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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: **James A. FitzPatrick Nuclear Power Plant – Response to Request For Additional Regarding: Request For Exemption (TAC NO. ME0727)**

Entergy Nuclear Operations, Inc.
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-59

References:
1) Entergy Letter, JAFP-09-0025, James A. FitzPatrick Nuclear Power Plant Request for Exemption from 10 CFR 50 Appendix R Section III.G.2 Requirements Based on Manual Actions (TAC No. ME0727), dated February 18, 2009.
2) USNRC Letter, James A. FitzPatrick Nuclear Power Plant – Request For Information Required for Acceptance Review Re: Request For Exemption (TAC NO. ME0727), dated March 20, 2009.
3) Entergy Letter, JAFP-09-0038, James A. FitzPatrick Nuclear Power Plant – Response to Request For Information Required for Acceptance Review Regarding: Request For Exemption (TAC NO. ME0727), dated March 30, 2009.
4) USNRC Letter, James A. FitzPatrick Nuclear Power Plant – Request For Additional Information On The Request For Exemption From 10 CFR 50, Appendix R, Section III.G.2 Requirements Based On Manual Actions At James A. Fitzpatrick Nuclear Power Plant (TAC NO. ME0727), dated September 16, 2009.

Dear Sir or Madam:

Entergy Nuclear Operations Inc., (ENO) submitted James A. FitzPatrick Nuclear Power Plant Request for Exemption from 10 CFR 50 Appendix R Section III.G.2 Requirements Based on Manual Actions (TAC No. ME0727), dated February 18, 2009 [Reference 1]. Subsequently ENO received James A. FitzPatrick Nuclear Power Plant – Request For Information Required for Acceptance Review Re: Request For Exemption (TAC NO. ME0727), dated March 20, 2009 [Reference 2].

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On March 30, 2009 JAF provided a written response [Reference 3] to the request for additional information. Subsequent to JAF's response [Reference 3] the staff requested additional information to support their review of the exemption request [Reference 4]. This letter provides the information requested in reference 4 as discussed via telephone with the NRC staff.

There are no new commitments made in this letter.

If you have any questions or require additional information, please contact me, at 315-349-6766.

Sincerely,

E.W. Dorman
ACTING FOR
Joseph Pechacek
Licensing Manager

Enclosure 1: Request For Additional Information On The Request For Exemption From 10 CFR 50, Appendix R, Section III.G.2 Requirements Based On Manual Actions At James A. Fitzpatrick Nuclear Power Plant (TAC NO. ME0727)

JP/ed

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JAFP-09-0130

Enclosure 1

Request For Additional Information On The Request For Exemption From 10 CFR 50, Appendix R, Section III.G.2 Requirements Based On Manual Actions At James A. Fitzpatrick Nuclear Power Plant (TAC NO. ME0727)

Request For Additional Information On The Request For Exemption From 10 CFR 50, Appendix R, Section III.G.2 Requirements Based On Manual Actions At James A. Fitzpatrick Nuclear Power Plant (TAC NO. ME0727)

RAI-01 Circumstances for Review

Enclosure 1 of the February 18, 2009, request contains descriptions of the proposed deviations from III.G.2 and the operator manual actions in question but does not contain a discussion of why JAF is unable to meet the requirements of III.G.2 and why a deviation from III.G.2 requirements is necessary.

Provide a justification of the special circumstances, in accordance with 10 CFR 50.12, that are present and warrant the consideration of this Exemption request. If it is the licensee's position that the protective measures prescribed by III.G.2 are not necessary to meet the underlying purpose of the rule, provide a technical justification of how the proposed arrangement achieves the underlying purpose of the rule.

RAI-01 Response

Appendix R Section III.G.2 requires the following:

Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;

b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or

c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating, In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;

JAF is currently unable to meet the requirements of Section III.G.2 as discussed below:

a. JAF does not have redundant safe shutdown trains located in Fire Area 10 separated by 3-hour fire rated barriers. The high pressure systems (HPCI or RCIC) are both assumed lost for a fire in Fire Area 10 due to fire damage and a low pressure system (ADS/Core Spray) is relied on for hot shutdown. The ability to control the SRVs from the Control Room can also be lost due to control cable damage. Based on this, an Operator is sent to the Local SRV Control Panel to operate the valves. Based on the

current physical configuration of Fire Area 10, separating the SRV control cables, which are routed in cable trays approximately 20 feet off the floor, from the redundant shutdown equipment in Fire Area 10 is not feasible.

b. There is no location in Fire Area 10 that would allow 20 feet of horizontal separation with no intervening combustibles or fire hazards. In addition, Fire Area 10 does not have a general area automatic fire suppression system.

c. The cable trays located in Fire Area 10, which contain the SRV control cables, are not currently separated from the other redundant trains by a 1 hour fire rated barrier and no full area automatic fire suppression system exists in this fire area.

