FAQ Number **07-0040** **FAQ Revision** **0**

FAQ Title **Non-Power Operations Clarifications**

Plant: Oconee Nuclear Station Date: September 7, 2007

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Distribution: *(NEI Internal Use)*

☒ 805 TF ☐ FPWG ☐ RATF ☐ RIRWG ☐ BWROG ☐ PWROG

Purpose of FAQ:

Clarify the ‘non-power’ plant operational states that correspond to configurations during which there is a high risk associated with the loss of a KSF. This takes into account the consequences of the loss of a KSF, not just the increased likelihood of the loss of a KSF.

Is this Interpretation of guidance? Yes / No

Proposed new guidance not in NEI 04-02? Yes / No

Details:

NEI 04-02 guidance needing interpretation (include section, paragraph, and line numbers as applicable):

NEI 04-02 Section 4.3.3 and Appendix F.

Circumstances requiring guidance interpretation or new guidance:

NEI 04-02, Revision 1, Section 4.3.3 states:

> *“The nuclear safety goal of NFPA 805 requires evaluation of the effects of a fire ‘during any operational mode and plant configuration.’”*

Section NEI 04-02 Section 4.3.3 further goes on to provide a strategy that “…*demonstrate[s] that the nuclear safety performance criteria are met for High Risk Evolutions (HREs as defined by NUMARC 91-06) during non-power operational modes…*”

The strategy as described was endorsed in Regulatory Guide 1.205. However, the use of the term High Risk Evolutions, as defined in NUMARC 91-06, may not be completely appropriate in this context, and appears to be causing regulatory concern. NUMARC 91-06 defines a High[er] Risk Evolution (HRE) as:

"Outage activities, plant configurations or conditions during shutdown where the plant is more susceptible to an event causing the loss of a key safety function."

The point of the strategy should be to evaluate and manage the effects of a fire, but not necessarily when the plant is more susceptible to an event causing the loss of a key safety function (KSF). Rather, the strategy should address configurations during which there is a high risk associated with the loss of a KSF. This takes into account the consequences of the loss of a KSF, not just the increased likelihood of the loss of a KSF.

Therefore, the strategy defined in NEI 04-02 will be based on configurations or Plant Operating States (POS) during an outage where the risk is intrinsically high, and will utilize normal risk management controls, processes and procedures during low risk periods.

Detail contentious points if licensee and NRC have not reached consensus on the facts and circumstances:

Potentially relevant existing FAQ numbers:

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

Many studies have been performed to characterize the risk associated with non-power states. Using Core Damage Frequency (CDF) as a risk metric, it is accepted that most outage configurations or POS are of relatively low risk and that only a few configurations or POS represent a risk near or greater than at-power operations.

NUREG/CR-6143 and NUREG/CR-6144

NUREG/CR-6143 and 6144 document Low Power and Shutdown (LPSD) risk studies performed in the early 1990's. NUREG/CR-6143 evaluated BWR risk using Grand Gulf Unit 1 as the study plant, while NUREG/CR-6144 evaluated PWR risk using Surry Unit 1.

In Phase 1 of the studies, a coarse screening analysis was performed to examine accidents initiated by internal events (including fire and flooding) for all POS. The objective of the Phase 1 study was to identify potentially "…vulnerable plant configurations, to characterize the potential core damage scenarios and to provide a foundation for a detailed phase 2 analysis."

Based on the results of the Phase 1 study, the Phase 2 analysis focused on POS 5 for BWRs, which covers approximately Cold Shutdown as defined by the Grand Gulf Tech Specs. For PWRs, mid-loop operation was selected as the plant configuration to be analyzed. Thus, it can be seen that these two plant configurations are clearly important with respect to risk during LPSD conditions.

NRC Public LPSD Workshop - 1999

The NRC sponsored a public LPSD workshop in 1999 to gather information regarding LPSD risk. A summary of the results of the workshop and presentations provided by the industry and NRC are contained in Sandia Report SAND99-1815. Some excerpts are provided below:

Westinghouse Experience and Insights from Shutdown Risk Projects

LPSD risk was dominated by events related to low reactor coolant system (RCS) inventory conditions and a few periods of high vulnerability.

