Pre-Winter Site Status Reviews and Readiness Certification

Prior to the onset of the Winter Period each Plant Manager verifies winter readiness and formally communicates site status to the RVP (see example Attachment 1 - Winter Readiness Certification). RVPs review regional Winter Readiness status and certify status to the EVP Operations.

Records

Any records generated as a result of this process shall be filed and retained in accordance with CPN-714 (Records Management). Processes and standards referenced in this document shall prescribe any specific records requirements within those documents.

Support Documents

Attachment 1(Typical Winter Readiness Certification Letter)

Attachment 2(Winter Readiness Actions Timeline)

Attachment 3(Lessons Learned Appendix)

Attachment 4(Maximo Seasonal Winter Maximo-PMs)

Attachment 5(Pre-Winter Season Checklist)

Attachment 6(Extreme Cold Weather Guidelines Sub-35 degrees F Processes & Checklist)

Attachment 7(Document Binder Tab)

Attachment 8(Plant Specification Design Criteria)

Attachment 9(Critical Equipment List)

Attachment 10(Map of Temporary Enclosures)

Attachment 1: Typical Winter Readiness Certification Letter

To: (Regional VP,

Operations Name) From:

(Plant/General Manager

Name) Subject: Winter

Readiness Certification

(Plant Name) has reviewed the requirements of the Plant Specific Plans and Procedures related to Winter Readiness preparation and Winter Operation, and by copy of this letter is ready to certify (Plant Name) winter readiness. [Plant] has completed review of plant winter readiness and implemented preventive and corrective actions required to provide reasonable assurance of operation during foreseeable winter conditions at the site. In-progress items relating to winter operation are summarized below.

A. The basis for our certification is as follows:

1. Significant outcomes of system reviews
2. Status of preventive maintenance affecting Winter Readiness
3. Status of corrective maintenance affecting Winter Readiness
6. Status of modifications/projects affecting Winter Readiness
7. Status of Operations Winter Readiness Procedures/Checklists
8. Status of Winter Readiness supplies
9. Other

B. Winter readiness items not completed

1. Reason
2. Open Actions Items
3. Owner & Due Date

Attachment 2: Winter Readiness Actions Timeline

Key Milestone	Recommended Completion	Comments
Initial Annual Pre-Winter Readiness Meeting	May - July	Meeting to review: Plant Winter Readiness Plan, Open Corrective "Winter" Work Orders and PM's
Final Workscope and Actions Required	August - September	Finalized workscope approved by Plant Manager to implement prior to winter
Operations Procedures Reviewed and Updated as Required	October	Site specific Winter Operations Procedures reviewed and updated based on lessons learned and new equipment added
Winter Readiness Training	November	Complete training for plant personnel involved with Winter Preparedness and Winter Operations
Winter Readiness Certification by the Plant Manager	November	Provided to RVP. Reference Attachment 1.
Winter Readiness Activities Completed	December 1	This date may vary for specific plants based on location
Post – Winter Meeting	March – April	Review specific plant lessons learned from the past winter.

Attachment 3: Lessons Learned and NERC, FERC, and PJM

Guidance/Requirements

FERC GUIDANCE:

FERC - Recent Weather Impacts on the Bulk Power System Jan. 16, 2014

http://www.ferc.gov/legal/staff-reports/2014/01-16-14-bulk-power.pdf

FERC - Commission and Industry Actions Relevant to Winter 2013-14 Weather Events – October 16, 2015

http://www.ferc.gov/media/news-releases/2014/2014-4/10-16-14-A-4-presentation.pdf

NERC GUIDANCE:

Reliability Guide – Generating Unit Winter Readiness – Current Industry Practices 12-3-2012 - Contains numerous detailed recommendations, including establishing a procedure for ensuring weather readiness is routinely addressed

http://www.nerc.com/comm/OC/Reliability%20Guideline%20DL/Generating_Unit_Winter_Weather_Readiness_final.pdf

Winter Preparation for Severe Weather Events Dec. 2012 – 64 page PowerPoint

http://www.nerc.com/pa/rrm/Webinars%20DL/NERC_Winter_Prep_Webinar_presentation_20121210.pdf

FERC NERC Findings and Recommendations

http://www.nerc.com/pa/rrm/ea/ColdWeatherTrainingMaterials/FERC%20NERC%20Findings%20and%20Recommendations.pdf

http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2013WRA_Final.pdf

2014 Polar Vortex Review Sep. 30, 2014 - NERC

http://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf

2014 Essential Reliability Services NERC Staff Report – August 20, 2014

http://www.ncsl.org/documents/summit/summit2014/onlineresources/M_lauby.pdf

2012/2013 Winter Reliability Assessment Nov. 2012

http://www.nerc.com/files/2012WRA_FINAL.pdf

2013/2014 Winter Reliability Assessment Nov. 2013

http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2013WRA_Final.pdf

2014/015Winter Reliability Assessment Nov. 2014

http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014WRA_Final.pdf

2015 Winter Performance Update – 08-12-2015

http://www.nerc.com/pa/rrm/ea/ColdWeatherTrainingMaterials/Winter_Review_2015.pdf

NERC LESSONS LEARNED – COLD WEATHER

All NERC Lessons Learned are available at

http://www.nerc.com/pa/rrm/ea/Pages/Lessons-Learned.aspx

- Gas and Electricity Interdependency – 9/12/2012
- Transmission Facilities and Winter Weather Operations – 1/6/2012
- Winter Storm Inlet Air Duct Icing – 9/22/2012
- Transformer Oil Level Issues During Cold Weather – 9/12/2012
- Plant Operator Training to Prepare for a Winter Weather Event – 1/6/2012
- Plant Onsite Material and Personnel Needed for a Winter Weather Event – 1/6/2012

- Plant Fuel Switching and Cold Weather – 10/19/2011
- Plant Instrument and Sensing Equipment Freezing due to Heat Trace and Insulation Failures – 10/19/2011
- Generating Unit Temperature Design Parameters and Extreme Weather Conditions – 9/28/2011

Adequate Maintenance and Inspection of Generator Freeze Protection – 9/28/2011

PJM Manual 14D Operational Requirements and PJM Manual 14D Attachment N Cold Weather Checklist

http://www.pjm.com/~/media/documents/manuals/m14d.ashx

7.5.2 Generation Resource Cold Weather Checklist

Attachment N of the Manual M14D contains the PJM generation resource Cold Weather Preparation Guidelines and Checklist. This Checklist or a similar one developed by the generation resource owner, is to be used annually prior to the winter season to prepare generation resources for extreme cold weather event operation. Prior to December 15th each year, the generation resource owner's representative shall verify via eDART that the represented generation resources have completed the items on the checklist, or a substantially equivalent one developed by the generation Owner.

Attachment 4: Pasadena Maximo Winter Readiness PMs-

	PM	Description	Plant Condition	Status	Program Category	Task Category	Site
1	101785	PD 1Y Winter Readiness Heater operational check (see attached checklist)	OPERATING	ACTIVE	SEASON	WINTER	PD
2	101788	Pasadena Heat Trace System Survey / Checkout	OPERATING	ACTIVE	SEASON	WINTER	PD
3	101851	Winter Readiness Fall Air Conditioner / Heater Preventative Maintenance	OPERATING	ACTIVE	SEASON	WINTER	PD
4	101867	Winter Readiness - Pasadena Insulation Survey / Checkout	OPERATING	ACTIVE	SEASON	WINTER	PD
5	101868	Winter Readiness Install Wind Breaks (see attached Location Map)	OPERATING	ACTIVE	SEASON	WINTER	PD
6	101895	Winter Readiness Fall Check Deluge House Electric Heater Operation	OPERATING	ACTIVE	SEASON	WINTER	PD
7	101912	P1 ANNUAL REGENERATIVE AIR DRYER DESICCANT CHANGE	OPERATING	ACTIVE	SEASON	WINTER	PD
8	101916	P2 ANNUAL REGENERATIVE AIR DRYER DESICCANT CHANGE	OPERATING	ACTIVE	SEASON	WINTER	PD
9	101918	Winter Seasonal Readiness Review - Post Season Critique - March	OPERRATING	ACTIVE	SEASON	WINTER	PD
10	101922	Winter Seasonal Readiness Certification Letter due November 20	OPERATING	ACTIVE	SEASON	WINTER	PD
11	103395	PD-1M-P1 Air Dryer Performance Test using handheld Dew Point Analyzer	OPERATING	ACTIVE	SEASON	WINTER	PD
12	103396	PD-1M-P2 Air Dryer Performance Test using handheld Dew Point Analyzer	OPERATING	ACTIVE	SEASON	WINTER	PD
13	103462	PD 1Y Winter Readiness Inventory Supplies	OPERATING	ACTIVE	SEASON	WINTER	PD
14	105102	PD 1Y Winter Seasonal Readiness Training Operations / Maintenance		ACTIVE	SEASON	WINTER	PD
15	116819	PD-1Y Winter Readiness Walkdown	OPERATING	ACTIVE	SEASON	WINTER	PD
16	116820	PD1Y Check Critical Equipment Breaker Heaters	OPERATING	ACTIVE	SEASON	WINTER	PD
17	116821	PD1Y Annual Winter System Readiness Review	OPERATING	ACTIVE	SEASON	WINTER	PD
18	117234	PD 1Y WINTER REVIEW CALPINE FLEET LESSONS LEARNED	OPERATING	ACTIVE	SEASON	WINTER	PD
19	117245	PD 1Y WINTER FINAL WORK SCOPE ACTION REQUIRED	OPERATING	ACTIVE	SEASON	WINTER	PD
20	117246	PD 1Y INITIAL SITE PRE WINTER OPS AND MAINT. MEETING	OPERATING	ACTIVE	SEASON	WINTER	PD
21	117247	PD 1 Y REVIEW WINTER STANDARDS PRIOR TO WINTER READINNESS MEETING	OPERATING	ACTIVE	SEASON	WINTER	PD
22	117249	PD 1Y WINTER-REVIEW ALL WINTER SEASONAL READINESS CM'S	OPERATING	ACTIVE	SEASON	WINTER	PD
23	117253	PD 1Y WINTER IDENTIFY THE CRITICAL EQUIPMENT	OPERATING	ACTIVE	SEASON	WINTER	PD
24	117254	PD 1Y WINTER REVIEW PAST WINTER FREEZING ISSUES	OPERATING	ACTIVE	SEASON	WINTER	PD
25	117255	PD 1Y- WINTER OPERATING TEMP REVIEW	OPERATING	ACTIVE	SEASON	WINTER	PD
26	47081	PD6M P1 1A REGENERATIVE AIR DRYERS MAINT. INSTRUMENT AIR	OPERATING	ACTIVE	SEASON	WINTER	PD
27	53979	P2 SEMI ANNUAL REGENERATIVE AIR DRYER MAINT. INSTRUMENT AIR (P2)	OPERATING	ACTIVE	SEASON	WINTER	PD

Pasadena Salamander Portable Heaters Testing and Setup (Attached to PM #101785) -

Salamander Portable Heaters Testing & Setup				
		Issues	Initials	Date
Pull heaters from storage from warehouse.				
Add fuel to heaters and test fire.				
Stage heaters in areas where freezing may occur.				
After the threat of freezing passes for the Winter Season heaters should be emptied and stored in the warehouse.				
*Care must be taken when refueling the portable heaters. *Turn heater off while fueling. *Set thermostats at 40 degrees. Fuel will last approximately 6 hours during freezing conditions.				

Attachment 5: Pre-Winter Season Inventory Checklist (Attached to PM #103462) -

On Hand Materials					
Material	**Desired Quantity**	**Actual Quantity**	**Comments**		
Self-Regulating Heat Trace Cable	100 '				
Spare Extension Cords	20				
Hand Held Torches or Electric Heat Guns	10				
Tarps	20				
Reinforced polyethylene	1 roll				
Salamander Heaters	12				
Electric Space Heaters	15				
Small Propane for Torches	24				
Duct Tape	5 Rolls				
#16 Gage Wire	5 Rolls of 200'				
Rope	100 ft.				
Flashlights	16				
Rolls of Caution Tape	3				
Rolls of Danger tape	3				
Tie Wraps	4 Bags				

General Preparation for Freezing Events

*During low heat load conditions coupled with freezing conditions operations will alternate cooling tower fans to prevent ice buildup in the cells.
*Top off all chemical tanks 2 days prior to any anticipated freezing events.
*Maintain clear communications with the QSE and Steam Host.
*Diesel/Kerosene deliveries will have to be set for every 12 hours to maintain all salamanders during freezing conditions.
*Add additional personnel to assist with extra duties.
*Establish contractor support potential for the season with a time & material purchase order in place if needed for support personnel.

CALPINE NYSE CPN

Pasadena Cogeneration, L.P. Energy Procedure Manual

PROCEDURE: EXTREME COLD WEATHER GUIDELINES

NUMBER: PD-ECW-0001	REVISION: 0	Dennis Coates	8/27/21
	GENERAL	PLANT MANAGER	DATE

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Purpose and Scope

Provide instructions for protecting equipment during extreme cold weather season (November 1st to March 15th of the following year) when outside air temperature is predicted to decrease or decreases to **ANY** of the following conditions:

LESS THAN or EQUAL to [redacted] for 24 hours

LESS THAN or EQUAL to [redacted]

Provide instructions for Restoration from Freezing Weather

Definitions

DCS: digital control system

EHS: Environmental Health and Safety

ERCOT ISO: Electrical Reliability Council of Texas Independent System Operator

MCC/DPU: Motor Control Center / Digital Processing Unit.

TCEQ: Texas Commission of Environment Quality

General Information

The Plant Manager SHALL implement this procedure prior to or upon a National Weather Service or company meteorologist prediction of falling temperatures within any of the limits described in Section 0.

Temperature indication for determining the outside air temperature to decide when to enter this procedure or change to a different condition SHALL be used in following order:

DCS air temperature.

Nearest National Weather Service weather observation location (typically the nearest airport).

Failure to maintain the Battery Room temperature greater than 60 °F MAY result in degrading the discharge capability of the battery should a loss of offsite power occur.

Failure to maintain either MCC/DPU room temperature greater than 60 °F MAY result in degrading the discharge capability of the MCC/DPU battery should a loss of offsite power occur.

IF an instrument is suspected of freezing, THEN the instrument indication SHALL be monitored to verify reliability.

IF an instrument indication is unreliable, THEN an alternate method of monitoring the affected process variable SHOULD be established.

IF an instrument freezes, THEN actions SHALL be taken to return the instrument to service.

Equipment/systems outside the confines of heated buildings SHALL be inspected per Form 1 (Freezing Weather Walkdown Guidelines) for deficiencies that could promote freezing.

WOs SHALL be implemented as soon as practical to repair any equipment/system deficiency that could promote freezing.

Out-of-Service equipment SHALL be evaluated for cold weather preparation (e.g., isolation/draining of tanks, isolation/draining non-essential equipment, installing temporary shelters, installing temporary heaters, and installing temporary insulation).

IF outside temperature is [redacted] **or LESS**, THEN all Freeze Protection Panels SHALL be monitored for operability at least every four hours.

Follow Electrical Safety Precautions of EHS-17 (Electrical Safety) when accessing Heater Controls. Open, energized circuits exist inside the heater control enclosures.

Operation of a drain valve in a system that leads to the oily water separator GREATER THAN 1 turn open could result in overloading the oily water separator. Direct all draining activities to be performed at rates which can be handled by the oily water separator.

Some Freeze Protection Circuits have Remote High Temperature Switches to prevent **local boiling in small dead legs of piping** (e.g. outside eyewash stations) or for when during normal operations the piping is full of hot water\steam but may be subject to freezing when shutdown. (i.e., HP, IP, and LP Drum instrument lines). In these cases, the heat trace is NOT ENERGIZED if the piping/tubing is "Hot" when the freeze protection panels are placed in "Hand/On" unless the piping/tubing system is below the applicable temperature switch set point.

The blank on the right side of certain steps in this procedure is for tracking completion of important activities. The blank can be initialed by either the person performing the procedure step or the person responsible for ensuring the step is completed as directed (e.g., the CRO can initial for the Yard Watch performed actions, etc...).

References

Procedures: Refer to Pasadena severe weather procedures, checklists and guidelines located on the Pasadena Server (\\Pasfs1\public_PASADENA_OPERATIONS_OPERATIONS_PROCEDURES)

Calpine Pasadena Freeze Protection Checklist

Calpine Pasadena freeze Protection Procedure

HCC Clarifier Outage Checklist

EHS-17, Electrical Safety

Seasonal Preparedness Guidelines

P&IDs:

Refer to P-1 and P-2 P&ID's for all applicable systems located on the Pasadena Public Server (\\Pasfs1\public_PASADENA_OPERATIONS)

Commitments:

ERCOT ISO Winter Weather Readiness for Texas Generators Whitepaper; May 3, 2011

Texas Public Utility Commission Emergency Operations Plan Filing of Calpine Corporation; April 30, 2008.

Responsibilities

The Plant Manager is responsible for ensuring overall implementation of this procedure.

Deciding that emergency actions are necessary to prevent equipment damage OR lost power production during any declared severe weather condition (cold).

Maintaining Checklist 3 (Cold Weather Checklist – Severe Weather Condition 3)

Maintaining Checklist 2 (Cold Weather Checklist – Severe Weather Condition 2)

Maintaining Checklist 1 (Cold Weather Checklist – Severe Weather Condition 1)

Logging emergency action taken, date/time in Control Room Logbook.

The Operations Manager is responsible for:

Ensuring operator actions are implemented in a timely manner to support implementation of this procedure.

Ensuring equipment deficiencies are properly prioritized to support continued plant operations.

The Maintenance Manager is responsible for:

Ensuring maintenance activities are performed in a timely manner to support implementation of this procedure.

Ensuring equipment deficiencies that could result impact continued plant operations are addressed according to priority of importance.

Operators are responsible for:

Implementing the procedure as directed in a timely manner.

Reporting equipment deficiencies which could impact cold weather operations as soon as possible.

