operating Reserves document for further details.

3.3.19 Daily Balance Risk Assessment Status

a. When conditions prompt the Generation Dispatcher to anticipate a limited capacity for generation contingencies, this will be communicated by changing the Daily Balance Risk Assessment status from **Standard** to **Alert** (definitions below).

b. The Daily Balance Risk Assessment status is communicated by Generation Dispatch to the GOP, the BA/TOP, the RC, management personnel and other internal groups as applicable.

STANDARD

- Standard operations and coordination protocols apply. Any unit coordination is communicated between generation and the Generation Dispatcher per established protocols.
- Standard Information Technology Systems coordination applies. Maintenance of generation or system operations control systems, RTUs, or the EMS system that impacts unit or EMS operations, is to be coordinated with the appropriate dispatch center per established protocols.

ALERT

- A "Hands Off Day" status is designated for generation, control systems, and IT processes, which can cause risk or impact unit or EMS operations.
- Operations and coordination protocols apply (any unit coordination is communicated between generation and Generation Dispatcher per established protocols).
- Information Technology Systems coordination applies. Maintenance of generation or system operations control systems, RTUs, or EMS system which impacts unit or EMS operations, is to be coordinated with appropriate Control Center per established protocols.

3.3.20 Electronic Messages

a. Generation Dispatch sends out electronic messages with fleet and system updates which can include changes in unit status, unit commitment, unit trips and system alerts.

b. An AIM request needs to be submitted to add, remove, or modify a subscription to Generator Unit Status Notification messages.

- Each AIM request will be evaluated to determine if there is a legitimate business need for the requested notification. If approved, Generation Dispatch will make the appropriate change(s) in the Inforad System. The Manager – Generation Dispatch and Trading or Supervisor -Generation Dispatch may approve additions to the program without an AIM request for approved business reasons.
- Generation Dispatch will remove notification subscriptions for individuals that leave the company when the "Remove All Access" AIM notification is received or when Generation Dispatch becomes aware, through the normal course of business, that an individual with notification subscriptions has left the company or for other management approved business reasons.

SECTION 4 - **Trimble County Joint Owned Units (JOU) Generator Coordination**

Trimble County coal generators are JOUs with 75% LG&E and KU ownership, 12.88% IMPA ownership, and 12.12% IMEA ownership. Generator coordination events including outages, derates, testing, and risk events, are coordinated with the other owners. Planned events and updates are to be coordinated / communicated with the other owners by 09:00 EST during normal business days and in real time as known. Unplanned events are communicated to the other owners in real time.

4.1 Trimble County 1 Generator Backup Power

4.1.1 As available on a non-firm basis, LG&E and KU may offer back up power to IMPA for Trimble County 1 at cost-based pricing when Trimble County 1 is on outage or derated.

4.1.2 Billed pricing for available non-firm backup power for Trimble County 1 to IMPA is after the fact and based upon the current Tariff for Cost-Based Sales of Capacity and Energy.

4.1.3 Backup power is not available to IMEA as their portion of Trimble County 1 is pseudo-tied into PJM.

4.2 Generation Dispatcher and Trader Schedule Validation for Trimble County 1

4.2.1 Trimble County 1 sends out their day ahead (next day) unit parameter projection to all three owners.

a. On days prior to weekends and NERC holidays this sheet will be sent for each subsequent calendar day through the next regular business day.

4.2.2 On a day-ahead basis, trading will update the Position Tool with hourly tagged schedules for the next day for IMPA.

4.2.3 If the Generation Dispatcher determines that IMPA has tagged a higher volume than their allotment, the Generation Dispatcher will notify IMPA that they have overscheduled.

4.2.4 In the event IMPA overschedules their portion of Trimble County 1 on a day ahead basis, they will need to curtail their tag to the appropriate allotment (unless they are being supplied backup power due to derate or outage of Trimble County 1).

a. Generation Dispatch may check IMPA's max available schedule for the day by updating the unit max and min limits on the "TC1 Overview" worksheet in the Position Tool.
b. The EMS Jointly Owned Unit software will automatically calculate IMEA's max available capacity and limit PJM's setpoint for pseudo-tie flow

appropriately.

4.2.5 In real time, the Generation Dispatcher will determine if IMPA has tagged less than their share of the max available capacity of the unit. If IMPA is scheduling less than their full share of the unit, the Generation Dispatcher will hold the unit output to a level that will not result in LG&E and KU using IMPA's share of the unit capacity.

a. The EMS Jointly Owned Unit software will automatically use PJM's setpoint to limit output of the unit appropriately for IMEA's share.

4.2.6 In real time, if IMPA schedules less than their share of unit minimum, the Generation Dispatcher will contact them to have them schedule and tag their share of the unit minimum.

a. The EMS Jointly Owned Unit software will automatically calculate IMEA's minimum required take and limit PJM's setpoint for pseudo-tie flow appropriately.

4.2.7 In real time, the trader will monitor IMPA's tags and update the Position Tool with the tagged scheduled values.

a. When changes are made to these schedules, the trader will inform the Generation Dispatcher.

b. If a change to the real time tag results in IMPA taking less than their max share of the unit, the Generation Dispatcher will hold the unit back so that LG&E and KU do not use more than its 75% share of the real time unit max.

c. The EMS Jointly Owned Unit software will automatically use PJM's setpoint to limit output of the unit appropriately for IMEA's share.

4.2.8 If IMPA is taking greater than their share of available unit capacity, the Generation Dispatcher will inform the owner that they have overscheduled and whether LG&E and KU is able to provide back-up energy. Back up energy for TC1 is non-firm and priced on a cost basis.

4.2.9 Sales and purchases with the other owners outside of back-up power are negotiated by trading as market-based transactions.

4.2.10 Day Ahead

a. Trimble County 1 will send out an electronic schedule to all owners with hourly projected maximum, minimum, AGC status and ramp rate for the next day (non-business day(s) can be handled on the proceeding business day).

b. The Generation Dispatcher will call other owners and inform them of any scheduled Trimble County 1 testing, maintenance or outage plans

4.2.11 Real Time

a. For unit output changes that can be planned or scheduled

- Trimble County 1 will call the Generation Dispatcher and discuss the event details and times.
- Trimble County 1 will send out an electronic schedule to all owners

with changes to the hourly projected maximum, minimum, AGC status and ramp rate.

- The Generation Dispatcher may call the other owners and ensure they received the schedule revision.

b. For unit output changes that are immediate or cannot be planned or scheduled

- Trimble County 1 will call the Generation Dispatcher and inform them of the known details of the event including where they believe the unit output will go to and the estimated time frame as known in real time.
- The Generation Dispatcher will call the other owners and inform them of the event including where the plant believes the unit output will go to, the estimated time frame as communicated by the plant, and inform them the plant will send out an updated electronic schedule when they can and the owners should go ahead and change their schedules based on this information.
- Trimble County 1 will follow up with an electronic schedule to all owners with changes to the hourly projected maximum, minimum, AGC status and ramp rate without intentional delay.

4.3 Generation Dispatch and Trading Schedule Validation for TC2

Day-Ahead Activity:

4.3.1 Trimble County 2 sends out their day ahead (next day) unit parameter projection to all three owners.

a. On days prior to weekends and NERC holidays this sheet will be sent for each subsequent calendar day through the next regular business day.

4.3.2 Trading will update the Position Tool with IMPA's tagged schedules for the next day.

4.3.3 Just prior to the day of flow, the Generation Dispatcher working with the trader will validate that IMPA's tags match the Position Tool.

4.3.4 The Generation Dispatcher will notify IMPA of scheduling violations and request that they change their tag as to not use another parties' attributes of the unit based on the scheduling option they are under.

4.3.5 The trader will monitor IMPA's tags and will work with the Generation Dispatcher to ensure that the schedule changes on the tag match the Position Tool. The Position Tool will identify any errors with the schedules, based on which scheduling option they are on.

a. The Generation Dispatcher will notify IMPA of scheduling violations and request that they change their tag as to not use another parties' attributes of the unit and ensure IMPA schedules their percentage of the unit minimum.

4.3.6 Day Ahead

a. Trimble County 2 will send out an electronic schedule to all owners with hourly projected maximum, minimum, AGC status and ramp rate for the next day (non-business day(s) can be handled on the proceeding business day).
b. The Generation Dispatcher will call other owners and inform them of any scheduled Trimble County 2 testing, maintenance, or outage plans

4.3.7 Real Time

a. For unit output changes that can be planned or scheduled
   - Trimble County 2 will call the Generation Dispatcher and discuss the event details and times.
   - Trimble County 2 will send out an electronic schedule to all owners with changes to the hourly projected maximum, minimum, AGC status and ramp rate.
   - The Generation Dispatcher may call the other owners and ensure they received the schedule revision.
b. For unit output changes that are immediate or cannot be planned or scheduled
   - Trimble County 2 will call the Generation Dispatcher and inform them of the known details of the event including where they believe the unit output will go to and the estimated time frame as known in real time.
   - The Generation Dispatcher will call the other owners and inform them of the event including where the plant believes the unit output will go to, the estimated time frame as communicated by the plant, and inform them the plant will send out an updated electronic schedule when they can and the owners should go ahead and change their schedules based on this information.
   - Trimble County 2 will follow up with an electronic schedule to all owners with changes to the hourly projected maximum, minimum, AGC status and ramp rate without intentional delay.

4.3.8 Trimble County 2 generator back up power.

a. No backup power provision is available associated with the Trimble County 2 generator.
b. Trimble County 2 generator outages or derates result in the other owners adjusting their schedules or pseudo-tie setpoints. Any imbalance is handled through the in-place imbalance process.

4.4 Operational Details

4.4.1 Refer to Trimble County 1 or 2 Participation Agreements, in place letters of understanding or coordinated operating protocols for specific operational details.

a. Located at \\fs3\pg_regtrading\Unitcoordlogs\TC1 and 2 JOU\

SECTION 5 - **Changes in Generator Parameter Ratings and Planned Maintenance Outages**

5.1 Longer Term Generator Parameter Changes

5.1.1 Generation Dispatch receives planned maintenance outage schedules from Generation Planning and updates the TVA SDX with planned maintenance outage information in accordance with section 1.2.