Scientech Presentation on Shutdown Risk Monitoring

LPSD CDF is less than, but comparable to full-power CDF. In some cases, instantaneous risk may be higher in LPSD than at-power, but only for very short durations. Most of the risk is associated with low inventory conditions early in the outage.

Shutdown Risk Assessment at Seabrook Station

The mean CDF is numerically comparable to full-power CDF, although of higher uncertainty. However, estimates for health effects (i.e., Level 3) were negligible. It was recommended that high thermal margin configurations be considered for screening.

CDF from internal events is 88% of total LPSD CDF

Loss of RHR with RCS at low level	71%
Loss of RHR with RCS filled	11%
LOCA (RCS Drain down event)	18%

Risk Perspective from EPRI Research and Applications

For both BWR and PWR analyses, the LPSD risk is dominated by peak risk periods characterized by relatively high instantaneous risk over short periods of time early during the outage. The risk contribution of these peaks to the entire outage risk was greater than 80%, for both BWRs and PWRs. The dominant contributor to risk is human error (50%).

Example BWR Results

Outage Average CDF	4.9E-6/yr
Peak CDF	6.1E-5/yr
Minimum CDF	4.4E-7/yr
Ratio of Peak to Min	~140

Outage Core Damage Probability (cumulative risk)	6.5E-7
Peak Risk Core Damage Probability (CDP)	5.5E-7

Example PWR Results

Outage Average CDF	1.8E-4/yr
Peak CDF	1.0E-3/yr
Minimum CDF	7.0E-7/yr
Ratio of Peak to Min	~1400

Outage Core Damage Probability (cumulative risk)	2.2E-5
Peak Risk Core Damage Probability (CDP)	1.9E-5

NRC Shutdown SDP Process

Inspection Manual IM0609, Appendix G, describes the NRC Shutdown SDP process. It acknowledges step increases in risk for PWRs when (1) the RCS boundary is breached and the steam generators cannot be used for DHR, and (2) during midloop conditions. For BWRs, it is recognized that a step increase occurs during cold shutdown.

The following simplified POS are defined in IM0609, Appendix G; they will be used to describe the recommended actions with respect to NFPA 805.

PWR [IM0609, Appendix G Attachment 2]

POS 1 - This POS starts when the RHR system is put into service. The RCS is closed such that a steam generator could be used for decay heat removal, if the secondary side of a steam generator is filled. The RCS may have a bubble in the pressurizer. This POS ends when the RCS is vented such that the steam generators cannot sustain core heat removal. This POS typically includes Mode 4 (hot shutdown) and portions of Mode 5 (cold shutdown).

POS 2 - This POS starts when the RCS is vented such that: (1) the steam generators cannot sustain core heat removal and (2) a sufficient vent path exists for feed and bleed. This POS includes portions of Mode 5 (cold shutdown) and Mode 6 *(refueling). Reduced inventory operations and midloop operations with a vented RCS are subsets of this POS.*

POS 3 - This POS represents the shutdown condition when the refueling cavity water level is at or above the minimum level required for movement of irradiated fuel assemblies within containment as defined by Technical Specifications. This POS occurs during Mode 6.

BWR [IM0609, Appendix G Attachment 3]

POS 1 - This POS starts when the RHR system is put into service. The vessel head is on and the RCS is closed such that an extended loss of the DHR function without operator intervention could result in a RCS re-pressurization above the shutoff head for the RHR pumps.

POS 2 - This POS represents the shutdown condition when (1) the vessel head is removed and reactor pressure vessel water level is less than the minimum level required for movement of irradiated fuel assemblies within the reactor pressure vessel as defined by Technical Specifications OR (2) a sufficient RCS vent path exists for decay heat removal.

POS 3 - This POS represents the shutdown condition when the reactor pressure vessel water level is equal or greater than the minimum level required for movement of irradiated fuel assemblies within the reactor pressure vessel as define by Technical Specifications. This POS occurs during Mode 5.

Disposition of POS

Based on the studies cited above and the understanding that LPSD risk is concentrated in only certain POS, the strategy described in Section 4.3.3 of NEI 04-02 be limited to those high risk POS or configurations. Beyond the high risk POS or configurations, additional analyses or controls are not warranted and normal controls, processes, procedures provide adequate protection.