Maintenance Technicians are responsible for:

Implementing work activities as directed by the Maintenance Manager in support of this procedure.

Reporting equipment deficiencies which could impact cold weather operations as soon as possible.

General Freeze Protection Actions

NOTE

- Steps in Section 0 MAY be performed concurrently.
- Steps in Section 0, have separate entry conditions and MAY be entered independently.

WHEN outside air temperature decreases to OR is predicted to decrease to **LESS THAN or EQUAL to** [redacted] for GREATER THAN 24 hours, THEN IMPLEMENT the following actions:

RECORD the date and time for declaring Severe Weather Condition 3, 2, or 1 in the Control Room Logbook. _____

PERFORM Addendum 1 (Cold Weather Readiness Actions), **Prior To** Outside air Temperature reaching [redacted] _____

REVIEW the Checklist 3 (Cold Weather Checklist – Severe Weather Condition 3) for additional actions that MAY be necessary to perform.

_____

IF any additional actions are necessary to perform, THEN RECORD the additional actions taken in the Control Room Logbook. _____

ENSURE equipment/systems that are not enclosed by or inside protective permanent plant buildings SHALL be inspected per Form 1 (Cold Weather Readiness Actions) for deficiencies that could promote freezing. _____

ENSURE all Freeze Protection Systems are in operation and operable or in repair. _____

ENSURE all instrument enclosure space heaters are in operation and operable or in repair. _____

ENSURE to inspect any existing temporary instrument or temporary equipment is properly protected to ensure adequate compensatory actions are implemented to prevent freezing. _____

IF any Deluge Valve House or CEMS Room Temperature is below [redacted] THEN ENSURE the appropriate Room Heaters have energized. _____

IF any MCC/DPU Room Temperature is below [redacted], THEN ENSURE the appropriate Room Heaters have energized. _____

IF the Plant Battery Room Temperature is below [redacted], THEN ENSURE the Room Heater has energized. _____

WHEN outside air temperature decreases to OR is predicted to decrease to **LESS THAN or EQUAL to** [redacted] THEN IMPLEMENT the following actions:

COMPLETE the applicable portion of the Checklist 3 (Cold Weather Checklist – Severe Weather Condition 3). _____

ENSURE Step 0 is in progress. _____

NOTE

IF desired, THEN additional actions MAY be taken in anticipation of dropping temperatures. This will assist in keeping the following rooms warm.

IMPLEMENT Deluge Valve House Extreme Cold Weather Guidelines per Section 0. _____

IMPLEMENT Water Treatment Plant Extreme Cold Weather Guidelines per Section 0 _____

IF the Main Cooling Tower Blowdown piping is **NOT** in service, THEN DRAIN the blowdown line to prevent freezing.

MONITOR the Plant Battery Room temperature. _____

IF the Plant Battery Room temperature is approaching [redacted] THEN PLACE one electric heater in the Plant Battery Room. _____

- ENSURE Heater maximum 1500 watt capacity _____

- ENSURE Heater is set on the floor of the Plant Battery Room below the battery bank. _____
- ENSURE **NO** potential for Flames in Battery Room _____

MONITOR the MCC/DPU room temperature. _____

IF a MCC/DPU room temperature is approaching [redacted], THEN PLACE one electric heater in the affected MCC/DPUC. _____

- ENSURE Heater maximum 1500 watt capacity _____
- ENSURE Heater is set on the floor near the MCC/DPUC Battery Charger. _____
- ENSURE **NO** potential for Flames in MCC/DPUC. _____

SECURE the Combustion Turbine Inlet fogging, evaporative cooling and water wash systems. _____

CAUTION

If the Combustion Turbine (CT) Inlet Fogging pumps, evaporative cooler pumps and water wash pumps are not properly drained , the pumps could freeze and rupture the pumps rendering the CT Inlet cooling and compressor wash systems inoperable.

ENSURE the following systems are drained and isolated:

CT-1 Evap cooler and H2o wash systems _____

CT-2 Inlet fogging and H2o wash systems

CT-3 Inlet fogging and H2o wash systems _____

ENSURE ALL Water Treatment Building HVAC Supply Fans are in OFF. _____

ENSURE ALL Water Treatment Building Doors are kept CLOSED. _____

ENSURE ALL Chemical Pump temporary shelters are kept CLOSED. _____

NOTE

Room Temperature logs MAY be taken every 6 hours until room air temperatures drop **below** [redacted] then room temperature logs SHOULD be taken every 4 hours. The Plant Manager MAY request room temperature logs be taken at shorter intervals of time as the weather dictates.

ENSURE the following logs have been initiated to monitor the room temperatures every 4 to 6 hours:

- Logsheet 1 () _____
- Logsheet 2 () _____
- Logsheet 3 () _____

IF the outside air temperature is projected to be **LESS THAN** [redacted] for 8 hours or GREATER, THEN PERFORM the following:

- Step 0 _____
- Step 0 _____

NOTE

- Freeze Protection/Heat Trace Panels SHOULD be monitored for operability/discrepancies
  - IF panel lamp(s) are available, they SHOULD be illuminated/extinguished properly
    - Power available lamp illuminated
    - Circuit failure alarm lamp properly illuminated
    - Heaters Energized lamp illuminated
    - Alarms lamp NOT illuminated
  - If control switch located on panel it SHOULD be in AUTO or ON
  - Space heaters SHOULD be in service
- Discrepancies SHOULD be handled in the following ways:
  - Indicate on Log, reference to remark section
  - Record Deficiency in Remarks Section of Log
  - Notify Control Room
  - Initiate WO(s) for identified deficiency
  - Record WO number Remarks Section of Operator Logsheet.

IF outside air temperature is **LESS THAN** [redacted], THEN PERFORM Logsheet 2 (Room Temperature Logsheet) **at least every four hours**. _____

IF outside air temperature is **GREATER THAN** [redacted], **AND** wind speed is **LESS THAN 10 MPH AND** outside air temperature remains **LESS THAN** [redacted] THEN COMPLETE the applicable portion of Checklist 2 (Cold Weather Checklist – Severe Weather Conditions). _____

IF outside air temperature is **LESS THAN** [redacted], THEN PERFORM the following Logsheets at the specified intervals:

Logsheet 1 (Instrument Enclosure Inspection Logsheet) _____

Logsheet 3 (Freeze Protection Panel Inspection Logsheet) _____

WHEN the outside air temperature is decreasing to OR is predicted to be, either one of the following:

- Outside air temperature **LESS THAN or EQUAL to** [redacted]
- Outside air temperature **LESS THAN or EQUAL to** [redacted] **AND** wind speed is **GREATER THAN** or **EQUAL to 20 MPH**
- REMAIN **LESS THAN** [redacted] **for GREATER THAN 24 hours**

THEN IMPLEMENT the following actions:

COMPLETE the applicable portion of the Checklist 1 (Cold Weather Checklist – Severe Weather Condition 1). _____

ENSURE the following Steps are complete or in progress:

	In Progress	Complete	
• Step 0	_____	_____	_____
• Step 0	_____	_____	_____
• Step 0	_____	_____	_____
• Step 0	_____	_____	_____

WHEN outside air temperature is GREATER THAN [redacted] THEN GO TO Section 0 Restoration from Freezing Weather. ____

Deluge Valve House Extreme Cold Weather Guidelines

NOTE

Room Temperature logs MAY be taken every 6 hours until room air temperatures drop **below** [redacted], then room temperature logs SHOULD be taken every 4 hours. Plant Manager MAY request room temperature logs be taken at shorter intervals of time as the weather dictates

IF outside air temperature is **LESS THAN or EQUAL to** [redacted] THEN ENSURE ALL Deluge Valve House doors properly CLOSED. _____

IF the temperatures in the individual Deluge Valve House Rooms are decreasing to [redacted] (Severe Weather Condition 1), THEN PLACE a portable electric heater (maximum 1500-watt capacity each) in the each of the affected rooms. _____

MONITOR Deluge Valve House room temperatures AND RECORD the values on Logsheet 2 (Room Temperature Logsheet) at the following intervals:

RECORD Temperatures every 4 hours until outside air temperature is **GREATER THAN** [redacted] _____

IF ANY Deluge Valve House room temperature is **below** [redacted], THEN ENSURE the appropriate Room Heaters have

WHEN outside air temperature is **GREATER THAN** [redacted] THEN GO TO Section 0, Restoration from Freezing Weather. _____

Water Treatment Plant Extreme Cold Weather Guidelines

ENSURE all exterior doors are closed on the R.O. building. _____

ENSURE wall and ceiling louvers are closed on the R.O. building. _____

ENSURE all electric heaters are operational and portable heaters are in service to maintain sufficient room temperature to prevent the sodium hypochlorite and sodium bisulfite from reaching freezing temperatures. _____

WHEN outside air temperature is **GREATER THAN** [redacted], THEN GO TO Section 0 Restoration from Freezing Weather. _____

Restoration from Freezing Weather

NOTE

Steps in Section 0 0MAY be performed concurrently.

If the forecast temperature is expected to go **below** [redacted] within the next 24 hours, THEN desired portions of this Section MAY be delayed as directed by the Plant Manager.

If the Plant Manager is reasonably sure that another Cold Weather Alert will occur in the near future, THEN temporary insulation and/or heating materials MAY remain in place.

Temporary heaters left in place SHALL BE properly secured until needed again.

IMPLEMENT the following actions at **EQUAL TO or GREATER THAN** [redacted]

Place ALL Water Treatment Building HVAC Supply Fans in AUTO. _____

REMOVE ANY temporary heaters that were installed. _____

REMOVE ANY temporary wind breaks that were installed. _____

REMOVE ANY temporary enclosures that were installed.

_____

REMOVE ANY temporary insulation that was installed. _____

REMOVE ANY temporary heat tracing that was installed. _____

EITHER PLACE Temporary Heating materials issued in storage, OR DISCARD the Temporary Heating materials **NO** longer suitable for reuse. _____

IF a Cold Weather Alert is canceled AND Senior Management agrees that another Cold Weather Alert is **NOT** imminent, THEN return all temporary heating materials to their proper storage location. _____

STOP ANY special temperature monitoring or logging initiated. _____

IF any "Additional necessary actions taken" were recorded in the Control Room Logbook per Checklist 1, Checklist 2 or Checklist 3 THEN ENSURE actions are restored as necessary. _____

RECORD the date and time for canceling Severe Weather Condition 3, 2, or 1 in the Control Room Logbook. _____

Support Documents

Addendum 1 (Cold Weather Readiness Actions)

Checklist 1 (Cold Weather Checklist – Severe Weather Condition 1)

Checklist 2 (Cold Weather Checklist – Severe Weather Condition 2)

Checklist 3 (Cold Weather Checklist – Severe Weather Condition 3)

Form 1 (Freezing Weather Walkdown Criteria)

Logsheet 1 (Instrument Enclosure Inspection Logsheet)

Logsheet 2 (Room Temperature Inspection Logsheet)

Logsheet 3 (Freeze Protection Panel Inspection Logsheet)

Cold Weather Readiness Actions Prior to outside air Temperature < 40 °F

NOTE

Addendum 1 (Cold Weather Readiness) MAY be performed in sections or in its entirety at the discretion of the Plant Manager.

Performance of Addendum 1 (Cold Weather Readiness), Step 1.0 Logsheet is a maintaining expectation for Cold Weather Operations and is expected to be performed ONCE PER SHIFT during Cold Weather Operations.

1.0 The outside operators SHALL verify that ALL enclosure space heaters operate properly throughout the shift during cold weather Operations. Document the inspections on Logsheet X. _____

2.0 Walkdown ALL exposed equipment focusing on instrumentation to ensure insulation, insulation covers and heat tracing are in place. This SHOULD be done as soon as possible whenever freezing weather is forecasted. The list below is **NOT** meant to be all inclusive:

2.1	HP, IP, LP Drum Instrumentation	_____
2.2	R.A.C. Level & Pressure Instrumentation	_____
2.3	CT Fuel Gas Heater/IP Feedwater pressure transmitters	_____
2.4	All Aux Boiler Drum Instrumentation	_____
2.5	Steam Turbine Pressure & Flow Transmitters	_____
2.6	Condenser Level Transmitters & Pressure Transmitters	_____
2.7	Condensate Pump Pressure & Flow Transmitters	_____
2.8	HRSG Feedwater Pump Pressure & Flow Transmitters	_____
2.9	Auxiliary Feedwater Pump Pressure & Flow Transmitters	_____
2.10	Demin Water Pump Pressure & Flow Transmitters	_____
2.11	Raw Water Pump Pressure & Flow Transmitters	_____
2.12	Ensure all plant heat trace panels are energized and circuits are functioning properly	_____
2.13	Ensure all CT water wash skids are properly isolated and drained	_____

2.14 Ensure all CT fogging systems are properly isolated and drained _____

2.15 Ensure CT-1 evap cooler system is properly isolated and drained _____

2.16 Ensure offline cooling water exchangers have water flow through the exchanger or are properly isolated and drained _____

3.0 The Operations Manager SHALL review the LOTO database for ALL equipment tagged out that MAY need to be drained or restored to service to prevent freezing. _____

4.0 The Operations Managers SHALL review, track and coordinate actions to either drain or restore the equipment for each respective power block. _____

NOTE

The intent is to determine how long the plant can operate with present inventories and fuel supplies and what is the impact if these commodities run out. This information SHALL be provided to the Operations Manager to ensure the inventory issues is addressed.

5.0 VERIFY chemical inventories are sufficient to support plant operations and identify any critical shipments expected during the cold weather forecasted period. Critical deliveries SHALL include margin (time and volume) of existing inventory. _____

6.0 VERIFY fuel supplies (e.g., diesel fuel, gasoline, kerosene, propane, etc...) are sufficient to support plant operations and identify any critical shipments expected during the cold weather forecasted period. Critical deliveries SHALL include margin (time and volume) of existing inventory. _____

7.0 VERIFY adequate supply of plastic tarps, tie-wraps, rope, duct tape, tie-wire is on hand to support the fabrication of temporary wind breaks throughout the plant. _____

8.0 VERIFY adequate supply of extension cords, drop lights, temporary electric heat tracing, heat guns, propane torch tips are on hand to support thawing of freezing equipment. _____

9.0 VERIFY adequate supply of portable kerosene heaters (and fuel) are on hand to support heating in temporary structures and water chemical buildings. _____

SEVERE WEATHER CONDITION 1:

- Outside air temperature **LESS THAN** or **EQUAL to** [redacted]
- Outside air temperature **LESS THAN** or **EQUAL to** [redacted] **AND** wind speed is **GREATER THAN** or **EQUAL to 20 MPH**.
- Remain **LESS THAN** [redacted] **for GREATER THAN 24 hours**

OR

ERCOT ISO issues Emergency Preparation Step D (Severe Cold Weather Alert)

NOTE

Severe Weather CONDITION 1 MAY be declared early at Plant Manager discretion.

The Plant Manager is responsible for completion of Checklist 1 (Cold Weather Checklist –Severe Weather Condition 1). This checklist MAY be performed independently of actions being implemented by the Extreme Cold Weather Guidelines.

1.0 SEVERE WEATHER CONDITIONS 2 & 3 actions complete. _____

2.0 SEVERE WEATHER CONDITIONS 2 & 3 monitoring actions are continuing. _____

3.0 Additional necessary actions taken are recorded in the Control Room Logbook. _____

4.0 ENSURE EHS has requested discretionary enforcement from TCEQ related to possible air emission exceedances necessary to protect grid reliability. _____

5.0 ENSURE temporary wind breaks or enclosures are in place if necessary to protect sensitive instrumentation.

5.1 HP, IP, LP Drum level and pressure transmitters _____

5.2 R.A.C. Level & Pressure Instrumentation _____

5.3 CT Fuel Gas Heater/IP Feedwater pressure transmitters _____

5.4 All Aux Boiler Drum Instrumentation _____

5.5 Steam Turbine Pressure & Flow Transmitters _____

5.6 Condenser Level Transmitters & Pressure Transmitters _____

5.7 Condensate Level & Pressure Transmitters _____

5.8 HRSG Feedwater Pump Pressure & Flow Transmitters _____

5.9 Auxiliary Feedwater Pump Pressure & Flow Transmitters _____

5.10 Demin Water Pump Pressure & Flow Transmitters _____

5.11 Raw Water Pump Pressure & Flow Transmitters _____

5.12 Safety shower and eye-wash stations _____

NOTE

At LEAST one Mechanical Maintenance Technician AND at LEAST one I&E Technician SHALL be assigned to dayshift and nightshift.

Contractor personnel MAY be used to supplement staffing levels to meet the around the clock staffing requirements.

The Plant Manager is responsible for completion of Checklist 1 (Cold Weather Checklist –Severe Weather Condition 1). This checklist MAY be performed independently of actions being implemented by the Extreme Cold Weather Guidelines.

6.0 ENSURE Operations and Maintenance staffing levels are increased to provide around the clock coverage. _____

7.0 ENSURE the Operations or Maintenance Manager is assigned to provide backshift managerial coverage if necessary during winter weather event. _____

8.0 ENSURE sufficient food, blankets, cots, drinking water, etc... is available at the plant should roads become impassable due to inclement weather. _____

9.0 ENSURE sufficient bulk chemicals are onsite. _____

10.0 ENSURE sufficient fuel for portable heaters is onsite. _____

11.0 SUSPEND all discretionary maintenance that could affect plant availability. _____

SEVERE WEATHER CONDITION 2:

Outside air temperature **GREATER THAN** [redacted] **AND** wind speed **LESS THAN 10 MPH** but remain **LESS THAN** or **EQUAL to** [redacted]

OR

ERCOT ISO has issued Emergency Preparation Step C (Cold Weather Alert)

NOTE
Severe Weather CONDITION 2 MAY be declared early at Plant Manager discretion.