5.1.2 With the exception of temporary generator parameter changes coordinated in real time, any longer term generator parameter changes, including, but not limited to, generator capacity ratings, generator low operational limits, generator ramp rate targets, generator heat rate curves, and generator start up times, will need to be approved by the Generation Planning Department and, if applicable, the TOP.

5.1.3 Any generation parameter changes that impact MVAR curves, production, interconnection agreement parameters, etc., will need to be approved by the TOP and if necessary, Generation Planning prior to implementation with Generation Dispatch.

5.1.4 Generation Dispatch will not implement longer term generator parameter changes unless reported and documented by Generation Planning.

SECTION 6 – **Meetings to Discuss Extreme Weather Preparation**

6.1 Semiannual Meetings

6.1.1 Semiannual meetings will be held between Generation Dispatch and the GOP in advance of the heating and cooling seasons to discuss preparation for extreme weather events.

6.1.2 Documentation of these meetings will be retained by Generation Dispatch.

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Generation Cold Weather Preparedness Plan

For Compliance with the following NERC Reliability Standards:

EOP-011-2 Emergency Preparedness and Operations

Version 1.0
Effective Date: April 1, 2023

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PPL companies

Generation Cold Weather Preparedness Plan
Effective: April 1, 2023

Required Approvals

DocuSigned by:
8AD647306F3F4A0...
3/28/2023 | 3:35 PM EDT

Steve Turner
VP Generation

DocuSigned by:
AFFFDBCBD1FE46E...
3/27/2023 | 3:22 PM EDT

Brian Sumner
General Manager, Cane Run and Paddy's Run

DocuSigned by:
1D5485047DAF410...
3/27/2023 | 4:36 PM EDT

Greg Wilson
General Manager, E.W. Brown

DocuSigned by:
70431092E709423...
3/28/2023 | 6:52 AM EDT

Alex Betz
General Manger, Mill Creek

DocuSigned by:
FA37C3DCD8C0418...
3/28/2023 | 7:23 AM EDT

Phil Rabe
General Manager, Ghent

DocuSigned by:
26FDF8979D584FF...
3/27/2023 | 3:07 PM EDT

Laura Mohn
General Manager, Trimble County

DocuSigned by:
2E4A29BC63C94A5...
3/28/2023 | 3:08 PM EDT

Michael Drake
Director, Generation Services

DocuSigned by:
5C90B045569F48E...
3/28/2023 | 1:20 PM EDT

Julie Hostrander
Manager, Compliance and Document Management

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Revision History

Revision	Effective	Summary of Changes
1	4/1/2023	Initial Generation Cold Weather Preparedness Plan.

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- D1. Work Management System (Maximo)
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Appendix F – Cold Weather Preparedness Plan: Mill Creek

F1. Work Management System (MAXIMO)
F2. Preparation of Critical Instrumentation and Equipment
F3. Insulation, Heat Trace, and Other Freeze Protection
F4. Supplemental Equipment
F5. Operational Supplies
F6. Staffing
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F8. Special Operating Instructions

Appendix G – Cold Weather Preparedness Plan: Trimble County

G1. Work Management System (MAXIMO)
G2. Preparation of Critical Instrumentation and Equipment
G3. Insulation, Heat Trace, and Other Freeze Protection
G4. Supplemental Equipment
G5. Operational Supplies
G6. Staffing
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G8. Special Operating Instructions

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1. Purpose and Scope

The Generation Cold Weather Preparedness Plan establishes the steps for the generating fleet to maintain unit reliability during cold weather events for compliance with NERC Reliability Standard EOP-011-2, which require that Louisville Gas and Electric Company ("LG&E") and Kentucky Utilities Company ("KU") (collectively, "LG&E/KU" or the "Company") maintain one or more cold weather preparedness plan(s) for its generating units.

2. EOP-011-2 Requirements

Requirements R1 through R6 do not apply to the Generator Owner (GO).

R7 *Each Generator Owner shall implement and maintain one or more cold weather preparedness plan(s) for its generating units. The cold weather preparedness plan(s) shall include the following at a minimum:*

7.1 Generating unit(s) freeze protection measures based on geographical location and plant configuration;

7.2 Annual inspection and maintenance of generating unit(s) freeze protection measures;

7.3 Generating unit(s) cold weather data, to include;

7.3.1. Generating unit(s) operating limitations in cold weather including;

7.3.1.1. capability and availability;

7.3.1.2. fuel supply and inventory concerns;

7.3.1.3. fuel switching capabilities; and

7.3.1.4. environmental constraints.

7.3.2. Generating unit(s) minimum:

7.3.2.1. design temperature; or

7.3.2.2. historical operating temperature; or

7.3.2.3. current cold weather performance temperature determined by an engineering analysis.

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M7	*Each Generator Owner will have evidence documenting that its cold weather preparedness plan(s) was implemented and maintained in accordance with Requirement R7.*

Cold weather preparedness plans were developed for using the methodology outlined in Appendix A. Specific processes for each generating station and unit are included in Appendices C – G. They include the freeze protection measures and annual inspection required by EOP-011-2, R7.1 and R7.2. The plan will be annually reviewed to evaluate improvement opportunities and identify lessons learned.

The cold weather data required per R7.3 is included in Appendix B. The cold weather data for the generating unit(s) operating limitations includes cold weather capacity and availability, fuel supply and inventory concerns, fuel switching capabilities, and environmental constraints. Additionally, the data includes either the generating unit(s) minimum design temperature, or historical operating temperature, or current cold weather performance temperature determined by an engineering analysis.

R8	*Each Generator Owner in conjunction with its Generator Operator shall identify the entity responsible for providing generating unit-specific training, and that identified entity shall provide the training to its maintenance or operations personnel responsible for implementing cold weather preparedness plan(s) developed pursuant to Requirement R7.*
M8	*Each Generator Operator or Generator Owner will have documented evidence that the applicable personnel completed the training of the Generator Owner's cold weather preparedness plan(s). This evidence may include, but is not limited to, documents such as personnel training records, training materials, date of training, agendas or learning objectives, attendance at pre-work briefings, review of work order tasks, tailboards, attendance logs for classroom training, and completion records for computer-based training in fulfillment of Requirement R8.*

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The Generator Owner (GO) will provide unit specific awareness training for the generating fleet. This training will focus on the personnel responsible for implementing the plan(s) defined in the following Appendices.

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Appendices

Appendix A – Cold Weather Data

Appendix B – Development of Cold Weather Preparedness Plans

Appendix C – Cold Weather Preparedness Plan: E.W. Brown

Appendix D – Cold Weather Preparedness Plan: Cane Run & Paddy's Run

Appendix E – Cold Weather Preparedness Plan: Ghent

Appendix F – Cold Weather Preparedness Plan: Mill Creek

Appendix G – Cold Weather Preparedness Plan: Trimble County

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Appendix A – Cold Weather Data

Unit	Historical Minimum Operating Temperature[1] (°F)	Operating Limitations in Cold Weather			
		Capability and Availability	Fuel Supply and Inventory Concerns	Fuel Switching Capabilities	Environmental Constraints
CR7-CT1 CR7-CT2 CR7-ST	0	None.	None.	N/A	None.
BR3 BR5 BR6 BR7 BR8 BR9 BR10 BR11	-13	None.	None.	None.[2]	None.
GH1 GH2 GH3 GH4	-10	None.	None.	N/A	None.
MC1 MC2 MC3 MC4	-5	None.	None.	N/A	None.
PR13	0	None.	None.	N/A	None.
TC1 TC2 TC5 TC6 TC7 TC8 TC9 TC10	-5	None.	None.	N/A	None.
DD1 DD2 DD3	-2	None.	None.	N/A	None.

Notes:

(1) Based on data from 1/1/2000 – 12/1/2022.

(2) BR3, 5, 6, & 7 do not have fuel switching capability. BR8, 9, 10, & 11 have fuel switching capability but there are no operating limitations in cold weather.

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Appendix B – Development of Cold Weather Preparedness Plans

The preparedness plans presented in Appendices C – G were developed using the considerations described below.

B1. Management Roles and Responsibilities

Management core roles and responsibilities related to cold weather preparation will include, but are not limited to the following:

- Set expectations for safety, reliability, and operational performance.
- Develop and maintain cold weather preparedness plans for each generating unit.
- Ensure cold weather preparedness plans include processes and staffing before, during and after extreme cold weather events.
- Ensure proper execution of the cold weather preparedness plans.
- Conduct a plant readiness review prior to any anticipated extreme cold weather event(s).
- Exercise elevated alertness for areas at risk due to cold weather conditions and identify opportunities to improve readiness and response.
- Evaluate the effectiveness of the cold weather plans and incorporate lessons learned.

B2. Communications

Clear and timely communication is essential. Key points include the following:

- Plant Management will communicate with the Vice President of Power Production.
- Plant Management will communicate with station personnel about changing conditions and potential areas of concern to heighten awareness around safe and reliable operations.
- The affected stations will keep the Balancing Authority (Generation Dispatch) up to date on changes to unit availability, capacity, or other operating limitations.
- After a generating unit trip, derate, or failure to start due to severe cold weather, Plant Management will conduct an analysis of the event and incorporate lessons learned into their cold weather preparedness plans.

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B3. Evaluation of Potential Problem Areas

A critical part of cold weather readiness is understanding potential problem areas which may experience freezing problems or other operational issues. Items to consider are:

- Equipment or processes that could create safety related hazards.
- Equipment that could initiate an automatic unit trip.
- Equipment that could impact unit startup.
- Anything that could potentially cause damage to the unit.
- Equipment that could adversely affect environmental controls that could lead to derates or outages.
- Equipment that could affect the delivery of fuel or water to the units.
- Impaired field devices that could cause operational problems.

B4. Testing

In addition to the typical problem areas, emphasis should be placed on additional testing of low frequency tasks such as startup of emergency generators and backup systems where applicable.

B5. Training

Annual winterization awareness training will be conducted for cold weather readiness. This may include response to freeze related alarms, troubleshooting and repair of freeze protection circuitry, review of special inspections or rounds implemented during severe cold weather events, fuel handling procedures, knowledge of the ambient temperature for which the freeze protection is designed, and lessons learned from previous experiences.

B6. Elements of a Cold Weather Preparedness Plan

Listed below are key elements of a cold weather preparedness plan addressed at each station.

