FAQ Number 07-0030 **FAQ Revision** 0

FAQ Title OMA Transition to Recovery Actions

Plant: Harris Nuclear Plant Date: January 22, 2009

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Purpose of FAQ:

To detail the process associated with transitioning current licensing basis Operator Manual Actions (OMAs) to NFPA 805 recovery actions.

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 currently addresses the transition of OMAs to recovery actions in the following sections:

- 4.3.2 Nuclear Safety Performance Criteria
- B.2.2 Fire Area-by-Fire Area Transition
- B.2.2.4 Recovery Actions

This guidance requires clarification with respect to the following:

- Difference between recovery actions and defense-in-depth actions
- Methodology used to assess the additional risk presented by the use of the recovery actions as a compliance strategy
- The feasibility evaluation requirements for recovery actions and defense-in-depth actions
- Methodology used to assess the 'reliability' of recovery actions

Circumstances requiring guidance interpretation or new guidance:

Background

NEI 04-02 FAQ 06-0012 was developed to provide clarification on allowable OMAs and to define the scope of the associated risk-informed, performance-based change evaluations. FAQ 06-0012 includes a binning process to determine if post-fire OMAs are allowed under the pre-transition licensing basis. FAQ 06-0012, Revision 5 was accepted by the NRC via closure memo

dated January 24, 2008 (ML072340368). In addition, Section 4.2.4 of NFPA 805 requires that the additional risk presented by the use of recovery actions be evaluated.

The pilot process determined that there is a need to:

- Differentiate between recovery actions and defense-in-depth actions
- Document the methodology used to assess the additional risk presented by the use of the recovery actions as a compliance strategy
- Establish the feasibility evaluation requirements for recovery actions and defense-in-depth actions
- Document the methodology used to assess the reliability of recovery actions

Additional clarification is provided on the definition of recovery actions as defined in Section 1.6.52 of NFPA 805. This clarification was presented by the NRC at the October 3, 2008 public meeting on Pilot Plant LARs lessons learned (ML082520076).

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

None

Potentially relevant existing FAQ numbers:

FAQ	Rev	Subject	Closure Memo
06-0011	2	Clarify III.G.3 Compliance Transition	ML080300121
06-0012	5	Clarify Manual Action Transition in Appendix B	ML072340368
07-0039	1	Lessons Learned NEI 04-02 Table B-2	
08-0055		Lessons Learned NEI 04-02 Table B-3 (split from FAQ 07-0039 per NRC request)	

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

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

See revisions to NEI 04-02 Section B.2.2 and B.2.2.4 below. Please note that these excerpts reflect the inclusion of FAQ 06-0011 (ML080300121) and FAQ 06-0012 (ML072340368). Included for context are excerpts from Section 4.3.2.

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4.3.2 Nuclear Safety Performance Criteria Transition Review

…Operator manual actions being transitioned to recovery actions that are not allowed under the current regulatory framework or do not have previous NRC approval should be evaluated using the change process. See Appendix B-2 of this document for additional guidance.

[As modified by FAQ 06-0011 Rev. 2 - ML080300121. Proposed changes to FAQ 06-0011 are annotated.]

B.2.2 Fire Area – by – Fire Area Transition

Table B-3 provides a worksheet for transitioning the fire area-by-fire area compliance. The current fire protection licensing basis for each fire area should be reviewed and summarized.

Transition of a fire area that is governed by Sections III.G.3/III.L of 10 CFR 50 Appendix R (or applicable sections of NUREG-0800) will be performed using the performance-based approach. The performance-based approach must include sufficient analyses (Thermal-Hydraulic, Fire Risk Evaluation [which may include Fire Modeling], etc.) to demonstrate that the available safe shutdown equipment and systems can meet the nuclear safety goals, nuclear safety objectives and the nuclear safety performance criteria in Chapter 1 of NFPA 805. The results of these analyses form the foundation for the available time frames for recovery actions. The performance-based analyses should include a comparison of the time available before failure of the nuclear safety performance criteria to the timeline of required operator actions needed to achieve the nuclear safety performance criteria. Recovery actions modeled in the Fire PRA should be addressed for reliability using Fire PRA methods (i.e., HRA). The risk associated with the implementation of recovery actions for these areas should be addressed per Section B.2.2.4.