1.0 SEVERE WEATHER CONDITION 3 actions complete OR in progress. _____

2.0 SEVERE WEATHER CONDITION 3 monitoring actions are continuing. _____

3.0 Additional necessary actions taken are recorded in the Control Room Logbook. _____

4.0 SUSPEND all discretionary maintenance that could affect plant availability. _____

SEVERE WEATHER CONDITION 3:

Outside air temperature:

- **LESS THAN or EQUAL to [redacted] for 24 hours**
- **LESS THAN or EQUAL to [redacted]**

NOTE
Severe Weather CONDITION 1 MAY be declared early at Plant Manager discretion.

1.0	Freeze Protection Panels in operation.	_____
2.0	Susceptible Out-Of-Service equipment drained OR protected.	_____
3.0	Susceptible In-Service equipment is protected.	_____
4.0	Temporary Shelter construction is in progress for areas needing additional protection.	_____
5.0	Temporary Heat Tracing in place, tagged & operating.	_____
6.0	Increased inspection frequency of high freeze potential areas.	_____
7.0	Temporary Logs initiated to monitor room temperatures.	_____
8.0	Personnel assigned to place and refuel portable heaters.	_____
9.0	Outside air temperature continuously displayed in Control Room.	_____
10.0	Additional necessary actions taken are recorded in the Control Room Logbook.	_____
11.0	Corporate Insurance Department notified of additional temporary heaters.	_____

NOTE

The following conditions are identified as potential problems when exposed to freezing weather. This should not be construed as an all-inclusive list.

1.0 Valve bonnets which are **NOT** insulated in a piping system which is insulated.

2.0 Freeze Protection leaves a gap where the pipe either goes underground or enters a building.

3.0 Freeze Protection ends before the Tee or Reducer at a pipe size transition, leaving a portion of the smaller pipe unprotected.

4.0 Freeze Protection ends at an equipment or system interface, leaving interface flanges or skid-mounted piping and instrumentation unprotected.

5.0 Local Instrumentation (gauge glasses, PIs, sensing lines, etc.) are **NOT** freeze protected and space heaters are **NOT** provided in instrument cabinets.

6.0 Freeze Protection is **NOT** continuous at pipe supports.

- 6.1 Demineralized Water
- 6.2 Fire Protection (wet pipe sections)
- 6.3 Service Water
- 6.4 Ammonia Supply

7.0 Look for insulation or heat tracing that has **NOT** been restored after Maintenance activities.

8.0 6" and smaller piping and pumps which contain water and are **NOT** insulated SHALL be evaluated for off-normal operation.

9.0 Freeze Protection is **NOT** provided at tank vacuum breakers, level gauges, instrumentation, etc. Monitor these areas for signs of problems.

10.0 Freeze Protection is **NOT** provided for extended vents and drains (evaluation SHALL be performed on a case-by-case basis to determine if susceptibility/fin-affected cooling is present).

11.0 ENSURE fan cooler condensation is **NOT** leaking onto other cold components and freezing.

12.0 ENSURE condensation in Instrument Air-line drains located in cold weather areas is drained.

13.0 Any water-filled piping, pump, heat exchanger, or other components that are **NOT** insulated and are **NOT** in service, SHALL be evaluated for possible draining. (Storage tanks are the exception.)

Date: **Note: This Logsheet is to be attached to the Daily outside Logsheet.**

Temporary Enclosure Location	Issues	0700-1900	1900-0700

Notes

1. Record SAT/UNSAT to denote operability of Instrument Enclosure Space Heaters.
2. WOs SHALL be written for failed space heaters.
3. Notify CRO of any inoperable Freeze Protection Circuits and implement compensatory freeze protection measures to determined necessary.

Date: _____ **Note: This Logsheet is to be attached to the Daily outside Logsheet.**

Room	Low	Norm	High	Units	0800	1200	1600	2000	0000	0400
P-1 Battery Room	[redacted]		[redacted]	°F						
P-1 BFW Pump House				°F						
CT-1/ST-1 Deluge Valve House				°F						
CT-2 NH3 Deluge Valve House				°F						
P-2 Battery room				°F						
Cooling Tower Deluge Valve House				°F						
CT-3 NH3 Deluge Valve House				°F						
P-2 Switchyard Deluge Valve House				°F						
P-2 R.O. Building				°F						

Date: _____ **Note: This Logsheet is to be attached to the Daily outside Logsheet.**

[redacted]	Circuit Issues	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800

Notes

4. Record SAT/UNSAT to denote operability of Freeze Protection Panels.
5. WOs SHALL be written for failed circuits.
6. Notify CRO of any inoperable Freeze Protection Circuits and implement compensatory freeze protection measures to determined necessary.

Note: This Logsheet is to be attached to the Daily outside Logsheet.

_____

Date: _____

[redacted]	Circuit Issues	1900	2000	2100	2200	2300	0000	0100	0200	0300	0400	0500	0600

Notes

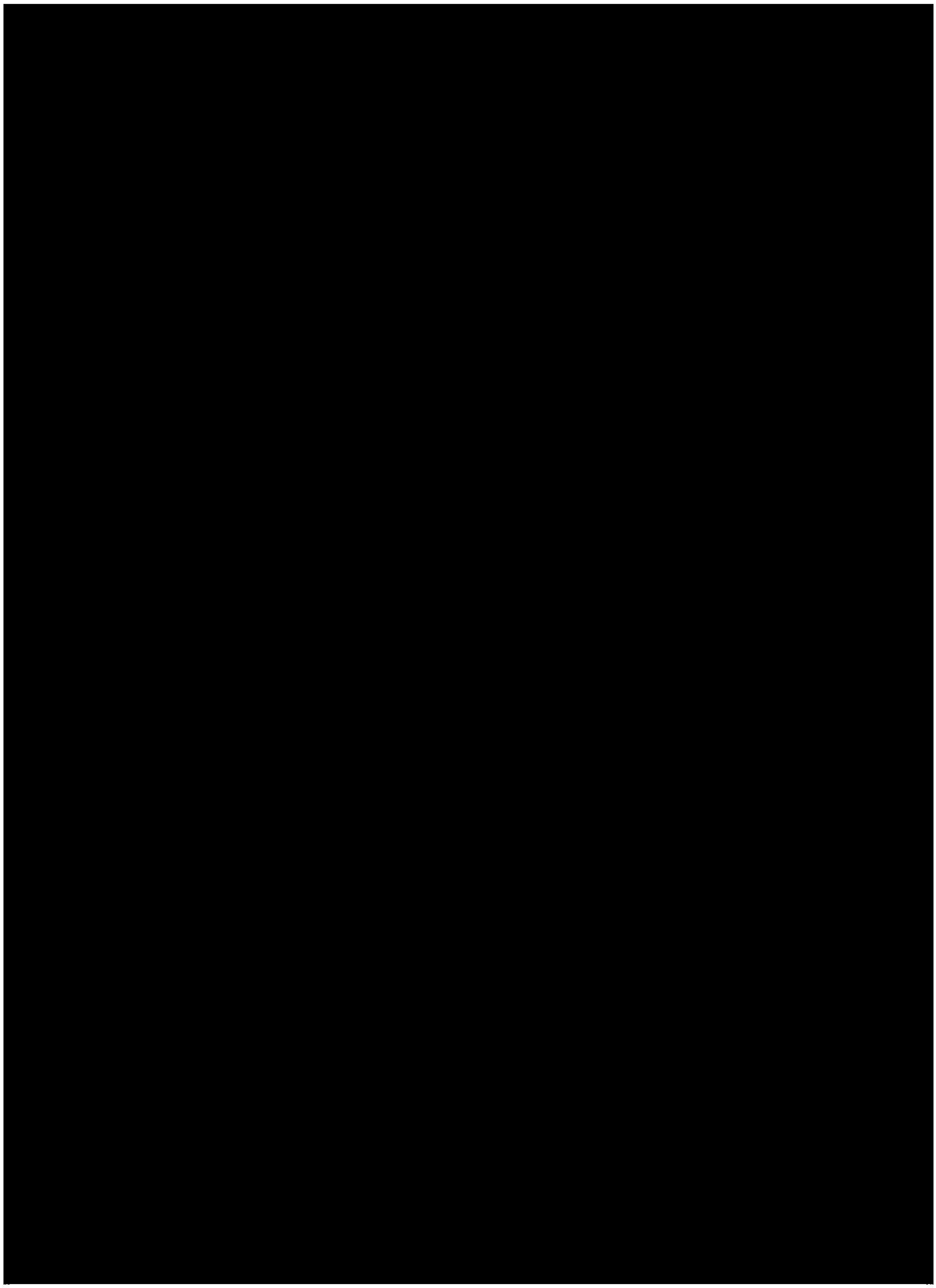
1. Record SAT/UNSAT to denote operability of Freeze Protection Panels.
2. WOs SHALL be written for failed circuits.

Notify CRO of any inoperable Freeze Protection Circuits and implement compensatory freeze protection measures to determined necessary.

This Form, when completed, SHALL be retained for a minimum of 5 years.

Attachment 7: Document Binder Tab

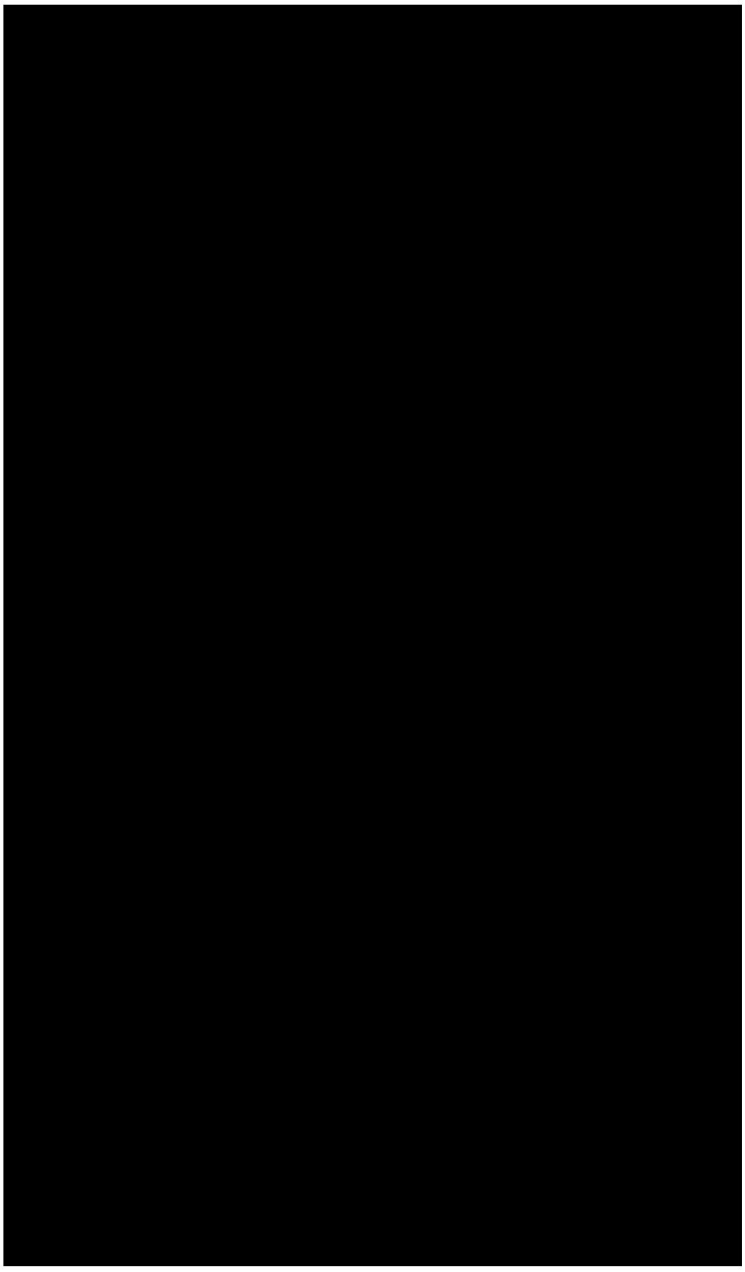
Tab 1	Winter Readiness Preparation and Operation Standard
Tab 2	Pasadena Winter Readiness Plan
Tab 3	Completed Critical Equipment Review
Tab 4	Completed Winter Preparation Checklist
Tab 5	Completed Maximo PMs and CMs
Tab 6	Annual Certification Letter
Tab 7	Monthly Meeting Minutes
Tab 8	Training Roster and Training Material
Tab 9	Miscellaneous Information