1. Work Management System (Maximo)

- Review the work management system to ensure adequate annual preventive work orders (PM's) exist for cold weather preparation.

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- Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
- Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
- Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather.
- Ensure modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

2. Preparation of Critical Instrumentation and Equipment

- Operating staff will conduct rounds to ensure critical areas have adequate protection for operability during a severe cold weather event.
- Monitor temperatures in areas containing sensitive equipment.
- Review unit critical equipment freeze protection measures, especially equipment in exposed areas and emphasize the points in the plant where equipment freezing could cause a unit trip, derate or failure to start.

3. Insulation, Heat Trace and Other Freeze Protection

- Heat trace reliability and electrical continuity
    - Perform check out of all heat trace circuits, including power supplies to ensure they maintain their functionality.
    - The evaluation of heat trace and insulation on critical lines should be performed on new installations, during regular maintenance activities or if damaged.
    - Ensure that any heat trace and insulation removed or disturbed during regular maintenance is replaced and integrity restored.
    - Check heat tracing on all critical lines and piping during severe cold weather events to ensure that the circuits remain functional. Temperature guns can be used to check piping temperatures.

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- Inspect instrument enclosures for any openings, faulty door hardware or insulation, gaps, and that heaters are functional.

- Heaters, Heat Lamps, and Space Heaters
  - Test operation of all permanently mounted wall heaters.
  - All portable space heaters should be tested, repaired and/or replaced as necessary.
- Wind Breaks
  - Install wind barriers as deemed appropriate to protect critical instruments, sensing lines, controllers, and piping.
- Covers, Enclosures, and Buildings
  - Install enclosures with heat lamps for identified transmitters.
  - Missing covers should be installed on valve actuators, damper drives and electrical boxes to prevent accumulating ice.
  - Inspect all buildings to ensure windows, doors, fan louvers and any other penetrations are closed to prevent cold air from entering.
  - Install tarps/plastic enclosures over openings and stairwells as necessary to prevent warm air from leaving the operating areas.
  - Inspect and repair as needed all large overhead doors at the station.

4. Supplemental Equipment

Ensure adequate inventories of equipment and other supplies needed to prepare and respond to a severe cold weather event. Examples of supplemental equipment might include:

- Tarps
- Portable Space Heaters and Heat Lamps and bulbs
- Extension Cords and GFI's
- Kerosene
- Propane and Rosebuds
- Plastic Rolls
- Lumber for building wind breaks and enclosures

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- Wire Ties
- Portable Lighting
- Portable Generators
- Handheld welding torches
- Instrumentation Tubing
- Ice removal chemicals and equipment
- Blankets
- Cots
- Shovels for Snow Removal
- Cold Weather Personal Protective Equipment (PPE) – Boots, gloves, head socks

5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Examples of Operational supplies might include:

- Coal
- Oil for Lighters
- Hydrogen
- CO2
- Anhydrous Ammonia
- Lime
- PAC or other Mercury Control Products
- Limestone
- Caustic Soda
- Sulfuric Acid
- Diesel Fuel
- Gasoline

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- Hydrazine
- Calibration Gases
- Lubricating Oils
- Welding Supplies

6. Staffing

- Consider enhanced staffing (24x7) during severe cold weather events.
- Arrange for on-site lodging and meals as needed.
- Arrange for transportation as needed.
- Arrange for support and appropriate staffing from substation operations to ensure minimal equipment and lines outages as needed.
- Rotate work crews exposed to severe cold weather conditions.
- Consider employing the "buddy system" during severe cold weather events to promote personnel safety.

7. Communications

- Ensure appropriate communication protocols are followed during severe cold weather events.
- Ensure back-up communication option in case the primary system is not working (i.e. satellite phone).
- Ensure communication is discussed as part of the daily job safety briefing during severe cold weather events.

8. Special Operating Instructions (prior to or during severe cold weather events)

- Initiate additional Operator rounds utilizing cold weather checklists to verify critical equipment is protected. Monitor room temperatures.
- Consider pre-warming, early start-up or placing units in service at minimum load prior to forecasted severe cold weather events.

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- Test run emergency generators prior to severe cold weather events to ensure availability. Review fuel availability.
- Place critical auxiliary equipment in service as necessary on Cooling Towers, Coal and Limestone conveyor systems and Service Water systems where freezing weather could adversely impact their operation.

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Appendix C – Cold Weather Preparedness Plan: E.W. Brown

C1. Work Management System (MAXIMO)

The goals of using the Maximo Work Management System as a part of the Winterization Plan are as follows:

1. Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
2. Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
3. Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather. Prioritize work so as to minimize the potential for operability impacts due to cold weather.
4. Ensure that all modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

These measures are generally PMs in Maximo which are programmed to generate work orders at the beginning of October, to be completed by November 30th. A list and description of these PMs can be found below. Completing these PMs in October and early November will ensure the plant is ready for winter by November 30th.

In addition, SERCO will ensure the plant's fleet of vehicles will have been properly winterized and in good working order.

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PM	Description	Responsibility	Date of Generation
BR000200	PM-WINTERIZE COLD WEATHER PROCEDURES / OPERATIONS DEPT ^	BRSTO	10/1/2023
BR000233	PM- YRLY WINTERIZE VENT FANS UNIT 2 ^	BRMMHY	10/1/2023
BR058065	PM-YEARLY - WINTERIZE (580 SUPER N BACKHOE) ^	BRMER	10/3/2023
BR100057	PM-(1 YR) WINTERIZE INSTRUMENTATION (SERC) (1) ^	BREI	10/1/2023
BR100789	PM-YEARLY - WINTERIZE (580 SUPER L BACKHOE) ^	BRMER	10/3/2023
BR020501	PM-(1 YR) PRELIMINARY CHECK OF CAR THAWING SYS ^	BREI	9/1/2023
BR058425	PM-NOVEMBER WINTERIZING SPRINKLER SYSTEM	BRMMHY	10/1/2023
BR058426	PM-APRIL DEWINTERIZING SPRINKLER SYSTEM	BRMMHY	3/25/2024
BC053877	PM-ANNUAL WINTERIZE BRCT, FREEZE PROTECTION PREPERATION ^	BRCTM	10/20/2023
00041903	PM_YRLY AMMONIA PLANT SHUTDOWN AND WINTERIZATION		
00045739	PM-WINTERIZE DIX HYDRO PLANT (SERC) (1) ^	BRMMHY	10/12/2023

C2. Preparation of Critical Instrumentation and Equipment

The following tasks will be completed according to the PMs listed in Section 1 to ensure that critical equipment and instrumentation are adequately prepared for cold weather.

1. All critical site-specific problem areas have adequate protection to ensure operability during a severe cold weather event.
2. All electrical and instrumentation equipment susceptible to cold weather will have been winterized. Critical instrumentation has been identified for additional operator rounds during severe weather events.
3. Temperature Indicators are placed in areas containing equipment sensitive to extreme cold conditions and in freeze protection enclosures to ensure that the temperature is being maintained above freezing.

C3. Insulation, Heat Trace, and Other Freeze Protection

In order to ensure the reliability of building/pipe insulation and heat trace circuitry, and to provide back-up for these systems, the following will occur:

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1. Verification of the integrity of the insulation on all critical equipment identified in the Cold Weather Preparation Procedure.
    a. Execute observations specific to integrity of insulation and heat trace functionality on exposed piping by operations and/or maintenance personnel. Any heat trace or insulation removed during regular maintenance will have been replaced and integrity restored
    b. Exercise elevated alertness for continued operations of heat trace equipment during severe cold weather events.
    c. Back-up methods of heating instrumentation will be on hand- heat blankets, additional lines of heat trace wire w/ 120VAC plugs for quick application, etc.
2. Heaters, Heat Lamps and Space Heaters
    a. Execute observations specific to building heat equipment by operations and/or maintenance personnel.
    b. All portable space heaters will be tested, repaired and/or replaced as necessary.
    c. An adequate fuel supply for the heaters will be onsite.
3. Wind Breaks
    a. Wind barriers will be installed as deemed appropriate to protect critical instruments, sensing lines, controllers and piping.
4. Covers, Enclosures, and Buildings
    a. Enclosures with heat lamps will be installed for identified transmitters.
    b. Portable space heaters will be placed as needed in enclosures with temperature-sensitive equipment and maintained at regular intervals.
    c. Missing covers will be installed on valve actuators, damper drives and electrical boxes to prevent from accumulating ice.
    d. Critical instruments have been placed inside plastic enclosures or otherwise protected against ice and wind.
    e. All of the exterior windows and doors will have been inspected, repaired if necessary, and be in good working order, or temporary provisions made to mitigate the potential for cold weather exposure.

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f. Tarps/plastic enclosures will be installed over openings and stairwells as necessary to prevent warm air from leaving the operating areas.
g. All large overhead doors at the station will be inspected and repaired as needed and kept closed when not in use.

