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Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific CCEC

NUMBER: CSN-102B REVISION: 1 Rene Pena 4-12-22

GENERAL PLANT MANAGER DATE

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Purpose and Scope

This Standard details the Corpus 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 Corpus 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# 117991 Supporting Document in Appendix Tab 2

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

   PM# 111957 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# 111957 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# 111959 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# 111957 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# 111957 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#111957 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

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)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	CCEC - PM #

Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	117991
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	117992
System Reviews Conducted	December - February	Reference Attachment 2	111957
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	111957
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	111957
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	117992

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 Corpus 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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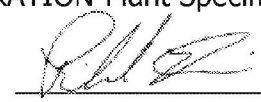
Standard: SUMMER READINESS PREPARATION-Plant Specific DPEC

NUMBER: CSN-001DP REVISION:  04-14-2021

GENERAL Plant Manager DATE

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Purpose and Scope

This Standard details the Company's 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 all Calpine Generation Facilities

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.

   Copy located in the Summer Book Appendix

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.

   Copy located in the Summer Book Appendix

3. Identify the Critical Equipment to the plants operation that may be impacted by hot summer conditions.
   Copy located in the Summer Book Appendix

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.

   Maximo PM#=116858

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.

   Maximo PM#=116859

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").

Maximo PM#=116860

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.

   Maximo PM#=116877

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.

   Attached Sign in sheet

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

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 (Summer Readiness Review)

Attachment 3 (Summer Readiness Action Timeline)

Attachment 4 (Lessons Learned Appendix)

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

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	PAG	Lube Oil
Cooling Tower and Circ Water	Inlet Cooling (Foggers, Evap Coolers, 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	DPEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	114651
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	114652
System Reviews Conducted	December - February	Reference Attachment 2	114653
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	108764
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	108756
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	108758

Attachment 4: Entity Guidance

NERC REPORTS:

2021 Summer Reliability Assessment

https://www.nerc.com/comm/RSTC/RAS/2021_Summer_Narrative_Guide.docx

2020 Summer Reliability Assessment

https://www.nerc.com/comm/PC/Reliability Assessment Subcommittee RAS 2013/2020_Summer_Narrative_Guide.docx

REGIONAL GUIDANCE:

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Standard Manual

Standard: SUMMER READINESS PREPARATION – Freestone Energy Center

NUMBER: CSN-102B REVISION: 0 Ivy Pate PLANT MANAGER 13-APR-2022 DATE

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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 Freestone 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.

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Regional Operations Vice Presidents

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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

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- 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 for 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# 117997 Supporting Document in Appendix Tab 2

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

   PM# 117998 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# 117999 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# 108773 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# 117998 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# 118001 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#118003 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, Foggers	Seal Oil
Chemical Feed	Fuel Gas	Steam Turbine
ACW System	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)
HRSGs	LCI's and Starting Motors	Fire Protection
Blowdown (HRSG and Cooling Tower, other)	Condenser	

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	FEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	118005
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	118005
System Reviews Conducted	December - February	Reference Attachment 2	117998
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	118003
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	118009
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	117997

Attachment 4: Entity Guidance

NERC REPORTS:

2021 Summer Reliability Assessment - May 2021 - NERC
https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC%20SRA%202021.pdf

2020 Summer Reliability Assessment – May 2020 – NERC
https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2020.pdf

REGIONAL GUIDANCE:

ERCOT – Report on the Capacity, Demand and Reserves (CDR) in the ERCOT Region, 2022-2031
https://www.ercot.com/files/docs/2021/12/29/CapacityDemandandReservesReport_December2021.pdf

APPENDIX

Appendix Documents are located in the Seasonal Readiness folder on the Freestone 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 JFEC

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

GENERAL PLANT MANAGER DATE

TABLE OF CONTENTS PAGE

Purpose and Scope

This Standard details the Jack Fusco 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 Jack Fusco 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# 107190 Supporting Document in Appendix Tab 2

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

   PM# 117975 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# 117976 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# 117977 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# 117978 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# 117980 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# 106660 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)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	JFEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	117976
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	117976
System Reviews Conducted	December - February	Reference Attachment 2	117978
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	106660
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	117981
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	107190

ttachment 4: Entity Guidance

IERC 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

EGIONAL 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

ppendix 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
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Tab 7 - PM-1Y SUMMER READINESS CERTIFICATION BY PLANT MANAGER
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Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific GEC

NUMBER: CSN-102B REVISION: 1 Andrew McDonald 4/12/2022

GENERAL PLANT MANAGER DATE

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Purpose and Scope

This Standard details the Guadalupe 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 Guadalupe 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.