The purpose of Appendix R, Section III.G.2, is to ensure one train of equipment needed to achieve and maintain hot shutdown is available from the control room. Although JAF does not meet any of the three acceptable methods of providing this protection, one method of achieving safe shutdown is maintained free of fire damage when allowed to operate the SRVs from the Local SRV Control Panel. Because JAF meets the underlying purpose of the rule with its current configuration, as discussed below, performing plant modifications to come into literal compliance with Section III.G.2 is not warranted.

The requested exemption satisfies the 10 CFR 50.12 criteria as stated below:

1. The requested exemption is authorized by law, does not present an undue risk to the public health and safety, and is consistent with the common defense and security

   10 CFR 50.12(a) authorizes the Nuclear Regulatory Commission to grant this exemption. Granting of this exemption would not present an undue risk to the public health and safety as it provides an equivalent level of protection to the public as that provided by literal compliance to Appendix R, Section III.G.2. In the unlikely event that the SRV control cables are damaged during a fire in the northwest quadrant of the Reactor Building 272' elevation (Fire Area 10) the SRVs can be controlled by cables and components that are maintained free of fire damage at the local SRV Control Panel on the Reactor Building 300' elevation (Fire Area 8). This action has been shown to be feasible and reliable.

   The common defense and security are not affected by this exemption request.

2. Special circumstances are present as defined in 10 CFR 50.12(a)(2)

   10 CFR 50.12(a)(2) states, in part:

   "The commission will not consider granting an exemption unless special circumstances are present. Special circumstances are present whenever...(ii) Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule;..."

Response to Request For Information Required for Acceptance Review Re: Request For Exemption (TAC NO. ME0727)

Underlying purpose of the rule

Achieve and Maintain Hot Shutdown During a Fire Event

The underlying purpose of 10 CFR 50 Appendix R, is to provide reasonable assurance that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire in the plant. Although JAF does not meet the separation requirements of Appendix R Section III.G.2 for Fire Area 10, redundant cables and components are maintained free of fire damage outside of Fire Area 10, but require an operator action outside the Control Room.

The manual operator action required for a fire in Fire Area 10 consists of operating the SRVs from the Local SRV Control Panel in the Reactor Building 300' elevation while plant shutdown is being controlled from the Control Room. Although the use of this action is not allowed by 10 CFR 50, Appendix R, Section III.G.2, it is being performed at a panel specifically installed and designated for use during an Appendix R fire event. The modification which added this shutdown feature was proposed as part of the original safe shutdown analysis and was reviewed and accepted by the NRC in an SER dated April 26, 1983 (Reference 1) and is discussed in an SER dated September, 5 1995 (Reference 2).

The required components, cables and power supplies required to operate the SRVs from the local panel are maintained free of fire damage for a fire occurring in Fire Area 10 as the cables are routed through Fire Areas 8, 9, and 17, but never enter Fire Area 10.

A fire occurring on the 272' elevation of Fire Area 10 that could potentially damage the SRV control cables will have no adverse impact on the ability of the Operator to respond to the local SRV control panel or manually operate the SRV switches. The 272' elevation of Fire Area 10 is separated from the 300' elevation of Fire Area 8 by a 3 hour fire rated barrier. The Operator traveling to the local SRV control panel is not required to enter Fire Area 10 for any reason.

The Manual Operator Action discussed above has been repeatedly demonstrated as being feasible and reliable during periodic training and NRC Inspections. The action consists of operating switches in accordance with plant abnormal operating procedures (AOP) and does not require any special knowledge or equipment. Based on the information provided above, JAF demonstrates reasonable assurance that safe shutdown can be achieved and maintained for a fire occurring in Fire Area 10. Because this is the ultimate goal of 10 CFR 50, Appendix R, JAF meets the underlying purpose of the rule.

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RAI-02 Regulatory Deficiency

Enclosure 1 of the March 30, 2009, "Response to Request for Information for Acceptance Review," provides background regarding the change but does not state, specifically, which criteria of III.G.2 are not met. In response to Question 3, JAF states that ionization smoke detection systems and no intervening combustibles are present in FA 10 and in response to Question 1 JAF states that III.G.2 separation requirements are also not met but it is not clear whether an automatic fire suppression system is provided.

Provide a detailed description of the deficiencies that exist with regard to fire detection, suppression, intervening combustibles and spatial separation and explain how the deficiencies are mitigated with other forms of defense-in-depth measures. For example, confirm whether an automatic suppression system is provided and if not, provide a justification for how the established level of safety and protection is maintained. Additionally, if the 20-ft spatial separation between redundant equipment trains is not provided, provide a description of the separation that is provided and why this arrangement should be considered acceptable with regard to the established level of safety.

