

ATTACHMENT 2

Work Process Manual (WPM) 607

Maintenance Rule Assessment Of
Equipment Removed From Service



WORK PROCESS MANUAL

WPM 607, Maintenance Rule Assessment Of Equipment Removed From Service

Revision Number

0
1
2
3
4
5
6
7

Issue Date

10/31/95
7/1/96
10/14/96
2/3/97
1/31/98
4/30/98
11/15/98
03/26/99

Catawba

Approved by / Date:

T.P. Harrall 03/25/99

Work Control Superintendent

Effective Date

03/26/99

McGuire

Approved by / Date:

K.D. Thomas 03/25/99

Work Control Superintendent

Effective Date

03/26/99

Oconee

Approved by / Date:

C.W. Boyd 03/25/99

Work Control Superintendent

Effective Date

03/26/99

Issued by: J. H. Bowden

Title: Nuclear Services - Work Control

INFORMATION ONLY

WPM 607, Maintenance Rule Assessment Of
Equipment Removed From Service
Rev.7

DOCUMENT REVISION DESCRIPTION

REVISION NO. PAGES or SECTIONS REVISED AND DESCRIPTION

7

Attachment 607.6.3:

1a. Changed the Matrix Function Tech Spec/SLC Correlation

Work Process Manual WPM 607

Maintenance Rule Assessment Of Equipment Removed From Service

607.1 Purpose:

The purpose of this procedure is to provide consistent processes to prevent high risk combinations of equipment from being out of service at the same time. This procedure along with WPM's 608 (Outage Risk Management Utilizing ORAM-Sentinel) and 609 (Innage Risk Management Utilizing ORAM-Sentinel) are intended to address the Maintenance Rule requirement and the Duke Power Company On-line Maintenance Policy requirement to control the safety impact of combinations of equipment removed from service.

These guidelines are independent of the requirements of Technical Specifications and Selected Licensee Commitments and are based on Probabilistic Risk Assessment (PRA) studies. Site specific matrices have been developed that identify combinations of equipment that when taken out of service can,

- (1) increase the chance of a transient,
- (2) reduce the reliability of mitigation functions,
- (3) increase the risk of core damage, or
- (4) reduce the reliability of containment.

These matrices are referenced in the attachments to this WPM and shall be referred to as "PRA Matrix". For Mode 4 at Catawba and McGuire Nuclear Stations, and Between 250F/350# and Cold Shutdown at Oconee Nuclear Station, lists of PRA equipment that should be kept available prior to cold shutdown have been developed. These lists are referenced in the attachments to this WPM and shall be referred to as the CNS/MNS "Mode 4 PRA Equipment List" and the ONS "Between 250F/350# and Cold Shutdown PRA Equipment List".

607.2 References and Definitions:

607.2.1 10CFR50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

607.2.2 NUMARC 93-01, Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants

607.2.3 NUMARC 93-02, A Report on the Verification and Validation of NUMARC 93-01, Draft 2A, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

607.2.4 NSD 403, Shutdown Risk Management

607.2.5 WPM 601, On-Line Maintenance Management / Innage WWM Rotation Schedule

607.2.6 WPM 608, Outage Risk Management Utilizing ORAM-Sentinel

607.2.7 WPM 609, Innage Risk Management Utilizing ORAM-Sentinel

607.2.8 Definitions:

- **AVAILABLE:** The status of a system, structure, or component that is in service in a FUNCTIONAL or OPERABLE state by immediate manual or automatic actuation.
- **AVAILABILITY:** Time that an SSC is capable of performing its intended function as a fraction of the total time that the intended function may be demanded. The numerical complement of *unavailability*.
- **BASIS DOCUMENT:** Document that contains the justification for labeling each of the PRA Matrix cells (no interaction, minor interaction, or major interaction).
- **CONFLICT:** An unacceptable PRA Matrix combination.
- **DEPENDENT SYSTEM:** A system that relies upon another system to provide a service, or function, that will allow it to perform as designed.
- **FUNCTIONAL:** The ability of a system or component to perform its intended service with considerations that applicable technical specification requirements or licensing/design basis assumptions may not be maintained.
- **FUNCTIONS LIST:** List of risk significant systems and the associated PRA functions that apply to that system. The applicable Technical Specification number is also listed.
- **INTERACTION:** Cell on the PRA Matrix that indicates whether there is a major or minor impact on risk to the station if the equipment were taken out of service. The interaction is obtained by plotting the equipment to be taken out of service horizontally and vertically on the Matrix.
- **MAINTENANCE RULE RISK SIGNIFICANT FUNCTIONS:** Systems, structures, and/or components that are significant contributors to core melt or releases comparable to 10 CFR Part 100 as determined by PRA or other methods.
- **MATRIX:** Tool for determining whether a system can be removed from service without unduly decreasing plant safety. The matrix lists all of the risk significant systems both horizontally and vertically in a rectangular array. Combinations of equipment to be taken out of service are plotted on the matrix to provide information as to whether the combination is permitted.

- **OPERABLE:** The ability of a system to perform its specified function with all applicable technical specifications or selected license commitment requirements satisfied.
- **PLANT OPERATIONS REVIEW COMMITTEE (PORC):** Site management comprised of the Station Manager, Engineering Manager, Safety Assurance Manager, Operations Superintendent, Work Control Superintendent, both Maintenance Superintendents, Mechanical and Nuclear Systems Engineering Manager, Electrical Systems and Equipment Engineering Manager, and the Mechanical and Civil Equipment Manager.
- **SUPPORT SYSTEM:** A system that provides a service, or function, to another system in order for the dependent system to perform as designed.

607.3 Applicability:

The Maintenance Rule requires an assessment be performed separately for each unit for all modes.

This procedure provides direction and guidance for using a PRA matrix in assessing the risk associated with removal from service of risk significant Systems, Structures, and/or Component's (SSC's) for all operating modes above hot shutdown (Modes 1-3) for McGuire and Catawba Nuclear Stations and prior to placing Low Pressure Injection in service at the Oconee Nuclear Station.

Once Mode 4 has been entered for McGuire and Catawba, or Low Pressure Injection has been placed in service for Oconee, then refer to the respective "Mode 4" or "Between 250F/350# and Cold Shutdown" PRA Equipment List in this procedure. The equipment on this list must be protected in this plant configuration anticipating continued cooldown or heatup. **This list is not meant to be all inclusive for Mode 4 or Between 250F/350# and Cold Shutdown.** This list serves as a bridge between the PRA Matrix and NSD 403 for the functions that have to be protected during shutdown (Modes 5, 6, and No Mode) per Maintenance Rule. **This list should NOT be used as a substitute for Tech Specs / SLC compliance.** This site specific list will serve as the risk assessment for this plant configuration or mode.

NSD 403, Shutdown Risk Management, will be used for assessment of equipment removal from service in the shutdown modes (5, 6 and no mode, <200°F). These modes of operation will not be addressed in this WPM.

Limitation 1 - The Matrix Does Not Cover All Equipment

The Maintenance Rule A(3) assessment is not limited to the systems on the matrix. It covers the "total plant equipment that is out of service." In order to keep the matrix to a manageable level, only the most important systems were put on the matrix. Also, some important systems are not on the matrix because it was not expected that they would ever be intentionally taken out of service. It is possible that some unexpected combinations

of equipment could be out of service that might have an affect on safety functions. **We must rely on operator judgment to address these situations.**

Limitation 2 - The Matrix Was Developed by Looking at Combinations of Two Systems at a Time

The Matrix was developed by the Maintenance Rule Expert Panel. This panel consisted of representatives from Operations, Mechanical and Electrical Systems Engineering and PRA. The matrix identifies combinations of systems that should not be out of service at the same time (RED on the Matrix) and combinations of systems that would be allowed out of service at the same time but are related in some way that could affect safety (YELLOW on the Matrix). The panel attempted to protect safety function redundancy, the ability to mitigate transients and considered important PRA sequences. Generally, interactions that are blank (or WHITE) were considered to be acceptable. However, this Expert Panel review was primarily considering systems TWO at a time. It is possible that if multiple systems were all out at the same time, there could be an additive impact on independent safety functions. **We must rely on operator judgment to address these situations.**

Limitation 3 - Systems May Be Degraded But Not Out Of Service

WPM-607 only requires the assessment be performed when systems are out of service that affect a Tech. Spec. or SLC. It is possible that some important safety functions may be degraded but not out of service. This in combination with other systems being out of service could affect safety function. **We must rely on operator judgment to address these situations.**

ORAM-Sentinel is used concurrently with the PRA Matrix. The guidelines for utilizing the ORAM-Sentinel software application for managing risk are provided in WPM 608 (for outages) and WPM 609 (for innages).

607.4 Responsibilities:

607.4.1 **Work Control Superintendent:** Has the responsibility for this Directive and the assessment process. In addition, is responsible to ensure the Work Control portion of the process is performed.

607.4.2 **Operations Superintendent:** Has the final responsibility to ensure the assessment has been performed and documented in accordance with this directive.

607.4.3 **Innage Manager:** Properly integrates all innage work activities.

607.4.4 **Outage Manager:** Properly integrates all outage work activities.

607.4.5 **Work Window Managers (WWM):** Will review the projected schedule when work is to be done by Execution and Support groups. Ensures schedule is developed in accordance with this procedure. Assists in conflict resolution.

- 607.4.6 **Unit Schedulers:** Utilize this procedure as an aid to develop the schedule in order to prevent conflicts in scheduling systems, structures, and/or components.
- 607.4.7 **Discipline Schedulers:** Utilize this procedure as an aid to develop the schedule in order to prevent conflicts in scheduling systems, structures, and/or components.
- 607.4.8 **Operations Matrix Support:** Perform a risk assessment of scheduled work using expected plant conditions, the PRA Matrix or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.
- 607.4.9 **Operations SRO:** Perform the final risk assessment of scheduled work using actual plant conditions, the PRA Matrix, or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List. Documents the assessment prior to signing clearance to begin work.
- 607.4.10 **Shift Work Manager:** Responsible for ensuring resolution of risk assessment conflicts during the execution week in accordance with this procedure.
- 607.4.11 **Operations Unit Managers Group:** Responsible for reviewing the schedule, assisting the operations SRO with final risk assessment, and assisting in conflict resolution and resolve conflicts per the Conflict of Resolution section of this procedure.
- 607.4.12 **Operations Shift Manager:** Will assist in the resolution of conflicts as necessary to ensure compliance with the PRA Matrix, or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.
- 607.4.13 **Plant Operations Review Committee (PORC):** The Plant Operations Review Committee will assist with conflict resolution by reviewing and approving scheduled work outside the PRA Matrix. Any matrix conflict decision reached by the PORC will be documented in the meeting minutes and can be applied to identical conflicts that occur in the future (without having to reconvene the PORC).
- 607.4.14 **Severe Accident Analysis Section:** The Severe Accident Analysis Section will assist the Plant Operations Review Committee in conflict resolution by providing probabilistic risk assessment analyses and insights.
- 607.4.15 **Operations Work Process Manager (OWPM):** The Operations Work Process Manager (OWPM) has the overall responsibility for providing operations focus into the site work scheduling plan. OWPM will provide a detailed schedule review to ensure compliance with Tech Specs, SLC, and PRA concerns.

607.5 Procedure:

607.5.1 Schedule Development

NOTE: If the plant is expected to be in Modes 1-3 at McGuire or Catawba, or above 250F/350# at Oconee, then use the matrix for schedule development. If the plant is expected to be in Mode 4 (CNS or MNS), or Between 250F/350# and Cold Shutdown (at ONS), then use the appropriate PRA Equipment List (equipment protected during this mode or configuration). If the plant is expected to be in cold shutdown, refueling, or defueled, then use site specific shutdown risk management guidelines for schedule development.