C4. Supplemental Equipment

Prior to a severe cold weather event, conduct an inventory of supplemental supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

PERSONAL PROTECTION /EXPOSURE PREVENTION EQUIPMENT

- Jersey Gloves
- Leather Gloves (All Sizes)
- Winter insulated water resistant gloves (All Sizes)
- Head Socks
- Hand and Feet Warmers
- Antifog safety lens wipes
- Tyvek Suits (All Sizes)

FUEL AND ACCESSORIES

- Diesel Fuel (All bulk tanks full)
- Diesel Fuel Tanks (Anti-gel additives)
- Kerosene (All bulk tanks full)
- Starting Fluid (Aerosol Cans)
- Fuel Cans (All sizes)
- Sta-Bil Fuel Storage
- Seafoam
- 20# and 30# propane cylinders

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- Portable double walled fuel cell (CT site)

SNOW REMOVAL/TRACTION MATERIALS

- Bulk Ice-Melt/sand and/or salt

MISCELLANEOUS ITEMS

- De-Icer (for windshields)
- Plastic (Several rolls, used to contain heat)
- Extra Rolls of Heat Trace
- Duct Tape
- Tie-Wire
- Heat Lamps/Bulbs
- Plywood
- 2X4 Lumber
- Galvanized 2 Wood Screws
- Spray Foam Sealant
- Snow Shovel
- Air hoses (chicago fittings)
- Torch Heads (20)
- Nap Gas (30)
- Misc Insulation
- Electric Heaters (20)
- Kerosene Heaters (30)
- Heat Lamps
- Extension Cords 12/3 (Various Lengths)
- Heat Trace in stock
- Conveyor liquid heat
- Pump Sprayer

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C5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Product	Tank Location	Main Constituent(s)
Nalco 1393T	Unit 3 Basement – 2,000 gallon tank	30-60% Hydroxyethylidenediphosphonic Acid
Nalco PC-191T	Water Treatment Reverse Osmosis Building – 275 gallon tote	Proprietary
Nalco PC-11	Water Treatment Reverse Osmosis Building – 55 gallon drum	30-60% Polyethylene Glycol, 20% 2,2-Dibromo-3-nitrilopropionamide
Nalco 7468	FGD Aux Blower – Defoamer – 55 gallon drum	1-5% Sorbitan Monostearate
Nalco 7357	U3 Middle Burner Level – Molybdate – 55 gallon drum	30-60% Sodium Molybdate
Nalco 8035	FGD - North Side - FGD Mercury Re-emission Treatment	Proprietary
Nalco Nalmet 1689	TDCR/PWS - Process Water Treatment – 275 gallon tote	1-5% Sodium Chloride, 1-5% Sodium Sulphide, 0.1-1% Sodium Hydroxide
Nalco Catfloc 71264	Water Treatment Reverse Osmosis Building – Trimites – 275 gallon tote	
Nalco Nalclear 7768	TDCPR/PWS – 275 gallon tote	
Sulfuric Acid	Process Water Treatment pH Control – Reverse Osmosis Building – 275 gallon tote BATW pH Control - Unit 3 Basement – 275 gallon tote	
Nalco 7408 – Bisulfite	RO Trimites – 275 gallon tote	
Ferric Chloride	PWS - Process Water Treatment – 275 gallon tote	
Sodium Hydroxide	TDCPR/PWS – Process Water Treatment – 275 gallon tote RO – 755 gallon tank	
Sodium Hypochlorite	U3 Cooling Tower – 2,000 gallon tank RO – 500 gallon tank	
Sodium Bisulfite	Unit 3 Cooling Tower – 275 gallon tote – Only use during summer months	

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Product	Tank Location	Main Constituent(s)
Ammonia Hydroxide	U3 Feedwater – U3 Basement – 55 gallon drum	
Powdered Activated Carbon	Environmental Mercury Control – 2 x 340,000 lb. Silo	
Hydrogen	Generator Cooling	
Hydrated Lime	S03 control – 2 x 600,000 lb. Silo	
Limestone	Scrubber Slurry S02 Control – 2 x 1,100,000 gallon tank - FGD	
C02	Generator Purging	
Avista L403 – Low pH	RO Chemical clean – 55 gallon drum	
Avista L212 – High pH	RO Chemical Clean – 55 gallon drum	
Nalco 19H - Hydrazine	U3 Basement – 180 gallon tote	
Nalco DustFoam Plus	Coal Handling – 450 gallon tote	

C6. Staffing

The following are the measures that will be taken to prepare the plant in the days immediately preceding a forecasted extreme cold-weather event.

Having made all the preparations listed above, the majority of this plan revolves around having enough personnel onsite to properly implement the plan and keep the plant running during the weather event and in the days following.

1. All departments will evaluate the need to have increased staffing levels onsite during the cold weather event. This is especially true during periods of normally low staffing (nights and weekends).
2. In the event personnel must stay overnight and cannot leave the property, food rations and cots are available. Cots are stored in the Warehouse. Frozen food or rations are stored in the freezer at the plant.
3. If local roadways are in such bad shape that staff cannot make it to the site in their own vehicles, four-wheel drive vehicles from the plant's fleet will be used to pick them up and bring them to the plant.

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4. Facilities maintenance personnel will focus on clearing snow and ice from the plant's main thoroughfares. Plant maintenance and extra operations personnel will make rounds to ensure the generating equipment remains in working order. They will deploy the heating and anti-freezing equipment listed above and make corrections to operating conditions as necessary.
5. Work crews will be rotated as staffing allows to limit exposure to severe cold weather
6. The "buddy system" will be employed as needed during severe cold weather events to promote personnel safety.

C7. Communications

To promote effective communication during cold weather events, the following will occur:

1. Appropriate communication protocols will be followed during severe cold weather events.
2. The satellite phone will be tested for operation according to weekly PMs.
3. Communication will be discussed during daily pre-job briefings.

C8. Special Operating Instructions

1. Additional Operator rounds will be initiated to verify critical equipment is protected. Room temperatures will be monitored.
2. Units will be placed online at minimum load prior to severe cold weather as Operations and Generation Dispatch mandate.
3. According to PMs, the Emergency Diesel Generator onsite will be tested for operability.
4. Auxiliary equipment will be placed in service on Cooling Towers and Raw Water systems where freezing weather could adversely impact their operation.

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Appendix D – Cold Weather Preparedness Plan: Cane Run & Paddy's Run

D1. Work Management System (Maximo)

The goals of using the Maximo Work Management System as a part of the Winterization Plan are as follows:

1) Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
2) Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
3) Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather. Prioritize work to minimize the potential for operability impacts due to cold weather.
4) Ensure that all modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

These measures are generally PMs in Maximo which are programmed to generate work orders at the beginning of October, to be completed by November 30th. A list and description of these PMs can be found below. Completing these PMs in October and early November will ensure the plant is ready for winter by November 30th.

In addition, SERCO will ensure the plant's fleet of vehicles will have been properly winterized and in good working order.

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PM	Description	Responsibility	Date of Generation
00056468	PM-ANNUAL Winterization CT1 Evaporative Cooler - Unwinterize and Prepare For Service	CROS	3/7/2024
00056469	PM-ANNUAL Winterization CT1 Evaporative Cooler - Winterize System and Piping	CROD	10/1/2023
00056472	PM-ANNUAL Winterization CT2 Evaporative Cooler - Unwinterize and Prepare For Service	CROS	2/10/2024
00056473	PM-ANNUAL Winterization CT2 Evaporative Cooler - Winterize System and Piping	CROD	10/1/2023
00056900	PM-ANNUAL Winterization - Inspect All Bldg Wall Mounted Heaters For Proper Operation	CROD	10/24/2023
00056901	PM-ANNUAL Winterization - Wholesale Inspection of All Heat Trace Circuits/Enclosed Transmitters	CRI7	10/1/2023
00057618	PM-ANNUAL Winterization - Inspection and Service of Plant Snow Removal Equipment(fm)	CROS	10/1/2023
00057619	PM-ANNUAL Winterization - Inspection and Service of Plant Portable Space Heaters	CRMC	10/1/2023
00057620	PM-ANNUAL Winterization - Inspection and Service of Plant Vehicles For Proper Winterization	CRMC	10/1/2023
00057621	PM-ANNUAL Winterization - Inspection or Repair of All Plant Exterior Doors and Windows(fm)	CROS	10/1/2023
00060305	PM-SEMI-ANNUAL HRSG1 LP ECONOMIZER RELIEF VALVE/PILOT VLV - Removable Insulation Cap - Winter/Summer	CROS	5/1/2023
00060310	PM-SEMI-ANNUAL HRSG2 LP ECONOMIZER RELIEF VALVE/PILOT VLV - Removable Insulation Cap - Winter/Summer	CROS	5/1/2023
00060311	PM-SEMI-ANNUAL HRSG1 IP ECONOMIZER RELIEF VALVE/PILOT VLV - Removable Insulation Cap - Winter/Summer	CROS	5/1/2023
00060312	PM-SEMI-ANNUAL HRSG2 IP ECONOMIZER RELIEF VALVE/PILOT VLV - Removable Insulation Cap - Winter/Summer	CROS	5/1/2023
00063984	PM-ANNUAL Winterization - Demin Water Storage Tank - Winterize N2 Blanketing Vlvs/Regulators	CROS	10/19/2023
00063985	PM-ANNUAL Winterization - Demin Water Storage Tank - Unwinterize N2 Blanketing Vlvs/Regulators	CROS	5/1/2023
00063986	PM-ANNUAL Winterization - CT1 FM-200 Cabinet Heaters - Seasonal Operation	CROD	4/19/2023
00063987	PM-ANNUAL Winterization - CT2 FM-200 Cabinet Heaters - Seasonal Operation	CROD	4/19/2023
00063988	PM-ANNUAL Winterization - HRSG1 SH Sample Lines - Cold Weather Outage PM	CROS	As Needed
00063989	PM-ANNUAL Winterization - HRSG2 SH Sample Lines - Cold Weather Outage PM	CROS	As Needed

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00044087	PM- Yearly - PR-13 Gas Turbine Winterize PR13.	PR O&M Crew	September 21
03145-01	PM- Annual- PR12 Check all Heaters and Heat Trace	PR O&M Crew	November 1

D2. Preparation of Critical Instrumentation and Equipment

The following tasks will be completed according to the PMs listed in Section 1 to ensure that critical equipment and instrumentation are adequately prepared for cold weather.

1. All critical site-specific problem areas have adequate protection to ensure operability during a severe cold weather event.
2. All electrical and instrumentation equipment susceptible to cold weather will have been winterized. Critical instrumentation has been identified for additional operator rounds during severe weather events.
3. Temperature Indicators are placed in areas containing equipment sensitive to extreme cold conditions and in freeze protection enclosures to ensure that the temperature is being maintained above freezing.

D3. Insulation, Heat Trace and Other Freeze Protection

In order to ensure the reliability of building/pipe insulation and heat trace circuitry, and to provide back-up for these systems, the following will occur:

1. Verification of the integrity of the insulation on all critical equipment identified in the Cold Weather Preparation Procedure.
    a. Execute observations specific to integrity of insulation and heat trace functionality on exposed piping by operations and/or maintenance personnel. Any heat trace or insulation removed during regular maintenance will have been replaced and integrity restored
    b. Exercise elevated alertness for continued operations of heat trace equipment during severe cold weather events.
    c. Back-up methods of heating instrumentation will be on hand- heat blankets, additional lines of heat trace wire w/ 120VAC plugs for quick application, etc.
2. Heaters, Heat Lamps and Space Heaters

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a. Execute observations specific to building heat equipment by operations and/or maintenance personnel.
b. All portable space heaters will be tested, repaired and/or replaced as necessary.
c. An adequate fuel supply for the heaters will be onsite.