The licensee's response should also include a technical explanation to justify how the proposed methods will result in a level of protection that is consistent with that intended by III.G.2. For example, demonstrate that defense-in-depth is provided such that operators are able to safely and reliably achieve and maintain hot shut down capability from the control room. Note that it is the Nuclear Regulatory Commission (NRC) staff's position that operator manual actions alone, regardless of their feasibility and reliability, do not meet the underlying purpose of the rule without specific consideration of the overall concept of defense-in-depth that is being applied in a particular fire area.

RAI-02 Response

Appendix R Section III.G.2 lists three methods for separating redundant safe shutdown equipment located in the same fire area. JAF does not comply with any of the methods provided and relies on an Operator action to operate the SRVs from the Local SRV Control Panel for a fire in Fire Area 10. In addition, Fire Area 10 does not have a full area automatic suppression system. The details on why JAF does not comply with any of the three separation methods is provided in the response to RAI-01 above.

In accordance with 10 CFR 50 Appendix R, the JAF Fire Protection Program extends the concept of defense-in-depth to fire protection in fire areas important to safety, with the following objectives:

- to prevent fires from starting;
- to detect rapidly, control, and extinguish promptly those fires that do occur;
- to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.

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JAF has administrative controls in place to strictly control ignition sources (Reference 3) and transient combustibles (Reference 4). Controls are also in place to ensure fire barrier breaches are tracked (Reference 5) and the required compensatory measures are established in accordance with the Technical Requirements Manual (TRM) (Reference 6). The fixed fire severity in Fire Area 10 is approximately 35 minutes and consists primarily of fire retardant electrical cable insulation.

The Reactor Building is protected throughout (with the exception of the Refuel Floor, elevation 369') by early warning ionization smoke detectors. These detectors will ensure any fire occurring in the Reactor Building is detected in its incipient stages and the Fire Brigade is promptly dispatched to extinguish the fire. The fire would be contained in Fire Area 10 and would be extinguished in its early stages prior to any wide spread equipment damage. If the detection systems are out of service for any reason, compensatory measures are established in accordance with the TRM. The Reactor Building also contains manual fire hose stations and portable fire extinguishers throughout to support manual fire extinguishment. The features discussed above are all part of the defense-in-depth strategy that JAF employs to ensure the ability to achieve and maintain safe shutdown during a fire is maintained.

The underlying purpose of 10 CFR 50 Appendix R, is to provide reasonable assurance that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after a postulated fire in the plant. Although JAF does not meet the separation requirements of Appendix R, Section III.G.2 for Fire Area 10, redundant cables and components are maintained free of fire damage outside of Fire Area 10, but require an operator action outside the Control Room.

The manual operator action required for a fire in Fire Area 10 consists of operating the SRVs from the Local SRV Control Panel in the Reactor Building 300' elevation while plant shutdown is being controlled from the Control Room. Although the use of this action is not allowed by 10 CFR 50, Appendix R, Section III.G.2, it is being performed at a panel specifically installed and designated for use during an Appendix R fire event. The modification which added this shutdown feature was proposed as part of the original safe shutdown analysis and was reviewed and accepted by the NRC in an SER dated April 26, 1983 (Reference 1) and is discussed in an SER dated September, 5 1995 (Reference 2).

The required components, cables and power supplies required to operate the SRVs from the local panel are maintained free of fire damage for a fire occurring in Fire Area 10 as the cables are routed through Fire Areas 8, 9, and 17, but never enter Fire Area 10.

A fire occurring on the 272' elevation of Fire Area 10 that could potentially damage the SRV control cables will have no adverse impact on the ability of the Operator to respond to the local SRV control panel or manually operate the SRV switches. The 272' elevation of Fire Area 10 is separated from the 300' elevation of Fire Area 8 by a 3 hour fire rated barrier. The Operator traveling to the Local SRV Control Panel is not required to enter Fire Area 10 for any reason.

The Manual Operator Action discussed above has been repeatedly demonstrated as being feasible and reliable during periodic training and NRC Inspections. The action consists of operating switches at the Local SRV Control Panel in accordance with procedural direction and does not require any special knowledge or equipment. Based on the information provided above, JAF demonstrates reasonable assurance that safe shutdown can be achieved and

maintained for a fire occurring in Fire Area 10. Because this is the ultimate goal of 10 CFR 50, Appendix R, JAF meets the underlying purpose of the rule for a fire occurring in Fire Area 10.

The purpose of Appendix R, Section III.G.2, is to ensure one train of equipment needed to achieve and maintain hot shutdown is available from the control room. Although JAF does not meet any of the three acceptable methods of providing this protection, one train of equipment is maintained free of fire damage when allowed to operate the SRVs from the Local SRV Control Panel. Therefore, the level of protection provided at JAF is consistent with that intended by Section III.G.2.