Deterministic methods may be used to simplify the analysis by verifying that the compliance strategy for the area meets the existing licensing basis, including approved exemptions, fire protection Existing Engineering Equivalency Evaluations (EEEEs, formerly Generic Letter 86-10 evaluations) and properly implemented Fire Protection Program (FPP) changes made under the Standard Fire Protection License Condition. Note that exemptions, EEEEs and properly implemented FPP changes must be reviewed to verify that the quality level and the basis for acceptability are still valid (see NEI 04-02 Sections 2.3.1 and 4.1.1). Also note that previous analyses have demonstrated the ability to achieve the safe shutdown goals required by 10 CFR 50 Appendix R, Section III.L. These same analyses may be capable of demonstrating the ability to achieve the nuclear safety performance criteria for these areas.

For alternative/dedicated shutdown fire areas that fully meet the current licensing basis, a change evaluation would not be required and "Defense-in-Depth" and "Safety Margin" requirements of Sections 2.4.4.2 and 2.4.4.3 of NFPA 805 are "deemed to satisfy" so no additional Defense-in-Depth or Safety Margin analyses are necessary. Also, if no changes were required to meet the nuclear safety performance criteria, an uncertainty analysis is also not required per 10 CFR

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50.48(c)(2)(iv).

The current licensing basis for an alternative/dedicated shutdown fire area may be more explicit than other fire areas, since many licensees have detailed alternative/dedicated shutdown Safety Evaluation Reports. It may require more detailed documentation to ensure future change evaluations accurately capture the baseline configuration. For example, a dedicated shutdown methodology may credit a unique power source or pump that is not part of the plant's safety systems or post-fire safe shutdown program. Post-transition changes to this equipment or methodology would need to be addressed by the NFPA 805 change evaluation process.

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[Replace Section B.2.2.4 in its entirety, including previous information from FAQ 06-0012]

B.2.2.4 Recovery Actions

Certain pre-transition operator manual actions (OMAs)/repairs will be transitioned as "recovery actions" in the new NFPA 805 licensing bases. NFPA 805 Section 4.2.3.1 does not allow recovery actions when using the deterministic approach to meet the nuclear safety performance criteria. However, the use of recovery actions is allowed by NFPA 805 using a performance-based approach, provided that the additional risk presented by the use of recovery actions has been evaluated by the licensee in accordance with NFPA 805 Section 4.2.4.

The following process should be utilized for transitioning operator manual actions:

- Establishment of OMA Evaluation Groups. See discussion in Section B.2.2.4.1.
  - If the transitioning OMA is allowed or was previously reviewed and approved by the NRC's Office of Nuclear Reactor Regulation (NRR), it does not require a change evaluation. Document in Table B-3. Include reference to documentation that demonstrates prior review and approval by the NRC.
  - If the transitioning OMA requires a change evaluation, include the reference to the appropriate document in Table B-3.
- Determination of whether a transitioning OMA is a post-transition recovery action, a defense-in-depth action, or neither. See discussion in Section B.2.2.4.2. Document the results.
- Evaluation of the additional risk presented by the use of recovery actions credited in the analysis post-transition as a compliance strategy and the results of that evaluation. See discussion in Section B.2.2.4.3. Document the results.
- Evaluation of the feasibility of the recovery and defense-in-depth actions credited in the analysis post-transition and the results of that evaluation. See discussion in Section B.2.2.4.4. Document the results.

- Evaluation of the reliability of recovery actions credited in the analysis post-transition as a compliance strategy and the results of that evaluation. See discussion in Section B.2.2.4.5. Document the results.

Note: Section 1.6.52 of NFPA 805 provides a definition of recovery action:

> "**Recovery Action.** Activities to achieve the nuclear safety performance criteria that take place outside of the main control room or outside of the primary control station(s) for the equipment being operated, including the replacement or modification of components."