607.5.1.1 The Unit and Discipline Schedulers will develop a projected schedule prior to the execution week that complies with the PRA Matrix, or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.

607.5.1.2 The Work Window Managers and the Unit Work Managers (Innage and Outage) will review and revise the schedule as necessary to ensure compliance with the PRA Matrix, or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.

607.5.2 Schedule Review

607.5.2.1 Prior to the commitment meeting, Operations Work Process Managers Group shall review the projected schedule, identify potential conflicts with the PRA Matrix or appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List and communicate concerns to the responsible Work Window Manager. The Work Window Manager will resolve conflicts per Resolution of Conflicts section of this procedure.

607.5.2.2 During the execution week, the OPS Matrix, or similarly qualified individual, will use the PRA Matrix, or appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List, to assess the acceptability of the schedule considering expected plant conditions. If unacceptable conditions are identified, the OPS Matrix will resolve conflicts per Resolution of Conflicts section of this procedure.

607.5.3 Work Order Review And Clearance to Begin Work

607.5.3.1 Work Control and/or Operations Work Process Managers Group will provide appropriate information to the Operations SRO so that the schedule can be adequately assessed using the PRA Matrix or

appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.

607.5.3.2 Operations SRO will use the PRA Matrix or appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List to assess the acceptability of the schedule considering current plant conditions. If unacceptable conditions are identified, the SRO will consult with the WWM, Shift Work Manager or Operations Unit Managers Group for resolution of conflicts per Resolution of Conflicts section of this procedure.

607.5.3.3 Operations SRO will conduct a separate assessment for each unit for all TSAIL / Tech Spec Logbook entries related to the PRA Matrix, or the appropriate Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List and document in the TSAIL/Tech Spec Logbook.

607.5.4 Resolution Of Conflicts

607.5.4.1 Coordinate work to eliminate schedule conflicts (i.e. - wait for conflicting equipment to be returned to service prior to allowing work to begin on component in question).

607.5.4.2 Have work rescheduled to eliminate the conflict.

607.5.4.3 If it is desired to perform the work, or if it must be completed as scheduled, contact SWM or WWM to facilitate Plant Operating Review Committee (PORC) review and approval of work that is outside the PRA Matrix, or outside the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List guidelines. If necessary, the PORC may request a special PRA analysis be performed by the Severe Accident Analysis Section to aid in the decision making process.

607.5.4.4 If the plant is found to be in an unacceptable PRA Matrix configuration due to equipment failure, then the Shift Work Manager will determine the best way to get the plant out of the unacceptable configuration. Options for the Shift Work Manager's consideration are: 1) back out of work in progress, 2) work continuously as necessary, 3) call in additional resources as necessary, 4) contact the duty Station Manager for additional guidance, and 5) consult the Operations Shift Manager.

607.5.4.5 If the plant is being kept in Mode 4 for McGuire and Catawba, or on Low Pressure Injection for Oconee, with no plans to enter the cold shutdown mode, and it is desired to work on equipment listed on the site specific Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List then contact the PORC for review and approval.

607.5.4.6 Any PORC decision made on a matrix conflict will be documented in the meeting minutes, communicated to the appropriate WWM and WC SRO, and referenced in the proposed and / or committed schedule.

607.5.5 Use Of Matrix During Schedule Development

NOTE: When support systems, such as for 4.16kv essential power, RN, and KC (at CNS), are out of service, many of the systems (referred to as dependent systems) that they support are considered inoperable. If a dependent system cannot perform its intended function, then the support system **and** the dependent system are **both highlighted** on the matrix. Any matrix interactions created directly by the support system and its associated dependent system(s) are expected, and the resulting interactions should **not** be included in the final count. This is because the dependent system is unable to perform its intended function while the support system is out of service, **so simultaneous work should be allowed on these systems**. However, interactions caused by the inoperability of other systems (not dependent on the support system) and support systems/dependent systems **shall** be included in the final count of interactions.

In some cases a support system may be out of service but the dependent systems may still be able to perform their Maintenance Rule Risk Significant functions. Examples of this include CA motor driven pumps when the Emergency Diesel Generator is out of service (MNS only), or the CA motor driven pumps when in the KC cross train alignment (CNS only). Therefore, if the dependent systems are considered technically inoperable because a support system is out of service (i.e. - per Technical Specifications), but are still functional, do **not** highlight the dependent systems on the matrix.

NOTE: When removing equipment from service it is necessary to consider the limitations of the matrix. For equipment not covered by the matrix, work control personnel (operations matrix) should use their best judgment to determine the impact on plant configuration and safety. If necessary they may contact the Severe Accident Analysis Group for aid in the decision making process.

NOTE: If the plant is in a condition where the PRA Matrix applies (Modes 1-3 at CNS & MNS and above 250F/350# at ONS) use steps 607.5.5.1 through 607.5.5.8.

607.5.5.1 Gather risk significant system information from projected schedule.

607.5.5.2 Evaluate each work item to determine applicability to PRA Matrix, and generate a list of items that affect the matrix.

607.5.5.3 Highlight (horizontally and vertically) the PRA Matrix items which are not related to the schedule that is being developed (i.e. - items already known to be, or expected to be, out of service).

607.5.5.4 Highlight (horizontally and vertically) the PRA Matrix items which are related to the schedule being developed (i.e. - items that are planned to be made out of service during the execution period).

607.5.5.5 Identify the intersections with all PRA significance indicated (interactions).

607.5.5.6 Bold PRA indicates there is a major interaction, and the work items should not be scheduled at the same time.

607.5.5.7 Non-bold PRA indicates there is a minor interaction. If there are 2 or more minor interactions on a system, then the work items should not be scheduled at the same time.

607.5.5.8 Any conflicts identified during schedule development will be resolved per the Resolution of Conflicts section of this procedure.

NOTE: If the plant is in a condition where the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List applies, then use steps 607.5.5.9 through 607.5.5.11.

607.5.5.9 Gather risk significant system information from projected schedule.

607.5.5.10 Evaluate each work item to determine applicability to the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List, and generate a list of work items that affect the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List.

607.5.5.11 Do not schedule work on any item that affects the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List without PORC review and approval.

607.5.6 Use of Matrix During Schedule Execution

NOTE: It is important to realize that adherence to the Maintenance Rule does not substitute for, nor replace, Tech Spec/SLC compliance. The requirements of the matrix are consistent with Duke Power's conservative decision making, and generally they are more conservative than Technical Specifications; however, they are NOT a substitute for Technical Specifications. Tech Spec/SLC compliance is always the overriding factor when any conflicting issue arises.

INFORMATION ONLY

WPM 607, Maintenance Rule Assessment
Of Equipment Removed From Service

Rev. 7 |

NOTE: When removing equipment from service it is necessary to consider the limitations of the matrix. For equipment not covered by the matrix, operators should use their best judgment to determine the impact on plant configuration and safety. If necessary the operator may contact the Severe Accident Analysis Group for aid in the decision making process.

NOTE: When support systems, such as for 4.16kv essential power, RN, and KC (at CNS), are out of service, many of the systems (referred to as dependent systems) that they support are considered inoperable. If a dependent system cannot perform its intended function, then the support system and the dependent system are both highlighted on the matrix. Any matrix interactions created directly by the support system and its associated dependent system(s) are expected, and the resulting interactions should not be included in the final count. This is because the dependent system is unable to perform its intended function while the support system is out of service, so simultaneous work should be allowed on these systems. However, interactions caused by the inoperability of other systems (not dependent on the support system) and support systems/dependent systems shall be included in the final count of interactions.

In some cases a support system may be out of service but the dependent systems may still be able to perform their Maintenance Rule Risk Significant functions. Examples of this include CA motor driven pumps when the Emergency Diesel Generator is out of service (MNS only), or the CA motor driven pumps when in the KC cross train alignment (CNS only). Therefore, if the dependent systems are considered technically inoperable because a support system is out of service (i.e. - per Technical Specifications), but are still functional, do not highlight the dependent systems on the matrix.

NOTE: If the plant is in a configuration where the Mode 4 / Between 250F/350# and Cold Shutdown PRA Equipment List applies, then do not allow work to proceed on equipment on the list unless prior review and approval is given by the PORC.

NOTE: If the plant is in a configuration where the PRA Matrix applies (Modes 1-3 at CNS and MNS and above 250F/350# at ONS) then use the steps listed below.

NOTE: A separate PRA Matrix assessment will be completed for each unit.

607.5.6.1 Gather current plant status information via TSAIL/Tech Spec Log and evaluate each TSAIL/Tech Spec Logbook item to determine applicability to the PRA Matrix.

607.5.6.2 Identify PRA Matrix items from the TSAIL/Tech Spec. log and highlight both horizontally and vertically on the matrix.

607.5.6.3 For each work order that requires a TSAIL/Tech Spec Logbook entry, evaluate its applicability to the PRA Matrix. In order to assist the SRO in determining the function and Technical Specification relationship they should use the site specific PRA Matrix Functions and Tech Spec/SLC Correlation attachment. If the work order does affect the matrix, then identify this item both horizontally and vertically, and identify each PRA interaction.

607.5.6.4 Bold PRA indicates there is a major interaction, and the work items should not be scheduled at the same time.

607.5.6.5 Non-bold PRA indicates there is a minor interaction. If there are 2 or more minor interactions on a system, then the work items should not be scheduled at the same time.

607.5.6.6 Any conflicts identified will be resolved per Section 607.5.4 - Resolution of Conflicts. Information related to conflict resolution will be forwarded to the Work Control Center SRO.

607.5.6.7 If at anytime an unplanned BOLD/RED or TWO Non-BOLD/YELLOWS in the same row or column condition is entered on the PRA matrix then document this entry using Attachment 607.6.14 "Documentation of an Unplanned BOLD/RED or TWO Non-BOLD/YELLOW INTERACTIONS in the same row or column on the PRA Matrix".

607.5.6.8 The documentation will be completed by the Work Control Center SRO. Copies of the documentation will be distributed by the Work Control Center SRO to 1) Severe Accident Analysis Group in the General Office, 2) Site Maintenance Rule Coordinator.

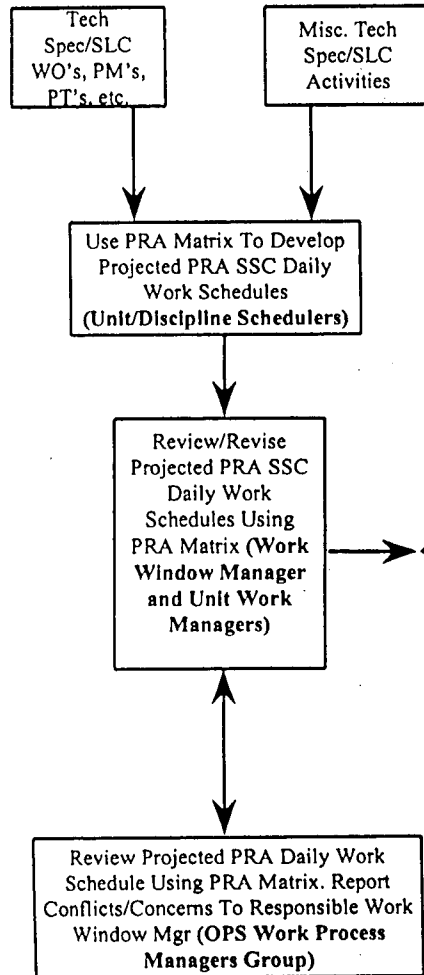
607.6 Attachments

- 607.6.1 Maintenance Rule Risk Assessment Flowpath
- 607.6.2 Oconee Nuclear Station PRA Matrix
- 607.6.3 Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation
- 607.6.4 Oconee Nuclear Station PRA Matrix Interaction Bases
- 607.6.5 McGuire Nuclear Station PRA Matrix
- 607.6.6 McGuire Nuclear Station PRA Matrix Functions
- 607.6.7 McGuire Nuclear Station PRA Matrix Interaction Bases
- 607.6.8 Catawba Nuclear Station PRA Matrix
- 607.6.9 Catawba Nuclear Station PRA Matrix Functions
- 607.6.10 Catawba Nuclear Station PRA Matrix Interaction Bases
- 607.6.11 Oconee Nuclear Station Between 250F/350# and Cold Shutdown PRA
Equipment List
- 607.6.12 McGuire Nuclear Station Mode 4 Equipment List
- 607.6.13 Catawba Nuclear Station Mode 4 Equipment List
- 607.6.14 Documentation of an Unplanned BOLD/RED or TWO Non-BOLD/YELLOW
INTERACTIONS in same row or column on the PRA Matrix.