RAI-03 Ensuring That One of the Redundant Trains Is Free of Fire Damage

Question 1 Response in Enclosure 1 of the March 30, 2009, "Response to Request for Information for Acceptance Review," states that the JAF does not meet the separation requirements of Appendix R Section III.G.2 for FA 10, but redundant cables and components are maintained free of fire damage for the Local SRV Control Panel in the Reactor Building 300' elevation.

Confirm whether all redundant equipment in FA 10 is assumed lost during a fire event. If it is assumed that all redundant equipment is lost during a fire event, this is inconsistent with III.G.2, which states that measures must be taken to ensure that one of the redundant trains remains free of fire damage. Furthermore, the use of OMAs, in lieu of the three options provided in III.G.2, is not explicitly included as a means of compliance with III.G.2. Provide a technical justification to support the claim that the redundant cables and components are maintained free of fire damage for the Local SRV Control Panel in the Reactor Building 300' elevation.

RAI-3 Response

The JAF Safe Shutdown Analysis demonstrates that safe shutdown can be performed during a fire while assuming a total loss of equipment and cables in any Fire Area (i.e. total consumption of the area). For a fire in Fire Area 10, JAF assumes a loss of its high pressure shutdown systems (HPCI and RCIC) due to fire induced cable damage and relies on ADS and Core Spray to achieve hot shutdown. The only redundant equipment needed to shutdown using ADS and Core Spray that is assumed lost in Fire Area 10 is the ability to control the SRVs from the Control Room. This is a result of control cable damage as discussed in the March 30, 2009 submittal (Reference 7).

Although the cables required to operate the SRVs from the Control Room are routed through Fire Area 10 and may be lost during a fire in this area, another set of SRV control cables are routed through Fire Areas 8 and 9, and a separate power cable is routed through Fire Areas 8, 9, and 17 that allow the SRVs to be controlled from the Local SRV Control Panel located in Fire Area 8. These cables are maintained free of fire damage as the fire is assumed to only damage the cables and equipment located in Fire Area 10. This demonstrates that all the equipment needed to achieve and maintain safe shutdown is available for a fire in Fire Area 10 from either the Control Room or the Local SRV Control Station without any repair activities. To avoid the potential for spurious operation of the SRVs, AOP-28 (Reference 8) provides

direction to the Operators to isolate the electric lift function of the SRVs in the Relay Room as an immediate action.

RAI-04 Other Evaluations

Fire areas may have other exemptions or engineering evaluations that affect fire protection systems or safe shutdown capabilities.

Provide a discussion of any other exemptions or evaluations that impact this request in any way and a justification for why such impact should be considered acceptable.

RAI-04 Response

JAF has one existing Appendix R Exemption for Fire Area 10 which also applies to all Fire Areas in the Reactor Building (Reference 9). This exemption approved the use of water spray curtain boundaries to achieve fire area separation in the Reactor Building in lieu of compliance with Section III.G.2. No other Appendix R exemptions exist for Fire Area 10.

JAF has several engineering evaluations which apply to Fire Area 10 and the surrounding fire areas. The engineering evaluations, prepared in accordance with the guidelines of Generic Letter 86-10, were performed to evaluate conditions associated with fire barrier penetration discrepancies. There are no engineering evaluations dealing with the 3 hour fire rated barrier separating the 272'elevation of Fire Area 10 (where the SRV control cables are located) and Fire Area 8. The only 86-10 evaluation associated with a common barrier between Fire Area 10 and Fire Area 8 is associated with a ventilation duct passing through the water curtain boundary on the 300' elevation without a fire damper (Reference 10). The evaluation concluded that lack of a fire damper would not adversely impact the ability of the water curtain to limit the spread of a fire based on the following:

a. The duct provides a lengthy and torturous path along which fire would have to travel.

b. The lack of combustibles within the duct precludes the possibility of fire propagation along the duct.

c. All areas adjacent to the water curtains are provided with ionization smoke detectors.

d. Manual suppression activities would be quickly initiated to protect the area. The fire brigade's primary activities would be to extinguish the fire.

The remaining evaluations associated with Fire Area 10 concluded, based the fire protection features present in the plant, that the barriers are adequate to withstand the hazards associated with the area and are acceptable. None of the evaluations identified issues that would adversely impact this exemption request or that could affect safe shutdown capabilities.

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RAI-05 Standards and Listings for Systems and Barriers

Enclosure 1 of the March 30, 2009, "Response to Request for Information for Acceptance Review," states that an ionization smoke detection system is installed in FA 10. However, the request does not state whether the system has been designed and installed in accordance with recognized design standards.

Where fire protection features such as detection and suppression systems and fire rated assemblies are installed, describe the technical basis for such installations including the applicable codes, standards and listings. In addition, provide a technical justification for any deviations from codes, standards and listings by independent testing laboratories in the fire areas that could impact this evaluation. Additionally, provide a technical justification for any non-rated fire protection assemblies.

For example:

Fire Area 10 is noted as having ionization smoke detectors installed throughout the area. State whether the detectors have been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association 72: National Fire Alarm Code, 1985 Edition.