3. Wind Breaks
   a. Wind barriers will be installed as deemed appropriate to protect critical instruments, sensing lines, controllers and piping.
4. Covers, Enclosures, and Buildings
   a. Enclosures with heat lamps will be installed for identified transmitters.
   b. Portable space heaters will be placed as needed in enclosures with temperature-sensitive equipment and maintained at regular intervals.
   c. Missing covers will be installed on valve actuators, damper drives and electrical boxes to prevent from accumulating ice.
   d. Critical instruments have been placed inside plastic enclosures or otherwise protected against ice and wind.
   e. All of the exterior windows and doors will have been inspected, repaired if necessary, and be in good working order, or temporary provisions made to mitigate the potential for cold weather exposure.
   f. Tarps/plastic enclosures will be installed over openings and stairwells as necessary to prevent warm air from leaving the operating areas.
   g. All large overhead doors at the station will be inspected and repaired as needed and kept closed when not in use.

D4. Supplemental Equipment

Prior to a severe cold weather event, conduct an inventory of supplemental supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

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PERSONAL PROTECTION /EXPOSURE PREVENTION EQUIPMENT

- Rubber Boot Slip-Ons (All Sizes) – Min Qty: L – 12pr / XL – 12pr
- Walk by Yaktrax (Attachable grips for work boots) – Min Qty: S – 5pr / M – 8pr / L – 8pr / XL 8pr
- Jersey Gloves – Min Qty: 75pr
- Leather Gloves (All Sizes) – Min Qty: S – 25pr / M – 25pr / L – 75pr / XL 50pr
- Head Socks – Min Qty: 25ea

FUEL AND ACCESSORIES

- Diesel Fuel (All tanks full) – Min Qty: 250 gal
- Diesel Fuel Tanks (Anti-gel additives) – Min Qty: 6 cans
- 400 Gallon Tank of Kerosene - Filled (For portable heaters) – Min Qty: 300 gal
- Starting Fluid (Aerosol Cans) – Min Qty: 12 cans
- Fuel Cans (All sizes/types) – Min Qty: 2 Gal – 2 ea. / 5 Gal – 2 ea.

SNOW REMOVAL/TRACTION MATERIALS

- Sand – Min Qty: 20 bags
- Ice-Melt – Min Qty: Concrete Safe – 40 bags / Regular – 120 bags

MISCELLANEOUS ITEMS

- De-Icer (for windshields) – Min Qty: 10 cans
- Plastic (used to contain heat) – Min Qty: Clear – 5 rolls / Reinforced – 5 rolls
- Extra Rolls of Heat Trace – Min Qty: 2 rolls
- Heat Blankets – Min Qty: 6 ea.
- Heat Tape – Min Qty: 7 ea
- Duct Tape – Min Qty: 24 ea.
- Tie-Wire – Min Qty: 5 rolls
- Heat Lamps/Bulbs – Min Qty: 18 lamps / 35 bulbs

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- Plywood – Min Qty: 12 sheets (4'x8')
- 2X4 Lumber – Min Qty: 12 ea.
- Galvanized 2 ½" Wood Screws – Min Qty: 1 box
- Spray Foam Sealant – Min Qty: 12 cans
- Snow Shovels – Min Qty: 12 ea.

D5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Product	Tank Location	Main Constituent(s)
0HRE-SKD--001 Sodium Bromide	Circulating Water Chemical Feed Building	Sodium Bromide
0HRE-SKD--001 Sodium Hypochlorite	Circulating Water Chemical Feed Building	Sodium Hypochlorite
0HRE-SKD--002 Sulfuric Acid	Circulating Water Chemical Feed Building	Sulfuric Acid
0HRE-SKD--003 Anti-Scalant	Circulating Water Chemical Feed Building	Nalco TRASAR 3DT134
0HRE-SKD--004 Non-Oxidizing Biocide	Circulating Water Chemical Feed Building	Nalco Nalsprese 73551
0HRE-SKD--005 Sodium Bisulfite	Circulating Water Chemical Feed Building	Sodium Bisulfite
0WTA-SKD--002 Clarifier Coagulant	Water Treatment Building	Ferric Blend Nalco 71264
0WTA-SKD--003 Clarifier/UF Sodium Hypochlorite	Water Treatment Building	Sodium Hypochlorite
0WTA-SKD--004 Clarifier Polymer	Water Treatment Building	Nalco Cat-Floc 7757
0WTA-SKD--005 Clarifier Sodium Permanganate	Water Treatment Building	Sodium Permanganate
0WTA -SKD--007 Dewatering Polymer	Water Treatment Building	Nalco Core Shell
0WTA -SKD--009 UF Acid	Water Treatment Building	Citric Acid

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Product	Tank Location	Main Constituent(s)
0WTD-SKD--006 RO Anti-Scalant	Water Treatment Building	Permatreat PC191T
0WTD-SKD--007 RO Sodium Bisulfite	Water Treatment Building	Sodium Bisulfite
0WTD-SKD--008 RO Caustic	Water Treatment Building	Sodium Hydroxide
0HRE-SKD--001 Cycle/Aux. Boiler Ammonia	Steam Turbine Building	Aqueous Ammonia
CCCW Scale Inhibitor		Nalco TRAC108

D6. Staffing

The following are the measures that will be taken to prepare the plant in the days immediately preceding a forecasted extreme cold-weather event.

Having made all the preparations listed above, the majority of this plan revolves around having enough personnel onsite to properly implement the plan and keep the plant running during the weather event and in the days following.

1. All departments will evaluate the need to have increased staffing levels onsite during the cold weather event. This is especially true during periods of normally low staffing (nights and weekends).
2. In the event personnel must stay overnight and cannot leave the property, food rations and cots are available. Cots are stored in the Warehouse. Frozen food or rations are stored in the freezer at the plant.
3. If local roadways are in such bad shape that staff cannot make it to the site in their own vehicles, four-wheel drive vehicles from the plant's fleet will be used to pick them up and bring them to the plant.
4. Facilities maintenance personnel will focus on clearing snow and ice from the plant's main thoroughfares. Plant maintenance and extra operations personnel will make rounds to ensure the generating equipment remains in working order. They will deploy the heating and anti-freezing equipment listed above and make corrections to operating conditions as necessary.
5. Work crews will be rotated as staffing allows to limit exposure to severe cold weather

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6. The "buddy system" will be employed as needed during severe cold weather events to promote personnel safety.

D7. Communications

To promote effective communication during cold weather events, the following will occur:

1. Appropriate communication protocols will be followed during severe cold weather events.
2. The satellite phone will be tested for operation according to weekly PMs.
3. Communication will be discussed during daily pre-job briefings.

D8. Special Operating Instructions

1. Additional Operator rounds will be initiated to verify critical equipment is protected. Room temperatures will be monitored.
2. Units will be placed online at minimum load prior to severe cold weather as Operations and Generation Dispatch mandate.
3. According to PMs, the Emergency Diesel Generator onsite will be tested for operability.
4. Critical auxiliary equipment will be placed in service on Cooling Towers and Raw Water systems in the Screen House where freezing weather could adversely impact their operation.

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Appendix E – Cold Weather Preparedness Plan: Ghent

E1. Work Management System (MAXIMO)

The goals of using the Maximo Work Management System as a part of the Winterization Plan are as follows:

1. Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
2. Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
3. Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather. Prioritize work so as to minimize the potential for operability impacts due to cold weather.
4. Ensure that all modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

These measures are generally PMs in Maximo which are programmed to generate work orders at the beginning of October, to be completed by November 30th. A list and description of these PMs can be found below. Completing these PMs in October and early November will ensure the plant is ready for winter by November 30th.

In addition, SERCO will ensure the plant's fleet of vehicles will have been properly winterized and in good working order.

PM	Description	Responsibility	Date of Generation
GH066236	PM-(PM) U-1& U-2 OPERATIONS COLD WEATHER PREPERATIONS	GHSOS	10/1/2023
GH066237	PM-(PM) U-3& U-4 OPERATIONS COLD WEATHER PREPERATIONS	GHSOS	10/1/2023

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PM	Description	Responsibility	Date of Generation
GH066238	PM-(PM) OUTSIDE OPERATIONS COLD WEATHER PREPERATIONS	GHSOS	10/1/2023
GH066239	(PM) PLANNING OUTSIDE BUILD COLD WEATHER HOOCHES	GHPLO	10/1/2023

E2. Preparation of Critical Instrumentation and Equipment

The following tasks will be completed according to the PMs listed in Section 1 to ensure that critical equipment and instrumentation are adequately prepared for cold weather.

1. All critical site-specific problem areas have adequate protection to ensure operability during a severe cold weather event.
2. All electrical and instrumentation equipment susceptible to cold weather will have been winterized. Critical instrumentation has been identified for additional operator rounds during severe weather events.
3. Temperature Indicators are placed in areas containing equipment sensitive to extreme cold conditions and in freeze protection enclosures to ensure that the temperature is being maintained above freezing.

E3. Insulation, Heat Trace, and Other Freeze Protection

In order to ensure the reliability of building/pipe insulation and heat trace circuitry, and to provide back-up for these systems, the following will occur:

1. Verification of the integrity of the insulation on all critical equipment identified in the Cold Weather Preparation Procedure.
    a. Execute observations specific to integrity of insulation and heat trace functionality on exposed piping by operations and/or maintenance personnel. Any heat trace or insulation removed during regular maintenance will have been replaced and integrity restored
    b. Exercise elevated alertness for continued operations of heat trace equipment during severe cold weather events.

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   c. Back-up methods of heating instrumentation will be on hand- heat blankets, additional lines of heat trace wire w/ 120VAC plugs for quick application, etc.