WPM 607 Attachment 607.6.1: Maintenance Rule Risk Assessment Flowpath
Assessment Of Maint Rule TS/SLC's To Be Removed From Service For Modes Above Cold Shutdown

Scheduling Phase

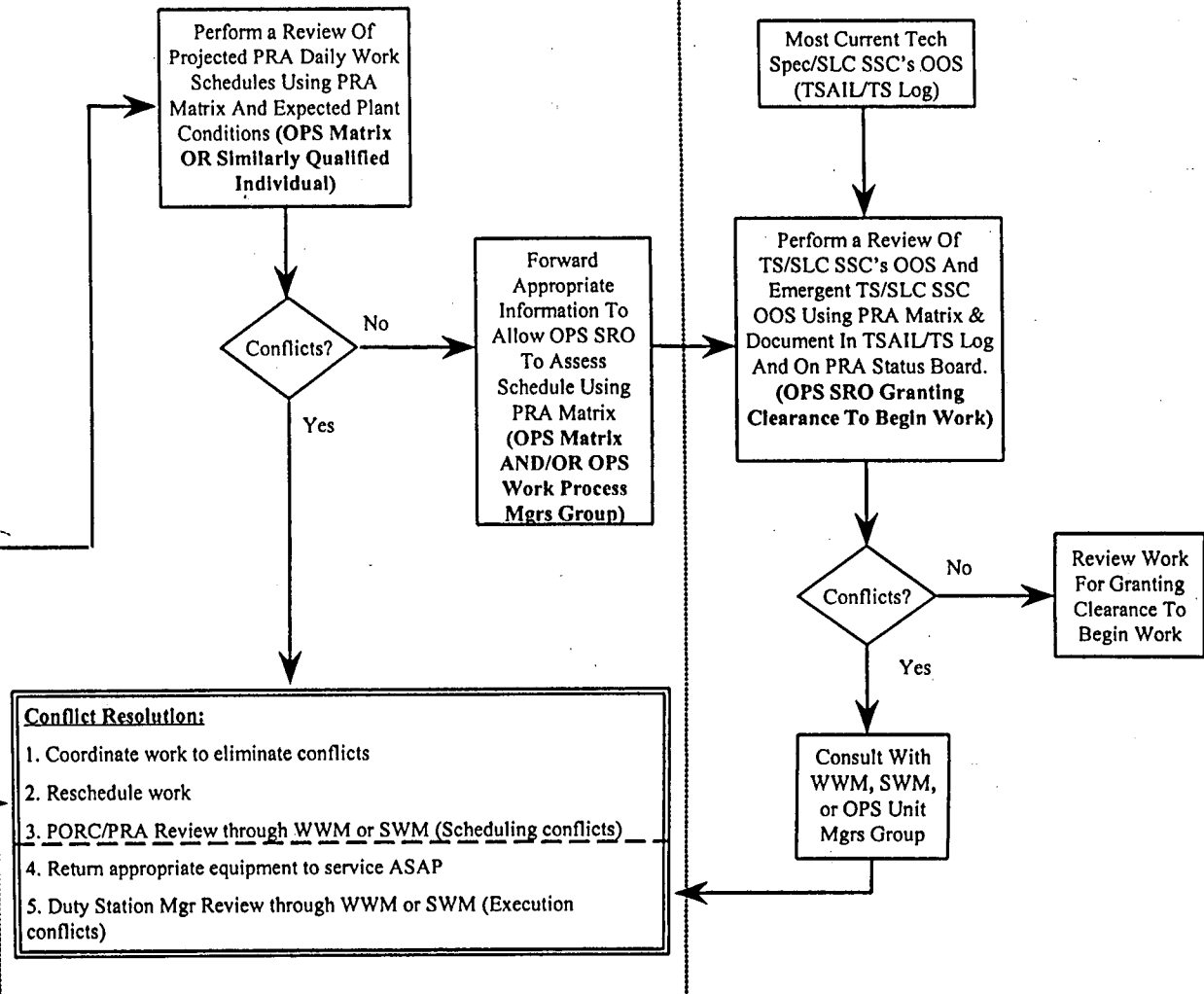
Projected Schedule Development
 Projected Schedule Review
 (Scheduling, Unit Work Managers, OPS Work Process Managers Group-OWPM)



Execution Phase

Operations Matrix Review
 Assessment/Oversight Of Daily
 Projected Work Schedule
 (OPS Matrix Coordinators/OPS Work Process Managers Group)

Work Control Center Review
 Continuous Assessment/Oversight Of
 MR TS/SLC SSC's To Be Removed From
 Service Considering Emergent Work/
 Changing Conditions
 (SRO Granting Clearance To Begin Work)



INFORMATION ONLY

INFORMATION ONLY

WPM 607 Attach. 607.6.2 ONS PRA Matrix (Rev.7)			Oconee Unit #		Risk Assessment Matrix																	Prepared By:			
CAUTION This Matrix Does NOT Replace the Technical Specifications. Tech specs should be reviewed prior to using the matrix. Matrix applies >250 degF / 350 psi			Date/Time From:										Until:												
			Electrical						SG Cooling			Cooling Water			ECCS					Containment			SSF		
			YLP/OSP	KOH+	KUG+	KE-ALL	LCP	OEM	EFW/MDP	EFW/TDP	ASW/MS	CCW	HPS	LPS	CF	HPI	RCPS	LPI	BWST	RBI	RBC	BS	RCM	SASW	
Electrical	230kV Switchyard Power System Offsite Power	YLP/OSP	PRA	PRA	PRA	PRA	PRA				PRA											PRA	Note 1		
	Keowee Overhead Path (Note 1)	KOH+	PRA		PRA		PRA	PRA			PRA											PRA	PRA		
	Keowee Under Ground Path (Note 1)	KUG+	PRA	PRA			PRA	PRA			PRA											PRA	PRA		
	Keowee Both Units (Note 1)	KE-ALL	PRA				PRA	PRA			PRA											PRA	PRA		
	Lee/Central Power System	LCP	PRA	PRA	PRA	PRA		PRA														PRA	Note 1		
	4160VAC Auxiliary Power System	OEM	PRA	PRA	PRA	PRA			PRA			PRA										PRA	PRA		
SG Cooling	Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP							PRA					PRA				PRA					PRA		
	Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	PRA	PRA	PRA		PRA	PRA			PRA		PRA				PRA					PRA		
	Auxiliary Service Water (Aux Bldg)/MS Atmospheric Dump Valves	ASW																					PRA		
Cooling Water	Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW									PRA			PRA				PRA			PRA	PRA			
	High Pressure Service Water System	HPS	PRA	PRA	PRA	PRA		PRA			PRA		PRA									PRA	PRA		
	Low Pressure Service Water System (including CCW first siphon)	LPS							PRA			PRA			PRA	PRA				PRA	PRA	Note 1			
ECCS	Core Flood System	CF															PRA	PRA							
	High Pressure Injection System	HPI						PRA	PRA		PRA		PRA			PRA						PRA	Note 2		
	RC Pump Seal Protection	RCPS											PRA		PRA			PRA				PRA			
	Low Pressure Injection System	LPI											PRA							PRA	PRA	Note 3			
	Borated Water Storage Tank	BWST							PRA	PRA		PRA			PRA					PRA		PRA	PRA		
Containment	Containment Isolation Penetrations & Valves	RBI																			PRA	PRA			
	Reactor Building Cooling System	RBC														PRA	PRA	PRA		PRA					
	Reactor Building Spray System	BS									PRA		PRA			PRA		PRA		PRA					
SSF	SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	PRA	PRA	PRA		PRA				PRA	PRA	PRA		PRA	PRA	PRA							
	SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	Note 2	PRA	PRA	PRA	Note 3	PRA	PRA	PRA	PRA	PRA	PRA	Note 2		Note 2		Note 2	PRA						

LEGEND :

Same System

PRA Not Allowed

PRA Interaction (2 or More Not Allowed in Same Row or Column)

NOTE 1: When both Keowee units are out of service, ONLY the Keowee Both units column/row is used for risk assessment.

NOTE 2: Taking SSF completely out of service counts as one minor PRA interaction

WPM 607 Attachment 607.6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX/SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION CATEGORY NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	TS/SLC	TS/SLC2	TS/SLC3	TS/SLC4	TS/SLC5	TS/SLC6	TS/SLC8	COMMENTS
Electrical	230 KV Switchyard Offsite Power System	YLP/OSP	YLP/OSP	YLP.2	230kV Switchyard Power System	Serves as an offsite source of auxiliary power to each Oconee and Keowee unit.	3.8.1.a; Cond A or J							Any work can be considered risk significant at the discretion of Switchyard Coordinator
Electrical	230 KV Switchyard Offsite Power System	KOH +	YLP	YLP.3	230kV Switchyard Power System	Functions during a loss of offsite power event or an ESF actuation with degraded grid to automatically separate the 230 kV switchgear from the grid and provide a clear, emergency path from Keowee to each Oconee units' auxiliary power system.	3.3.19							
Electrical	Keowee Hydro	KOH + or KUG + or KE-ALL	KU + 1	KU + .1	Keowee Hydro Unit	Supply emergency electric power to one or more Oconee units through the overhead or emergency power paths.	TS 3.8 as listed below.							Only affects one of the matrix systems: KOH +, KUG +, or KE-ALL
Electrical	Keowee Overhead Power Path	KOH +	KOH +	KOH + .1	Keowee Overhead	Provide emergency 6900V and 4160V power to Oconee auxiliaries from a Keowee Unit, through the 230 kv switchyard to all three Oconee unit CT transformers.	3.8.1.a.2; Cond A or C							
Electrical	Keowee Underground Power System	KUG +	KUG +	KUG.1	Keowee Under Ground Path	Provide emergency 4160V power through a dedicated underground power path and CT-4 to the Oconee emergency standby buses.	3.8.1.b; Cond D							
Electrical	Keowee- Both Units	KE-ALL	KE-ALL	KU	Keowee- Both Units	Provide emergency hydro electric power to the Keowee Overhead and Underground power paths.	3.8.1.b; Cond G, H, or I							
Electrical	Lee/Central Power System	LCP	LCP	LCP.1	Lee/Central Power System	Alternate off site power supply from Lee Steam Station to Standby Buses SL Breakers when 230 KV power supply, and Keowee power paths are not available.	16.8.6							
Electrical	4160VAC Power System	OEM	OEM	OEM.1	4160VAC Auxiliary Power System	Provide safety-related power at adequate voltage to all safety-related loads and certain non-safety-related loads. (I.e., those fed from the main feeder buses and from the 4kv switchgear TC, TD and TE).	3.8.8.a; Cond A	3.8.8.b; Cond B						
Electrical	4160VAC Power System	OEM	OEM	OEM.2	4160VAC Auxiliary	Breakers operate in response to load shed, EPSL, and breaker control signals.	3.8.9							Applicable to MFBs & ES power strings only.
SG Cooling	Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP	EFW	EFW.1	Emergency Feedwater System	Provide an assured source of feedwater to the steam generators to remove decay heat until the LPI system may be operated (Motor Driven Pump Only).	3.7.6; Cond A, C, or F	3.3.14						Two MDEFDWP's may be removed from service by TS 3.7.6; Condition C. All efforts shall be made to prevent entering this TS.
SG Cooling	Emergency Feedwater System Turbine Driven Pump	EFW/TDP	EFW	C.1	Emergency Feedwater System	Provide an assured source of feedwater to the steam generators to remove decay heat until the LPI system may be operated (Turbine Driven Pump Only).	3.7.6; Cond B or D	3.3.14						TS apply only when TDEFDWP is removed from service.
SG Cooling	Emergency Feedwater System Turbine Driven Pump	EFW/TDP	C	C.2	Condensate System	Upper Surge Tanks provides primary source of emergency feedwater for emergency feedwater pumps.	3.7.6							
SG Cooling	Emergency Feedwater System Turbine Driven Pump	EFW/TDP	AS	AS.1	Auxiliary Steam	Supply steam to TDEFDWP	3.7.5; Cond B or D							