Fire Areas 8 and 9 are noted as having water spray curtains installed. State whether the water spray curtains have been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association 13: Standard for the Installation of Sprinkler Systems, 1985 Edition.

RAI-05 Response

The entire Reactor Building, except elevation 369'-6" contains area wide ionization smoke detectors installed in accordance with NFPA 72E – 1978. The entire Reactor Building also has manual hose stations installed in accordance with NFPA 14 - 1978 and portable fire extinguishers installed in accordance with NFPA 10 - 1990. A complete NFPA code conformance review was performed at JAF in 1994 (Reference 11). This review determined there was one minor design deviation associated with the smoke detection in Fire Area 10 dealing with the lack of smoke detector coverage below the removable hatchway cover on the 300' elevation. The deviation was determined to be acceptable based on the other fire protection features and the low localized combustible loading in the area. There are no other code deviations identified that would potentially impact this exemption request.

Fire rated barriers installed to separate Fire Area 10 from surrounding Fire Areas meet the design requirements of a 3 hour fire rated barrier when tested in accordance with the ASTM E119 Standard. Deviations to these designs have been evaluated in accordance with Generic Letter 86-10 and are discussed the response to RAI-04.

The water spray curtains separating Fire Area 10 from adjacent fire areas are automatically actuated by rate compensation heat detectors. The water curtain boundaries which separate Fire Area 10 from Fire Area 9 on the 272' elevation and from Fire Areas 8 and 9 on the 300' elevation include closely spaced nozzles located at the ceiling level and directed downwards to form a water curtain effect. The nozzles are positioned in long baffle boxes (of sheet metal

construction with open bottoms). The heat detectors that actuate the water curtains are located near the ceiling level on both sides of each respective water curtain. The detectors are divided into two sub-circuits. Actuation of the water spray curtain requires one detector on each subsection to sense a fire (cross-zoned). Additionally, Fire Area 10 is separated from Fire Area 9 at the 326' elevation at the open stairwell in the southwest corner by a water spray curtain. This water spray curtain utilizes open sidewall type sprinklers and heat detectors positioned at the floor openings through which the respective stair passes. These systems were designed using guidance contained in NFPA 13 – 1982 and are described in submittals to the NRC that ultimately resulted in the approved Appendix R Exemption (Reference 9).

The heat detectors used for the water spray curtains are of the fixed temperature (195°F) design and are self-resetting. The detectors are not of a standard fire protection model and are not listed or approved by a nationally recognized testing laboratory. However, the detector supplier submitted similar detectors to Underwriters Laboratories (U.L.) for testing in accordance with UL521 "Standard for Heat Detectors for Fire Protection Signaling Systems". that were found to be acceptable.

All of the automatic and manual fire protection features discussed above are tested and maintained per the guidance provided in the respective NFPA standards and the Technical Requirements Manual.

RAI-06 Time and Sequence Assumptions

Question 2 Response in Enclosure 1 of the March 30, 2009, "Response to Request for Information for Acceptance Review," states that based on walkthroughs of Abnormal Operating Procedure 28 for a fire in FA 10, an Operator would be stationed at the Local Safety/Relief Valve (SRV) Control Panel within 15 minutes. The request lacks a detailed description of the series of events that may occur prior to initiating the OMA procedures.

Describe the circumstances and assumptions needed to enter the OMA procedure. For example, describe the amount of time, and the technical basis, that has been assumed for detection and assessment of a postulated fire. Additionally, provide an analysis and/or a technical justification to evaluate scenarios where components fail, or damage occurs, before a fire has been detected.

RAI-06 Response

The procedure that the Operations Department uses to guide them through achieving and maintaining normal (from the Control Room) safe shutdown is AOP-28. AOP-28 is an event based procedure and a set of criteria must occur prior to the Control Room Operators entering the procedure. In order for the Operators to enter AOP-28, the following must occur:

- A serious fire is in progress (emergency plan Alert level or worse)
  and
- The reactor is in Mode 1, 2, or 3
  and
- One of the following exist:
  - Ionization or fire alarm at the Control Room Fire Protection Panel

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  - Actuation of a fire suppression system
  - Verbal report of a fire

    and
- One of the following exist:
  - Unexplained EPIC or annunciator alarm
  - Unexplained loss of equipment
  - Unexplained actuation of equipment

If a fire occurred in Fire Area 10 the Control Room would receive notification while the fire is in its incipient stages due to the presence of an early warning ionization smoke detection system and the fire brigade would be dispatched to promptly extinguish the fire. Based on this it is assumed that detection of a fire occurs immediately under normal conditions. When the alarm is received by the Control Room without any other indication of a fire, a member of the fire brigade is dispatched to assess the situation. The amount of time the assessment takes will be based on the length of time it takes for the Operator to travel to the fire location. For a fire in Fire Area 10, the time required to complete this assessment would be minimal. If a fire is confirmed the fire brigade would be dispatched. If a fire is reported by personnel in the plant, the fire brigade is dispatched immediately and no further confirmation by an operator is required.