Based on this definition, Bin D OMAs at the primary control station are not considered recovery actions.

NFPA 805 does not provide a definition of "primary control station." Since no definition is provided, the definition of "emergency control station" from Regulatory Guide 1.189, Revision 1 will be utilized as the definition of "primary control station" in a post-transition NFPA 805 program:

> "A location outside the main control room where actions are taken by operations personnel to manipulate plant systems and controls to achieve safe shutdown of the reactor."

For the purposes of recovery action definition, a primary control station is considered to be stations such as remote/alternative shutdown panels, valve control stations, local instrumentation/monitoring panels, and component controls provided at motor control panels, load centers, switchgear, etc. Local manual valve operation, repairs, and operation of components manually at the component location or breaker due to loss of power/control are not considered primary control stations.

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B.2.2.4.1 Establishment of OMA Evaluation Groups

Figure B-4 depicts the general process for establishing OMA evaluation groups. This process "bins" transitioning OMA. The "bin" identifiers are for ease of reference.

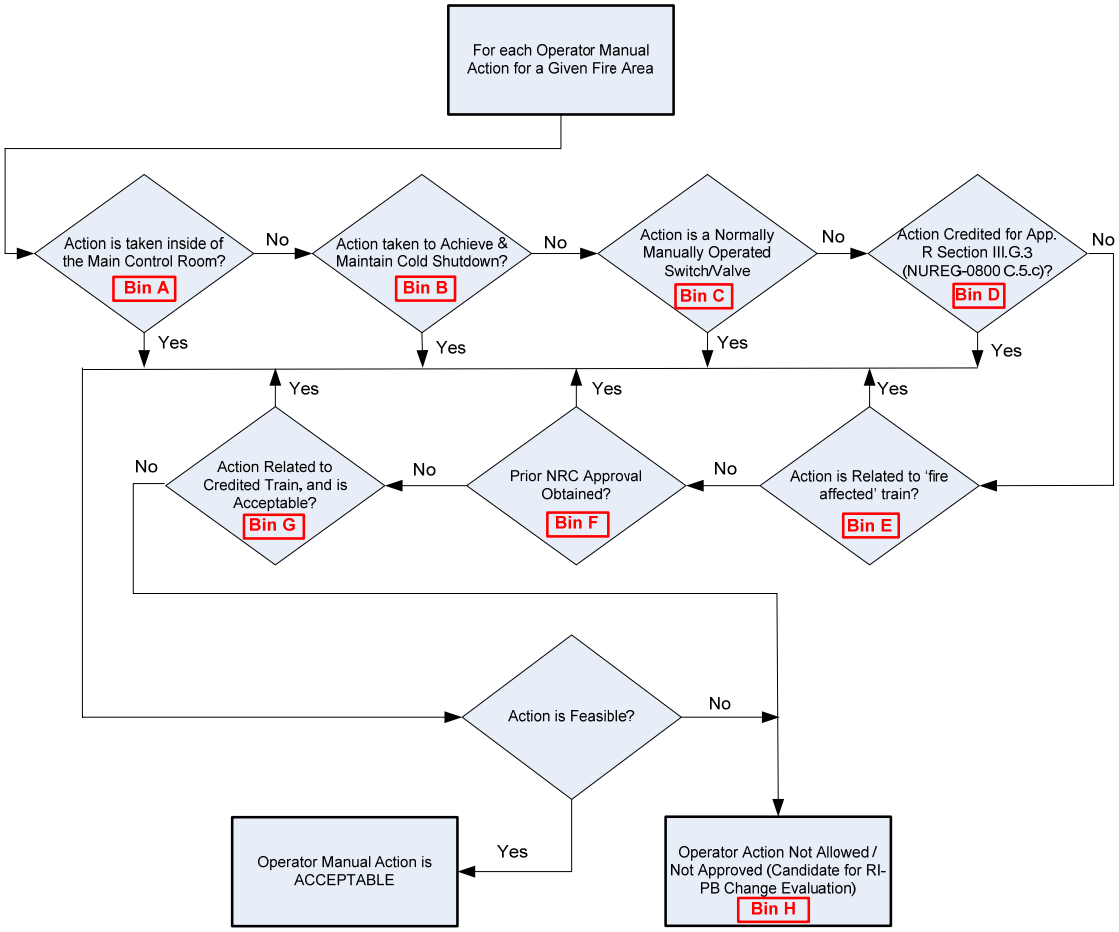

Figure B-4 General Process to Transition Operator Manual Actions

OMAs that are allowed and/or have been previously reviewed and approved by the NRC (as documented in an approved exemption/deviation/safety evaluation report) can be transitioned without using the change evaluation process. Examples of allowed OMAs include:

Bin A - Manual operation from the control room or emergency control station(s)

> Note: Operation of components from the Control Room, by definition[1], is not considered either an "operator manual action" or "recovery action," and is therefore excluded from further consideration for items such as credit taken for their use,

[1] See NFPA 805 Section 1.6.52

feasibility, and additional risk. Emergency control station actions that are applicable to alternative shutdown actions would be characterized as Bin D.

Bin B - Repairs or OMAs credited either for transitioning to or maintaining cold shutdown

Note: Repairs or OMAs credited either for transitioning to or maintaining cold shutdown may be relied upon in fire areas relying on alternative or dedicated shutdown capability per Section III.G.3 of 10 CFR 50, Appendix R (or Section C.5.c of NUREG-0800). For the purposes of the transition process, these actions should be treated as Bin B actions.