INFORMATION ONLY

WPM 607 Attachment 6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION SYSTEM NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	TS/SLC1	TS/SLC2	TS/SLC3	TS/SLC4	TS/SLC5	TS/SLC6	COMMENTS
SG Cooling	Emergency Feedwater System Turbine Driven Pump	EFW/TDP	C	C.2	Condensate System	Condenser Hotwell provides the backup source of emergency feedwater for the emergency feedwater pumps.	3.7.6						
SG Cooling	Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP	C	C.1	Condensate System	Upper Surge Tanks provides primary source of emergency feedwater for emergency feedwater pumps.	3.7.6						
SG Cooling	Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP	C	C.2	Condensate System	Condenser Hotwell provides the backup source of emergency feedwater for the emergency feedwater pumps.	3.7.6						
SG Cooling	Aux Service Water (Aux Building)	ASW	ASW	ASW.1	Auxiliary Service Water	Supplies raw water to SGs for decay heat removal.	16.9.9 Action 1						
SG Cooling	Aux Service Water (Aux Building)	ASW	ASW	ASW.2	Auxiliary Service Water	Supplies backup cooling water to HPI pump motor coolers.	16.9.9 Action 1						
SG Cooling	Aux Service Water (Aux Building)/ MS Atmospheric Dump Valves	ASW	ASW	ASW.3	Auxiliary Service Water (Aux Building)	Switchgear provides backup power to the HPIP motors.	16.9.9 Action 1						
SG Cooling	Aux Service Water (Aux Building/ Main Steam Atmospheric Dump Valves	ASW	MS	MS.11	Main Steam System	Provide for decay heat removal via the atmospheric dump valves	16.9.9						

Cooling Water	Low Pressure Service Water	LPS	CCW	CCW.2	Condenser Circulating Water System (CCW)	Provide suction source for water to the following services: - HPS Pumps - LPS Pumps	16.9.7; Cond A or E.	16.9.7; Cond C (U1 Only)	3.7.8				Must cause entry into TS 3.0.3 or 3.7.7 because of one of the mentioned SLCs
Cooling Water	Low Pressure Service Water	LPS	LPS	LPS.6	Low Pressure Service Water System	Provide Component Cooling system cooling water	16.9.7; Cond A or E.	16.9.7; Cond C (U1 Only)	3.7.8				
Cooling Water	Condenser Circulating Water (Integrity on any Unit)	CCW	8076	CCW.7	Auxiliary Building	Prevent TB flooding from entering the Aux Building.	16.9.11						
Cooling Water	Condenser Circulating Water (Integrity on any Unit)	CCW	CCW	CCW.7	Condenser Circulating Water System (CCW)	Maintain system integrity to prevent TB Flood.	16.9.11						
Cooling Water	High Pressure Service Water	HPS	HPS	HPS.5	High Pressure Service Water System	Provide automatic and manual backup cooling water for HPI pump motors.	16.9.8.a						
Cooling Water	High Pressure Service Water	HPS	HPS	HPS.6	High Pressure Service Water System	Provide sealing and cooling water to CCW pumps and motors.	16.9.7; Cond A	16.9.8 (U1 Only)					
Cooling Water	High Pressure Service Water	HPS	HPS	HPS.7	High Pressure Service Water System	Provide automatic or manual backup cooling water to TDEFWP cooling jacket.	16.9.8.a						
Cooling Water	Low Pressure Service Water	LPS	LPS	LPS.1	Low Pressure Service Water System	Provide cooling water from the CCW intake to the RBCUs, LPI Coolers, HPI Pump Motor Bearing Coolers, TDEFDWP Bearing Cooling Jackets - Motor Driven EFW Pump Motors.	16.9.7; Cond A or E.	16.9.7; Cond C (U1 Only)	3.7.7				

ECCS	Core Flood System	CF	CF	CF.4	Core Flood System	Provide injection of core flood tank contents into the RCS following postulated DBEs	3.5.1						
------	-------------------	----	----	------	-------------------	--	-------	--	--	--	--	--	--

INFORMATION ONLY

WPM 607 Attachment 607.6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION SYSTEM NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	TS/SLC1	TS/SLC2	TS/SLC3	TS/SLC4	TS/SLC5	TS/SLC6	COMMENTS
ECCS	High Pressure Injection System	HPI	HPI	HPI.1	High Pressure Injection	Inject borated water into the RC System during postulated DBEs.	18.6.13.a	18.6.13.b					
ECCS	High Pressure Injection System	HPI	HPI	HPI.2	High Pressure Injection System	Provide intermediate core cooling following a small break LOCA by recirculating injection water from the RB sump to the RCS using the LPI pump discharge line as a suction source (piggy-back mode) until cooldown to LPI can be achieved..	3.5.2						Includes associated interpretations.
ECCS	RC Pump Seal Protection	RCPS	HPI	HPI.5	High Pressure Injection	Provide RCP seal injection	18.9.10						
ECCS	RC Pump Seal Protection	RCPS	CC	CC.3	Component Cooling	Component Cooling of RCP Thermal Barrier	18.9.10						
ECCS	Low Pressure Injection System	LPI	LPI	LPI.1	Low Pressure Injection System	Provide injection of borated fluid from the BWST after postulated DBEs to assure adequate shutdown margin and core cooling. (OPS) Include required instruments.	3.5.3	3.5.4					
ECCS	Low Pressure Injection System	LPI	LPI	LPI.2	Low Pressure Injection System	Provide for long term heat removal after LOCAs by recirculating fluid from the emergency reactor building sump.	3.5.3						
ECCS	Low Pressure Injection System	LPI	LPI	LPI.4	Low Pressure Injection System	Provide indication of BWST level for switchover to RB Emergency Sump, if necessary, after Design Basis Events.	3.3.8; Cond E (Function 14)						
ECCS	Low Pressure Injection System	LPI	LPI	LPI.6	Low Pressure Injection System	Supply water from the RB emergency sump to the HPI and RB spray pumps after a small break LOCA (piggy-back mode - provide NPSH for HPI/RBS pumps).	3.5.2; Cond C	3.5.4	3.5.3				
ECCS	Low Pressure Injection System	LPI	LPI	LPI.7	Low Pressure Injection System	Provide RCS circulation to prevent boron precipitation after a LOCA.	3.5.3						
ECCS	Borated Water Storage Tank	BWST	LPI	LPI.3	Low Pressure Injection	Provide a source of borated water from the BWST to the HPI and RB spray pumps.	3.5.4	3.5.3	3.5.2; Cond D				
Containment	Containment Isolation Penetration and Valves	RBI	RBI	RBI+.1	Containment Isolation Penetrations & Valves	Ensure that RB atmosphere leakage is minimized for all conditions. (Includes the equipment, personnel and emergency personnel hatches and the electrical and mechanical system.)	3.6.1	3.6.2	3.6.3	3.6.4			
Containment	Reactor Building Cooling System	RBC	RBC	RBI+.1	Reactor Building Cooling System	Provide sufficient heat removal from the containment atmosphere during post accident conditions to assist in maintaining RB atmosphere within the environmental envelope to assure component operability.	3.6.5; Cond B, C, E, or H						
Containment	Reactor Building Spray System	BS	BS	BS.2	Reactor Building Spray System	Provide Reactor Building pressure and temperature reduction by using the BWST or the RB Building Emergency Sump as a suction source.	3.6.5; Cond A, C, F or H						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator/SSF Aux Service Water System	RCN/SASW	DGA+.1	DGA+.2	SSF	Provides for an independent emergency source of electrical power to support the essential SSF system loads.	TS 3.10 as listed below						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	RCM	RCM.2	Reactor Coolant Makeup System	Supply cooling water from the SFP to the RCP seals to prevent seal LOCA.	3.10.1.c; Cond C						

INFORMATION ONLY

WPM 607 Attachment 6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION SYSTEM NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	T3/SLC1	T3/SLC2	T3/SLC3	T3/SLC4	T3/SLC5	T3/SLC6	COMMENTS
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	RCM	RCM.3	Reactor Coolant Makeup System	Provide RCS letdown capability to the SFP.	3.10.1.c; Cond C						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SF	SF.1	Spent Fuel Cooling System	Provide SSF makeup source and letdown storage capability for RCS inventory.	3.10.1.c; Cond C						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SVA	SVA.1	SSF 120VAC Vital Power System	Provides DC inverted 120VAC power to instrumentation and control loads.	3.10.1.d; Cond D	3.10.2					
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SVD	SVD.1	SSF 125vdc Power System	Provide a reliable source of continuous power for controls, instrumentation, and inverters.	3.10.1.d; Cond D	3.10.2					
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SVD	SVD.2	SSF 125vdc Power System	Provide a reliable source of power for DC loads required for a black start of the diesel.	3.10.1.d; Cond D	3.10.2					
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SDG	SDG.1	SSF Generator Power System	Provide power to the 4000V essential SSF loads in case normal power supplies are lost. (Includes Generator)	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SDG	SDG.2	SSF Generator Power System	Provide power to the 800V essential load center through the 4160/800V essential load center transformer.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SML	SML.1	SSF Auxiliary Power System	Supply power to the 600 VAC, 208 VAC and 120 VAC vital SSF loads.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SML	SML.2	SSF Auxiliary Power System	Provide electrical isolation of SSF equipment from non-SSF equipment.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	SML	SML.4	SSF Auxiliary Power System	Provide RC pressure control through manually controlled pressurizer heaters.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	AE	AE.1	Air Intake and Exhaust System	Provide air intake and exhaust for the SSF diesel engines.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DE	DE.1	Diesel Engine	Provide motive power to supply the SSF emergency generator in case normal power supplies are lost.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DJW	DJW.1	Diesel Jacket Water Cooling System	Provide jacket cooling and lube oil cooling for the SSF diesel generator.	3.10.1.d; Cond D	3.10.1.b; Cond B					
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DJW	DJW.2	Diesel Jacket Water Cooling System	Maintains lube oil heating in standby.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DFO	DFO.1	Fuel Oil System - SSF	Provide fuel oil supply to the diesel engines.	3.10.1.d; Cond D						