In a situation where two or more smoke detectors in Fire Area 10 are out of service compensatory measures would be established per the requirements of the JAF Technical Requirements Manual. These compensatory measures consist of establishing a continuous fire watch in the area or verifying backup fire suppression equipment is available and establish an hourly fire watch patrol.

There is no credible fire scenario that would allow a fire to occur and cause components to fail or become damaged before the fire in Fire Area 10 is detected. In accordance with 10 CFR 50 Appendix R, the JAF Fire Protection Program extends the concept of defense-in-depth to fire protection in fire areas important to safety, with the following objectives:

- to prevent fires from starting;
- to detect rapidly, control, and extinguish promptly those fires that do occur;
- to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.

JAF has administrative controls in place to strictly control ignition sources and transient combustibles. Controls are also in place to ensure fire barrier breaches are tracked and the required compensatory measures are established in accordance with the TRM. The Reactor Building is protected throughout (with the exception of the Refuel Floor, elevation 369') by early warning ionization smoke detectors. These detectors will ensure any fire occurring in the Reactor Building is detected in its incipient stages and the Fire Brigade is dispatched to extinguish the fire. Based on the open layout of the Reactor Building, even if a fire occurred in Fire Area 10 while the smoke detectors in that area were out of service, the smoke would be picked up by another zone before any equipment damage is expected. The Reactor Building also contains manual fire hose stations and portable fire extinguishers throughout to support manual fire extinguishment.

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RAI-07 Water Curtain

Enclosure 1 of the February 18, 2009, request states that a water spray curtain is installed in the southwest stairwell leading up to Fire Area 9. Provide an explanation as to why a water spray curtain is not shown on Attachment 2 and explain the intended purpose of the water spray curtain. If the water spray curtain is installed to separate redundant equipment, describe if it impacts this exemption.

RAI-07 Response

The diagram provided as Attachment 2 of the February 18, 2009 (Reference 12) submittal does not show the water spray curtain that separates Fire Area 10 from Fire Area 9 at the 326' elevation. Attachment 2 is a diagram of the 300' elevation and the water spray curtain is located at the floor opening of the 326' elevation. Attachment 1 to this submittal provides a diagram of the 326' elevation that shows the water curtain in question.

The water spray curtain separating Fire Area 10 from Fire Area 9 at the 326' floor opening is installed to separate redundant safe shutdown equipment. The use of the water spray curtains as fire area boundaries was approved by the NRC in an Appendix R Exemption (Reference 9) and its use will have no adverse impact on this exemption request. The use of the water spray curtains was determined to be an acceptable method of separating redundant safe shutdown equipment and this exemption request makes no changes to the details provide in the exemption.

RAI-08 Motor Control Centers

Enclosure 1 of the March 30, 2009, "Response to Request for Information for Acceptance Review," states that there are two Motor Control Centers (MCCs) located in FA 10. The Question 3 Response section states that it is unlikely that sufficient heat buildup would occur from the MCCs at the ceiling level to cause cable damage. Provide the critical details and/or assumptions of the analysis that supports this claim.

RAI-08 Response

As discussed in the March 30, 2009 submittal the only credible fire hazards that could potentially cause fire induced failure of the SRV control cables are the two MCCs located in the northwest corner of the Reactor Building 272' elevation. The two MCCs are located on the floor but are not directly below the tray that contains the SRV control cables. 71MCC-133 is 6 feet from being within the vertical plane of the tray and 71MCC-152 is located approximately 9 feet from being within the vertical plane of the tray. Because the tray in question is not directly above the MCCs, no fire damage due to elevated plume temperatures or flame impingement is expected. Attachment 1 of the March 30, 2009 submittal shows the routing of the cable tray and approximate location of the MCCs. The affected cable tray is also located approximately 6 feet below the ceiling level.

The MCCs consist of cable insulation and plastic from breakers and relays contained completely within the metallic MCC enclosures. Because the combustibles are completely enclosed in the metallic enclosures, if a fire were to occur in one of the MCCs it would not be

expected to burn completely and would not contribute a significant quantity of heat to the surrounding area. There are no other combustible materials within the immediate vicinity of the MCCs and administrative controls are in place to control transient combustibles and ignitions sources. For the MCCs to contribute to a fire in the area the fire must occur within the MCC. As stated above, because the cable insulation and plastics are completely contained within the metallic enclosure of the MCCs, the heat release rate would be minimal. In addition, the area is protected throughout by a full area, early warning ionization smoke detection system that would provide notification of the fire to the Control Room in the fires incipient stages.