2. Heaters, Heat Lamps and Space Heaters
   a. Execute observations specific to building heat equipment by operations and/or maintenance personnel.
   b. All portable space heaters will be tested, repaired and/or replaced as necessary.
   c. An adequate fuel supply for the heaters will be onsite.
3. Wind Breaks
   a. Wind barriers will be installed as deemed appropriate to protect critical instruments, sensing lines, controllers and piping.
4. Covers, Enclosures, and Buildings
   a. Enclosures with heat lamps will be installed for identified transmitters.
   b. Portable space heaters will be placed as needed in enclosures with temperature-sensitive equipment and maintained at regular intervals.
   c. Missing covers will be installed on valve actuators, damper drives and electrical boxes to prevent from accumulating ice.
   d. Critical instruments have been placed inside plastic enclosures or otherwise protected against ice and wind.
   e. All of the exterior windows and doors will have been inspected, repaired if necessary, and be in good working order, or temporary provisions made to mitigate the potential for cold weather exposure.
   f. Tarps/plastic enclosures will be installed over openings and stairwells as necessary to prevent warm air from leaving the operating areas.
   g. All large overhead doors at the station will be inspected and repaired as needed and kept closed when not in use.

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E4. Supplemental Equipment

Prior to a severe cold weather event, conduct an inventory of supplemental supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

PERSONAL PROTECTION /EXPOSURE PREVENTION EQUIPMENT

- Rubber Boot Slip-Ons (All Sizes) – Min Qty: L – 12pr / XL – 12pr
- Walk by Yaktrax (Attachable grips for work boots) – Min Qty: S – 5pr / M – 8pr / L – 8pr / XL 8pr
- Jersey Gloves – Min Qty: 75pr
- Leather Gloves (All Sizes) – Min Qty: S – 25pr / M – 25pr / L – 75pr / XL 50pr
- Head Socks – Min Qty: 25ea

FUEL AND ACCESSORIES

- Diesel Fuel (All tanks full) – Min Qty: 250 gal
- Diesel Fuel Tanks (Anti-gel additives) – Min Qty: 6 cans
- 400 Gallon Tank of Kerosene - Filled (For portable heaters) – Min Qty: 300 gal
- Starting Fluid (Aerosol Cans) – Min Qty: 12 cans
- Fuel Cans (All sizes/types) – Min Qty: 2 Gal – 2 ea. / 5 Gal – 2 ea.

SNOW REMOVAL/TRACTION MATERIALS

- Sand – Min Qty: 20 bags
- Ice-Melt – Min Qty: Concrete Safe – 40 bags / Regular – 120 bags

MISCELLANEOUS ITEMS

- De-Icer (for windshields) – Min Qty: 10 cans
- Plastic (used to contain heat) – Min Qty: Clear – 5 rolls / Reinforced – 5 rolls
- Extra Rolls of Heat Trace – Min Qty: 2 rolls

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- Heat Blankets – Min Qty: 6 ea.
- Heat Tape – Min Qty: 7 ea
- Duct Tape – Min Qty: 24 ea.
- Tie-Wire – Min Qty: 5 rolls
- Heat Lamps/Bulbs – Min Qty: 18 lamps / 35 bulbs
- Plywood – Min Qty: 12 sheets (4'x8')
- 2X4 Lumber – Min Qty: 12 ea.
- Galvanized 2 ½" Wood Screws – Min Qty: 1 box
- Spray Foam Sealant – Min Qty: 12 cans
- Snow Shovels – Min Qty: 12 ea.

E5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Product	Tank Location	Main Constituents
1393T	Units 1 & 2 Clg Twrs (Cooling Systems)	Anti-Scalant
1393T	Units 3 & 4 Clg Twrs (Cooling Systems)	Anti-Scalant
3DT120	Units 1 & 2 Clg Twrs (Cooling Systems)	Dispersant
3DT120	Units 3 & 4 Clg Twrs (Cooling Systems)	Dispersant
H-901G	Towers (Cooling Systems)	Biocide
ControlBrom CB70	Units 1 & 2 Clg Twrs (Cooling Systems)	Biocide
ControlBrom CB70	Units 3 & 4 Clg Twrs (Cooling Systems)	Biocide
90005	Units 1 & 2 Clg Twrs (Cooling Systems)	Cooling Tower Corrosion Inhibiter
90005	Units 3 & 4 Clg Twrs (Cooling Systems)	Bearing Water Corrosion Inhibiter
3DT397	Cooling Towers (Cooling Systems)	Cooling Tower Corrosion Inhibiter
7357	Units 1 & 2 Bearing (Cooling Systems)	Bearing Water Corrosion Inhibiter

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Product	Tank Location	Main Constituents
7357	Units 3 & 4 Bearing (Cooling Systems)	Bearing Water Corrosion Inhibiter
Zebra Mussel Trtmt	Units 1 & 2 Serv Wtr (Zebra Mussel Trmt.)	Zebra Mussel Trtmt
Zebra Mussel Trtmt	Units 3 & 4 Serv Wtr (Zebra Mussel Trmt.)	Zebra Mussel Trtmt
PC-191T	R.O. (Boiler / RO)	Anti-Scalant
PC-11	R.O. (Boiler / RO)	Biocide
CV-941	Boiler (Boiler / RO)	Ammonia
71301	Bottom Ash Floc (Bottom Ash / Effluent)	Flocculent
8185	Effluent TSS Coagulant (Bottom Ash / Effluent)	Coagulant
1689	Clg Tower Blowdown (Bottom Ash / Effluent)	Copper Removal/Treatment
1689	PWT (PWT)	Organosulfide - Metals Removal/Treatment
7768	PWT (PWT)	Polymer
8034 Plus	Unit 1 Absorber (MerControl)	Mercury Removal/Treatment
8034 Plus	Unit 3 Absorber (MerControl)	Mercury Removal/Treatment
8034 Plus	Unit 4 Absorber (MerControl)	Mercury Removal/Treatment
7895	Unit 2 Boiler (MerControl)	Mercury Oxidation
8035	Unit 1 Absorber (MerControl)	Mercury Removal/Treatment
8035	Unit 3 Absorber (MerControl)	Mercury Removal/Treatment
8035	Unit 4 Absorber (MerControl)	Mercury Removal/Treatment
Sodium Hydroxide	U3 Demin	Sodium Hydroxide
Sulfuric Acid	U3 Demin	Sulfuric Acid
Sulfuric Acid	U1/2 CW	Sulfuric Acid
Sulfuric Acid	U3/4 CW	Sulfuric Acid
Sodium Hypochlorite	U1/2 CW	Sodium Hypochlorite
Sodium Hypochlorite	U3/4 CW	Sodium Hypochlorite
Hydrochloric Acid	PWT	Hydrochloric Acid
Ferric Chloride	PWT	Ferric Chloride
Hydrated Lime	PWT	Hydrated Lime

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E6. Staffing

The following are the measures that will be taken to prepare the plant in the days immediately preceding a forecasted extreme cold-weather event.

Having made all the preparations listed above, the majority of this plan revolves around having enough personnel onsite to properly implement the plan and keep the plant running during the weather event and in the days following.

1. All departments will evaluate the need to have increased staffing levels onsite during the cold weather event. This is especially true during periods of normally low staffing (nights and weekends).
2. In the event personnel must stay overnight and cannot leave the property, food rations and cots are available. Cots are stored in the Warehouse. Frozen food or rations are stored in the freezer at the plant.
3. If local roadways are in such bad shape that staff cannot make it to the site in their own vehicles, four-wheel drive vehicles from the plant's fleet will be used to pick them up and bring them to the plant.
4. Facilities maintenance personnel will focus on clearing snow and ice from the plant's main thoroughfares. Plant maintenance and extra operations personnel will make rounds to ensure the generating equipment remains in working order. They will deploy the heating and anti-freezing equipment listed above and make corrections to operating conditions as necessary.
5. Work crews will be rotated as staffing allows to limit exposure to severe cold weather
6. The "buddy system" will be employed as needed during severe cold weather events to promote personnel safety.

E7. Communications

To promote effective communication during cold weather events, the following will occur:

1. Appropriate communication protocols will be followed during severe cold weather events.

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2. The satellite phone will be tested for operation according to weekly PMs.
3. Communication will be discussed during daily pre-job briefings.

E8. Special Operating Instructions

1. Additional Operator rounds will be initiated to verify critical equipment is protected. Room temperatures will be monitored.
2. Units will be placed online at minimum load prior to severe cold weather as Operations and Generation Dispatch mandate.
3. According to PMs, the Emergency Diesel Generator onsite will be tested for operability.
4. Critical auxiliary equipment will be placed in service on Cooling Towers and Raw Water systems in the Screen House where freezing weather could adversely impact their operation.

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Appendix F – Cold Weather Preparedness Plan: Mill Creek

F1. Work Management System (MAXIMO)

The goals of using the Maximo Work Management System as a part of the Winterization Plan are as follows:

1. Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
2. Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
3. Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather. Prioritize work to minimize the potential for operability impacts due to cold weather.
4. Ensure that all modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

These measures are generally PMs in Maximo which are programmed to generate work orders at the beginning of October, to be completed by November 30th. A list and description of these PMs can be found below. Completing these PMs in October and early November will ensure the plant is ready for winter by November 30th.

In addition, SERCO will ensure the plant's fleet of vehicles will have been properly winterized and in good working order.

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PM	Description	Responsibility	Date of Generation
00056022	PM-Annual - Cold Weather Winterization Efforts for Operations (Operations Support Supervisor)	MCPO	9/1/2023
00056159	PM-Annual - Cold Weather Winterization Efforts for Building Maintenance (MCBM): See Long Description	MCBM	9/1/2023
00056162	PM-Annual – (MCM1) Cold Weather Winterization Efforts for 1-4 WFGD: See Long Description	MCM1	9/15/2023
00056180	PM-Annual - Cold Weather Winterization Efforts for Coal Handling (Coal Handling Supervisor)	MCCH	9/1/2023
00056181	PM-CRIT-Annual – (MCM8) Cold Weather Winterization Efforts for I/E 1-4 Plant and 3&4 WFGD.	MCM8	10/1/2023
00056182	PM-Annual - Cold Weather Winterization Efforts for Insulation (INCORP): See Long Description	MCINCORP	9/1/2023
00057247	PM-Annual - PSM / RMP, Anhydrous Ammonia Farm Showers, Heat Tracer Inspections (Winter Time)	MCM12	11/1/2023
00057532	PM- CRIT -Annual – (MCM4) Cold Weather Winterization, Control Instrumentation	MCM4	10/1/2023
00057538	PM-Annual – (MCM12) Cold Weather Winterization Efforts for I/E Limestone, CH, GPP & PWS	MCM12	9/1/2023
00058601	PM-Annual – (MCM14) Cold Weather Winterization Efforts for 1-4 PJFF : See Long Description	MCM14	9/1/2023
00059634	PM-Weekly – (MCBM) - Winter Grounds Keeping: Snow removal, salt spreading, etc	MCBM	11/1/2023
00063678	PM-Annual – (MCM2) Winterization of Submerged Flight Conveyor	MCM2	11/1/2023
00066225	PM-CRIT-Annual – (MCCEM) Cold Weather Winterization Efforts for I/E CEM Equipment All units	MCCEM	9/4/2023

F2. Preparation of Critical Instrumentation and Equipment

The following tasks will be completed according to the PMs listed in Section 1 to ensure that critical equipment and instrumentation are adequately prepared for cold weather.