NO FORN DISSEM

WPM 607 Attachment 607.6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION SYSTEM NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	TS/SLC1	TS/SLC2	TS/SLC3	TS/SLC4	TS/SLC5	TS/SLC6	COMMENTS
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DFO	DFO.2	Fuel Oil System - SSF	Provide heat sink for diesel engine injectors.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	GO	GO.1	Governor	Provide speed control for the SSF diesel engines.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DLO	DLO.1	Lube Oil System - Diesel	Provide lube oil supply to the SSF diesel generator.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	HVC	HVC.1	SSF HVAC System	Provide heating, ventilation and air conditioning for the SSF.	3.10.1.d; Cond D						
SSF	SSF RCMU Reactor Coolant Makeup System or Diesel Generator	RCM	DA	DA.1	Starting Air System	Provide starting air for the SSF diesel engine.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	SASW	SASW.1	SSF Auxiliary Service Water System	Provide a source of water from the Unit 2 CCW inlet piping for OTSG secondary side cooling.	3.10.1.a; Cond A	3.10.1.d; Cond D					
SSF	SSF Auxiliary Service Water System	SASW	SASW	SASW.2	SSF Auxiliary Service Water	Drive the SSF-CCW suction line air ejector.	3.10.1.a; Cond A						
SSF	SSF Auxiliary Service Water System	SASW	SASW	SASW.3	SSF Auxiliary Service Water System	Use the submersible pump to replenish the Unit 2 CCW inlet pipe with raw water for the SSF.	3.10.1.b; Cond B						
SSF	SSF Auxiliary Service Water System	SASW	SASW	SASW.4	SSF Auxiliary Service Water	Provides cooling water for the HVAC heat exchanger.	3.10.1.a; Cond A						
SSF	SSF Auxiliary Service Water System	SASW	SASW	SASW.5	SSF Auxiliary Service Water	Provides cooling water for the diesel engine heat exchanger.	3.10.1.a; Cond A						
SSF	SSF Auxiliary Service Water System	SASW	SVA	SVA.1	SSF 120VAC Vital Power	Provides DC inverted 120VAC power to instrumentation and control loads.	3.10.1.d; Cond D	3.10.2					
SSF	SSF Auxiliary Service Water System	SASW	SVD	SVD.1	SSF 125vdc Power System	Provide a reliable source of continuous power for controls, instrumentation, and inverters.	3.10.1.d; Cond D	3.10.2					
SSF	SSF Auxiliary Service Water System	SASW	SVD	SVD.2	SSF 125vdc Power	Provide a reliable source of power for DC loads required for a black start of the diesel.	3.10.1.d; Cond D	3.10.2					
SSF	SSF Auxiliary Service Water System	SASW	SDG	SDG.1	SSF Generator Power	Provide power to the 4000V essential SSF loads in case normal power supplies are lost. (Includes Generator)	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	SDG	SDG.2	SSF Generator Power	Provide power to the 600V essential load center through the 4180/800V essential load center transformer.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	SML	SML.1	SSF Auxiliary Power	Supply power to the 600 VAC, 208 VAC and 120 VAC vital SSF loads.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	SML	SML.2	SSF Auxiliary Power	Provide electrical isolation of SSF equipment from non-SSF equipment.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	SML	SML.4	SSF Auxiliary Power	Provide RC pressure control through manually controlled pressurizer heaters.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	AE	AE.1	Air Intake and Exhaust	Provide air intake and exhaust for the SSF diesel engines.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	DE	DE.1	Diesel Engine	Provide motive power to supply the SSF emergency generator in case normal power supplies are lost.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	DJW	DJW.1	Diesel Jacket Water Cooling	Provide jacket cooling and lube oil cooling for the SSF diesel generator.	3.10.1.d; Cond D	3.10.1.b; Cond B					
SSF	SSF Auxiliary Service Water System	SASW	DJW	DJW.2	Diesel Jacket Water Cooling	Maintains lube oil heating in standby.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	DFO	DFO.1	Fuel Oil System - SSF	Provide fuel oil supply to the diesel engines.	3.10.1.d; Cond D						

INFORMATION ONLY

WPM 607 Attachment 6.3 (Rev.7)
Oconee Nuclear Station PRA Matrix Functions and Tech Spec/SLC Correlation

MATRIX TYPE	MATRIX SYSTEM DESCRIPTION	MATRIX SYSTEM	FUNCTION SYSTEM NAME	FUNCTION NUMBER	SYSTEM DESCRIPTION	SYSTEM FUNCTION	TS/SLC1	TS/SLC2	TS/SLC3	TS/SLC4	TS/SLC5	TS/SLC6	COMMENTS
SSF	SSF Auxiliary Service Water System	SASW	DFO	DFO.2	Fuel Oil System - SSF	Provide heat sink for diesel engine injectors.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	GO	GO.1	Governor	(1) Provide speed control for the SSF diesel engines.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	DLO	DLO.1	Lube Oil System	Provide lube oil supply to the SSF diesel generator.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	HVC	HVC.1	SSF HVAC System	Provide heating, ventilation and air conditioning for the SSF.	3.10.1.d; Cond D						
SSF	SSF Auxiliary Service Water System	SASW	DA	DA.1	Starting Air System	Provide starting air for the SSF diesel engine.	3.10.1.d; Cond D	3.18.6					
Miscellaneous		LPI	LPI	LPI.11	Low Pressure Injection	Control the temperature of the RCS during shutdown.	Shutdown Protection Plan						
Miscellaneous		LPI	LPI	LPI.6	Low Pressure Injection System	Provide long term RCS normal decay heat removal by recirculation of the RCS fluid and heat rejection to the LPSW.	3.5.3	3.5.4					
Miscellaneous		MISC	RC	RC.1	Reactor Coolant	Transfer heat from the reactor to the steam generators.	3.4.4	3.4.5					
Miscellaneous		MISC	RC	RC.2	Reactor Coolant System	Provide a barrier to prevent the release of fission products from the reactor core to the environment. (RCS pressure boundary)	Required						
Miscellaneous		CCW	B078	B078	Turbine Building	Provide a flood mitigating drain for internal and external flooding events.	16.9.11						
Miscellaneous		MISC	RC	RC.3	Reactor Coolant	Provide reactor core cooling.	3.4.4	3.4.5					
Miscellaneous		MISC	RC	RC.5	Reactor Coolant	Provide RCS pressure control (includes overpressure protection).	3.4.9	3.4.10					
Miscellaneous		MISC	CRD	CRD.3	Control Rod Drive	Drops control rods on a reactor trip signal.	3.1.4	3.3.4					
Miscellaneous		MISC	SF	SF.9	Spent Fuel Pool	Drain accumulated RB Spray water (post-accident) from the fuel transfer canal.	Required						

FOR INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
230kV Switchyard Power System Off-site Power			When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). Therefore, priority will be given to protecting functions that provide emergency power and Blackout mitigation.
230kV Switchyard Power System Off-site Power	YLP/OSP		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Keowee Overhead Path	KOH+	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the Overhead path from service at the same time would reduce the reliability of the emergency power source for Oconee. However the matrix would assure that the underground path was in service if switchyard work is in progress or if the overhead path were out of service. The underground path has high reliability. Therefore, YLP/OSP and KOH+ have a minor interaction.
Keowee Under Ground Path	KUG+	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the Under Ground path from service at the same time would significantly reduce the reliability of the emergency power source for Oconee. Therefore, YLP/OSP and KUG+ have a major interaction and should not be removed from service at the same time.
Keowee Both Units	KE-ALL	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of both Keowee units from service at the same time would significantly reduce the reliability of the emergency power source for Oconee. Therefore, YLP/OSP and KE-ALL have a major interaction and should not be removed from service at the same time.
Lee/Central Power System	LCP	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the 100kv path from Lee/Central from service at the same time would reduce the reliability of the emergency power sources for Oconee. However, the matrix prevents removal of Keowee from service at the same time as the 100kv path and switchyard work. Keowee is a reliable source of emergency power. Therefore, YLP/OSP and LCP have a minor interaction.
4160VAC Auxillary Power System	OEM	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between YLP/OSP and OEM.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, there is a minor interaction between YLP/OSP and EFW/TDP.
Auxiliary Service Water (Aux. Building)/ MS ADV Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between YLP/OSP and HPS.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between YLP/OSP and RCM.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between YLP/OSP and SASW.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Keowee Overhead Path</u>			The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. Therefore, functions that have the potential to cause a LOOP, functions that support emergency power and functions that provide blackout mitigation should be protected when the Overhead Path is out of service.
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the Overhead path from service at the same time would reduce the reliability of the emergency power source for Oconee. However the matrix would assure that the underground path was in service if switchyard work is in progress or if the overhead path were out of service. The underground path has high reliability. Therefore, YLP/OSP and KOH+ have a minor interaction.
Keowee Overhead Path	KOH+		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Keowee Under Ground Path	KUG+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. If the Underground path is also out of service, Oconee must rely on the Lee/Central 100kv path for emergency power. This is a significant reduction in the reliability of emergency power. Therefore, the KOH+ and KUG+ should not be out of service at the same time unless the LEE path is made available as required by Tech. Specs.
Keowee Both Units	KE-ALL		When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. Therefore, there is no additional risk created if the Overhead or Underground path are out of service at the same time as both units of Keowee.
Lee/Central Power System	LCP	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Since the matrix would not allow the SSF, the Overhead path and the Lee/Central path to be out of service at the same, there is a minor interaction between KOH+ and LCP.
4160VAC Auxiliary Power System	OEM	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between KOH+ and OEM.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, there is a minor interaction between KOH+ and EFW/TDP.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between KOH+ and HPS.
Low Pressure Service Water System (Including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	NRC Agreement. There is an increased probability of Blackout Event with one Keowee Emergency Power Path degraded or inoperable. To ensure full capacity to maintain safe shutdown for such an event, must require SSF operability.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	NRC Agreement. There is an increased probability of Blackout Event with one Keowee Emergency Power Path degraded or inoperable. To ensure full capacity to maintain safe shutdown for such an event, must require SSF operability.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

INFORMATION ONLY

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
--------------------	-----------	-------------------	-----------------------

Keowee Under Ground Path			The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. Therefore, functions that have the potential to cause a LOOP, functions that support emergency power and functions that provide blackout mitigation should be protected when the Under Ground Path is out of service.
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the Under Ground path from service at the same time would significantly reduce the reliability of the emergency power source for Oconee. Therefore, YLP/OSP and KUG+ have a major interaction and should not be removed from service at the same time.
Keowee Overhead Path	KOH+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. If the Underground path is also out of service, Oconee must rely on the Lee/Central 100kv path for emergency power. This is a significant reduction in the reliability of emergency power. Therefore, the KOH+ and KUG+ should not be out of service at the same time unless the LEE path is made available as required by Tech. Specs.
Keowee Under Ground Path	KUG+		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Keowee Both Units	KE-ALL		When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. Therefore, there is no additional risk created if the Overhead or Underground path are out of service at the same time as both units of Keowee.
Lee/Central Power System	LCP	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Therefore the KUG+ and LCP should not be out of service at the same time.
4160VAC Auxiliary Power System	OEM	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, KUG+ and OEM should not be out of service at the same time.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, KUG+ and EFW/TDP should not be out of service at the same time.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, KUG+ and HPS should not be out of service at the same time.
Low Pressure Service Water System (Including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KUG+ and RCM should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KUG+ and SASW should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

Keowee Both Units			When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. Therefore, functions that have the potential to cause a LOOP, functions that support emergency power and functions that provide blackout mitigation should be protected when the both Keowee units are out of service.
230kV Switchyard Power System Off-site Power	YLP/ OSP	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the of both Keowee units from service at the same time would significantly reduce the reliability of the emergency power source for Oconee. Therefore, YLP/OSP and KE-ALL have a major interaction and should not be removed from service at the same time.
Keowee Overhead Path	KOH+		When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. Therefore, there is no additional risk created if the Overhead or Underground path are out of service at the same time as both units of Keowee.
Keowee Under Ground Path	KUG+		When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. Therefore, there is no additional risk created if the Overhead or Underground path are out of service at the same time as both units of Keowee.
Keowee Both Units	KE-ALL		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Lee/Central Power System	LCP	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Therefore KE-ALL and LCP should not be out of service at the same time.
4160VAC Auxiliary Power System	OEM	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, KE-ALL and OEM should not be out of service at the same time.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, KE-ALL and EFW/TDP should not be out of service at the same time.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, KE-ALL and HPS should not be out of service at the same time.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KE-ALL and RCM should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KE-ALL and SASW should not be out of service at the same time.