Based on the modest amount of heat release expected from a potential MCC fire and the configuration of the area, including the open stairwells and equipment hatches in the Reactor Building, it is unlikely that sufficient heat build up would occur at the ceiling level to cause cable damage in a tray six (6) feet below the ceiling. If a fire were to occur in one of the MCCs, the maximum heat energy in the cone of influence of the plume would be nearly directly above the MCCs.

Although it is unlikely that an MCC fire would cause damage to the cables in question based on the above information, the JAF Safe Shutdown Analysis assumes these cables are lost for a fire occurring in any location of Fire Area 10. Based on this, the Operators take immediate action to isolate the X1 series of solenoids that provide control of the SRVs from the Control Room to prevent spurious operation of the SRVs due to potential fire induced damage of the cables. An Operator is then sent to the Local ADS Control Panel to operate the SRVs using the X2 series solenoids as directed by the Shift Manager. Additional information on the X1 and X2 series solenoids can be found in Enclosure 1 of the February 18, 2009 submittal.

RAI-09 Smoke Migration

Attachment 1 and 2 of the February 18, 2009, request indicate that FA 8 is located directly above the postulated fire location in FA 10, elevation 272'. Attachment 2 shows that the ceiling on elevation 272' contains hatches which could allow smoke to migrate into FA 8 on elevation 300'. The Smoke and Toxic Gases section of Enclosure 1, states that the floor of Fire Area 8 is three hour rated and that all penetrations are sealed to the equivalent rating of the fire barrier. Confirm that the hatches on the drawing are three hour rated with the appropriate seals and provide the critical details and/or assumptions of the analysis to justify that smoke migration does not occur and would not impact the ability of plant personnel to perform the OMA in FA 8.

RAI-09 Response

The ceiling of Fire Area 10 on the 272' elevation which separates it from Fire Area 8 on the 300' elevation is a 3 hour fire rated barrier. This ceiling does contain a hatchway that is covered with a 3 piece, 9 inch thick concrete hatch cover. This hatch is designed such that it overlaps the hatchway opening and the 3 pieces are designed to fit together such that there are no openings and the cover maintains the 3 hour rating of the barrier. This design of the hatchway will prevent smoke migration from Fire Area 10 to Fire Area 8 through this barrier. Any smoke migration that would occur from a fire on the 272' elevation west side would be via the open stairwell in the southwest corner or through the open hoistwell in the south east side

of the Reactor Building. However, smoke migration occurring in Fire Area 8 based on a fire in on the 272' elevation of Fire Area 10 is unlikely based on this path of travel.

If smoke were to migrate up to the 300' elevation via the southwest stairwell it is expected that it would continue up to the higher elevations based on the stack effect that would occur up the stairwell due to the heated air from the fire traveling upward toward the cooler air above. As the smoke travels up the open stairwell and gets further from the fire, its temperature will drop due to heat transfer and dilution. This will reduce the buoyancy of the smoke as the distance from the fire increases and cause the smoke to stratify at one of the higher elevations when it loses its buoyancy relative to its surroundings. However, because the 300' elevation would be still relatively close to the origin of the fire the smoke layer would stratify at some point above this elevation when the smoke and hot gases cooled.

If a fire were to occur in Fire Area 10 and was sufficient enough to actuate the water spray curtains that bound the Fire Area, it is expected the smoke would be contained within Fire Area 10. This assumption is based on the design of the water spray curtains and the ability of the water spray curtains to contain the fire, smoke and hot gases due to the wall of water that would be produced.

The Operator dispatched to the Local SRV Control Panel has two separate and distinct paths available to reach the panel, neither of which requires travel through Fire Area 10 or from an elevation above 300'. Additional details on the available travel paths were provided in Enclosure 1 of the February 18, 2009 submittal.

REFERENCES

1. NRC Letter and SER, Domenic B. Vassallo to J. P. Bayne, "Alternate Safe Shutdown Capability, Modifications and Exemptions to Meet Appendix R of 10 CFR Part 50 – Fire Protection", April 26, 1983

2. NRC Letter and SER, C. E. Carpenter, Jr. to William J. Cahill, Jr., "Safety Evaluation of Safe Shutdown Capability Reassessment for James A. FitzPatrick Nuclear Power Plant (TAC No. M84780)", September 5, 1995

3. EN-DC-127, "Control of Hot Work and Ignition Sources", Revision 7

4. EN-DC-161, "Control of Combustibles", Revision 3

5. AP-14.04, "Fire Penetration Breach Permit", Revision 7

6. "Technical Requirements Manual", Revision 38

7. JAFP-09-0038, "James A. FitzPatrick Nuclear Power Plant – Response to Request for Information Required for Acceptance Review Regarding: Request for Exemption (TAC No. ME0727)", March 30, 2009
8. AOP-28, "Operation During Plant Fires", Revision 18