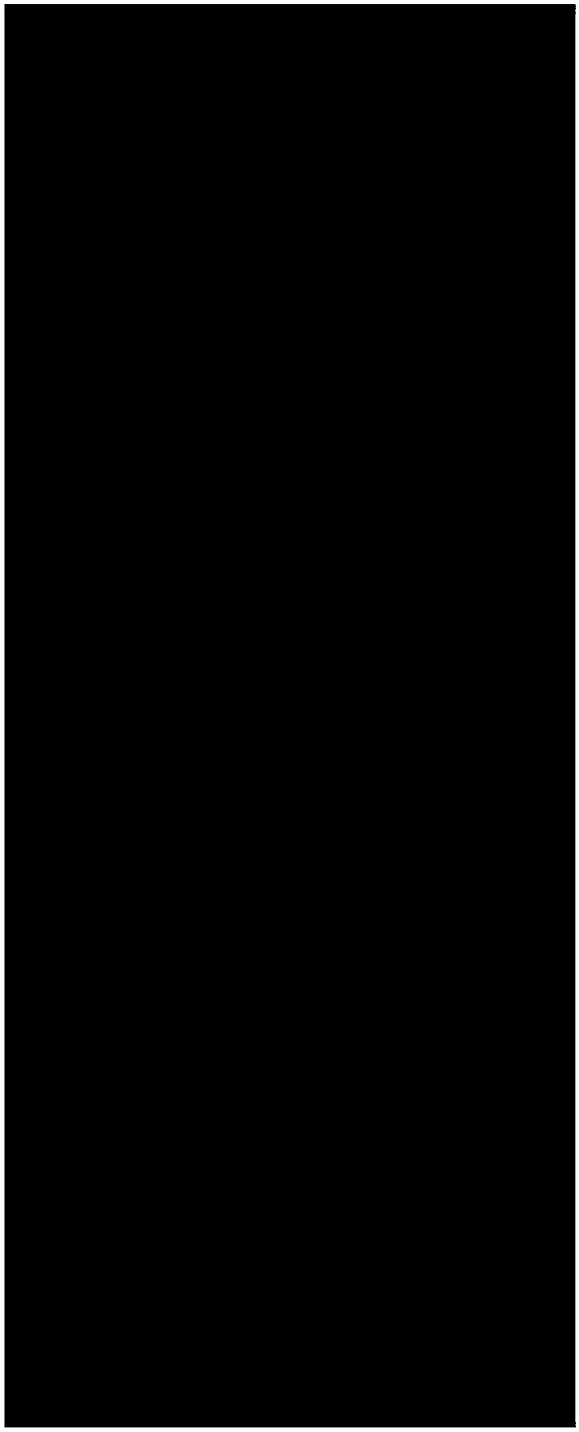


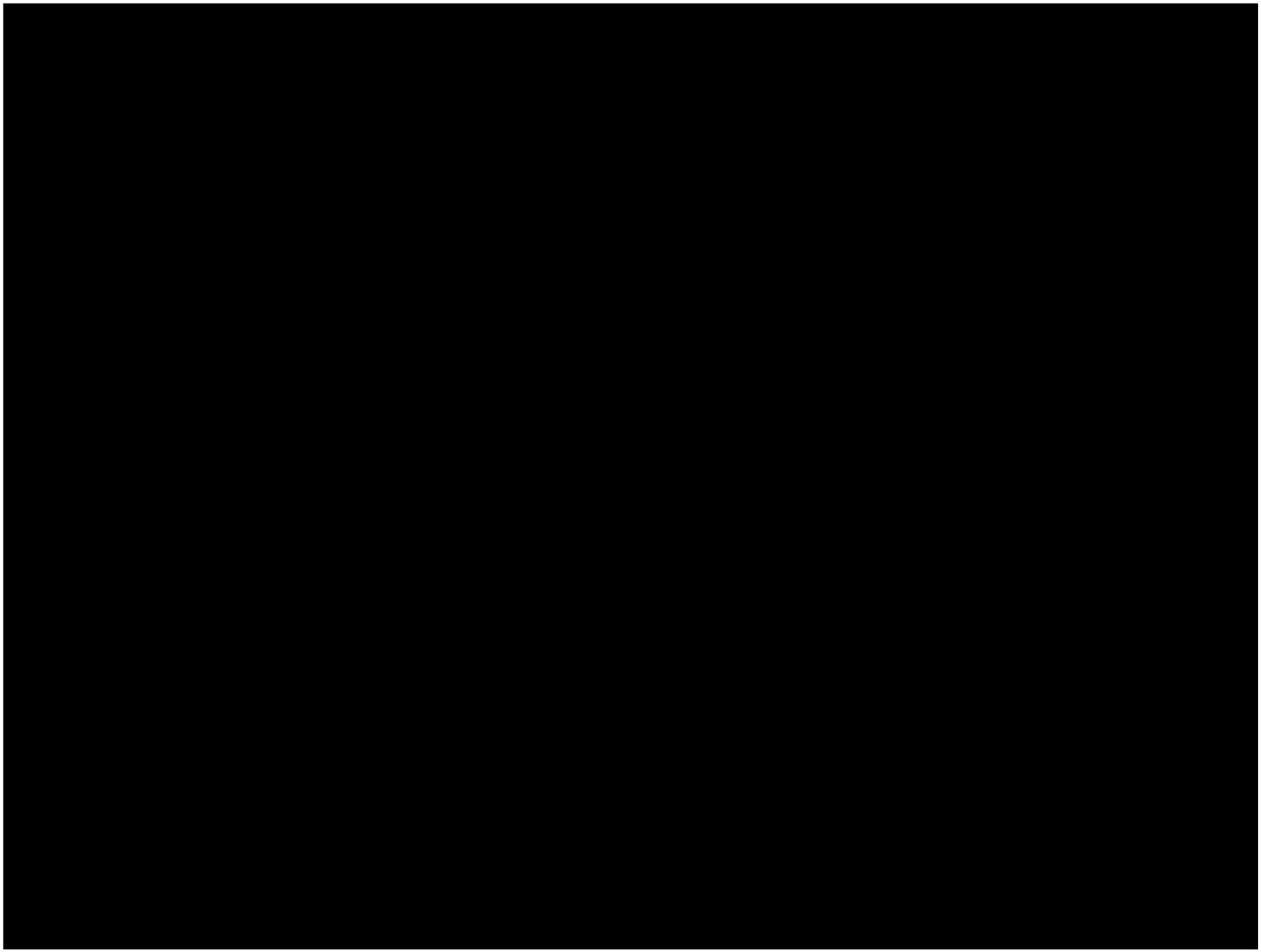
Attachment 9: Critical Equipment List

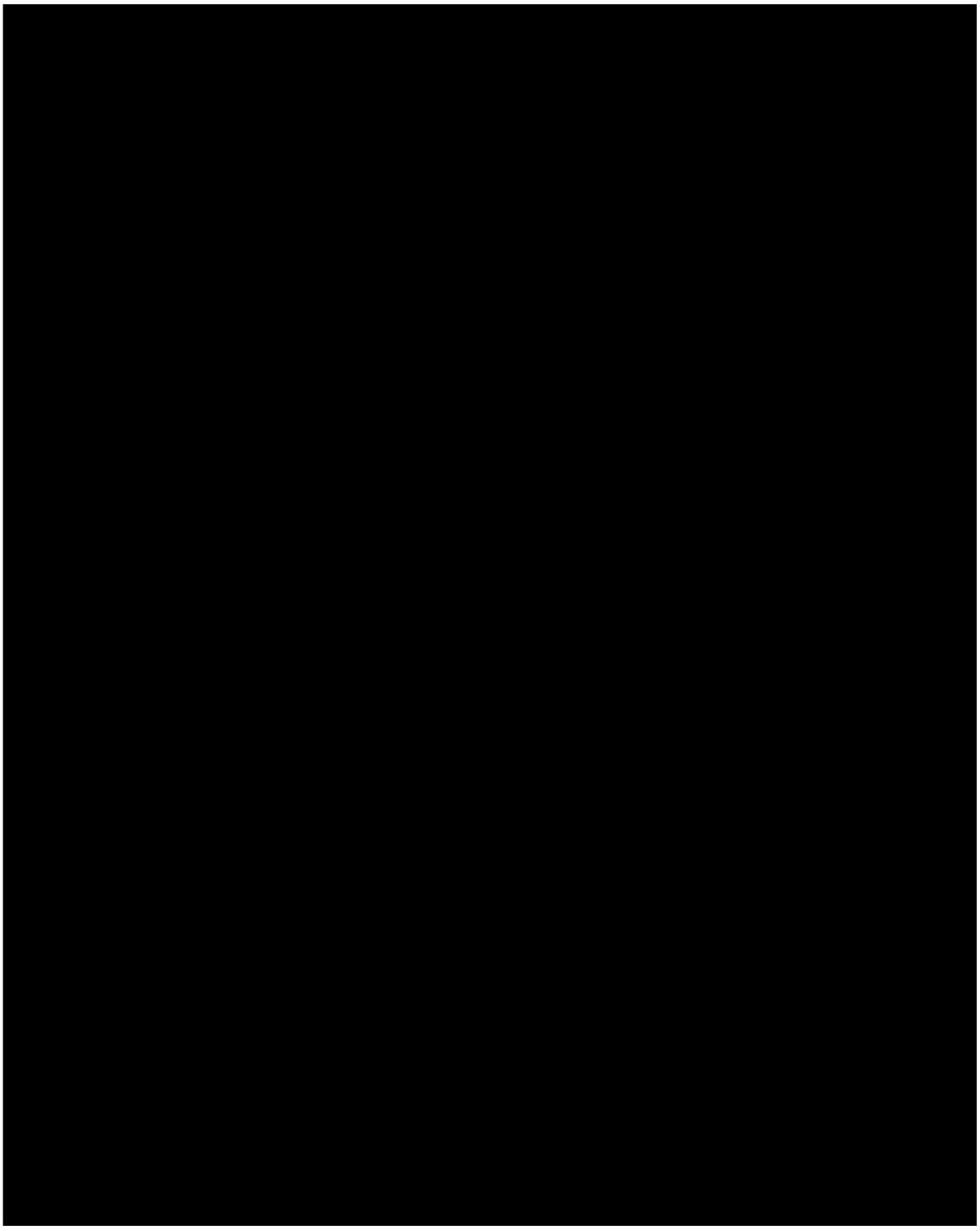
CRITICAL EQUIPMENT LIST

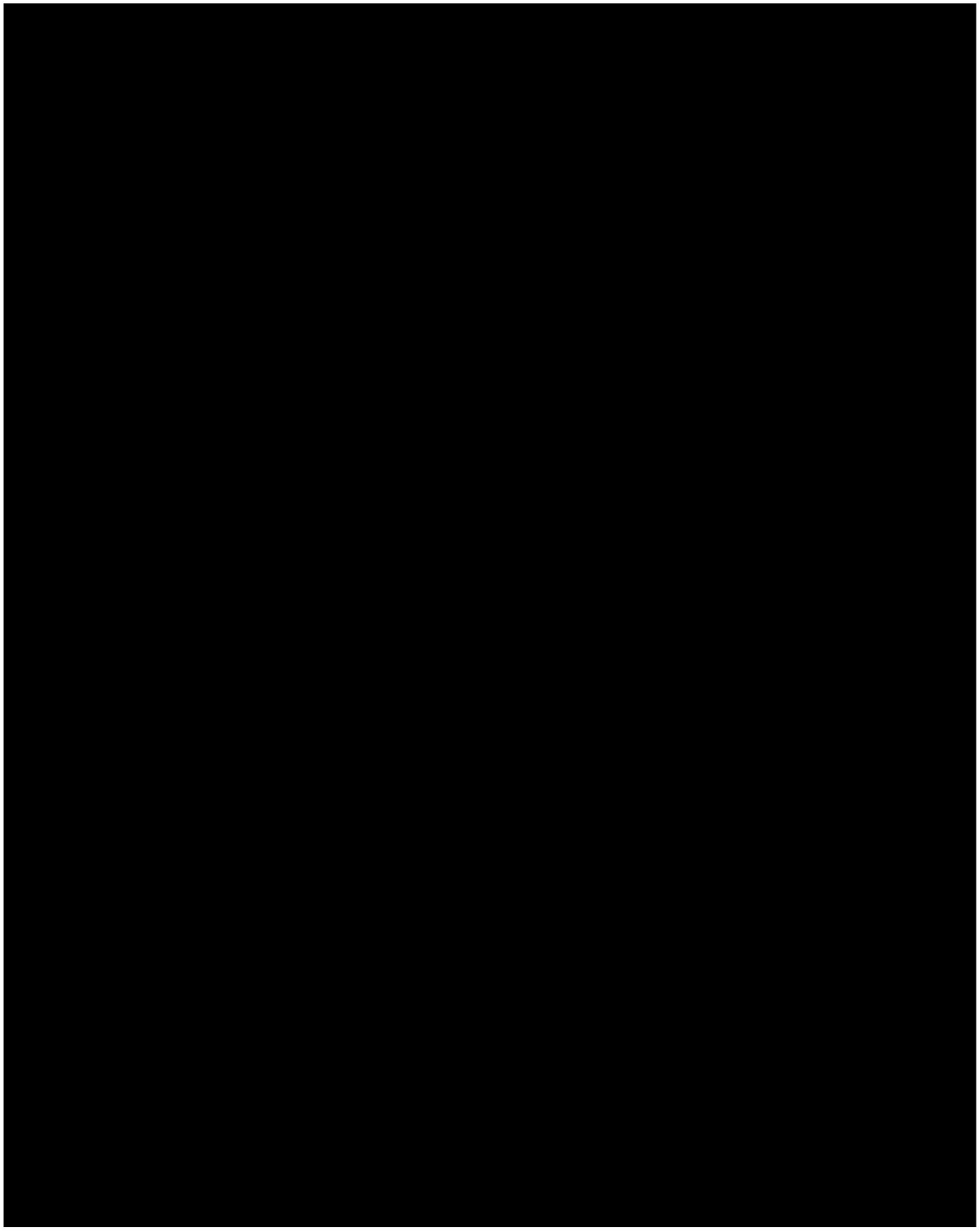
All critical equipment systems are reviewed by plant staff. They are documented in the system review and mitigation form.











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Texas City Procedure Manual

DOCUMENT: PLANT SPECIFIC WINTER READINESS PLAN

NUMBER: TC-SRP-0001 REVISION: 1

DS MA

DocuSigned by: Torreon Martin 644CACDC4BFC420...
PLANT MANAGER

11-17-2021
DATE

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- Attachment 3: Winter Readiness Consumables and Supplies
- Attachment 4: Permanent Building Space Heaters
- Attachment 5: Space Heater Check for Critical Equipment Breakers
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- Attachment 9: Personnel/Operator Training
- Attachment 10: Winter Readiness Actions Timeline

- Attachment 11: Texas City Winter Readiness Certification

1.0 PURPOSE

The purpose of this document is to describe the process to be used for preparing the Plant for reliable operations during the Winter Period by ensuring compliance with the Plant Specific Winter Readiness Plan (the "Plan"). The Plan is to be used in conjunction with the Winter Readiness Standard (the "Standard"), Plant Specific Extreme Cold Weather Procedure (the "Procedure"), the Winter Readiness Actions Timeline, checklists, worksheets, and Maximo PMs.

2.0 SCOPE

For the purpose of this procedure, the Winter Period is from October 31 through March 31. This Plan directs the management of the scope of work activities for staff to complete before cold weather arrives. This Winter Readiness Plan is not the same as the Procedure. The Plan is to provide guidance for *preparing* the plant to endure winter temperatures without unplanned or forced outages or derates. The Plant staff will implement the Procedure only when the ambient temperature is low enough to cause potential problems. The intent of the Plan is to identify reliability issues that are directly related to cold weather, not reliability issues in general.

3.0 DEFINITIONS

Critical Equipment: Plant equipment that, during cold weather events, has the potential to: initiate a unit trip, impact unit startup, initiate an automatic runback, adversely affect environmental controls that may cause an outage or derate, adversely affect the delivery of fuel or water supply to the unit, or create a safety hazard.

Winter Period: The period from October 31 to March 31.

4.0 RESPONSIBILITIES

Plant Manager

The Plant Manager is responsible for:

- Developing and revising (based on lessons learned) the Plant's Plan and the Procedure. The Plan and Procedure must address all recommendations in the Standard that are applicable to the Plant.
- Performing or delegating Winter Readiness Coordinator responsibilities.
- Approving Plant Specific Plans and Procedures and ensuring all identified winter readiness work is completed prior to its required winter completion date per PM #111516.
- Ensure all Plant specific planned winter readiness activities and identified preventive maintenance ("PM") and corrective maintenance are entered into Maximo. All winter

planned and repair work is to be documented in Maximo using the program category "Seasonal" and the task category "Winter".

- Routinely updating the RVP on the Plant's winter readiness status.
- Verifying the Plant's winter readiness and formally certifying that readiness to the RVP prior to winter.
- During cold weather operation, ensuring the Plant Procedure is implemented, and any issues identified are corrected in a timely manner to assure continued reliable winter operation.

Maintenance Manager

The Maintenance Manager is responsible for:

- Implementing the Plant Plan and revising the scope of the Plan as required based on lessons learned per PM #111515.
- Ensuring the Winter Readiness PMs and other activities are in Maximo and implemented in accordance with the timeline included in the Plant's Plan and documented in Maximo (using the category "Seasonal" and the task category "Winter").
- Ensuring initial adequate stock of any consumables and supplies required to be on hand prior to any significant cold weather event (list included in the Plan) and re-ordering such stock of consumables and supplies when appropriate.
- During Winter Period, timely identifying and addressing any equipment deficiencies that could impact reliable operation during cold weather and properly documenting all repairs in Maximo.

Operations Manager

The Operations Manager is responsible for:

- Implementing the Plant Procedure and revising the Procedure as advisable based on lessons learned.
- Reviewing the Plant Operations Procedure before each Winter Period (October) to ensure the operating procedures, checklists, and instructions are current and include any new equipment added to the plant configuration since the previous Winter Period. Include in the review, Calpine fleet lesson learned, NERC lessons learned, and general industrial best practices that may have become known since last Winter Period.
- Reviewing the ongoing winter operation activities implemented during cold weather

This review is scheduled in PM #1116322 and any identified action items are placed in Maximo work orders and identified with program code "Season" and Task Code "Winter" and reviewed during annual training with Plant staff. Any lessons learned may also be documented in the Plant's SharePoint.

3. Review Critical Equipment List. A list of Plant Critical Equipment that may be impacted by cold weather is attached as Attachment 1 to this Plan (Critical Instrument List).

4. Inspection and Testing of Heat Trace Panels and Heat Tracing for Critical Equipment Instruments. The type of heat tracing used at the Plant is the constant wattage Heat tracing is used to protect instruments and other vulnerable equipment from freezing. PM # 101852 is in Maximo for monthly testing from November through March. Any issues found during these PM checks are documented as follow up work orders in Maximo and identified with program code "Season" and Task Code "Winter." Attached to the Plan is Attachment 2 (Heat Trace List), identifying the circuits, testing method, ambient temperature when tested and testing results.

5. Perform Instrument Air System Maintenance. The Instrument Air System is critical to the operation of the Plant. Instrument Air System components are given high priority when malfunctions occur. The Plant's Instrument Air System is designed to maintain a dew point of -40°F dew point temperature. A dew point meter is installed in the discharge of plant air compressors and has indication and alarms tied into the DCS. The instrument air system automatically blows down moisture at the air compressor. Plant Operators will verify automatic valves are working correctly and manually blow down other air system low points of moisture prior to extreme cold conditions.

   An annual review of the Instrument Air system maintenance is performed on PM #111508 prior to winter operation.

6. Review Corrective Maintenance Work Orders. As part of the Winter Period preparation, a review of open Corrective Maintenance Work Orders having program code "Seasonal", and Task Code "Winter" is conducted to determine their potential impact on winter readiness and shall be integrated into the Plant's work week.

7. Perform Plant Insulation Walkdown. Perform a Plant walk down of the Critical Equipment's insulation and lagging and identify areas of insulation that should be considered for repair prior to winter operation. PM #111505 is in place to generate a work order for this review. Any corrective work is documented in Maximo by corrective work orders created during the Winter Readiness walkdown.

8. Winter Readiness Consumables and Supplies. A list of consumables and supplies kept in store for freeze protection is contained in Attachment 3 (Winter Readiness Consumables and Supplies). An inventory check is performed by Operations personnel (PM #111510).

This review is scheduled in PM #1116322 and any identified action items are placed in Maximo work orders and identified with program code "Season" and Task Code "Winter" and reviewed during annual training with Plant staff. Any lessons learned may also be documented in the Plant's SharePoint.

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8. Winter Readiness Consumables and Supplies. A list of consumables and supplies kept in store for freeze protection is contained in Attachment 3 (Winter Readiness Consumables and Supplies). An inventory check is performed by Operations personnel (PM #111510).

9. Test Portable Heaters and Heat Lamps. Portable space heaters used for freeze protection are kept in a designated storage area for winter supplies. An operational test is performed on these portable heaters annually by Operations personnel (PM #111502) of the Plan.

10. Test Permanent Building Space Heaters. An annual operational/functional check of all space heaters permanently installed in Plant buildings is conducted annually to ensure proper operations under PM #111507. PM #111504 is in place to initiate a check of the HVAC Heater. A copy of the list of permanent building space heaters and their location is attached in Attachment 4 (Permanent Building Space Heaters).

11. Check Glycol Concentration. Not applicable. The Plant does not have any fuel oil handling equipment.

12. Space Heaters on Critical Instrument Breakers. To ensure the protection of all critical equipment circuit breakers, PM #111512 is performed annually to inspect and function test space heaters in all critical equipment breakers that are so equipped. A list of breakers and inspection criteria is attached in Attachment 5 (Space Heater Check for Critical Equipment Breakers) of this Plant.

13. Operation Check of Instrument Box Heaters on Critical Equipment. PM #111512 is in place to check box heaters on critical instruments. A list of instrument box heaters on critical instruments is attached in Attachment 6 (Instrument Box Heater Check).

14. Installation and Disassembly of Temporary Wind Breaks / Enclosures. Windbreaks and temporary heaters are installed annually to protect critical equipment from freezing. PM #111506 is performed each year to erect wind breaks/enclosures. The location of the temporary windbreals around the Plant is attached in Attachment 7 (Temporary Windbreaks).

15. Draining Equipment. Attachment 8 (Draining Equipment) lists equipment that requires draining for the winter operation. PM # 111513 is active to initiate the draining procedure.

16. Fuel Oil Handling Equipment. Not applicable. The Plant does not have any fuel oil handling equipment.

17. Icing Prevention Equipment. Not applicable. The Plant does not have any icing prevention equipment.

18. Additional Preparations for Susceptible Plants. Not applicable. The Plant is not located in area susceptible to winter storms.

19. Annual Plan Review. This Plan will be reviewed annually by Plant management. PM#111514 is in place to ensure the annual reviews are performed.

20. Personnel/Operator Training. Winter readiness refresher training is completed annually

as part of the Plant's Procedure prior to the Winter Period. The training will include any applicable Plant modifications, past winter lesson's learned, alternative instrumentation should the Plant's primary instrumentation becomes unreliable.

Personnel and Operator Training is documented as part of the Plan on PM #111511 and attendance by Plant personnel should be documented in writing in Attachment 9 (Personnel/Operator Training) and retained.

21. Winter Readiness Action Timeline. Attachment 10 (Winter Readiness Action Timeline) of this Plan contains a timeline for winter readiness actions and milestones.

6.0 The Procedure

In accordance with the Standard, the Plant implements the Procedure when:

1. Operational Checklist During Freezing Weather. When outside ambient air temperature at the Plant is predicted to decrease or decreases to the ambient temperature set forth in the Procedure the Plant Operations Team implements the Procedure which is stored in the Plant SharePoint, including completing the Freezing Weather Actions and Logsheets.