1. All critical site-specific problem areas have adequate protection to ensure operability during a severe cold weather event.
2. All electrical and instrumentation equipment susceptible to cold weather will have been winterized. Critical instrumentation has been identified for additional operator rounds during severe weather events.

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3. Temperature Indicators are placed in areas containing equipment sensitive to extreme cold conditions and in freeze protection enclosures to ensure that the temperature is being maintained above freezing.

F3. Insulation, Heat Trace, and Other Freeze Protection

In order to ensure the reliability of building/pipe insulation and heat trace circuitry, and to provide back-up for these systems, the following will occur:

1. Verification of the integrity of the insulation on all critical equipment identified in the Cold Weather Preparation Procedure.
    a. Execute observations specific to integrity of insulation and heat trace functionality on exposed piping by operations and/or maintenance personnel. Any heat trace or insulation removed during regular maintenance will have been replaced and integrity restored
    b. Exercise elevated alertness for continued operations of heat trace equipment during severe cold weather events.
    c. Back-up methods of heating instrumentation will be on hand- heat blankets, additional lines of heat trace wire w/ 120VAC plugs for quick application, etc.
2. Heaters, Heat Lamps, and Space Heaters
    a. Execute observations specific to building heat equipment by operations and/or maintenance personnel.
    b. All portable space heaters will be tested, repaired and/or replaced as necessary.
    c. An adequate fuel supply for the heaters will be onsite.
3. Wind Breaks
    a. Wind barriers will be installed as deemed appropriate to protect critical instruments, sensing lines, controllers, and piping.
4. Covers, Enclosures, and Buildings
    a. Enclosures with heat lamps will be installed for identified transmitters.
    b. Portable space heaters will be placed as needed in enclosures with temperature-sensitive equipment and maintained at regular intervals.

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c. Missing covers will be installed on valve actuators, damper drives and electrical boxes to prevent from accumulating ice.
d. Critical instruments have been placed inside plastic enclosures or otherwise protected against ice and wind.
e. All the exterior windows and doors will have been inspected, repaired if necessary, and be in good working order, or temporary provisions made to mitigate the potential for cold weather exposure.
f. Tarps/plastic enclosures will be installed over openings and stairwells as necessary to prevent warm air from leaving the operating areas.
g. All large overhead doors at the station will be inspected and repaired as needed and kept closed when not in use.

F4. Supplemental Equipment

Prior to a severe cold weather event, conduct an inventory of supplemental supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

1. Portable Space Heaters and Heat Lamps and bulbs
2. Extension Cords and GFI's
3. Kerosene
4. Propane and Rosebuds
5. Plastic Rolls
6. Lumber for building wind breaks and enclosures
7. Wire Ties
8. Portable Lighting
9. Portable Generators
10. Instrumentation Tubing
11. Ice removal chemicals and equipment
12. Blankets
13. Cots

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14. Shovels for Snow Removal
15. Cold Weather Personal Protective Equipment (PPE) – Boots, gloves, head socks
16. MRE's
17. Additional Heat Trace

F5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Product	Tank Location	Main Constituent(s)
HEDP 1393T	Unit 2 CT & Unit 3&4 CT service bldg	30-60% Hydroxyethylidenediphosphonic acid
Control Brom CB70	Unit 2 CT & Unit 3&4 CT service bldg	10-30% Sodium Bromide
Sodium Hypochlotite	Unit 2 CT & Unit 3&4 CT service bldg	12.5% sodium hypochlorite
H901G	Unit 1 screenhouse bromination room	96% 1-Bromo-3-Chloro-5,5-Dimethyl-Hydantoin
PC-191T	RO bldg (antiscalant)	Proprietary
Sodium Hydroxide tote	RO bldg	50% sodium hydroxide
Sodium Hypochlotite tote	RO bldg	12.5% sodium hypochlorite
Sodium Bisulfite tote	RO bldg	40% sodium bisulfite
Aqueous Ammonia tote	Unit 1 main floor	
Anhydrous Ammonia	Ammonia farm at the end of unit 4	
Trac 114plus61 tote	Outside basement lab	Proprietary
Propylene Glycol 50%	RO bldg	
Nalco Nalmet 1689 (Dissolved Metals)	PWS	Organosulfide
Brenntag (Coagulant)	PWS	Ferric Chloride

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Product	Tank Location	Main Constituent(s)
Nalco Coreshell 71301 (Flocculant)	PWS	Polymer
Hydrochloric Acid	PWS	Hydrochloric Acid
Hydrated Lime HRH KY-BULK	WFGD	Hydrated Lime (High reactive)
PowerPAC Premium	WFGD	Powder Activated Carbon (Brominated)
PowerPAC	WFGD	Powder Activated Carbon (Non-brominated)
Nalco 8035	WFGD	Nalco Scrubber Additive

F6. Staffing

The following are the measures that will be taken to prepare the plant in the days immediately preceding a forecasted extreme cold-weather event.

Having made all the preparations listed above, the majority of this plan revolves around having enough personnel onsite to properly implement the plan and keep the plant running during the weather event and in the days following.

1. All departments will evaluate the need to have increased staffing levels onsite during the cold weather event. This is especially true during periods of normally low staffing (nights and weekends).
2. In the event personnel must stay overnight and cannot leave the property, food rations and cots are available. Cots are stored in the Warehouse. Frozen food or rations are stored in the freezer at the plant.
3. If local roadways are in such bad shape that staff cannot make it to the site in their own vehicles, four-wheel drive vehicles from the plant's fleet will be used to pick them up and bring them to the plant.
4. Facilities maintenance personnel will focus on clearing snow and ice from the plant's main thoroughfares. Plant maintenance and extra operations personnel will make rounds to ensure the generating equipment remains in working order. They will deploy the heating and anti-freezing equipment listed above and make corrections to operating conditions as necessary.

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5. Work crews will be rotated as staffing allows to limit exposure to severe cold weather.
6. The "buddy system" will be employed as needed during severe cold weather events to promote personnel safety.

F7. Communications

To promote effective communication during cold weather events, the following will occur:

1. Appropriate communication protocols will be followed during severe cold weather events.
2. The satellite phone will be tested for operation according to weekly PMs.
3. Communication will be discussed during daily pre-job briefings.

F8. Special Operating Instructions

1. Additional Operator rounds will be initiated to verify critical equipment is protected. Room temperatures will be monitored.
2. Units will be placed online at minimum load prior to severe cold weather as Operations and Generation Dispatch mandate.
3. According to PMs, the Emergency Diesel Generator onsite will be tested for operability.
4. Critical auxiliary equipment will be placed in service on Cooling Towers and Raw Water systems in the Screen House where freezing weather could adversely impact their operation.

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Appendix G – Cold Weather Preparedness Plan: Trimble County

G1. Work Management System (MAXIMO)

The goals of using the Maximo Work Management System as a part of the Winterization Plan are as follows:

1. Ensure that all cold weather preparation preventive work orders (PM's) are completed prior to the onset of the winter season.
2. Perform cold weather readiness system walkdowns to identify any deficiencies and issues that will need repair.
3. Review the work management system for open corrective maintenance work orders that could affect plant operation and reliability in cold weather. Prioritize work to minimize the potential for operability impacts due to cold weather.
4. Ensure that all modifications and construction activities are performed such that the changes maintain cold weather readiness for the station.

These measures are generally PMs in Maximo which are programmed to generate work orders at the beginning of October, to be completed by November 30th. A list and description of these PMs can be found below. Completing these PMs in October and early November will ensure the plant is ready for winter by November 30th.

In addition, SERCO will ensure the plant's fleet of vehicles will have been properly winterized and in good working order.

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PM	Description	Responsibility	Date of Generation
00066216	PM-Inventory all #2 fuel oil supplies and ensure adequate su	TCOPPLT	9/30/2023
00066217	PM-Test run all portable heaters and ensure they are in good	TCOPPLT	9/30/2023
00066218	PM-Inspect unit 1 cooling tower for fill damage and valve op	TCOPPLT	9/30/2023
00066219	PM-Inspect unit 2 cooling tower for fill damage and valve	TCOPPLT	9/30/2023
00066220	PM-Inspect entry doors on all structures and ensure they wil	TCOPPLT	9/30/2023
00066221	PM-Check thermometer locations and ensure all thermometers a	TCOPPLT	9/30/2023
00066223	Check Glycol in Cooling systems and LCI cooling systems on all units at Combustion Turbine site.	TCOPPLT	9/30/2023
00066226	PM-Ensure all evaporative cooling systems including sumps ar	TCOPPLT	9/30/2023
00066227	PM-Place mobile fuel oil tank in bed of field truck and fill	TCOPPLT	9/30/2023
00066228	PM-Stage mobile fuel drums in unit 2 Ground floor area at th	TCOPPLT	9/30/2023
00066229	PM-Verify all louvers are positioned correctly for TC1	TCOPPLT	9/30/2023
00066230	PM-Verify all louvers are positioned correctly for TC2	TCOPPLT	9/30/2023
00066231	PM-Verify all heat trace panels for TC1 are operational.	TCOPPLT	9/30/2023
00066233	PM-Verify all heat trace panels for TC2 are operational.	TCOPPLT	9/30/2023
00066234	PM-Verify all heat trace panels for out outlining building are operational.	TCOPPLT	9/30/2023

G2. Preparation of Critical Instrumentation and Equipment

The following tasks will be completed according to the PMs listed in Section 1 to ensure that critical equipment and instrumentation are adequately prepared for cold weather.