   PM#117503 Located in Appendix Tab 1 SLZ Needed

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# 108295 Supporting Document in Appendix Tab 2

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

   PM# 108295 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# 108281 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# 108284 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# 111680 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# 106645 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#110396 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

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)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	GEC
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	108281
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	108295
System Reviews Conducted	December - February	Reference Attachment 2	108284
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	111680
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	111680
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	108295

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 Guadalupe Public Drive

Tab 1 – Maximum Designed Operating Temperature
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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

CALPINE®
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Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific HEC

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

GENERAL PLANT MANAGER DATE

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Purpose and Scope

This Standard details the HIDALGO 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 Hidalgo 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

as 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.

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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#117953-Supporting Document in Appendix Tab 2

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

   PM# 117952-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# 117955-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# 117949-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# 117952-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# 117957-Supporting Document in Appendix Tab 9

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# 117950-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.

re-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#117954-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)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	HEC PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	117951
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	117951
System Reviews Conducted	December - February	Reference Attachment 2	117952
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	117954
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	117956
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	117953

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 Hidalgo Public Drive

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Tab 2 – PM-1Y POST SUMMER (SUMMER READINESS) MEETING
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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
Tab 9 - PM-1Y SUMMER READINESS HURRICANE PROCEDURE REVIEW

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Standard Manual

Standard: SUMMER READINESS PREPARATION – Plant Specific MVG

NUMBER: CSN-102B REVISION: 5 4/12/2022

GENERAL PLANT MANAGER DATE

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Purpose and Scope

This Standard details the Magic Valley Generations 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 Magic Valley Generation

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# 117993 Supporting Document in Appendix Tab 2

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

   PM# 116831 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# 118004 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# 118004 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# 116831 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# 118002 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.

   PM#99587 Supporting Document in Appendix Tab 3

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#117994 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

Confirm

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)	Condenser	Aux Boiler

Attachment 3: Summer Readiness Action Timeline

Key Milestone	Recommended Completion	Comments	MVG PM #
Initial Pre-Summer Readiness Meeting	November - December	Meeting to review: Plant Summer Readiness Plan, Open Corrective "Summer" Work Orders, and PM's	116831
Review Calpine Fleet Lessons Learned	November	Fleet Summer Lessons Learned from the Past Summer Provided by RVP's	116831
System Reviews Conducted	December - February	Reference Attachment 2	118000
Summer Readiness Certification by the Plant Manager	May	Provided to RVP. Reference Attachment 1	117994
Summer Readiness Activities Completed	June 1	This date may vary for specific sites based on location	99587
Post-Summer Meeting	September - October	Review specific plant lessons learned from the past summer	117993

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

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Procedure Manual

Standard: SUMMER READINESS PREPARATION- Plant Specific Pasadena

NUMBER: CSN-102PD REVISION: 1 Dennis Coates 5/06/2021

DATE

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Purpose and Scope

This Procedure details the PASADENA 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 the PASADENA Facility

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. The Summer Readiness Coordinator for PASADENA is the Maintenance Scheduler/Planner.

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 the Appendix

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.

   Past summer review- Located in the Appendix Tab Item #2

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

   Plant Systems Package- Located in the Appendix tab item #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 #- 116891 (New 5/9/21)

5. Perform a walk down (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 walk down PM.

   PM #- 116892 (5/9/21)

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 #-116893 (New 5/9/21)

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.) plus the hurricane checklist and procedure for preparing for these extreme storm events, and for use while these events are taking place.

   PM#116894 (New 5/9/21)

   Completed Checklists Attached

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.

   See Signed Standard review Sheet- Attached

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

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 (Summer Readiness Review)

Attachment 3 (Summer Readiness Action Timeline)

Attachment 4 (Lessons Learned Appendix)

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

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

P1 and P2 Plant Systems or Equipment to be reviewed include (as applicable):

Raw Water	Settling Ponds	Air Extraction/Gland Seal Steam
Ammonia	Power Augmentation	Lube Oil
Cooling Towers	CT Inlet Cooling	Control Oil
Chemical Feed	Fuel Gas	Steam Turbines
Circ water/Auxiliary Cooling	Gen Hydrogen/Seal Oil	Combustion Turbines (CT)
Instrument/Service Air	UPS/DC	Transformers and Bushings
Condensate	Switchyards	DCS/Other Control
Boiler Feed Water	Generators	Potable Water
HRSGs	Starting Packages	Fire Protection
Blowdown	Condensers	Auxiliary Boilers
Steam (HP,IP,LP, Process)	Water Sampling/Analysis	CT Inlet Filters
Storm Water	Electrical Distribution	Waste Water
Demin Water	Service Water	HVAC/Enclosure Cooling