The disposition of the POS with respect to NFPA 805 risk evaluations are provided in Tables 1 and 2. For other non-power conditions (e.g., PWR Mode 3, BWR Startup Mode 2), it is recommended that the at-power process be used, since it should generally be bounding.

Table 1 - PWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 1 with SG Heat Removal Available	Screened	In this POS, if SGs are available in addition to RHR, significant redundancy and diversity exists for heat removal. Just having inventory in the SGs can provide substantial passive heat removal, providing additional time to recover other heat removal methods. Inventory control is not generally challenged during this POS.
POS 1 with SG Heat Removal Unavailable [Consider limiting to configurations where time to core damage is less than 2 hours and/or RCS level is being changed]	Perform actions per NEI 04-02, Section 4.3.3	Without SG Heat Removal capability, heat removal is limited to RHR and potentially bleed and feed. RCS pressurization on loss of heat removal could render RHR unavailable due to high pressure. Activities in this POS often involve changing RCS level. During RCS level changes, the likelihood of loss of inventory control is higher, challenging the inventory control safety function.
POS 2	Perform actions per NEI 04-02, Section 4.3.3.	This is the generally the highest risk configuration/POS for a PWR. Due to low inventory, times to core uncovery and damage are low, on the order 2 hours or less.
POS 3	Evaluate potential RCS drain paths that could be affected by fire	During this POS, substantial inventory exists to cope with an extended loss of active heat removal. Times to core damage are often on the order of 16 or more hours. However, fire induced RCS draindown events can reduce margins substantially.

Table 2 - BWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 1	Perform actions per NEI 04-02.	Inventory control is not generally challenged during this POS. However, loss of RHR could lead to a re-pressurized condition and there could be situations where the unavailability of high pressure injections systems from service could limit the mitigation capabilities.
POS 2	Perform actions per NEI 04-02.	This is generally a period of relatively high risk in a BWR especially early in the outage when the decay heat is still relatively high.

Table 2 - BWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 3	Evaluate potential RV drain paths that could be affected by fire	During this POS, substantial inventory exists to cope with an extended loss of active heat removal. Times to core damage are often on the order of 16 or more hours. However, induced RV draindown events can reduce margins substantially.

If appropriate, provide proposed rewording of guidance for inclusion in the next Revision:

See revisions to NEI 04-02 Section 4.3.3 and Appendix F below.

4.3.3 Non-Power Operational Modes Transition Review

The nuclear safety goal of NFPA 805 requires the evaluation of the effects of a fire "during any operational mode and plant configuration". The concept of protection of equipment from the effects of fire during plant shutdown conditions is discussed in NUREG-1449. In general, the underlying concerns are the differences between the functional requirements (i.e. different (or additional) set of systems and components) and time dependencies on decay heat removal system operation during non-power operations and full power operations. The current industry approaches for evaluating risk during shutdown conditions involves both quantitative and qualitative assessments and is based on NEI 93-01 and NUMARC 91-06.

The strategy for additional controls/protection of equipment during non-power operations, for plants adopting NFPA 805, will be based on configurations or Plant Operating States (POS) during the outage where the risk is intrinsically high. The point of the strategy will be to evaluate and manage the risks of a fire, but not necessarily when the plant is more susceptible to an event causing the loss of a key safety function (KSF). Rather, the strategy should address configurations during which there is a high risk associated with the loss of a KSF. This takes into account the consequences of the loss of a KSF, not just the increased likelihood of the loss of a KSF. During periods of low risk normal risk management controls, processes and procedures will be utilized.

Many studies have been performed to characterize the risk associated with non-power states. Using Core Damage Frequency (CDF) as a risk metric, it is accepted that most outage configurations or POS are of relatively low risk and that only a few configurations or POS represent a risk near or greater than at-power operations. Appendix F contains the evaluation various Plant Operational States and determines those that would require additional protection from the effects of fire during non-power states.