9. NRC Letter and SER, Domenic B. Vassallo to C.A. McNeill, "Exemption Requests – 10 CFR 50.48 Fire Protection and Appendix R to 10 CFR 50", January 11, 1985

Response to Request For Information Required for Acceptance Review Re: Request For Exemption (TAC NO. ME0727)

10. JAF-ANAL-FPS-00293, "Evaluation of Ventilation Ducts Passing Through Water Curtain of the Reactor Building on 272' and 300' Elevations", Revision 1

11. JAF-RPT-FPS-01490, "NFPA Code Conformance Review Report", Revision 0

12. JAFP-09-0025, "Request for Exemption from 10 CFR 50 Appendix R Section III.G.2 Requirements Based on Manual Actions", February 18, 2009

ATTACHMENTS

1. Sketch of Reactor Building, Elevation 326'

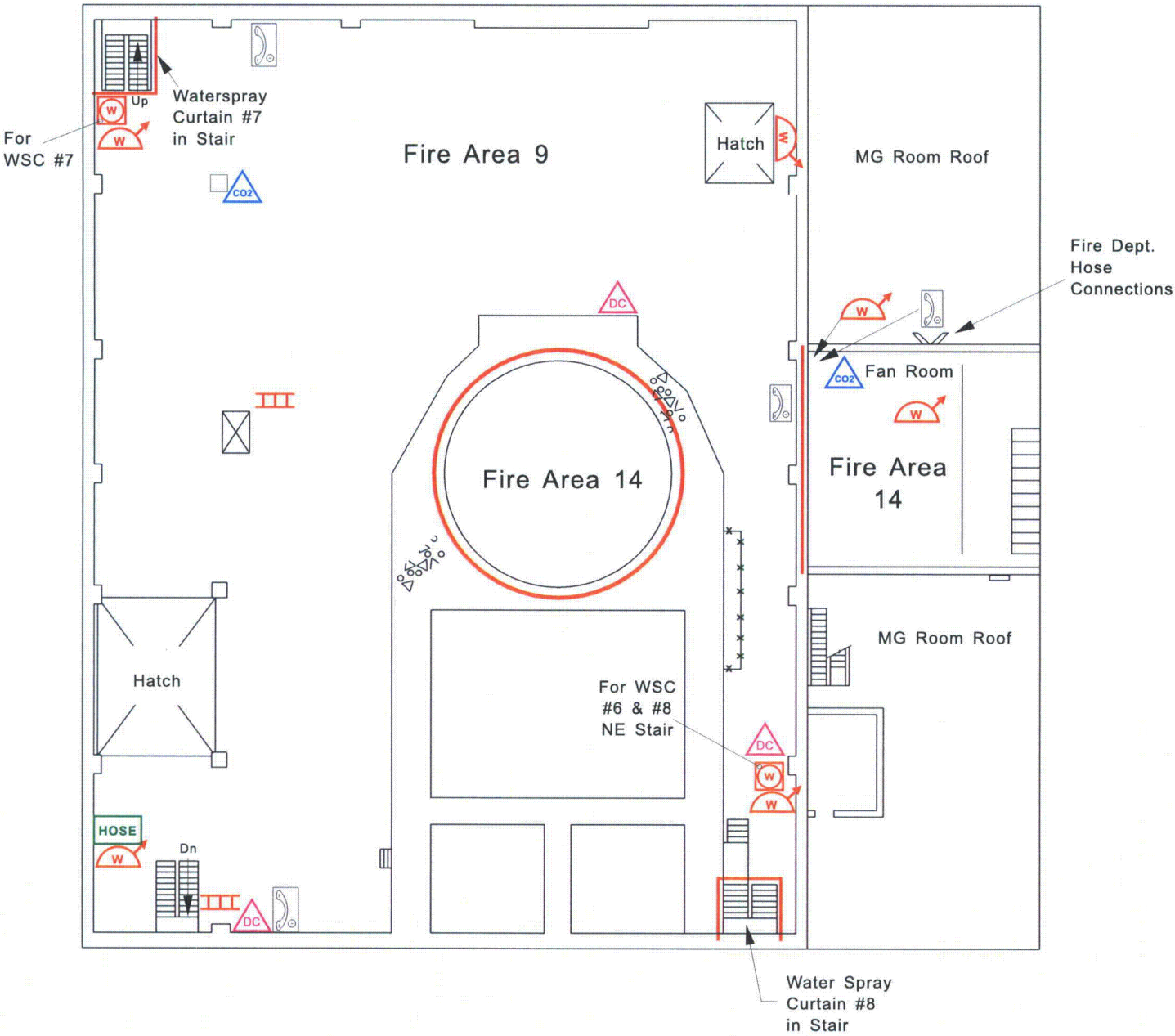
JAFP-09-0130

Enclosure 1

Attachment 1

Sketch of Reactor Building, Elevation 326'

Attachment 1
Reactor Building - Elev. 326'



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