7.0 Pre-Winter Plant Status Reviews and Readiness Certification

Prior to the onset of the Winter Period each Plant Manager verifies winter readiness and formally communicates site status to the RVP (see example Attachment 11 (Texas City Winter Readiness Certification). RVPs review regional winter readiness status and certify status to the EVP Operations. PM # 111509 is active to initiate the drafting of the certification letter.

8.0 REFERENCES

- CSN-1021 (Winter Readiness Standard)
- CPN-714 (Records management)
- CSN-101 (WORK MANAGEMENT PROGRAM)
- Management OF Design Change Procedure

SUPPORT DOCUMENTS

Attachment 1: Critical Instrument List

Attachment 2: Heat Tracing List

Attachment 3: Winter Readiness Consumables and Supplies

Attachment 4: Permanent Building Space Heaters

Attachment 5: Space Heater Check for Critical Equipment Breakers

Attachment 6: Instrument Box Heater Check

Attachment 7: Temporary Windbreaks

Attachment 8: Draining Equipment

Attachment 9: Personnel/Operator Training

Attachment 10: Winter Readiness Actions Timeline

Attachment 11: Texas City Winter Readiness Certification

Attachment 12: Texas City Extreme Cold Weather Procedure

Attachment 1: Critical Instrument List

Attachment 2: Heat Tracing List

Attachment 3: Winter Readiness and Consumables

Date:	Name:	Signature_____	
ITEM	**MIN QTY**	**ACTUAL QTY**	**NEEDED**
Tarps MISC Sizes	20		
Propone Bottes	4-12 packs		
Propane Heaters	6		
Kerosene	Diesel fuel		
Extension Cords	15		
Duct Tape	20 rolls		
Thermometers (Large, Manging)	2 spares		
IR Temperature Guns	2		
MI Cable	100 ft		
Bags of Sand	2 bags		
Danger Tape	5 rolls		
Caution Tape	5 rolls		
Rope	100 feet		
Bungee Cords	5 bundles		
Zip Ties	2-200 count		
Plastic Sheeting	1 roll 100 x 20		
Spare Insulation	1 large roll		
Electric Heaters	4		
Torpedo Heaters	6		
Halogen Lights	2		
Spare 50w halogen bulbs	20		

Tire Wire Rolls	4		
Drop Lights	5		
Spare 75watt bulbs	12 ct		
Outlet adapter	3		
Cord Grips	10		
Heat Guns	5		
Self-regulating heat cable 50 feet	20		
Self Igniting Torch	6		
Rock Salt	1-50lb bag		
110vac plug	15		
Trash bags	5 rolls		
Gasoline company truck	Full		
Winter leather gloves	12 each size		
Rubber boots	12 pair		

Attachment 5: Space Heater Check for Critical Equipment Breakers

Date:_____Performed by: _____

Note: Create Priority 4 Work Orders for any heaters that do not produce heat.

Switchyard+A1:K36GA1:K36	
Equipment	**Heat Present (Y/N)**
OCB 162	
OCB 166	
OCB 562	
OCB 662	
OCB 266	
OCB 262	
OCB 762	
OCB 366	
OCB 362	
OCB 462	
OCB862	
SS1	
SS2	
TR2	
TR3	

GTA	
Equipment	**Heat Present (Y/N)**
XTII	
Mechanical Pkg	
Battery Room	

GTB	
Equipment	**Heat Present (Y/N)**
XTI2	
Mechanical Pkg	

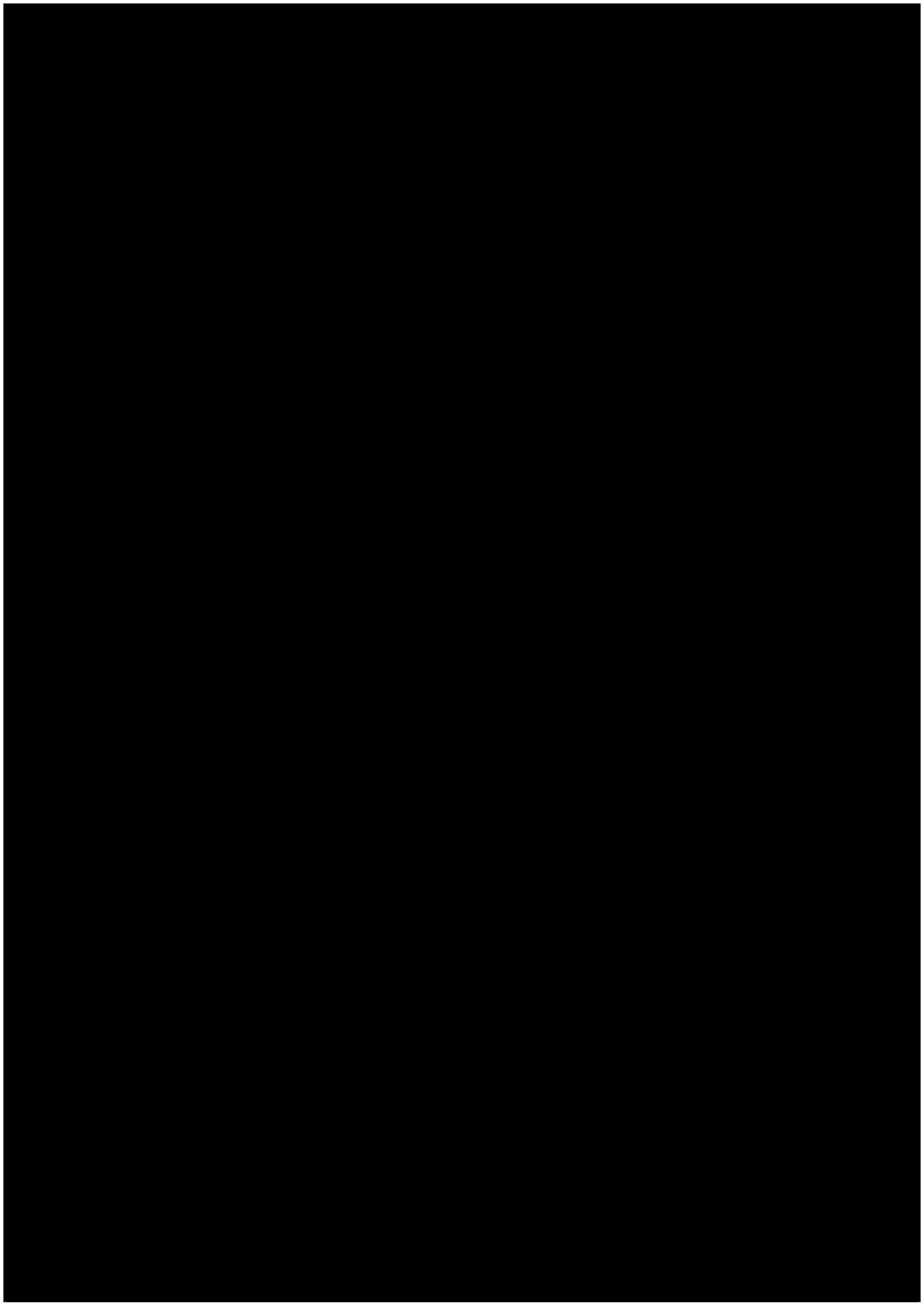
Battery Room	
GTC	
Equipment	**Heat Present (Y/N)**
XTI3	
Mechanical Pkg	
Battery Room	
Hydraulic Skid	

ST2000	
Equipment	**Heat Present (Y/N)**
ZT01	

Misc.	
Equipment	**Heat Present (Y/N)**
R/O Building	
Demin	

4160V Motors	
Equipment	**Heat Present (Y/N)**
CM-1000A	
P-3400A	
P-3110A	
P-3410B	
CT-5100A BKR ONLY	
CT-5100B BKR ONLY	
CM-1000B	
P-3110B	
P-3130B	
P-3410A	
Ct-5100C BKR ONLY	
P-3120A	
P-3130A	
P-3400C	

P-3120B	
P-3120B	
CM-1000C	
P-3400B	
P-3500A	
CT-5100D BKR ONLY	



Attachment 7: Temporary Windbreaks

Location	Description	Temp	Perm	Comments
DCS	Critical Transmitter display			Done
BOP	Insulation - RO building walls/ceiling insulation		X	LIMA
BOP	Windbreak - RO Building South Wall		X	LIMA
BOP	Windbreak - CT Polymer tank	X		Need new tank, heated blanket and feed tubing w/heat trace
GTC	Windbreak - 7030 Deck			No longer in service
GTB	Windbreak - Aux Compressor			Not needed at this time
GTA	Windbreak - BD Sump			Not needed, remedied through operational procedures
GTB	Windbreak - BD Sump			Not needed, remedied through operational procedures
ABX	Windbreak - BFWP (x3)		X	PIC
ABX	Windbreak - DA (x3)		X	PIC
ABX	Windbreak - Closed Cooling		X	PIC
BOP	Windbreak - IA Compressor		X	PIC
BOP	Windbreak - I/A Dryers		X	PIC
BOP	Windbreak - Attemporator Pumps		X	PIC
BOP	Windbreak - Lamella / Clearwell		X	PIC

BOP	Windbreak - Filtrate pumps and tanks		X	PIC
GTB	Windbreak - HP/IP/DA Drum		X	PIC
GTB	Windbreak - Mez Deck		X	PIC
GTB	Windbreak - 7030 Deck		X	PIC
BOP	Heaters - Demin acid/caustic skid steam heaters		X	Replace existing
BOP	Insulation - Drum Pressure Sensing Line		X	Thermon
BOP	Insulation - DA Recirc Trans Cover		X	Thermon
BOP	Insulation - Cond Vacuum Sensing line		X	Thermon
BOP	Insulation - Condensor PT Sensing line		X	Thermon
BOP	Insulation - CWP Packing Quench (x3)		X	Thermon
GTA	Insulation - FW FM Tap Blanket		X	Thermon
GTA	Insulation - FW FM Trans Blanket		X	Thermon
BOP	Windbreak - NAOH Batch Tank	X		TPIS
BOP	Windbreak - HRSG Chemical Feed	X		TPIS
GTA	Windbreak - HP/IP/DA Drum	X		TPIS

GTA	Windbreak - Mez Deck	X		TPIS
GTC	Windbreak - HP/IP/DA Drum	X		TPIS
GTC	Windbreak - Mez Deck	X		TPIS
GTC	Windbreak - BD Sump	X		TPIS
GTA	Windbreak - Duct Burners	X	X	TPIS roll-up windbreaks, Steamtrace/heater permenant (Thermon?)
GTB	Windbreak - Duct Burners	X	X	TPIS roll-up windbreaks, Steamtrace/heater permenant (Thermon?)
GTC	Windbreak - Duct Burners	X	X	TPIS roll-up windbreaks, Steamtrace/heater permenant (Thermon?)
BOP	Windbreak - Comp Bleed Air Hex			
BOP	Insulation - QWS Level			

Attachment 8: Draining Equipment

The combustion turbine evaporative coolers, fogging systems and water wash systems are drained or winterized..

Attachment 9: Personnel/Operator Training

Training Rosters and Training Materialsshould be retained by Plant for 5 years.

Employee Name	Date Training Complete	Employee Signature	Comments

Attachment 10: Winter Readiness Action Timeline

Key Milestone	Recommended Completion	Comments
Initial Annual Pre-Winter Readiness Meeting	May–July	Meeting to review: Plant Winter Readiness Plan, Open Corrective "Winter" Work Orders and PMs
Final Workscope and Actions Required	August–September	Finalized workscope approved by Plant Manager to implement prior to winter
Operations Procedures Reviewed and Updated as Required	October	Site specific Winter Operations Procedures reviewed and updated based on lessons learned and new equipment added
Winter Readiness Training	November	Complete training for plant personnel involved with Winter Preparedness and Winter Operations
Winter Readiness Certification by the Plant Manager	November	Provided to RVP. Reference Attachment 17
Winter Readiness Activities Completed	December 1	This date may vary for specific plants based on location
Post – Winter Meeting	March–April	Review specific plant lessons learned from the past winter.

Attachment 11: Texas City Winter Readiness Certification

To: (Regional VP, Operations Name)

From: (Plant/General Manager Name)

Subject: Winter Readiness Certification

(Plant Name) has reviewed the requirements of the Plant Specific Plans and Procedures related to Winter Readiness preparation and Winter Operation, and by copy of this letter is ready to certify (Plant Name) winter readiness. [Plant] has completed review of plant winter readiness and implemented preventive and corrective actions required to provide reasonable assurance of operation during foreseeable winter conditions at the site. In-progress items relating to winter operation are summarized below.

A. The basis for our certification is as follows:

1. Significant outcomes of system reviews
2. Status of preventive maintenance affecting Winter Readiness
3. Status of corrective maintenance affecting Winter Readiness
6. Status of modifications/projects affecting Winter Readiness
7. Status of Operations Winter Readiness Procedures/Checklists
8. Status of Winter Readiness supplies
9. Other

B. Winter readiness items not completed

1. Reason
2. Open Actions Items
3. Owner & Due Date

Texas City Cogeneration	Texas City Extreme Cold Weather Procedure			
	Document No.:	ECWP-01	Version No.:	R4
	Authority:	TCC	Revision Date:	11/03/20
	Content Owner:	M Rodriguez	Initial Issuance:	10/20/20
	Approval:	MJH	Review Frequency:	Annual
	Approval Date:	11/03/20	Effective Date:	10/20/20

1.0 PURPOSE

The purpose of this procedure is to provide guidance to the plant personnel in preparation for extreme cold weather events. The Extreme Cold Weather Procedure has been developed to ensure the protection of plant employees and assets.

2.0 SCOPE

It is the intention of plant management to maintain the reliable operations of the plant throughout extreme weather events. This procedure is intended to provide information and outlines steps to protect personnel and equipment against the possible extreme cold weather conditions.

Six phases of readiness have been developed in conjunction with the extreme cold weather threats and their definitions are listed in the DEFINITIONS section below.

WARNINGS

This Procedure is in the early developmental stages. If you any questions regarding this procedure please contact your supervisor. The final revision is expected in the Fall of 2021

3.0 PREREQUISITES

- Check sheets to be used with this procedure can be found on the public drive in the Seasonal Readiness folder

4.0 DEFINITIONS

Extreme Cold Weather Season October 31st to March 31st of the following year

Extreme Cold Weather Event Levels

PHASE I - The beginning of the Winter Readiness activities: September 1st

PHASE II - The beginning of the Cold Weather season: November 1st

PHASE III - Freezing weather is forecast in within the next 7-days

PHASE IV - Freezing weather is forecast within the next 24 hour period

PHASE V - Freezing weather is forecast to last longer than 48 hour period

5.0 REFRENCES

- Texas City Winter Readiness Plan
- NERC Reliability Guideline Generating Unit Winter Weather Readiness
- ERCOT 2018 Freeze Lesson Learned
- Texas RE and ERCOT Generator Weatherization Workshop – 2018
- Winter Weather Readiness for Texas Generators
- NOAA 2020-21 Winter Forecast
- Calpine Emergency Communications Procedures
- Calpine Inclement Weather and Natural Disaster Policy
- Texas City Integrated Contingency Plan

6.0 PROCEDURE

The Texas City Winter Readiness Plan (TC-SRP-0001) details the steps to be take in preparation for winter weather. The seasonal readiness tasks identified in the plan have been integrated into the Maximo PM module. The winter readiness tasks are outlined below:

PM# 111516 - Winter Readiness - Initial Pre-Winter Readiness Review
PM# 111515 - Winter Readiness - Seasonal Work Scope Development
PM# 111514 - Winter Readiness - Winter Operation Procedures Review
PM# 111511 - Winter Readiness - Training Operations / Maintenance
PM# 111509 - Winter Readiness - Certification Letter - Due November 20
PM# 111510 - Winter Readiness - Inventory Supplies and Consumables
PM# 101852 - Winter Readiness - Heat Trace System Survey / Checkout
PM# 111502 - Winter Readiness - Portable Heater - Operational Check
PM# 111504 - Winter Readiness - HVAC Heater Preventative Maintenance
PM# 111505 - Winter Readiness - Insulation Survey / Checkout
PM# 111506 - Winter Readiness - Install Wind Breaks at Selected Locations
PM# 111507 - Winter Readiness - Deluge House Electric Heater – Check
PM# 111508 - Winter Readiness - Air Dryer Performance - Dew Point Testing
PM# 111512 - Winter Readiness - Check Space Heaters on Critical Equipment Breakers
PM# 111513 - Winter Readiness - Drain Equipment - Evap Coolers

Texas City Winter Readiness Plan Timeline

- March 15 - Current Year Winter Readiness Critique Meeting - Management Team
- April 15 - System Material Condition Assessment - Maintenance Manager
- June 1 - Review - Winter Readiness Work Management - Operations Manager
- October 15 - Review scheduled TNMP winter outages - Maintenance Manager
- October 15 - Complete All Winter Readiness Work Scope - Maintenance Manager
- November 6 - Complete Certification letter - Plant manager

6.1 Phase I

- ✓ Phase I activities are defined in the Texas City Winter Readiness Plan.

6.2 Phase II The beginning of the Cold Weather season: November 1st

- ✓ All Phase I activities should be complete or scheduled
- ✓ The Operations team closely monitoring local weather forecasts and national weather broadcasts for early signs of freezing weather.
- ✓ The Plant Management team will insure all freeze risks have been mitigated.
- ✓ The Plant Management team will identify outside resources that may be needed to implement the Phase IV and V activities. The list will be maintained throughout the Cold Weather season.
- ✓ The Plant Management team will maintain and update the telephone and emergency telephone numbers of employees and vendors.
- ✓ The Cold Weather Response Crew list for the Cold Weather season will be posted in the control room.