To demonstrate that the nuclear safety performance criteria are met for the required POSs ~~(HREs as defined by NUMARC 91-06)~~ during non-power operational modes, the following strategy is recommended:

- Review existing plant outage processes (outage management and outage risk assessments) to determine equipment relied upon to provide Key Safety Functions (KSF) including support functions during the required Plant Operational States (See Appendix F). Each outage evolution identifies the diverse methods of achieving the KSF. For example to achieve the Decay Heat Removal KSF a plant may credit DHR Train A, DHR Train B, HPI Train A, HPI Train B, and Gravity Feed and Chemical and Volume Control.
- Compare the equipment credited for achieving these KSFs against the equipment credited for nuclear safety. Note the position/function for the component. For example, the traditional nuclear safety analysis (Appendix R analysis) may credit the valve in the closed position however; the valve may be required open for shutdown modes of operation.
- For those components not already credited (or credited in a different way e.g., on versus off, open versus closed, etc.) analyze the circuits in accordance with the nuclear safety methodology.

- Identify locations where 1) fires may cause damage to the equipment (and cabling) credited above, or 2) recovery actions credited for the KSF are performed (for those KSFs ~~KFSs~~ that are achieved solely by recovery action, i.e., alignment of gravity feed).
- Identify fire areas where a single fire may damage all the credited paths for a KSF during the required plant operational state. This may include fire modeling to determine if a postulated fire (MEFS – LFS) would be expected to damage required equipment.
- For those areas consider combinations of the following options to reduce fire risk depending upon the significance of the potential damage:
  - Prohibition or limitation of hot work in fire areas during periods of increased vulnerability
  - Verification of operable detection and /or suppression in the vulnerable areas.
  - Prohibition or limitation of combustible materials in fire areas during periods of increased vulnerability
  - Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during increased vulnerability
  - Use of recovery actions to mitigate potential losses of key safety functions.
  - Identification and monitoring insitu ignition sources for “fire precursors” (e.g., equipment temperatures).
- NUMARC 91-06 discusses the development of outage plans and schedules. And that a key element of that process is to ensure the ~~KFSs~~ KSFs perform as needed during the various outage evolutions. The results of the fire area analysis of those components relied upon to maintain defense in depth should be factored into the plant’s existing outage planning process.

It is important to note that shutdown PRAs do not exist at this time.

Appendix F provides details of the evaluation of Plant Operational States and provides examples of this process and the documentation requirements anticipated.

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F. Considerations for Non-Power Operational Modes

F.1 Determination of Plant Operational States Requiring Additional Protection/Controls During Non-Power During an Outage

To begin the process of assessing the fire protection requirements for non-power modes of operation discussions should be held between the Probabilistic Risk Assessment (PRA) Staff, the Fire Protection, and the Outage Management staff to determine the best way to integrate NFPA 805 fire protection aspects into existing Outage Management Processes.

The current industry approaches for evaluating risk during shutdown conditions involves both quantitative and qualitative assessments and is based on NEI 93-01 and NUMARC 91-06. The point of the strategy defined in NEI 04-02 will be to evaluate and manage the risk of a fire and not necessarily identify when the plant is more susceptible to an event causing the loss of a key safety function (KSF). Rather, the strategy will address configurations during which there is a high risk associated with the loss of a KSF. This takes into account the consequences of the loss of a KSF, not just the increased likelihood of the loss of a KSF.

Therefore, the strategy defined in NEI 04-02 will be based on configurations or Plant Operating States (POS) during an outage where the risk is intrinsically high, and will utilize normal risk management controls, processes and procedures during low risk periods.

Many studies have been performed to characterize the risk associated with non-power states. Using Core Damage Frequency (CDF) as a risk metric, it is accepted that most outage configurations or POS are of relatively low risk and that only a few configurations or POS represent a risk near or greater than at-power operations.

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NRC Shutdown SDP Process

Inspection Manual IM0609, Appendix G, describes the NRC Shutdown SDP process. It acknowledges step increases in risk for PWRs when (1) the RCS boundary is breached and the steam generators cannot be used for DHR, and (2) during midloop conditions. For BWRs, it is recognized that a step increase occurs during cold shutdown.

The following simplified POS are defined in IM0609, Appendix G; they will be used to describe the recommended actions with respect to NFPA 805.