INFORMATION ONLY.

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
<u>Lee/Central Power System</u>			The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Therefore, when LCP is out of service, other systems that could increase the likelihood of a LOOP, provide emergency power, or mitigate a blackout should be protected.
230kV Switchyard Power System	YLP/OSP	PRA	With switchyard work in progress, there is an increased chance of a LOOP event. Removal of the 100kv path from Lee/Central from service at the same time would reduce the reliability of the emergency power sources for Oconee. However, the matrix prevents removal of Keowee from service at the same time as the 100kv path and switchyard work. Keowee is a reliable source of emergency power. Therefore, YLP/OSP and LCP have a minor interaction.
Off-site Power			
Keowee Overhead Path	KOH+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Since the matrix would not allow the SSF, the Overhead path and the Lee/Central path to be out of service at the same, there is a minor interaction between KOH+ and LCP.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Therefore the KUG+ and LCP should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. Therefore KE-ALL and LCP should not be out of service at the same time.
Lee/Central Power System	LCP		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
4160VAC Auxiliary Power System	OEM	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between LCP and OEM.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between LCP and RCM.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between LCP and SASW.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

INFORMATION ONLY

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

4160VAC Auxiliary Power System			If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is degraded. Therefore, when OEM is out of service, other systems that could increase the likelihood of a LOOP, provide emergency power, or mitigate a blackout should be protected.
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between YLP/OSP and OEM.
Keowee Overhead Path	KOH+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between KOH+ and OEM.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, KUG+ and OEM should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, KE-ALL and OEM should not be out of service at the same time.
Lee/Central Power System	LCP	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. Therefore, there is a minor interaction between LCP and OEM.
4160VAC Auxiliary Power System	OEM		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is degraded. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, OEM and EFW/TDP should not be out of service at the same time.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between OEM and HPS.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. . The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, OEM and SSF RCP should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. . The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, OEM and SASW should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Emergency Feedwater System Motor Driven Pump or Train</u>			The EFW system motor driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. Since they rely on AC power and LPSW cooling, they are susceptible to plant transients involving support systems. When EFW/MDP is out of service, functions that could increase the chance of a transient, or functions that could mitigate a loss of all EFW should be protected.
230kV Switchyard Power System Off-site Power	YLP/OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	To assure reliability of the EFW function, the EFW turbine driven pump should not be out of service at the same time as an EFW motor driven pump.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	The EFW system motor driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/MDP out of service, the reliability of EFW is slightly degraded. If EFW should fail following a loss of main feedwater transient, the operators would use HPI forced cooling to cool the reactor core. When a train of HPI is out of service, the reliability of HPI forced cooling may be degraded. Therefore, EFW/MDP and HPI have a minor interaction.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST	PRA	When the EFW/MDP is out of service, the reliability of Steam Generator cooling is degraded. If there is a total loss of SG cooling, it would be necessary to use HPI forced cooling (feed and bleed). Since the BWST is the suction source for HPI, when the BWST is out of service it would not be possible to go to feed and bleed cooling. Therefore the BWST and EFW/MDP should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The EFW system motor driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/MDP out of service, the reliability of EFW is slightly degraded. The SSF ASW pump can also be used to supply feedwater to the steam generators so it serves as a backup to the EFW system. Therefore, the EFW/MDP and the SASW should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

INFORMATION ONLY

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

Emergency Feedwater System Turbine Driven Pump			The EFW system turbine driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. When EFW/TDP is out of service, functions that could increase the chance of a transient, or functions that could mitigate a loss of all EFW should be protected.
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, there is a minor interaction between YLP/OSP and EFW/TDP.
Keowee Overhead Path	KOH+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, there is a minor interaction between KOH+ and EFW/TDP.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, KUG+ and EFW/TDP should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, KE-ALL and EFW/TDP should not be out of service at the same time.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is degraded. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power. When the EFW TDP is out of service, the blackout mitigation must rely on the SSF ASW Pump. Therefore, OEM and EFW/TDP should not be out of service at the same time.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP	PRA	To assure reliability of the EFW function, the EFW turbine driven pump should not be out of service at the same time as an EFW motor driven pump.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	Low Pressure Service Water provides cooling to the EFW motor driven pumps so that with a train of LPSW out of service, the reliability of the EFW/MDP function is reduced. When the EFW turbine driven pump is out of service, the EFW reliability is also reduced. Therefore, there is a minor interaction between LPS and EFW/TDP.

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	The EFW system turbine driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/TDP out of service, the reliability of EFW is slightly degraded. If EFW should fail following a loss of main feedwater transient, the operators would use HPI forced cooling to cool the reactor core. When a train of HPI is out of service, the reliability of HPI forced cooling may be degraded. Therefore, EFW/TDP and HPI have a minor interaction.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST	PRA	When the EFW/TDP is out of service, the reliability of Steam Generator cooling is degraded. If there is a total loss of SG cooling, it would be necessary to use HPI forced cooling (feed and bleed). Since the BWST is the suction source for HPI, when the BWST is out of service it would not be possible to go to feed and bleed cooling. Therefore the BWST and EFW/TDP should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The EFW system turbine driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/TDP out of service, the reliability of EFW is slightly degraded. The SSF ASW pump can also be used to supply feedwater to the steam generators so it serves as a backup to the EFW system. Therefore, the EFW/TDP and the SASW should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Auxiliary Service Water (Aux. Building)</u>			The Auxiliary Service Water pump is used as a backup to the SSF ASW pump. It is one of the primary means of mitigating a tornado event, since the SSF service water may not be available during some tornado events. Because of its low discharge pressure, the MS Atmospheric dumps are also required to reduce SG pressure and allow ASW injection to the SGs
230KV Switchyard Power System Off-site Power	YLP/OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	Tornado Event. SSF ASW may be required to mitigate the most limiting Tornado Scenario. There is a 50% probability of a 20% increase in core damage risk due to a worst-case Tornado scenario with ASWP/TDEFWP unavailable, thus necessitating that the SSF ASW be operable when the ASW is degraded or unavailable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Condenser Circulating Water System (CCW) (Integrity on any Unit)</u>			When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. Therefore, the functions that provide mitigation capability for loss of all EFW and LPSW should be protected when there is an increased potential for a Turbine Building flood event. The preferred action would be to go to the SSF and start the RCMU pump for RCP seal cooling and start the ASW pump for steam generator cooling. If this fails, it may be necessary to start HPI forced cooling while using High Pressure Service Water from the Elevated Water Storage Tank as a cooling source for the HPI pumps.
230kV Switchyard Power System Off-site Power	YLP/OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
High Pressure Service Water System	HPS		When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. LPSW is the normal cooling system for the HPI pumps. High pressure service water can provide backup cooling to the HPI pumps from the elevated water storage tank if LPSW is lost. Therefore, CCW and HPS functions should not be out of service at the same time.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. If the EFW pumps fail, it may be necessary to go to HPI forced cooling. Therefore, there is a minor interaction between CCW and HPI.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps which could require HPI forced cooling. Since the BWST is the suction source for HPI, BWST and CCW should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, the LPSW system provides cooling to the RBCUs. The Reactor Building Spray System can provide some containment cooling and fission product scrubbing independent of LPSW. Therefore, there is a minor interaction between CCW and BS.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. Therefore, the functions that provide mitigation capability for loss of all EFW and LPSW should be protected when there is an increased potential for a Turbine Building flood event. The preferred action would be to go to the SSF and start the RCMU pump for RCP seal cooling and start the ASW pump for steam generator cooling. Therefore, CCW and RCM should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. The functions that mitigate a loss of all EFW and LPSW should be protected. The preferred action would be to go to the SSF and start the RCMU pump for RCP seal cooling and start the ASW pump for steam generator cooling. Therefore, CCW and SASW should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
--------------------	-----------	-------------------	-----------------------

<u>High Pressure Service Water System</u>			The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the HPI pumps motor coolers, and the EFW TDP. Therefore, when HPS is out of service, LPSW should be protected. Also, the SSF should be protected since it can operate independent of the LPSW or HPSW cooling.
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between YLP/OSP and HPS.
Keowee Overhead Path	KOH+	PRA	The Keowee Overhead Path is one of the ways to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between KOH+ and HPS.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, KUG+ and HPS should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, KE-ALL and HPS should not be out of service at the same time.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxillary Power System	OEM	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. The Turbine Driven EFW pump can supply EFW to the steam generators without AC power but it would rely on High Pressure Service Water for cooling. Therefore, there is a minor interaction between OEM and HPS.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. LPSW is the normal cooling system for the HPI pumps. High pressure service water can provide backup cooling to the HPI pumps from the elevated water storage tank if LPSW is lost. Therefore, CCW and HPS functions should not be out of service at the same time.
High Pressure Service Water System	HPS		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the HPI pumps motor coolers, and the EFW TDP. Therefore, HPS and LPS should not be degraded at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the HPI pumps from the EWST. This is an important function for loss of turbine building flood sequences, since this allows the HPI to operate independent of LPSW. The SSF RCMP pump can also operate independent of the plants LPSW. Therefore, the HPS and RCM should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the EFW TDP from the EWST. This is an important function for loss of all AC power sequences, since this allows the TDP to operate independent of AC power. The SSF ASW pump can also operate independent of the plants AC power. Therefore, the HPS and SASW should not be out of service at the same time.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Low Pressure Service Water System (including CCW first siphon)</u>			The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Therefore, when the reliability of LPSW is reduced, those functions that serve as a backup to LPSW and those systems that operate independently of LPSW should be protected.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP	PRA	Low Pressure Service Water provides cooling to the EFW motor driven pumps so that with a train of LPSW out of service, the reliability of the EFW/MDP function is reduced. When the EFW turbine driven pump is out of service, the EFW reliability is also reduced. Therefore, there is a minor interaction between LPS and EFW/TDP.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the HPI pumps motor coolers, and the EFW TDP. Therefore, HPS and LPS should not be degraded at the same time.
Low Pressure Service Water System (including CCW first siphon)	LPS		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. With backup cooling from HPSW, the HPI system can supply HPI forced cooling independent of LPSW. Therefore, LPS and HPI have a minor interaction.
RC Pump Seal Protection	RCPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, with the RC pump seal cooling degraded, there is an increased chance of a Loss of RCP seal cooling event. Therefore, LPS and RCPS should not be out of service at the same time.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, the LPSW system provides cooling to the RBCUs. The Reactor Building Spray System can provide some containment cooling and fission product scrubbing independent of LPSW. Therefore, there is a minor interaction between LPS and BS.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's LPSW. Therefore, there is a minor interaction between LPS and RCM.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's LPSW. Therefore, there is a minor interaction between LPS and SASW.