6.3 Phase III - Freezing weather is forecast in within the next 7 days

- ✓ The Plant management team will notify outside resources (vendors/contractors) that they may be needed to at the plant within the next 7 days.
- ✓ The Plant management team will verify the availability of the Cold Weather Response Crew.
- ✓ The Plant management team will walk the plant and verify all windbreaks and heater are in-place and operational
- ✓ The Maintenance team will verify all heat trace circuits are operational.
- ✓ The Operations team will verify all chemical, diesel, and propane tanks are full.
- ✓ Plant management team will maintain communications with steam host, Calpine Corporate Offices, and other outside entities to keep them posted if any changes in readiness or operations becomes necessary.

6.4 PHASE IV - Freezing weather is forecast within the next 24 hour period.

- ✓ The Plant management team will evaluate forecast prediction and estimate the event arrival.
- ✓ If deemed necessary Plant management team will mobilize the Cold Weather Response Crew
- ✓ If deemed necessary Plant management team will mobilize additional resources (labor, contactor, vendors, etc.) as necessary to supplement the Cold Weather Response Crew
- ✓ The Operations team will verify all heat trace circuits are on and functional when the temperature drops below 40 deg F
- ✓ The Operations team will start all portable heaters when the temperature drops below 40 deg F.
- ✓ The CRO will begin the Cold Weather Control Room Checklist control room log
- ✓ The Outside Operator and Demin Operator will begin the Cold Weather Heat Trace and Outside Operator rounds and checklists.
- ✓ The Cold Weather Response Crew will monitor critical heat trace circuits and implement any necessary mitigation measures (traps, lamps, heaters, temporary HT) necessary to insure continued reliable plant operation.

6.5 PHASE V - Freezing weather is forecast to last longer than 48 hour period

- ✓ Plant management team will mobilize the Cold Weather Response Crew. Notify the crew is sequestration is a possibility.
- ✓ Plant management team will mobilize additional resources (labor, contactor, vendors, etc.) as necessary to supplement the Cold Weather Response Crew.
- ✓ The Operations manager will verify EHS has requested discretionary enforcement from TCEQ related to possible air emission exceedances necessary to protect grid reliability.
- ✓ The Outside Operator will begin the Cold Weather Heat Trace and Outside Operator check sheets. Rounds will be taken every four hours until the Operations Manager or CRO declares Cold Weather event is over.

7.5 PHASE V - Continued

- ✓ The Demin Operator will begin the Cold Weather Heat Race and Outside Operator checklists Rounds will be taken every four hours until the Operations Manager or CRO declares Cold Weather event is over.
- ✓ The Operations team will verify all heat trace circuits are on and functional when the temperature drops below 40 deg F. The Operations team will monitor the heat trace circuits through the event.
- ✓ The Operations team will start all portable heaters when the temperature drops below 40 deg F. The Operations team will refuel the portable heaters as necessary.
- ✓ The Operations team will check out-buildings (Lab, MCCs, electrical packages, mechanical packages, Battery rooms, CEMS building, Deluge House) room temperature and verify temperature are [redacted]
- ✓ The CRO will begin the control room Extreme Cold Weather Check Sheet
- ✓ The Operations team will begin the outside Extreme Cold Weather Check Sheets every two hours.
- ✓ The Cold Weather Response Crew will monitor critical heat trace circuits and implement any necessary mitigation measures (traps, lamps, heaters, temporary HT) necessary to insure continued reliable plant operation.
- ✓ Cold Weather Response Crew will begin anti-icing activities (salt and sand) as necessary in critical areas (duct burners, entrances to the MCC's, electrical packages, and demin).
- ✓ Plant management team will maintain communications with steam host, Calpine Corporate Offices, and other outside entities to keep them posted if any changes in readiness or operations becomes necessary.

7.0 VERSION HISTORY

Version Number	Content Owner	Approver	Summary of Change(s) and Reason(s) Why
1	MJH	MJH	Phase Development
2	MJH	MJH	Check Sheet Development
4	MR	MJH	Final Review and Edits

8.0 LOCATION OF CONTROLLED COPIES

Type	Location
Procedure	Secure Front Office Folder
Check Sheets	Secure Front Office Folder

9.0 PROCEDURE REVIEW ACKNOWLEDGEMENT

Employee #	Print Name	Signature	Date

Attachment 1 – Example Phase III Pre-Winter Event Operations Checklist

CALPINE Texas City Cogen

Phase III Pre-Winter Event Operations Checklist

Begin this checklist when a freeze event is forecast in the next 7-days. Update and Publish as-needed.

CRO Information

Name: _____ Date: _____ Shift: _____

Forecast Conditions

Forecast Low Temp: _____ Expected Wind chill: _____ Wind Speed: _____
Event Date: _____ Expected Duration: _____ Wind Direction: _____

Extreme Cold Weather Staffing

Operations Day Shift _____ Operation Night Shift: _____
_____ _____
_____ _____
_____ _____
Cold Weather Crew: _____ Cold Weather Crew: _____
Day shift _____ Night shift _____
(On-Call / On-Site) (On-Call / On-Site)

Extreme Cold Weather Contract Support

Scaffold / Insulation: _____ Equipment/Heater Fueling: _____
Windbreaks / Heaters: _____ Instrumentation Support: _____
Emergency PO's Issued: _____

Critical Equipment Status

Critical Equipment Out of Service: _____
_____
Critical Equipment Impaired: _____
_____
Winter Readiness Impairments: _____

Pre-Event Checklist

☐ Test Heat Trace Circuits	☐ Check Windbreaks	☐ Test Heaters
☐ Mark Freezing Water Hazards	☐ Check WR Supplies	☐ Drain Outfalls
☐ Write WR Work Orders	☐ Print WR Checklists	☐
☐ Drain Service Water	☐ Protect OFS Equipment	☐

Attachment 2 - Operations Control Room Extreme Weather Check Sheet

CALPINE Texas City Cogen

Operations Control Room Extreme Weather Check Sheet

Phase IV Event - Check Lists Completed Every 6 Hours (twice per shift)
Phase V Event - Check Lists Completed Every 4 Hours (three per shift)

Event Data

Start Date: _____ CRO: _____ Crew: _____

	Time	Time	Time	Time	Time	Time	Time
Temperature							
Wind Speed							
Direction							

DCS Screen Review - Data Integrity

HRSG (Drum Level/Press)				Alarm Screen			
Package/DPU Temperatures				DH DPU Screen			
STG (Cond Level/Press)				Letdown Screen			
BOP (Cooling/IA)							

Identify Points Forced, Off-Scan, In Alarm, Deviation

DCS Cold Weather Trend Review - Data Integrity

DOW Steam							
DA/HP Drum levels							
Level Switches							
Instrument Air							
Cooling Systems							

Identify Potential Freezing Issues (spikes high or low, flat lines, flakey or erratic data)

Critical Transmitter Interrogation - Data Integrity

HP Drum Level (LT)							
HP Drum Pressure (PSH)							
Condenser Pressure (PSH)							
IA Dew Point							

Operator Check Sheet Review

Outside Operator							
Demin Operator							
ICE Tech							

Continued on Page 2

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Operations Control Room Extreme Weather Check Sheet

Mitigation Measures

	Yes	No
Take Units Out of AGC / Use Manual Load Control		
Full Speed-No Load Units In Reserve Shutdown to Keep HRSG Warm		
Bottle up Reserve Shutdown HRSG's to Hold in Heat		
Switch to Single Element Drum Level Control		
Request Regular Updates on Local Drum Level Indications		
Check DCS Drum Level Transmitters Selected for Control		
By-Pass Steam To Condenser to Keep Circulating Water Temp Warm		
Run CT Fans at Low Speed		
Shutdown Cooling Tower Fans to Keep Circ Water Temp above 40 deg F		
Alternate cooling tower fans to prevent ice buildup (Every 30 Minutes)		
Check Fan Blades for Icing Prior to Start		
Setup Electric Heaters at Duct Burner Skids		
Shutdown Reserve SD Unit Turbine Enclosure Mech Package Fans		
Manually Open Pump Min Flow Valves to Prevent Freezing		
Monitor Turbine Inlet Icing Conditions - Open Doors If Necessary		
Extreme Measure - Force Trip Logic - Log All Forces		

Issues Log / Maximo Work Orders / Temporary Freeze Protection Measure Taken

List Issues, Maximo Work Orders, and Temporary Freeze Protection Measure Take on Your Shift

Continued on Page 3

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Operations Control Room Extreme Weather Check Sheet

Building Temperature

Room	Target						
GTA Elect. Package							
GTA Batteries							
GTB Elect. Package							
GTB Batteries							
GTC Elect. Package							
GTC Batteries							
Main MCC							
Relay House Battery Room							
Switchyard Building							
Demin Lab							
Demin MCC							
RO Building							
Deluge Building							
CEMS Shelter							

Report any building heater issues to the Maintenance Manager. Complete a Maximo Work Order
If room temperatures approach 60 °F place a potable electric heater in the affected building (1500 watts max)

Attachment 3 – Example ICE Tech Phase V Extreme Weather Check Sheet

CALPINE Texas City Cogen

ICE Tech Extreme Weather Check Sheet

Phase IV Event - Check Lists Completed once per shift, Phase V Event - twice per shift

Event Data

Start Date: _____ Tech: _____ Shift: _____

Ambient temp: _____ Expected Duration: _____ Event Level: _____

Switchyard Indication Checklist

Inspect GSU's, Breaker's, and Switches. Report any issues immediately.

GTA		GTB		GTC		STG	
GSU		GSU		GSU		GSU	
L139		L129		L119		G019	
Y820		Y850		Y880		Y910	
Y810		Y840		Y870		Y900	
Y800		Y830		Y860		Y890	
Y821		Y851		Y881		Y911	
Y822		Y852		Y882		Y912	
Y811		Y842		Y872		Y902	
Y802		Y832		Y871		Y901	
Y801		Y831		Y862		Y892	

Heat Trace Panel Breaker and Circuit Status

Inspect Heat Trace Panel breakers and record circuit amps. Report any issues immediately

Location: HRSG A - Panel: HTSP3EA

Circuit	Instrument	Previous	Current
1	FT1800; FT1850A		
2	CHEMICAL INJ MAN		
3	LT1858A; PT1853A		
4	CHEMICAL INJ MAN		
5	PT1803A; PT1828A		
6	LT1865A		
7	LT1802A; LT1834A		
8	LT1827A; LT1812A;		
9	UNKNOWN		
10	FT1825A		

Location: HRSG B - Panel: HTSP3EB

Circuit	Instrument	Previous	Current
1	LT1865B		
2	AMINE SCAV INJ		
3	LT1812B; LT1827B		
4	LT1802B; LT1834B		
5	LT1858B; PT1853B		
6	PT1828B; PT1803B		
7	FT1800B; FT1851B		
8	CHEMICAL INJ MAN		
9	CHEMICAL INJ MAN		
10	FT1825B		

Location: HRSG C - Panel: HTSP3EC

Circuit	Instrument	Previous	Current
1	AMINE SCAV INJ		
2	PT1828C; PT1803C		
3	FT1865C		
4	LT1812C; LT1827C		
5	FT1851C; FT1850C;		
6	CHEMICAL INJ MAN		
7	LT1852C; PT1853C;		
8	CHEMICAL INJ MAN		
9	LT1802C;LT1834C		
10	FT1825C		
11	LT1825C;PT1853C;		

Location: Demin - Panel: HTP3F

Circuit	Instrument	Previous	Current
1	POWER. TSHTP3N;		
2	TK6850 (CP6850)		
3	3" SC9570, -9572; 1		
4	TK6850 (CP6850)		
5	3" SC9570, -9572; 1		
6	TK6850 (CP6850)		
8	1" CI9467, -9480		
10	1" CI9467, -9480		
12	TK6690		

Continued on Page 2

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ICE Tech Extreme Weather Check Sheet

Phase IV Event - Check Lists Completed once per shift

Phase V Event - Check Lists Completed twice per shift

Heat Trace Panel Breaker and Circuit Status

Inspect Heat Trace Panel breakers and record circuit amps. Report any issues immediately

Location: Main MCC - Panel: HTP3E

Circuit	Instrument	Previous	Current
1	PT2010; FT3300;		
2	PT8300; 1" CI9459; -		
3	FT1801A;		
4	HRBB HTSP-3EB		
5	HRBA HTSP-3EA		
6	HRBB HTSP-3EB		
7	HRBA HTSP-3EA		
8	SPARE		
9	HRBC HTSP-3EC		
13	2" CL8093; 2" OW-		
11	HRBC HTSP-3EC		
12	2" CL8094; 1"		
18	FT3360; 1/2"		
23	PT3410; 3/4"		
25	2" OW9100 (abv		
28	Surge arrestor		
29	PSH8121; PTB128;		
30	Surge arrestor		
31	PTB101; PSH8231;		
32	Surge arrestor		
33	PI8271; PSL8272;		
40	3/4" CW3400A, -B, -		

Location: HRSG C - Panel: HTSP3EC

Circuit	Instrument	Previous	Current
1	AMINE SCAV INJ		
2	PT1828C; PT1803C		
3	FT1865C		
4	LT1812C; LT1827C		
5	FT1851C; FT1850C;		
6	CHEMICAL		
7	LT1852C; PT1853C;		
8	CHEMICAL INJ MAN		
9	LT1802C;LT1834C		
10	FT1825C		
11	LT1825C;PT1853C;		

Notes:

Air Compressor and Dryer Operation

Monitor Air Compressor and Dryer Operation

3900A (Lead/Lag): _____ 3900A (Lead/Lag): _____ Bleed Air (SP/%): _____

North Dryer Operation: _____ South Dryer Operation: _____

North Dryer Dew Point: _____ South Dryer Dew Point: _____

Critical Transmitter and Alarm Check

Monitor Transmitter Data and DCS Alarms to identifty Freeze Issues

Notify CRO and Implement Temporary Freeze Protection Measures

Attachment 4 – Example Outside Operator Phase V Extreme Weather Check Sheet

CALPINE Texas City Cogen

Outside Operator Extreme Weather Check Sheet

Phase IV Event - Check Lists Completed Every 6 Hours (twice per shift)
Phase V Event - Check Lists Completed Every 4 Hours (three per shift)

Extreme Cold Weather Event Data

Date and Time: _____ Temperature / Wind Speed: _____
Operator: _____ Shift: _____

Outside Rounds Check Sheet			
Time			
Insure All Tanks are Topped off - 30/30/30 Minimum			
Initiate a Small Flow on Safety Showers			
Check HRSG Windbreaks			
Monitor Heat Trace - Complete Checklist			
Check Heat Trace Cables with IR Gun			
O'Brian Box Temperatures - Complete Check Sheet			
Blowdown HRSG Instrument Air Header Drains			
Blowdown Aux Compressor Air Reviever			
Check Reserve SD Unit Turbine Enclosure Temps			
Check GT Inlets for Icing			
Check the Duct Burner Skid for Icing			
Check the Mezzanine Deck of Icing			
Check Mezzanine Deck level Controls for Icing			
Check Stairways and Walkways for Icing			
Traffic Cones or Danger Tape Round Slip Hazards			
Salt and Sand Slip Hazards			
Check CEMS Building Temperatures			
Check Electrical Package Temperatures			
Check Electrical Package Dehumidifiers			
Reverve SD GTs - Purge Sensing Lines Inside Enclosure			
Check Transformer Oil levels			

Report any issues to the CRO and Maintenance Manager. Complete a Maximo Work Order
Mitigate any issues that could result in freeze ups

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Demin Operator Extreme Weather Check Sheet

Phase IV Event - Check Lists Completed Every 6 Hours (twice per shift)
Phase V Event - Check Lists Completed Every 4 Hours (three per shift)

Extreme Cold Weather Event Data

Date and Time: _____ Temperature / Wind Speed: _____
Operator: _____ Shift: _____

Demin Rounds Check Sheet			
Time			
Initiate a Small Flow on Safety Showers			
Close all Demin Building Doors			
Check Air Compressor Windbreaks			
Check Air Dryer Windbreaks			
Start Air Dyer Portable Heater			
Check Air Dryer Dew Point Temperatures			
Check for Proper Air Dryer Operation			
Blowdown Instrument Air Drip Pots			
Blowdown Gas Yard Instrument Air Low Points			
Start Caustic Tank Portable Heater			
Insure Demin Bldg Temp > 60 deg F			
Check Clarifier Windbreak			
Check Boiler Chemical Windbreak			
Start Boiler Chemical Portable Heater			
Check Deligе Building Heater Operation			
Check Demin Building Heater Operation			
Check RO Building Heater Operation			
Check Cooling Tower Basin for Icing			
Check CT Fan Speed is Set to Low			
Drain Service Water Headers			
Check Torpedo Heater Operation			

CALPINE®
NYSE CPN

Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific BT

NUMBER: CSN-102B REVISION: 1 _____ 4/12/22

GENERAL PLANT MANAGER DATE

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Attachment 4 - Entity Guidance - Appendix 11

Purpose and Scope

This Standard details the Baytown Energy Center process for ensuring safe and reliable generating facility operation during summer weather conditions.

Key Areas addressed in this Standard are:

- Guidelines for the development of a Plant /Site Specific Summer Readiness Plan
- Timeline for major activities associated with Summer Readiness, including milestones for Pre-Summer Preparedness and Post-Summer Lessons Learned
- Identify Management Responsibilities
- Requires the utilization of the Maximo Work Management System for Summer Readiness planned activities and corrective work related to Summer reliability
- Documents Summer Readiness recordkeeping requirements

Applicability

This Standard applies to Baytown Energy Center

Definitions

Summer Period: June 1 through September 15 (may vary for specific plant locations – any variance from this definition, must be included in the plant specific Summer Readiness Plan). Sites in some geographical areas may have this period of time extended to include when extreme storm events may occur, such as hurricane season.

Critical Equipment: plant equipment that, during hot summer weather conditions, has the potential to: initiate a unit trip, impact unit startup, initiate an automatic runback, adversely affect environmental controls that may cause an outage or derate, adversely affect the delivery of fuel or water supply to the unit, or create a safety hazard. The intent is to identify reliability issues that are directly related to hot weather, not reliability issues in general.