1. All critical site-specific problem areas have adequate protection to ensure operability during a severe cold weather event.
2. All electrical and instrumentation equipment susceptible to cold weather will have been winterized. Critical instrumentation has been identified for additional operator rounds during severe weather events.
3. Temperature Indicators are placed in areas containing equipment sensitive to extreme cold conditions and in freeze protection enclosures to ensure that the temperature is being maintained above freezing.

G3. Insulation, Heat Trace, and Other Freeze Protection

In order to ensure the reliability of building/pipe insulation and heat trace circuitry, and to provide back-up for these systems, the following will occur:

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5. Verification of the integrity of the insulation on all critical equipment identified in the Cold Weather Preparation Procedure.
    a. Execute observations specific to integrity of insulation and heat trace functionality on exposed piping by operations and/or maintenance personnel. Any heat trace or insulation removed during regular maintenance will have been replaced and integrity restored
    b. Exercise elevated alertness for continued operations of heat trace equipment during severe cold weather events.
    c. Back-up methods of heating instrumentation will be on hand- heat blankets, additional lines of heat trace wire w/ 120VAC plugs for quick application, etc.
6. Heaters, Heat Lamps and Space Heaters
    d. Execute observations specific to building heat equipment by operations and/or maintenance personnel.
    e. All portable space heaters will be tested, repaired and/or replaced as necessary.
    f. An adequate fuel supply for the heaters will be onsite.
7. Wind Breaks
    a. Wind barriers will be installed as deemed appropriate to protect critical instruments, sensing lines, controllers, and piping.
8. Covers, Enclosures, and Buildings
    a. Enclosures with heat lamps will be installed for identified transmitters.
    b. Portable space heaters will be placed as needed in enclosures with temperature-sensitive equipment and maintained at regular intervals.
    c. Missing covers will be installed on valve actuators, damper drives, and electrical boxes to prevent from accumulating ice.
    d. Critical instruments have been placed inside plastic enclosures or otherwise protected against ice and wind.
    e. All the exterior windows and doors will have been inspected, repaired if necessary, and be in good working order, or temporary provisions made to mitigate the potential for cold weather exposure.

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f. Tarps/plastic enclosures will be installed over openings and stairwells as necessary to prevent warm air from leaving the operating areas.

g. All large overhead doors at the station will be inspected and repaired as needed and kept closed when not in use.

G4. Supplemental Equipment

Prior to a severe cold weather event, conduct an inventory of supplemental supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

PERSONAL PROTECTION /EXPOSURE PREVENTION EQUIPMENT

- Rubber Boot Slip-Ons (All Sizes) – Min Qty: L – 12pr / XL – 12pr
- Walk by Yaktrax (Attachable grips for work boots) – Min Qty: S – 5pr / M – 8pr / L – 8pr / XL 8pr
- Jersey Gloves – Min Qty: 75pr
- Leather Gloves (All Sizes) – Min Qty: S – 25pr / M – 25pr / L – 75pr / XL 50pr
- Head Socks – Min Qty: 25ea

FUEL AND ACCESSORIES

- Diesel Fuel (All tanks full) – Min Qty: 250 gal
- Diesel Fuel Tanks (Anti-gel additives) – Min Qty: 6 cans
- 400 Gallon Tank of Kerosene - Filled (For portable heaters) – Min Qty: 300 gal
- Starting Fluid (Aerosol Cans) – Min Qty: 12 cans
- Fuel Cans (All sizes/types) – Min Qty: 2 Gal – 2 ea. / 5 Gal – 2 ea.

SNOW REMOVAL/TRACTION MATERIALS

- Sand – Min Qty: 20 bags
- Ice-Melt – Min Qty: Concrete Safe – 40 bags / Regular – 120 bags

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MISCELLANEOUS ITEMS

- De-Icer (for windshields) – Min Qty: 10 cans
- Plastic (used to contain heat) – Min Qty: Clear – 5 rolls / Reinforced – 5 rolls
- Extra Rolls of Heat Trace – Min Qty: 2 rolls
- Heat Blankets – Min Qty: 6 ea.
- Heat Tape – Min Qty: 7 ea
- Duct Tape – Min Qty: 24 ea.
- Tie-Wire – Min Qty: 5 rolls
- Heat Lamps/Bulbs – Min Qty: 18 lamps / 35 bulbs
- Plywood – Min Qty: 12 sheets (4'x8')
- 2X4 Lumber – Min Qty: 12 ea.
- Galvanized 2 ½" Wood Screws – Min Qty: 1 box
- Spray Foam Sealant – Min Qty: 12 cans
- Snow Shovels – Min Qty: 12 ea.

G5. Operational Supplies

Prior to a severe cold weather event, conduct an inventory of critical supplies needed to keep the plant operational. Coordinate with the Commercial Group at the station to schedule deliveries based on the severity of the event and lead times of the individual items.

Product	Tank Location	Main Constituent(s)
1393T	TC1 and TC2 Cooling Tower Antiscalant	30-60% Hydroxyethylidenediphosphonic Acid
3DT120	TC1 and TC2 Cooling Tower Dispersant	Proprietary
ControlBrom CB70	TC1 and TC2 Cooling Tower Bio Control	10-30% Sodium Bromide
H901G	TC1 and TC2 Cooilng Tower Bio Control	96% 1-Bromo-3-Chloro-5,5-Dimethyl-Hydantoin
PC-191T	Water Treatment Reverse Osmosis Antiscalant	Proprietary
PC-11.36	Water Treatment Reverse Osmosis Bio Control	30-60% Polyethylene Glycol, 20% 2,2-Dibromo-3-nitrilopropionamide

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Product	Tank Location	Main Constituent(s)
PC-87	Water Treatment Reverse Osmosos Membrane Cleaner	5-10% Phosphoric Acid
PC-97	Water Treatment Reverse Osmosos Membrane Cleaner	5-10% Tetrasodium EDTA, 5-10% Sodium Hydroxide
Y303759.91	Water Treatment Clarifier Coagulant	70-99.5 %Aluminum chlorohydrate solution, 0.5-10% Polyquaternary amine
7468	Defoamer	1-5% Sorbitan Monostearate
7468	Defoamer	See Above
7357	Closed Cooling Corrosion Control	30-60% Sodium Molybdate
7346	Sewage Treatment	54.2 % 1-Bromo-3-Chloro-5,5-Dimethyl-Hydantoin, 28.9% 1,3-Dichloro-5,5-Dimethylhydantoin, 15.9% 1,3-Dichloro-5-Ethyl-5-Methylhydantoin
7160	Sewage Treatment	Proprietary
8801	Coal Dust Suppression	10-30% Ethoxylated 4-Nonylphenol
22350	Aux. Boiler	1-5 % Diethylethanolamine
7221	Boiler Treatment	Proprietary
8035	FGD Mercury Re-emission Treatment	Proprietary
1689	Process Water Treatment Mercury Treatment	1-5% Sodium Chloride, 1-5% Sodium Sulphide, 0.1-1% Sodium Hydroxide
71301	Process Water Treatment Clarifier Floculant	10-30 % Hydrotreated Light Distillate (petroleum), 1-5% Ethoxylated Sorbitan Monostearate, 1-5% Ethoxylated C10-16 Alcohols, 1-5% Sodium Chloride, 1-5% Urea
Hydrochloric Acid	Process Water Treatment pH Control	Hydrochloric Acid
Ferric Chloride	Process Water Treatment Clarifier Coagulant	Ferric Chloride
Sulfuric Acid	Water Treatment Demineralizer and TC2 Condensate Polisher Resin Regeneration; TC1 and TC2 Cooling Tower pH Control	Sulfuric Acid
Sodium Hydroxide	Water Treatment Demineralizer and TC2 Condensate Polisher Resin Regeneration	Sodium Hydroxide
Sodium Hypochlorite	TC1 and TC2 Cooling Tower Bio Control	Sodium Hypochlorite
Sodium Bisulfite	TC1 and TC2 Cooling Tower Dechlorination	Sodium Bisulfite
Aqueous Ammonia	Enviornmental NOX Control	Aqueous Ammonia
Powdered Activated Carbon	Enviornmental Mercury Control	Powdered Activated Carbon
Hydrogen	Generator Cooling	Hydrogen

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Product	Tank Location	Main Constituent(s)
Hydrated Lime	S03 control	Hydrated Lime
Limestone	Scrubber Slurry S02 Control	Limestone
C02	Generator Purging	C02

G6. Staffing

The following are the measures that will be taken to prepare the plant in the days immediately preceding a forecasted extreme cold-weather event.

Having made all the preparations listed above, the majority of this plan revolves around having enough personnel onsite to properly implement the plan and keep the plant running during the weather event and in the days following.

1. All departments will evaluate the need to have increased staffing levels onsite during the cold weather event. This is especially true during periods of normally low staffing (nights and weekends).
2. In the event personnel must stay overnight and cannot leave the property, food rations and cots are available. Cots are stored in the Warehouse. Frozen food or rations are stored in the freezer at the plant.
3. If local roadways are in such bad shape that staff cannot make it to the site in their own vehicles, four-wheel drive vehicles from the plant's fleet will be used to pick them up and bring them to the plant.
4. Facilities maintenance personnel will focus on clearing snow and ice from the plant's main thoroughfares. Plant maintenance and extra operations personnel will make rounds to ensure the generating equipment remains in working order. They will deploy the heating and anti-freezing equipment listed above and make corrections to operating conditions as necessary.
5. Work crews will be rotated as staffing allows to limit exposure to severe cold weather
6. The "buddy system" will be employed as needed during severe cold weather events to promote personnel safety.

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G7. Communications

To promote effective communication during cold weather events, the following will occur:

1. Appropriate communication protocols will be followed during severe cold weather events.
2. The satellite phone will be tested for operation according to weekly PMs.
3. Communication will be discussed during daily pre-job briefings.

G8. Special Operating Instructions

1. Additional Operator rounds will be initiated to verify critical equipment is protected. Room temperatures will be monitored.
2. Units will be placed online at minimum load prior to severe cold weather as Operations and Generation Dispatch mandate.
3. According to PMs, the Emergency Diesel Generator onsite will be tested for operability.
4. Critical auxiliary equipment will be placed in service on Cooling Towers and Raw Water systems in the Screen House where freezing weather could adversely impact their operation.