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

Core Flood System			Both CFT's are required to prevent Fuel Clad Damage for Large Break LOCA's. With one CFT Inoperable, it is important to have full LPI capability to limit the extent of the core damage for the Large Break LOCA scenario.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (Including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI	PRA	Both CFT's are required to prevent Fuel Clad Damage for Large Break LOCA's. With one CFT Inoperable, it is important to have full LPI capability to limit the extent of the core damage for the Large Break LOCA scenario.
Borated Water Storage Tank	BWST	PRA	Both CFT's are required to prevent Fuel Clad Damage for Large Break LOCA's. The BWST is the suction source for all ECCS. With one CFT Inoperable, it is important to have full ECCS capability to limit the extent of the core damage for the Large Break LOCA scenario. Therefore, CF and BWST should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

High Pressure Injection System			The High Pressure Injection System provides makeup capability for small to medium sized loss of coolant events. Also, HPI can be used for HPI forced cooling if there is a loss of steam generator cooling. Therefore, when a train of the HPI system is out of service, those systems that prevent loss of steam generator cooling or loss of coolant events should be protected.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP	PRA	The EFW system motor driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/MDP out of service, the reliability of EFW is slightly degraded. If EFW should fail following a loss of main feedwater transient, the operators would use HPI forced cooling to cool the reactor core. When a train of HPI is out of service, the reliability of HPI forced cooling may be degraded. Therefore, EFW/MDP and HPI have a minor interaction.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP	PRA	The EFW system turbine driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/TDP out of service, the reliability of EFW is slightly degraded. If EFW should fail following a loss of main feedwater transient, the operators would use HPI forced cooling to cool the reactor core. When a train of HPI is out of service, the reliability of HPI forced cooling may be degraded. Therefore, EFW/TDP and HPI have a minor interaction.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. If the EFW pumps fail, it may be necessary to go to HPI forced cooling while using HPSW from the EWST to cool the HPI pumps. Therefore, there is a minor interaction between CCW and HPI.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. With backup cooling from HPSW, the HPI system can supply RCP seal cooling or HPI forced cooling independent of LPSW. Therefore, LPS and HPI have a minor interaction.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
RC Pump Seal Protection	RCPS	PRA	The High Pressure Injection System provides makeup capability for small to medium sized loss of coolant events. If the RC pump seal protection is degraded, there is an increased chance of a RCP seal LOCA. Therefore, HPI and RCPS should not be out of service at the same time.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	For Turbine Building Flooding sequences, all EFW will be lost. The two primary ways to mitigate this loss of EFW are to either use HPI forced cooling (feed and bleed) or to use the SSF. Therefore, there is a minor interaction between SSF and HPI.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	For Turbine Building Flooding sequences, all EFW will be lost. The two primary ways to mitigate this loss of EFW are to either use HPI forced cooling (feed and bleed) or to use the SSF. Therefore, there is a minor interaction between SSF and HPI.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

INFORMATION ONLY

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>RC Pump Seal Protection</u>			When the RC Pump Seal Protection is degraded, there is an increased chance of a loss of RC Pump seal cooling and RC Pump seal LOCA. Therefore, when RCPS is degraded, systems which supply backup seal cooling or LOCA mitigation should be protected.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.


WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, with the RC pump seal cooling degraded, there is an increased chance of a Loss of RCP seal cooling event. Therefore, LPS and RCPS should not be out of service at the same time.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	The High Pressure Injection System provides makeup capability for small to medium sized loss of coolant events. If the RC pump seal protection is degraded, there is an increased chance of a RCP seal LOCA. Therefore, HPI and RCPS should not be out of service at the same time.
RC Pump Seal Protection	RCPS		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST	PRA	When the RC Pump Seal Protection is degraded, there is an increased chance of a loss of RC Pump seal cooling and RC Pump seal LOCA. The BWST is the suction source for all ECCS which would be required to mitigate a LOCA. Therefore the BWST and RCPS should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	When the RC Pump Seal Protection is degraded, there is an increased chance of a loss of RC Pump seal cooling and RC Pump seal LOCA. The SSF reactor coolant makeup pump can provide RCP seal cooling if the normal means of cooling are lost. Therefore, RCPS and RCM should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

Low Pressure Injection System			The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. Therefore, when a train of LPI is out of service, systems which also mitigate LOCAs or provide containment cooling should be protected.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		Both CFT's are required to prevent Fuel Clad Damage for Large Break LOCA's. With one CFT inoperable, it is important to have full LPI capability to limit the extent of the core damage for the Large Break LOCA scenario.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC	PRA	The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. The Reactor Building Cooling Systems also provides containment cooling independent of LPI. Therefore, RBC and LPI should not be out of service at the same time.
Reactor Building Spray System	BS	PRA	The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. The Reactor Building Spray System can provide fission product scrubbing following a core damage accident. Also, the RBS may provide some small amount of cooling during the spray injection phase of an accident. Therefore, BS and LPI have a minor interaction.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	For Turbine Building Flooding sequences, all EFW will be lost. One way to mitigate this loss of EFW is to either use HPI forced cooling (feed and bleed) and then to swap to sump recirculation using the LPI system to supply HPI. The other method would be to use the SSF. Therefore, there is a minor interaction between SSF and LPI.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	For Turbine Building Flooding sequences, all EFW will be lost. One way to mitigate this loss of EFW is to either use HPI forced cooling (feed and bleed) and then to swap to sump recirculation using the LPI system to supply HPI. The other method would be to use the SSF. Therefore, there is a minor interaction between SSF and LPI.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

Borated Water Storage Tank			The BWST is the suction source for all ECCS and for Reactor Building Spray System. When the BWST is out of service, functions that should be protected include tyhose that would increase the likelihood of a LOCA or things that might increase the likelihood of a transient that would require feed and biled cooling. Also, the Reactor Building Coolers should be protected since they could still provide containment cooling even if the RBS system was unable to operate with out a suction source.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP	PRA	The BWST is the suction source for all ECCS and for Reactor Building Spray System. When the BWST is out of service, functions that should be protected that might increase the likelihood of a transient that would require feed and bleed cooling. There fore the BWST and EFW/MDP should not be out of service at the same time.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP	PRA	The BWST is the suction source for all ECCS and for Reactor Building Spray System. When the BWST is out of service, functions that should be protected that might increase the likelihood of a transient that would require feed and bleed cooling. There fore the BWST and EFW/TDP should not be out of service at the same time.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	The BWST is the suction source for all ECCS and for Reactor Building Spray System. When the BWST is out of service, functions that should be protected that might increase the likelihood of a transient that would require feed and bleed cooling. There fore the BWST and CCW should not be out of service at the same time.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF	PRA	Both CFT's are required to prevent Fuel Clad Damage for Large Break LOCA's. With one CFT inoperable, it is important to have full ECCS capability to limit the extent of the core damage for the Large Break LOCA scenario. Therefore, the CF and BWST should not be out of service at the same time.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS	PRA	The BWST is the suction source for all ECCS and for Reactor Building Spray System. When the BWST is out of service, functions that should be protected that might increase the likelihood of a transient that would require feed and bleed cooling. Therefore the BWST and RCPS should not be out of service at the same time.
Low Pressure Injection System	LPI		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Borated Water Storage Tank	BWST		Same system.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC	PRA	The BWST is the suction source for ECCS and RBS following a LOCA. The Reactor Building Cooling Systems also provides containment cooling independent of ECCS and RBS. Therefore, RBC and BWST should not be out of service at the same time.
Reactor Building Spray System	BS		The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. The Reactor Building Spray System can provide fission product scrubbing following a core damage accident. Also, the RBS may provide some small amount of cooling during the spray injection phase of an accident. Therefore, BS and LPI have a minor interaction.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM	PRA	For Turbine Building floods, all EFW may be lost and it may be necessary to go to feed and bleed cooling with HPI taking suction from the BWST. If feed and bleed is not possible, the SSF can be used to provide RCP seal cooling and cooling water to the SGs. Therefore the BWST and SSF should not be out of service at the same time.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW	PRA	For Turbine Building floods, all EFW may be lost and it may be necessary to go to feed and bleed cooling with HPI taking suction from the BWST. If feed and bleed is not possible, the SSF can be used to provide RCP seal cooling and cooling water to the SGs. Therefore the BWST and SSF should not be out of service at the same time.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Containment Isolation Penetrations & Valves</u>			The reliability of the containment function is reduced any time that RBI, RBC, or BS are removed from service. Therefore, these systems interact and care should be used to assure containment protection functions remain reliable.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Reactor Building Cooling System	RBC	PRA	If the fission products are released from the core, the containment provides an additional barrier and prevents release to the environment. For the containment to function, it must be isolated and it must be cooled. To assure that containment remains a reliable function, the cooling function should not be degraded at the same time as the isolation function.
Reactor Building Spray System	BS	PRA	Reactor building sprays help scrub fission products from the containment atmosphere. Because most fission products will be in the particulate form, they will naturally settle out over a short period of time. Therefore, the scrubbing function of the sprays is not as significant as isolation and cooling but would slightly increase risk if removed from service at the same time. Therefore, there is a minor interaction between RBI and BS.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

<u>Reactor Building Cooling System</u>			The reliability of the containment function is reduced any time that RBI, RBC, or BS are removed from service. Therefore, these systems interact and care should be used to assure containment protection functions remain reliable
230kV Switchyard Power System Off-site Power	YLP/OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI	PRA	The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. The Reactor Building Cooling Systems also provides containment cooling independent of LPI. Therefore, RBC and LPI should not be out of service at the same time.
Borated Water Storage Tank	BWST	PRA	The BWST is the suction source for ECCS and RBS following a LOCA. The Reactor Building Cooling Systems also provides containment cooling independent of ECCS and RBS. Therefore, RBC and BWST should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI	PRA	If the fission products are released from the core, the containment provides an additional barrier and prevents release to the environment. For the containment to function, it must be isolated and it must be cooled. To assure that containment remains a reliable function, the cooling function should not be degraded at the same time as the isolation function.
Reactor Building Cooling System	RBC		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
Reactor Building Spray System	BS	PRA	The reliability of the containment function is reduced any time that RBI, RBC, or BS are removed from service. Therefore, these systems interact and care should be used to assure containment protection functions remain reliable. Reactor building sprays help scrub fission products from the containment atmosphere. Because most fission products will be in the particulate form, they will naturally settle out over a short period of time. The Reactor Building Cooling Systems also provides containment cooling independent of LPI and BS. To assure that containment remains a reliable function, the RBC function should not be degraded at the same time as the BS function.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
--------------------	-----------	-------------------	-----------------------

Reactor Building Spray System			The reliability of the containment function is reduced any time that RBI, RBC, or BS are removed from service. Reactor building sprays help scrub fission products from the containment atmosphere. Therefore, the RBI, RBC, and BS systems interact and care should be used to assure containment protection functions remain reliable.
230kV Switchyard Power System Off-site Power	YLP/ OSP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Overhead Path	KOH+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Under Ground Path	KUG+		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Keowee Both Units	KE-ALL		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Lee/Central Power System	LCP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
4160VAC Auxiliary Power System	OEM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Motor Driven Pump or Train	EFW/ MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/ TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	When CCW Integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, the LPSW system provides cooling to the RBCUs. The Reactor Building Spray System can provide some containment cooling and fission product scrubbing independent of LPSW. Therefore, there is a minor interaction between CCW and BS.
High Pressure Service Water System	HPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. Also, the LPSW system provides cooling to the RBCUs. The Reactor Building Spray System can provide some containment cooling and fission product scrubbing independent of LPSW. Therefore, there is a minor interaction between LPS and BS.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI	PRA	The LPI system provides makeup capability and core cooling following a LOCA. It also helps to cool containment by recirculating containment sump water through the LPI coolers. The Reactor Building Spray System can provide fission product scrubbing following a core damage accident. Also, the RBS may provide some small amount of cooling during the spray injection phase of an accident. Therefore, BS and LPI have a minor interaction.
Borated Water Storage Tank	BWST		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Containment Isolation Penetrations & Valves	RBI	PRA	Reactor building sprays help scrub fission products from the containment atmosphere. Because most fission products will be in the particulate form, they will naturally settle out over a short period of time. Therefore, the scrubbing function of the sprays is not as significant as isolation and cooling but would slightly increase risk if removed from service at the same time. Therefore, there is a minor interaction between RBI and BS.
Reactor Building Cooling System	RBC	PRA	The reliability of the containment function is reduced any time that RBI, RBC, or BS are removed from service. Therefore, these systems interact and care should be used to assure containment protection functions remain reliable. Reactor building sprays help scrub fission products from the containment atmosphere. Because most fission products will be in the particulate form, they will naturally settle out over a short period of time. The Reactor Building Cooling Systems also provides containment cooling independent of LPI and BS. To assure that containment remains a reliable function, the RBC function should not be degraded at the same time as the BS function..
Reactor Building Spray System	BS		Same system; interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
--------------------	-----------	------------------	-----------------------