References

CPN-714 (Records Management)

CSN-101 (Work Management Program)

Management of Change Procedure (Procedure Managed by Calpine Central Engineering)

Responsibilities

Regional Operations Vice Presidents

The Regional Operations Vice Presidents (RVPs) are responsible for certifying their region's Summer Readiness to the EVP for Power Operations after reviewing formal readiness attestations by the Plant/Area/General Managers. The RVPs are responsible for assuring each Plant/Site in their region

has site specific Summer Readiness Plans in place, based on the guidelines in this Standard. The RVP's should also share lessons learned across the Calpine fleet.

Plant/Area/General Manager

The Plant/Area/General Managers are responsible for ensuring that all site activities required for reliable Summer Operations are implemented, including:

- Developing and revising (based on lessons learned) the plant specific Summer Readiness Plan. The plan shall include all the recommendations included in this Standard as applicable to the specific plant/site.
- Performing or delegating site Summer Readiness Site Coordinator responsibilities.
- Approving site-specific Summer Readiness plans and activities, and assuring all summer readiness work that is identified is completed prior to the required summer completion date for all such work.
- Assure all site-specific Summer Readiness activities that are planned, and identified corrective work, are Maximo PM's or corrective work orders. All summer readiness planned and repair work is required to be documented in Maximo (using the program category "Seasonal", and the task category "Summer").
- Routinely updating the RVP on the site's Summer Readiness status.
- Verifying the site's Summer Readiness, and formally Certifying Readiness to the RVP prior to Summer.

Maintenance Manager

The Maintenance Manager is responsible for:

- Implementing the plant specific Summer Readiness Plan, and revising the Plan as required based on lessons learned.
- Assuring the Summer Readiness PM's and other activities are in Maximo and implemented in accordance with the timeline included in the plant's Summer Preparedness Plan (and document the implementation in Maximo using the program category "Seasonal", and the task category "Summer").
- During Summer Operation, ensure that equipment deficiencies identified (that could impact plant reliable operation during hot summer weather conditions) are addressed and corrected in a timely manner, with all repairs properly documented in Maximo.

Operations Manager

The Operations Manager is responsible for:

- Supporting the implementation of the Summer Readiness Plan.
- Provide input to the Systems Review for the Summer Readiness Plan.
- Review the on-going operations activities that are implemented during hot summer conditions, and identify by Work Order any issues that require immediate attention.
- Verifying that communications system is operational and backup communications are in place.

Site Summer Readiness Coordinator

Plant/Area/General Managers designate a Summer Readiness Coordinator for the site. The Site Summer Readiness Coordinators are responsible communicating and tracking activities needed to achieve sustained reliability and availability during hot summer weather conditions, and for routinely reporting to the Plant/Area/General Manager the status of the site's Summer readiness preparations. The Site Summer Readiness Coordinator supports the Operations and Maintenance Managers as required in performing their responsibilities as outlined above.

Specific responsibilities include:

- Chairing scheduled summer Readiness meetings at intervals appropriate to the site.
- Tracking and reporting status of the site's Summer readiness preparations.
- Leading and documenting the findings from the Summer Readiness system reviews.

Process

Plant Specific Summer Readiness Plan Guidelines

Each generation facility within Calpine shall develop a plant/site specific Summer Readiness Plan. The following are recommendations provided for consideration for each plant's specific Summer Readiness Plan:

1. Document the maximum plant design operating temperature to determine the highest ambient temperature at which the unit is able to reliability operate. Review any modifications performed to the plant equipment (or addition of new equipment) over the past year to assure these modifications meet the maximum plant design operating temperature, or if different, document the maximum temperature limitations of these modifications.

   Located in Appendix Tab 1

2. Review the past summer issues and experience with any equipment. Document this review and the Actions required to prevent reoccurrence. Any identified Action Items are to be documented and tracked in the Maximo system.

   PM# 111056 Supporting Document in Appendix Tab 2

3. Identify the Critical Equipment to the plants operation that may be impacted by hot summer conditions.

   PM# 113912 Supporting Document in Appendix Tab 3

4. Review open corrective work orders under the program category "Seasonal", and the task category "Summer", and those that may impact summer reliability should be considered for correction prior to summer operation. Open corrective work orders that may impact summer reliability (and are approved to be performed) shall be managed by the Site Summer Readiness Coordinator, and the status reported regularly to the Plant Manager, Operations Manager, and Maintenance Manager.

   PM# 111056 Supporting Document in Appendix Tab 4

5. Perform a walkdown (to be scheduled in Maximo as a Summer Readiness PM) of the Plant Systems, and identify equipment that should be considered for repairs prior to summer operation. This work requires documentation in Maximo, by corrective work orders created from the Summer Readiness walkdown PM.

   PM# 113912 Supporting Document in Appendix Tab 5

6. Conduct a system by system review of the Critical Equipment that may impact plant reliability during summer hot weather conditions. Use Attachment 2 (System Readiness Review) to document and identify all actions to be considered to ensure systems shall function properly and reliably through the summer. These actions shall also be documented in Maximo, by

corrective work orders using the program category "Seasonal", and the task category "Summer").

PM# 113912 Supporting Document in Appendix Tab 3

7. PM# 112343 Sites that are located in geographical areas that may be susceptible to high winds, hurricanes, heavy rains, localized flooding, and other extreme storm related events will require additional preparations, and these must be addressed in the site specific Summer Readiness Plan. These additional preparations may include: equipment and supplies to have staged at the plant (i.e., emergency generator, sand bags, etc.) and additional checklists for preparing for these extreme storm events, and for use while these events are taking place.

8. The Plant Manager, Maintenance Manager, Operations Manager, Plant Engineer, and Site Winter Readiness Coordinator should review this Standard annually prior to the initial summer readiness meeting conducted at the plant each year.

   PM# 111056 Supporting Document in Appendix Tab 6

9. The plant specific Summer Readiness Plan shall include a Summer Readiness Action Timeline, which should be included in the plant specific Summer Readiness Plan (dates to be site specific). Key milestones that must be included (recommended month(s) for completion of the task is included in parenthesis):
   a. Initial Site-Specific Pre-Summer Maintenance, Operations, and Procurement Meeting (November - December):
      i. Review the implementation of the Plant summer Readiness Plan.
      ii. All required PM's and corrective work to be scheduled in Maximo.
      iii. Corrective Work Orders should be reviewed that are related to Summer operation reliability, and those that must be completed prior to summer prioritized.
   b. Calpine fleet lessons learned (to be provided by RVP's), and general industrial best practices that may have become known (November).
   c. System reviews and scope recommendations completed (December- February).
   d. Final work scope and actions required prior to summer in place and approved by the Plant Manager (February - March).
   e. Site-Specific Summer Readiness Reviews and Certification of Readiness (Plant Manager to RVP). This date to be provided to the Plant Manager by the RVP each year (typically in May).
   f. Post-Summer meeting to review issues and incorporate lessons learned into the Summer Readiness Plan (September - October).
   g. Date when all Summer Preparations must be completed. **This is June 1 for all Calpine generation facilities.** Note that in some areas of the country this date may vary from June 1. Exceptions to this completion date must be approved by the RVP for the specific plant.

Pre-Summer Site System Reviews and Readiness Certification

Prior to the onset of the Summer Period each Plant Manager verifies summer readiness and formally communicates site status to the RVP (see example Attachment 1 - Summer Readiness Certification). RVPs review regional Summer Readiness status and certify status to the EVP Operations

PM#111056 Supporting Document in Appendix Tab 7

Records

Any records generated as a result of this process shall be filed and retained in accordance with CPN-714 (Records Management). Processes and standards referenced in this document shall prescribe any specific records requirements within those documents.

Support Documents

Attachment 1 (Typical Summer Readiness Certification Letter)

Attachment 2 (Typical Summer Readiness Review)

Attachment 3 (Summer Readiness Action Timeline)

Attachment 4 (Entity Guidance)

To: Vice President Operations, Central Region

From: Plant Manager, Baytown Energy Center

Subject: Summer Readiness Certification

Baytown Energy Center has reviewed the requirements of the Plant Specific Plans related to Summer Readiness preparation and response and by copy of this letter is ready to certify (Plant Name) summer readiness. "[Plant] has completed review of plant summer readiness and implemented preventive and corrective actions required to provide reasonable assurance of operation during foreseeable summer conditions at the site. In-progress items relating to summer operation are summarized below.

A. The basis for our certification is as follows:

1. Significant outcomes of system reviews
2. Status of preventive maintenance affecting Summer Readiness
3. Status of corrective maintenance affecting Summer Readiness
6. Status of modifications/projects affecting Summer Readiness
7. Other

B. Summer readiness items not completed

1. Reason
2. Open Actions Items
3. Owner & Due Date

_____ _____

Date

Plant Manager

Baytown Energy Center

Attachment 2 System Readiness Review

No.	System or Equipment	Could Cause a Trip	Could Cause Derate	Could Increase Risk of Trip or Derate	Could Prevent Prompt Return to Power	Action Owner	Mitigation Action	Due Date

Plant Systems to be reviewed include (as applicable):

Raw Water	Duct Burners	Gland Seal Steam
Cooling Tower Make-up	Condenser	Lube Oil
Cooling Tower and Circ Water	Inlet Cooling, Chillers	Seal Oil
Chemical Feed	Fuel Gas	Steam Turbine
Closed Cooling	Generator Hydrogen	Gas Turbine
Instrument Air	Batteries	Transformer and Bushings
Condensate	Switchyard Breakers	DCS
HP and IP Feedwater	Generator Circuit Breakers	Potable Water (including Safety Showers)
HRSG (including SCR)	LCI's and Starting Motors	Fire Protection
Blowdown (HRSG and Cooling Tower, other)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	BT PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	111056
Review Calpine Fleet Lessons Learned	November - December	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	111056
System Reviews Conducted	December - February	Reference Attachment 2	113912
Summer Readiness Certification by the Plant Manager	May 15	Provided to RVP. Reference Attachment 1	111056
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	111056
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	111056

Attachment 4: Entity Guidance

NERC REPORTS:

2014 Summer Reliability Assessment - May 2014 - NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014SRA.pdf

2015 Summer Reliability Assessment – May 2015 – NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2015_Summer_Reliability_Assessment.pdf

REGIONAL GUIDANCE:

PJM - PJM Manual 14D Generator Operational Requirements (Section 7 – Pre-Summer Review)
http://www.pjm.com/~/media/documents/manuals/m14D.ashx

PJM – PJM Manual M13 – Emergency Operations – (Section 3.4 Hot Weather Alert)
http://www.pjm.com/~/media/documents/manuals/m13-redline.ashx

APPENDIX

Appendix Documents are located in the Seasonal Readiness folder on the Baytown Public Drive

Tab 1 – Maximum Designed Operating Temperature
Tab 2 – PM-1Y POST SUMMER (SUMMER READINESS) MEETING
Tab 3 - PM-1Y CONDUCT SUMMER READINESS SYSTEM REVIEWS
Tab 4 – PM-1Y SUMMER READINESS OPEN CORRECTIVE WORK ORDER REVIEW
Tab 5 - PM-1Y SUMMER READINESS WALKDOWN OF PLANT SYSTEMS
Tab 6 - PM-1Y SUMMER READINESS STANDARD REVIEW
Tab 7 - PM-1Y SUMMER READINESS CERTIFICATION BY PLANT MANAGER
Tab 8 - PM-1Y INITIAL PRE-SUMMER READINESS MEETING

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Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific BEC

NUMBER: CSN-102B REVISION: 1 _____ 4-11-2022

GENERAL Plant Manager DATE

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Attachment 4 - Entity Guidance - Appendix 11

Purpose and Scope

This Standard details the Bosque Energy Centers process for ensuring safe and reliable generating facility operation during summer weather conditions.

Key Areas addressed in this Standard are:

- Guidelines for the development of a Plant /Site Specific Summer Readiness Plan
- Timeline for major activities associated with Summer Readiness, including milestones for Pre-Summer Preparedness and Post-Summer Lessons Learned
- Identify Management Responsibilities
- Requires the utilization of the Maximo Work Management System for Summer Readiness planned activities and corrective work related to Summer reliability
- Documents Summer Readiness recordkeeping requirements

Applicability

This Standard applies to Bosque Energy Center

Definitions

Summer Period: June 1 through September 15 (may vary for specific plant locations – any variance from this definition, must be included in the plant specific Summer Readiness Plan). Sites in some geographical areas may have this period of time extended to include when extreme storm events may occur, such as hurricane season.

Critical Equipment: plant equipment that, during hot summer weather conditions, has the potential to: initiate a unit trip, impact unit startup, initiate an automatic runback, adversely affect environmental controls that may cause an outage or derate, adversely affect the delivery of fuel or water supply to the unit, or create a safety hazard. The intent is to identify reliability issues that are directly related to hot weather, not reliability issues in general.

References

CPN-714 (Records Management)

CSN-101 (Work Management Program)

Management of Change Procedure (Procedure Managed by Calpine Central Engineering)

Responsibilities

Regional Operations Vice Presidents

The Regional Operations Vice Presidents (RVPs) are responsible for certifying their region's Summer Readiness to the EVP for Power Operations after reviewing formal readiness attestations by the Plant/Area/General Managers. The RVPs are responsible for assuring each Plant/Site in their region

has site specific Summer Readiness Plans in place, based on the guidelines in this Standard. The RVP's should also share lessons learned across the Calpine fleet.

Plant/Area/General Manager

The Plant/Area/General Managers are responsible for ensuring that all site activities required for reliable Summer Operations are implemented, including:

- Developing and revising (based on lessons learned) the plant specific Summer Readiness Plan. The plan shall include all the recommendations included in this Standard as applicable to the specific plant/site.
- Performing or delegating site Summer Readiness Site Coordinator responsibilities.
- Approving site-specific Summer Readiness plans and activities, and assuring all summer readiness work that is identified is completed prior to the required summer completion date for all such work.
- Assure all site-specific Summer Readiness activities that are planned, and identified corrective work, are Maximo PM's or corrective work orders. All summer readiness planned and repair work is required to be documented in Maximo (using the program category "Seasonal", and the task category "Summer").
- Routinely updating the RVP on the site's Summer Readiness status.
- Verifying the site's Summer Readiness, and formally Certifying Readiness to the RVP prior to Summer.

Maintenance Manager

The Maintenance Manager is responsible for:

- Implementing the plant specific Summer Readiness Plan, and revising the Plan as required based on lessons learned.
- Assuring the Summer Readiness PM's and other activities are in Maximo and implemented in accordance with the timeline included in the plant's Summer Preparedness Plan (and document the implementation in Maximo using the program category "Seasonal", and the task category "Summer").
- During Summer Operation, ensure that equipment deficiencies identified (that could impact plant reliable operation during hot summer weather conditions) are addressed and corrected in a timely manner, with all repairs properly documented in Maximo.

Operations Manager

The Operations Manager is responsible for:

- Supporting the implementation of the Summer Readiness Plan.
- Provide input to the Systems Review for the Summer Readiness Plan.
- Review the on-going operations activities that are implemented during hot summer conditions, and identify by Work Order any issues that require immediate attention.
- Verifying that communications system is operational and backup communications are in place.

Site Summer Readiness Coordinator

Plant/Area/General Managers designate a Summer Readiness Coordinator for the site. The Site Summer Readiness Coordinators are responsible communicating and tracking activities needed to achieve sustained reliability and availability during hot summer weather conditions, and for routinely reporting to the Plant/Area/General Manager the status of the site's Summer readiness preparations. The Site Summer Readiness Coordinator supports the Operations and Maintenance Managers as required in performing their responsibilities as outlined above.

Specific responsibilities include:

- Chairing scheduled summer Readiness meetings at intervals appropriate to the site.
- Tracking and reporting status of the site's Summer readiness preparations.
- Leading and documenting the findings from the Summer Readiness system reviews.

Process

Plant Specific Summer Readiness Plan Guidelines

Each generation facility within Calpine shall develop a plant/site specific Summer Readiness Plan. The following are recommendations provided for consideration for each plant's specific Summer Readiness Plan:

1. Document the maximum plant design operating temperature to determine the highest ambient temperature at which the unit is able to reliability operate. Review any modifications performed to the plant equipment (or addition of new equipment) over the past year to assure these modifications meet the maximum plant design operating temperature, or if different, document the maximum temperature limitations of these modifications.

   Located in Appendix Tab 1

2. Review the past summer issues and experience with any equipment. Document this review and the Actions required to prevent reoccurrence. Any identified Action Items are to be documented and tracked in the Maximo system.

   PM# 110293 Supporting Document in Appendix Tab 2

3. Identify the Critical Equipment to the plants operation that may be impacted by hot summer conditions.

   PM# 110291 Supporting Document in Appendix Tab 3

4. Review open corrective work orders under the program category "Seasonal", and the task category "Summer", and those that may impact summer reliability should be considered for correction prior to summer operation. Open corrective work orders that may impact summer reliability (and are approved to be performed) shall be managed by the Site Summer Readiness Coordinator, and the status reported regularly to the Plant Manager, Operations Manager, and Maintenance Manager.

   PM# 116907 Supporting Document in Appendix Tab 4

5. Perform a walkdown (to be scheduled in Maximo as a Summer Readiness PM) of the Plant Systems, and identify equipment that should be considered for repairs prior to summer operation. This work requires documentation in Maximo, by corrective work orders created from the Summer Readiness walkdown PM.

   PM# 116908 Supporting Document in Appendix Tab 5

6. Conduct a system by system review of the Critical Equipment that may impact plant reliability during summer hot weather conditions. Use Attachment 2 (System Readiness Review) to document and identify all actions to be considered to ensure systems shall function properly and reliably through the summer. These actions shall also be documented in Maximo, by

corrective work orders using the program category "Seasonal", and the task category "Summer").

PM# 110291 Supporting Document in Appendix Tab 3

7. Sites that are located in geographical areas that may be susceptible to high winds, hurricanes, heavy rains, localized flooding, and other extreme storm related events will require additional preparations, and these must be addressed in the site specific Summer Readiness Plan. These additional preparations may include: equipment and supplies to have staged at the plant (i.e., emergency generator, sand bags, etc.) and additional checklists for preparing for these extreme storm events, and for use while these events are taking place.