PWR [IM0609, Appendix G Attachment 2]

POS 1 - This POS starts when the RHR system is put into service. The RCS is closed such that a steam generator could be used for decay heat removal, if the secondary side of a steam generator is filled. The RCS may have a bubble in the pressurizer. This POS ends when the RCS is vented such that the steam generators cannot sustain core heat removal. This POS typically includes Mode 4 (hot shutdown) and portions of Mode 5 (cold shutdown).

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POS 3 - This POS represents the shutdown condition when the reactor pressure vessel water level is equal or greater than the minimum level required for movement of irradiated fuel assemblies within the reactor pressure vessel as define by Technical Specifications. This POS occurs during Mode 5.

Disposition of POS

Based on the studies cited above and the understanding that LPSD risk is concentrated in only certain POS, the strategy described in Section 4.3.3 of NEI 04-02 be limited to those high risk POS or configurations. Beyond the high risk POS or configurations, additional analyses or controls are not warranted and normal controls, processes, procedures provide adequate protection.

The disposition of the POS with respect to NFPA 805 risk evaluations are provided in Tables 1 and 2. For other non-power conditions (e.g., PWR Mode 3, BWR Startup Mode 2), it is recommended that the normal risk management controls, processes and procedures be used.

Table 1 - PWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 1 with SG Heat Removal Available	Screened	In this POS, if SGs are available in addition to RHR, significant redundancy and diversity exists for heat removal. Just having inventory in the SGs can provide substantial passive heat removal, providing additional time to recover other heat removal methods. Inventory control is not generally challenged during this POS.
POS 1 with SG Heat Removal Unavailable [Consider limiting to configurations where time to core damage is less than 2 hours and/or RCS level is being changed]	Perform actions per NEI 04-02, Section 4.3.3	Without SG Heat Removal capability, heat removal is limited to RHR and potentially bleed and feed. RCS pressurization on loss of heat removal could render RHR unavailable due to high pressure. Activities in this POS often involve changing RCS level. During RCS level changes, the likelihood of loss of inventory control is higher, challenging the inventory control safety function.
POS 2	Perform actions per NEI 04-02, Section 4.3.3.	This is the generally the highest risk configuration/POS for a PWR. Due to low inventory, times to core uncovery and damage are low, on the order 2 hours or less.
POS 3	Evaluate potential RCS drain paths that could be affected by fire	During this POS, substantial inventory exists to cope with an extended loss of active heat removal. Times to core damage are often on the order of 16 or more hours. However, fire induced RCS draindown events can reduce margins substantially.

Table 2 - BWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 1	Perform actions per NEI 04-02.	Inventory control is not generally challenged during this POS. However, loss of RHR could lead to a re-pressurized condition and there could be situations where the unavailability of high pressure injections systems from service could limit the mitigation capabilities.
POS 2	Perform actions per NEI 04-02.	This is generally a period of relatively high risk in a BWR especially early in the outage when the decay heat is still relatively high.

Table 2 - BWR POS Disposition

POS / Configuration	Disposition	Discussion
POS 3	Evaluate potential RV drain paths that could be affected by fire	During this POS, substantial inventory exists to cope with an extended loss of active heat removal. Times to core damage are often on the order of 16 or more hours. However, induced RV draindown events can reduce margins substantially.

F.1 Methodology

To transition to the NFPA 805 Licensing Basis, the licensee must demonstrate that the nuclear safety performance criteria are met for the required POSs. To accomplish this objective the following tasks should be performed. These should be documented using Table F-1.

- Review existing plant outage processes (outage management and outage risk assessments) to determine equipment relied upon to provide Key Safety Functions (KSF) including support functions during the required POSs. Each outage evolution identifies the diverse methods of achieving the KSF. For example to achieve the Decay Heat Removal KSF a plant may credit DHR Train A, DHR Train B, HPI Train A, HPI Train B, and Gravity Feed and Chemical and Volume Control.
- Compare the equipment credited for achieving these KSFs against the equipment credited for nuclear safety. Note the position/function for the component. For example, the existing nuclear safety analysis (Appendix R analysis) may credit the valve in the closed position however; the valve may be required open for shutdown modes of operation.
- For those components not already credited (or credited in a different way e.g., on versus off, open versus closed, etc.) analyze the circuits in accordance with the nuclear safety methodology.
- Identify locations where 1) fires may cause damage to the equipment (and cabling) credited above, or 2) recovery actions credited for the KSF are performed (for those ~~KFS~~ KSFs that are achieved solely by recovery action, i.e., alignment of gravity feed).
- Identify fire areas where a single fire may damage all the credited paths for a KSF. This may include fire modeling to determine if a postulated fire (MEFS – LFS) would be expected to damage required equipment.
- For those areas consider combinations of the following options to reduce fire risk depending upon the significance of the potential damage:
  - Prohibition or limitation of hot work in fire areas during periods of increased vulnerability
  - Verification of operable detection and /or suppression in the vulnerable areas.
  - Prohibition or limitation of combustible materials in fire areas during periods of increased vulnerability

- Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during increased vulnerability
- Use of recovery actions to mitigate potential losses of key safety functions.
- Identification and monitoring insitu ignition sources for "fire precursors" (e.g., equipment temperatures).

▪ NUMARC 91-06 discusses the development of outage plans and schedules. And that a key element of that process is to ensure the ~~KFS~~ KSFs perform as needed during the various outage evolutions. The results of the fire area analysis of those components relied upon to maintain defense in depth should be factored into the plant's existing outage planning process.

It is important to note the evaluation of the plant during non-operational modes is qualitatively risk-informed at this time pending the development of shutdown PRAs.

Table F-1

NFPA 805 – Non-Power Operational Guidance

NFPA 805 Requirements	Implementing Guidance	Process and Results
The nuclear safety goal is to provide reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition.	▪ Review existing plant outage processes (outage management and outage risk assessments) to determine equipment relied upon to provide Key Safety Functions (KSF) including support functions during required Plant Operational States. Each outage evolution identifies the diverse methods of achieving the KSF. For example to achieve the Decay Heat Removal KSF a plant may credit DHR Train A, DHR Train B, HPI Train A, HPI Train B, and Gravity Feed and Chemical and Volume Control.	▪ List the KSFs and the systems / components required to support those function. ▪ Identify those systems / components that require additional analyses. For example, a ~~KFS~~KSF may rely on instrumentation that is currently not part of the "Safe Shutdown Analysis", or a component may have been modeled in one position (closed, off, etc.) but to support the ~~KFS~~KSF it would need to be evaluated in an additional positions (open, on, etc.) ▪ For those additional components, perform circuit analysis, location tasks described in Appendix B of NFPA 805. Document the results.
	▪ Identify locations where 1) fires may cause damage to the equipment (and cabling) credited above, or 2) recovery actions credited for the KSF are performed (for those ~~KFS~~KSFs that are achieved solely by recovery action i.e., alignment of gravity feed).	▪ Evaluate on a fire area basis the loss of ~~KFS~~KSF s. Document those areas
	▪ Identify fire areas where a single fire may damage all the credited paths for a KSF. This may include fire modeling to determine if a postulated fire (MEFS – LFS) would be expected to damage equipment required.	▪ For the areas identified above, determine if a single fire in the area can cause a loss of all credited paths for a ~~KFS~~KSF. ▪ Conservatively, assume the entire contents of a fire area are lost. If this does not result in the loss of all credited paths for a ~~KFS~~KSF, document success. ▪ If fire modeling is used to limit the damage in a fire area, document that fire modeling is credited and ensure the basis for acceptability of that model (location, type, and quantity of

Table F-1

NFPA 805 – Non-Power Operational Guidance

NFPA 805 Requirements	Implementing Guidance	Process and Results
		combustible, etc.) is documented. These critical design inputs are required to be maintained during outage modes. See next step below.
	▪ For those areas consider one or more of the following options to mitigate potential fire damage depending upon the significance of the potential damage: o Prohibition or limitation of hot work in fire areas during periods of increased vulnerability o Verification of operable detection and /or suppression in the vulnerable areas. o Prohibition or limitation of combustible materials in fire areas during periods of increased vulnerability o Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during increased vulnerability o Use of recovery actions to mitigate potential losses o Identification and monitoring insitu ignition sources for "fire precursors" (e.g., equipment temperatures).	▪ Integrate the results of the analysis performed above into the plant's outage management process. ▪ To the extent practical pre-plan the options for achieving the ~~KFS~~KSF. See list to the left.