SSF Reactor Coolant Makeup System (RCM or Diesel Generator)			
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between YLP/OSP and RCM.
Keowee Overhead Path	KOH+	PRA	NRC Agreement. There is an increased probability of Blackout Event with one Keowee Emergency Power Path degraded or inoperable. To ensure full capacity to maintain safe shutdown for such an event, must require SSF operability.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KUG+ and RCM should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KE-ALL and RCM should not be out of service at the same time.
Lee/Central Power System	LCP	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between LCP and RCM.
4160VAC Auxiliary Power System	OEM	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, OEM and SSF RCP should not be out of service at the same time.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

INFORMATION ONLY

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

INFORMATION ONLY

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. Therefore, the functions that provide mitigation capability for loss of all EFW and LPSW should be protected when there is an increased potential for a Turbine Building flood event. The preferred action would be to go to the SSF and start the RCMU pump for RCP seal cooling and start the ASW pump for steam generator cooling. Therefore, CCW and RCM should not be out of service at the same time.
High Pressure Service Water System	HPS	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the HPI pumps from the EWST. This is an important function for loss of turbine building flood sequences, since this allows the HPI to operate independent of LPSW. The SSF RCMP pump can also operate independent of the plants LPSW. Therefore, the HPS and RCM should not be out of service at the same time.
Low Pressure Service Water System (Including CCW first siphon)	LPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's LPSW. Therefore, there is a minor interaction between LPS and RCM.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	For Turbine Building Flooding sequences, all EFW will be lost. The two primary ways to mitigate this loss of EFW are to either use HPI forced cooling (feed and bleed) or to use the SSF. Therefore, there is a minor interaction between SSF and HPI.
RC Pump Seal Protection	RCPS	PRA	When the RC Pump Seal Protection is degraded, there is an increased chance of a loss of RC Pump seal cooling and RC Pump seal LOCA. The SSF reactor coolant makeup pump can provide RCP seal cooling if the normal means of cooling are lost. Therefore, RCPS and RCM should not be out of service at the same time.
Low Pressure Injection System	LPI	PRA	For Turbine Building Flooding sequences, all EFW will be lost. One way to mitigate this loss of EFW is to either use HPI forced cooling (feed and bleed) and then to swap to sump recirculation using the LPI system to supply HPI. The other method would be to use the SSF. Therefore, there is a minor interaction between SSF and LPI.
Borated Water Storage Tank	BWST	PRA	For Turbine Building floods, all EFW may be lost and it may be necessary to go to feed and bleed cooling with HPI taking suction from the BSWT. If feed and bleed is not possible, the SSF can be used to provide RCP seal cooling and cooling water to the SGs. Therefore the BWST and SSF should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.

**WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis**

Interacting System	Matrix ID	Type Inter-action	Basis for Interaction
--------------------	-----------	-------------------	-----------------------

SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)			
230kV Switchyard Power System Off-site Power	YLP/OSP	PRA	When switchyard systems are out of service or when significant switchyard work is in progress, there is an increased risk of a Loss of Off-site Power Event (LOOP). The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between YLP/OSP and SASW.
Keowee Overhead Path	KOH+	PRA	NRC Agreement. There is an increased probability of Blackout Event with one Keowee Emergency Power Path degraded or inoperable. To ensure full capacity to maintain safe shutdown for such an event, must require SSF operability.
Keowee Under Ground Path	KUG+	PRA	The Keowee Under Ground Path is the most reliable and dependable way to transmit Keowee Emergency power to Oconee. When it is out of service, the reliability of the Oconee Emergency power supply is significantly reduced. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KUG+ and SASW should not be out of service at the same time.
Keowee Both Units	KE-ALL	PRA	When both Units of Keowee are out of service, the Overhead Path and the Underground Path are unable to supply emergency power to Oconee. This significantly increases the risk of a Loss of all AC Power. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. Therefore, KE-ALL and SASW should not be out of service at the same time.
Lee/Central Power System	LCP	PRA	The Lee/Central 100kv power path can be used as a backup power source if both Keowee units are out of service or if they fail. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, there is a minor interaction between LCP and SASW.
4160VAC Auxiliary Power System	OEM	PRA	If a train of 4160VAC system is affected, the reliability of emergency power to the safety related pumps is slightly degraded. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's AC power. This makes the SSF important to Blackout mitigation. Therefore, OEM and SSF SASW should not be out of service at the same time.
Emergency Feedwater System Motor Driven Pump or Train	EFW/MDP	PRA	The EFW system motor driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/MDP out of service, the reliability of EFW is slightly degraded. The SSF ASW pump can also be used to supply feedwater to the steam generators so it serves as a backup to the EFW system. Therefore, the EFW/MDP and the SASW should not be out of service at the same time.
Emergency Feedwater System Turbine Driven Pump	EFW/TDP	PRA	The EFW system turbine driven pumps provide emergency feedwater to the steam generators if main feedwater is not available. With a train of EFW/TDP out of service, the reliability of EFW is slightly degraded. The SSF ASW pump can also be used to supply feedwater to the steam generators so it serves as a backup to the EFW system. Therefore, the EFW/TDP and the SASW should not be out of service at the same time.
Auxiliary Service Water (Aux. Building)/ MS Atmospheric Dump Valves	ASW	PRA	Jornado Event. SSF ASW may be required to mitigate the most limiting Tornado Scenario. There is a 50% probability of a 20% increase in core damage risk due to a worst-case Tornado scenario with ASWP/TDEFWP unavailable, thus necessitating that the SSF ASW be operable when the ASW is degraded or unavailable.

INFORMATION ONLY

WPM 607 Attachment 607.6.4 (Rev. 7)
Oconee Nuclear Station PRA Matrix Interaction Basis

Interacting System	Matrix ID	Type Interaction	Basis for Interaction
Condenser Circulating Water System (CCW) (Integrity on any Unit)	CCW	PRA	When CCW integrity is out of service, there is an increased potential for a Turbine Building flooding event. This event could result in failure of the EFW pumps and the LPSW pumps. The functions that mitigate a loss of all EFW and LPSW should be protected. The preferred action would be to go to the SSF and start the RCMU pump for RCP seal cooling and start the ASW pump for steam generator cooling. Therefore, CCW and SASW should not be out of service at the same time.
High Pressure Service Water System	HPS	PRA	The High Pressure Service Water System serves as a backup to the LPSW system to provide cooling to the EFW TDP from the EWST. This is an important function for loss of all AC power sequences, since this allows the TDP to operate independent of AC power. The SSF ASW pump can also operate independent of the plants AC power. Therefore, the HPS and SASW should not be out of service at the same time.
Low Pressure Service Water System (including CCW first siphon)	LPS	PRA	The Low Pressure Service Water System provides cooling to most of Oconee's safety related pumps and motors. Without LPSW the plant is susceptible to a significant transient that could result in RCP seal LOCA or loss of steam generator cooling. The SSF can supply RCP Seal cooling and ASW to the steam generators independent of the plant's LPSW. Therefore, there is a minor interaction between LPS and SASW.
Core Flood System	CF		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
High Pressure Injection System	HPI	PRA	For Turbine Building Flooding sequences, all EFW will be lost. The two primary ways to mitigate this loss of EFW are to either use HPI forced cooling (feed and bleed) or to use the SSF. Therefore, there is a minor interaction between the SSF and HPI.
RC Pump Seal Protection	RCPS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Low Pressure Injection System	LPI	PRA	For Turbine Building Flooding sequences, all EFW will be lost. One way to mitigate this loss of EFW is to either use HPI forced cooling (feed and bleed) and then to swap to sump recirculation using the LPI system to supply HPI. The other method would be to use the SSF. Therefore, there is a minor interaction between the SSF and LPI.
Borated Water Storage Tank	BWST	PRA	For Turbine Building floods, all EFW may be lost and it may be necessary to go to feed and bleed cooling with HPI taking suction from the BWST. If feed and bleed is not possible, the SSF can be used to provide RCP seal cooling and cooling water to the SGs. Therefore the BWST and SSF should not be out of service at the same time.
Containment Isolation Penetrations & Valves	RBI		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Cooling System	RBC		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
Reactor Building Spray System	BS		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF Reactor Coolant Makeup System (RCM or Diesel Generator)	RCM		The Maintenance Rule Expert Panel has reviewed this interaction and concluded that any risk associated with these two systems being out of service at the same time is acceptable.
SSF ASW Auxiliary Service Water System (SASW or Diesel Generator)	SASW		Same system; Interactions between trains are covered by Tech. Specs. and are therefore not covered by the matrix.

INFORMATION ONLY

ATTACHMENT 607.6.11**Oconee Nuclear Station Between 250F/350# and Cold Shutdown
PRA Equipment List**

NOTE: This list is not meant to be all inclusive for Between 250F/350# and Cold Shutdown. This list serves as a bridge between the PRA Matrix and NSD 403 for the functions that have to be protected during shutdown per Maintenance Rule. This list should NOT be used as a substitute for Tech Specs / SLC compliance.

<u>Component</u>	<u>Number required</u>
LPI Trains	2 operable NOTE: Only one train required if both steam generators are available for heat transfer and two LPI pumps are available to the operable train.
LPSW Pumps	Units 1 & 2: 3 operable Unit 3: 2 operable
HPI Trains	1 available
BWST Gravity Flowpaths	N/A
BWST Level and Conc.	> 42 FEET and > 2050 PPM
Emerg. Sump Recirc.	1 available to an operable LPI train
RB Cooling	1 available (RBCU, or AUX FAN)
Elect. Power Supplies	1 energized 1 available
KEOWEE Hydro Units	1 operable
MFBs	2 energized

INFORMATION ONLY

WPM 607, Maintenance Rule Assessment
Of Equipment Removed From Service
Rev. 7 |

Attachment 607.6.14

Documentation of an Unplanned BOLD/RED or TWO Non-BOLD/YELLOW INTERACTIONS in the same row or column on the PRA Matrix

Date: _____ Time: _____

1. Equipment highlighted on matrix prior to entering RED or TWO YELLOW in the same row or column interaction on PRA matrix.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
2. Equipment removed from service due to failure, etc. that caused RED or TWO YELLOW in the same row or column condition on PRA matrix.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
3. Date and time RED or TWO YELLOW interaction occurred. _____
4. Equipment returned to service to exit RED or TWO YELLOW interaction on PRA matrix.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
5. Date and time RED or TWO YELLOW interaction exited. _____
6. Length of time in RED or TWO YELLOW interaction on PRA matrix.

7. PIP # _____ (per NSD 208).
8. Attach copy of completed "RED" or "TWO YELLOW" interaction matrix to this form.

Documentation completed by WCC SRO: _____

Send one (1) copy to:

- a. Severe Accident Analysis in General Office
- b. Site Maintenance Rule Coordinator