   Not Applicable

8. The Plant Manager, Maintenance Manager, Operations Manager, Plant Engineer, and Site Winter Readiness Coordinator should review this Standard annually prior to the initial summer readiness meeting conducted at the plant each year.

   PM# 116909 Supporting Document in Appendix Tab 6

9. The plant specific Summer Readiness Plan shall include a Summer Readiness Action Timeline, which should be included in the plant specific Summer Readiness Plan (dates to be site specific). Key milestones that must be included (recommended month(s) for completion of the task is included in parenthesis):
   a. Initial Site-Specific Pre-Summer Maintenance, Operations, and Procurement Meeting (November - December):
      i. Review the Implementation of the Plant summer Readiness Plan.
      ii. All required PM's and corrective work to be scheduled in Maximo.
      iii. Corrective Work Orders should be reviewed that are related to Summer operation reliability, and those that must be completed prior to summer prioritized.
   b. Calpine fleet lessons learned (to be provided by RVP's), and general industrial best practices that may have become known (November).
   c. System reviews and scope recommendations completed (December- February).
   d. Final work scope and actions required prior to summer in place and approved by the Plant Manager (February - March).
   e. Site-Specific Summer Readiness Reviews and Certification of Readiness (Plant Manager to RVP). This date to be provided to the Plant Manager by the RVP each year (typically in May).
   f. Post-Summer meeting to review issues and incorporate lessons learned into the Summer Readiness Plan (September - October).
   g. Date when all Summer Preparations must be completed. **This is June 1 for all Calpine generation facilities.** Note that in some areas of the country this date may vary from June 1. Exceptions to this completion date must be approved by the RVP for the specific plant.

Pre-Summer Site System Reviews and Readiness Certification

Prior to the onset of the Summer Period each Plant Manager verifies summer readiness and formally communicates site status to the RVP (see example Attachment 1 - Summer Readiness Certification). RVPs review regional Summer Readiness status and certify status to the EVP Operations

PM#110294 Supporting Document in Appendix Tab 7

Records

Any records generated as a result of this process shall be filed and retained in accordance with CPN-714 (Records Management). Processes and standards referenced in this document shall prescribe any specific records requirements within those documents.

Support Documents

Attachment 1 (Typical Summer Readiness Certification Letter)

Attachment 2 (Typical Summer Readiness Review)

Attachment 3 (Summer Readiness Action Timeline)

Attachment 4 (Entity Guidance)

To: (Regional VP,Operations Name)

From: (Plant/General Manager Name)

Subject: Summer Readiness

Certification

(Plant Name) has reviewed the requirements of the Plant Specific Plans related to Summer Readiness preparation and response and by copy of this letter is ready to certify (Plant Name) summer readiness. "[Plant] has completed review of plant summer readiness and implemented preventive and corrective actions required to provide reasonable assurance of operation during foreseeable summer conditions at the site. In-progress items relating to summer operation are summarized below.

A. The basis for our certification is as follows:

1. Significant outcomes of system reviews
2. Status of preventive maintenance affecting Summer Readiness
3. Status of corrective maintenance affecting Summer Readiness
6. Status of modifications/projects affecting Summer Readiness
7. Other

B. Summer readiness items not completed

1. Reason
2. Open Actions Items
3. Owner & Due Date

SUMMER READINESS PREPARATION STANDARD

STANDARD NUMBER: CSN-102B

Attachment 2 System Readiness Review

No.	System or Equipment	Could Cause a Trip	Could Cause Derate	Could Increase Risk of Trip or Derate	Could Prevent Prompt Return to Power	Action Owner	Mitigation Action	Due Date

Plant Systems to be reviewed include (as applicable):

Raw Water	Duct Burners	Gland Seal Steam
Cooling Tower Make-up	Condenser	Lube Oil
Cooling Tower and Circ Water	Inlet Cooling, Evap Coolers	Seal Oil
Chemical Feed	Fuel Gas	Steam Turbine
Closed Cooling	Generator Hydrogen	Gas Turbine
Instrument Air	Batteries	Transformer and Bushings
Condensate	Switchyard Breakers	DCS
HP and IP Feedwater	Generator Circuit Breakers	Potable Water (including Safety Showers)
HRSG (including SCR)	LCI's and Starting Motors	Fire Protection
Blowdown (HRSG and Cooling Tower, other)		

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	BEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	110290
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	110290
System Reviews Conducted	December - February	Reference Attachment 2	110291
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	110294
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	116910
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	110293

Attachment 4: Entity Guidance

NERC REPORTS:

2014 Summer Reliability Assessment - May 2014 - NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014SRA.pdf

2015 Summer Reliability Assessment – May 2015 – NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2015_Summer_Reliability_Assessment.pdf

REGIONAL GUIDANCE:

PJM - PJM Manual 14D Generator Operational Requirements (Section 7 – Pre-Summer Review)
http://www.pjm.com/~/media/documents/manuals/m14d.ashx

PJM – PJM Manual M13 – Emergency Operations – (Section 3.4 Hot Weather Alert)
http://www.pjm.com/~/media/documents/manuals/m13-redline.ashx

APPENDIX

Appendix Documents are located in the Seasonal Readiness folder on the Bosque Public Drive

Tab 1 – Maximum Designed Operating Temperature
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CALPINE
NYSE CPN

Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific CEC

NUMBER: CSN-102B REVISION: 1

GENERAL PLANT MANAGER 6.12.22 DATE

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Purpose and Scope

This Standard details the Channel Energy Centers process for ensuring safe and reliable generating facility operation during summer weather conditions.

Key Areas addressed in this Standard are:

- Guidelines for the development of a Plant /Site Specific Summer Readiness Plan
- Timeline for major activities associated with Summer Readiness, including milestones for Pre-Summer Preparedness and Post-Summer Lessons Learned
- Identify Management Responsibilities
- Requires the utilization of the Maximo Work Management System for Summer Readiness planned activities and corrective work related to Summer reliability
- Documents Summer Readiness recordkeeping requirements

Applicability

This Standard applies to Channel Energy Center

Definitions

Summer Period: June 1 through September 15 (may vary for specific plant locations – any variance from this definition, must be included in the plant specific Summer Readiness Plan). Sites in some geographical areas may have this period of time extended to include when extreme storm events may occur, such as hurricane season.

Critical Equipment: plant equipment that, during hot summer weather conditions, has the potential to: initiate a unit trip, impact unit startup, initiate an automatic runback, adversely affect environmental controls that may cause an outage or derate, adversely affect the delivery of fuel or water supply to the unit, or create a safety hazard. The intent is to identify reliability issues that are directly related to hot weather, not reliability issues in general.

References

CPN-714 (Records Management)

CSN-101 (Work Management Program)

Management of Change Procedure (Procedure Managed by Calpine Central Engineering)

Responsibilities

Regional Operations Vice Presidents

The Regional Operations Vice Presidents (RVPs) are responsible for certifying their region's Summer Readiness to the EVP for Power Operations after reviewing formal readiness attestations by the Plant/Area/General Managers. The RVPs are responsible for assuring each Plant/Site in their region has site specific Summer Readiness Plans in place, based on the guidelines in this Standard. The RVP's should also share lessons learned across the Calpine fleet.

Plant/Area/General Manager

The Plant/Area/General Managers are responsible for ensuring that all site activities required for reliable Summer Operations are implemented, including:

- Developing and revising (based on lessons learned) the plant specific Summer Readiness Plan. The plan shall include all the recommendations included in this Standard as applicable to the specific plant/site.
- Performing or delegating site Summer Readiness Site Coordinator responsibilities.
- Approving site-specific Summer Readiness plans and activities, and assuring all summer readiness work that is identified is completed prior to the required summer completion date for all such work.
- Assure all site-specific Summer Readiness activities that are planned, and identified corrective work, are Maximo PM's or corrective work orders. All summer readiness planned and repair work is required to be documented in Maximo (using the program category "Seasonal", and the task category "Summer").
- Routinely updating the RVP on the site's Summer Readiness status.
- Verifying the site's Summer Readiness, and formally Certifying Readiness to the RVP prior to Summer.

Maintenance Manager

The Maintenance Manager is responsible for:

- Implementing the plant specific Summer Readiness Plan, and revising the Plan as required based on lessons learned.

- Assuring the Summer Readiness PM's and other activities are in Maximo and implemented in accordance with the timeline included in the plant's Summer Preparedness Plan (and document the implementation in Maximo using the program category "Seasonal", and the task category "Summer").

- During Summer Operation, ensure that equipment deficiencies identified (that could impact plant reliable operation during hot summer weather conditions) are addressed and corrected in a timely manner, with all repairs properly documented in Maximo.

Operations Manager

The Operations Manager is responsible for:

- Supporting the implementation of the Summer Readiness Plan.
- Provide input to the Systems Review for the Summer Readiness Plan.
- Review the on-going operations activities that are implemented during hot summer conditions, and identify by Work Order any issues that require immediate attention.
- Verifying that communications system is operational and backup communications are in place.

Site Summer Readiness Coordinator

Plant/Area/General Managers designate a Summer Readiness Coordinator for the site. The Site Summer Readiness Coordinators are responsible communicating and tracking activities needed to achieve sustained reliability and availability during hot summer weather conditions, and for routinely reporting to the Plant/Area/General Manager the status of the site's Summer readiness preparations. The Site Summer Readiness Coordinator supports the Operations and Maintenance Managers as required in performing their responsibilities as outlined above.

Specific responsibilities include:

- Chairing scheduled summer Readiness meetings at intervals appropriate to the site.

- Tracking and reporting status of the site's Summer readiness preparations.

- Leading and documenting the findings from the Summer Readiness system reviews.

Process

Plant Specific Summer Readiness Plan Guidelines

Each generation facility within Calpine shall develop a plant/site specific Summer Readiness Plan. The following are recommendations provided for consideration for each plant's specific Summer Readiness Plan:

1. Document the maximum plant design operating temperature to determine the highest ambient temperature at which the unit is able to reliability operate. Review any modifications performed to the plant equipment (or addition of new equipment) over the past year to assure these modifications meet the maximum plant design operating temperature, or if different, document the maximum temperature limitations of these modifications.

   Located in Appendix Tab 1

2. Review the past summer issues and experience with any equipment. Document this review and the Actions required to prevent reoccurrence. Any identified Action Items are to be documented and tracked in the Maximo system.

   PM# 101884 Supporting Document in Appendix Tab 2

3. Identify the Critical Equipment to the plants operation that may be impacted by hot summer conditions.

   PM# 117962 Supporting Document in Appendix Tab 3

4. Review open corrective work orders under the program category "Seasonal", and the task category "Summer", and those that may impact summer reliability should be considered for correction prior to summer operation. Open corrective work orders that may impact summer reliability (and are approved to be performed) shall be managed by the Site Summer Readiness Coordinator, and the status reported regularly to the Plant Manager, Operations Manager, and Maintenance Manager.

   PM# 117963 Supporting Document in Appendix Tab 4

5. Perform a walkdown (to be scheduled in Maximo as a Summer Readiness PM) of the Plant Systems, and identify equipment that should be considered for repairs prior to summer operation. This work requires documentation in Maximo, by corrective work orders created from the Summer Readiness walkdown PM.

   PM# 117964 Supporting Document in Appendix Tab 5

6. Conduct a system by system review of the Critical Equipment that may impact plant reliability during summer hot weather conditions. Use Attachment 2 (System Readiness Review) to

document and identify all actions to be considered to ensure systems shall function properly and reliably through the summer. These actions shall also be documented in Maximo, by corrective work orders using the program category "Seasonal", and the task category "Summer").

PM# 117965 Supporting Document in Appendix Tab 3

7. Sites that are located in geographical areas that may be susceptible to high winds, hurricanes, heavy rains, localized flooding, and other extreme storm related events will require additional preparations, and these must be addressed in the site specific Summer Readiness Plan. These additional preparations may include: equipment and supplies to have staged at the plant (i.e., emergency generator, sand bags, etc.) and additional checklists for preparing for these extreme storm events, and for use while these events are taking place.

   PM# 117966

8. The Plant Manager, Maintenance Manager, Operations Manager, Plant Engineer, and Site Winter Readiness Coordinator should review this Standard annually prior to the initial summer readiness meeting conducted at the plant each year.

   PM# 117969 Supporting Document in Appendix Tab 6

9. The plant specific Summer Readiness Plan shall include a Summer Readiness Action Timeline, which should be included in the plant specific Summer Readiness Plan (dates to be site specific). Key milestones that must be included (recommended month(s) for completion of the task is included in parenthesis):
   a. Initial Site-Specific Pre-Summer Maintenance, Operations, and Procurement Meeting (November - December):
      i. Review the implementation of the Plant summer Readiness Plan.
      ii. All required PM's and corrective work to be scheduled in Maximo.
      iii. Corrective Work Orders should be reviewed that are related to Summer operation reliability, and those that must be completed prior to summer prioritized.
   b. Calpine fleet lessons learned (to be provided by RVP's), and general industrial best practices that may have become known (November).
   c. System reviews and scope recommendations completed (December- February).
   d. Final work scope and actions required prior to summer in place and approved by the Plant Manager (February - March).
   e. Site-Specific Summer Readiness Reviews and Certification of Readiness (Plant Manager to RVP). This date to be provided to the Plant Manager by the RVP each year (typically in May).
   f. Post-Summer meeting to review issues and incorporate lessons learned into the Summer Readiness Plan (September - October).
   g. Date when all Summer Preparations must be completed. **This is June 1 for all Calpine generation facilities.** Note that in some areas of the country this date may

vary from June 1. Exceptions to this completion date must be approved by the RVP for the specific plant.

Pre-Summer Site System Reviews and Readiness Certification

Prior to the onset of the Summer Period each Plant Manager verifies summer readiness and formally communicates site status to the RVP (see example Attachment 1 - Summer Readiness Certification). RVPs review regional Summer Readiness status and certify status to the EVP Operations

PM#117970 Supporting Document in Appendix Tab 7

Records

Any records generated as a result of this process shall be filed and retained in accordance with CPN-714 (Records Management). Processes and standards referenced in this document shall prescribe any specific records requirements within those documents.

Support Documents

Attachment 1 (Typical Summer Readiness Certification Letter)

Attachment 2 (Typical Summer Readiness Review)

Attachment 3 (Summer Readiness Action Timeline)

Attachment 4 (Entity Guidance)

To: (Regional VP, Operations Name)

From: (Plant/General Manager Name)

Subject: Summer Readiness Certification

(Plant Name) has reviewed the requirements of the Plant Specific Plans related to Summer Readiness preparation and response and by copy of this letter is ready to certify (Plant Name) summer readiness. "[Plant] has completed review of plant summer readiness and implemented preventive and corrective actions required to provide reasonable assurance of operation during foreseeable summer conditions at the site. In-progress items relating to summer operation are summarized below.

A. The basis for our certification is as follows:

1. Significant outcomes of system reviews
2. Status of preventive maintenance affecting Summer Readiness
3. Status of corrective maintenance affecting Summer Readiness
4. Status of modifications/projects affecting Summer Readiness
5. Other

B. Summer readiness items not completed

1. Reason
2. Open Actions Items
3. Owner & Due Date

Attachment 2 System Readiness Review

No.	System or Equipment	Could Cause a Trip	Could Cause Derate	Could Increase Risk of Trip / Derate	Could Prevent Prompt Return to Power	Action Owner	Mitigation Action	Due Date

Plant Systems to be reviewed include (as applicable):

Raw Water	Duct Burners	Gland Seal Steam / SJAE
Cooling Tower Make-up	Steam Turbine Condenser	Lube Oil / Seal Oil
Cooling Tower and Circ Water	Inlet Fogging System	Demineralization / RO System
Chemical Feed Systems	Fuel Gas	Steam Turbine
Auxiliary Cooling System	Generator Hydrogen	Gas Turbine
Instrument Air	Batteries	Transformers and Bushings (138/345)
Condensate / Cycle Make-Up	Switchyard Breakers (138/345)	DCS / PLCs
HP, IP, and LP Feedwater	Generator Circuit Breakers	Potable Water (including Safety Showers)
HRSG (including SCR)	Starting Motors	Fire Protection
Blowdown (HRSG, Cooling Tower, Aux. Boilers)	Auxiliary Boilers	HVAC / Enclosure Vent Fans

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	CEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	117963
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	117963
System Reviews Conducted	December - February	Reference Attachment 2	117965
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	117970
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	117971
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	101884

Attachment 4: Entity Guidance

NERC REPORTS:

2014 Summer Reliability Assessment - May 2014 - NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014SRA.pdf

2015 Summer Reliability Assessment – May 2015 – NERC
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2015_Summer_Reliability_Assessment.pdf

REGIONAL GUIDANCE:

PJM - PJM Manual 14D Generator Operational Requirements (Section 7 – Pre-Summer Review)
http://www.pjm.com/~/media/documents/manuals/m14d.ashx

PJM – PJM Manual M13 – Emergency Operations – (Section 3.4 Hot Weather Alert)
http://www.pjm.com/~/media/documents/manuals/m13-redline.ashx

APPENDIX

Appendix Documents are located in the Seasonal Readiness folder on the Bosque Public Drive

Tab 1 – Maximum Designed Operating Temperature
Tab 2 – PM-1Y POST SUMMER (SUMMER READINESS) MEETING
Tab 3 - PM-1Y CONDUCT SUMMER READINESS SYSTEM REVIEWS
Tab 4 – PM-1Y SUMMER READINESS OPEN CORRECTIVE WORK ORDER REVIEW
Tab 5 - PM-1Y SUMMER READINESS WALKDOWN OF PLANT SYSTEMS
Tab 6 - PM-1Y SUMMER READINESS STANDARD REVIEW
Tab 7 - PM-1Y SUMMER READINESS CERTIFICATION BY PLANT MANAGER
Tab 8 - PM-1Y INITIAL PRE-SUMMER READINESS MEETING