Bin C - Manual operation of normally operated manual switches and valves where separation/protection is provided for redundant safe-shutdown trains in accordance with Section III.G.1 or III.G.2 of 10 CFR 50, Appendix R (or applicable sections of NUREG-0800)

- NRC Letter to NEI dated May 16, 2002 states: *"With proper analysis, manual actions are allowed for fire safe shutdown activities under the following circumstances:*
  - *Manual operation of normally operated manual switches and valves"*

Bin D - OMAs credited for compliance with Section III.G.3 of 10 CFR 50, Appendix R (or Section C.5.c of NUREG-0800).

- NRC Letter to NEI dated May 16, 2002 states: *"With proper analysis, manual actions are allowed for fire safe shutdown activities under the following circumstances:*
  - *Manual operation of equipment used to meet the requirements of Section III.G.3 for Alternative or Dedicated Shutdown of Appendix R to 10 CFR Part 50, where meeting performance criteria of Section III.L is required"*
- RIS 2006-10 states: *"Paragraph III.G.2 allows the licensee to use the alternative shutdown method described in paragraph III.G.3 of Appendix R if the licensee cannot meet the requirements of paragraph III.G.2."*

Note that the definition of recovery actions in Section 1.6.52 of NFPA 805 includes only those actions "…outside of the main control room or outside of the primary control station(s)…" Therefore, Bin D OMAs at the primary control station are not considered recovery actions.

Bin E - Operation of fire affected equipment for fire areas that meet the separation requirements of Section III.G.1of 10 CFR 50, Appendix R (or applicable sections of NUREG-0800). (See Figure B-5)

- NRC Letter to NEI dated May 16, 2002 states: *"With proper analysis, manual actions are allowed for fire safe shutdown activities under the following circumstances:*
  - *Operation of equipment for which cables are located in fire areas that meet Section III.G.1 of Appendix R to 10 CFR Part 50, by having redundant cables and equipment in a completely different fire area"*

Operation of fire affected equipment for fire areas that meet the protection requirements of Section III.G.2 of 10 CFR 50, Appendix R (or applicable sections of NUREG-0800) for redundant trains. (See Figure B-6)

- RIS 2006-10 states: "*As discussed during a March 1, 2006, public meeting, if one of the redundant trains in the same fire area is free of fire damage by one of the specified means in paragraph III.G.2, then the use of operator manual actions, or other means necessary, to mitigate fire-induced operation or maloperation to the second train may be considered in accordance with the licensee's fire protection program and license condition since paragraph III.G.2 has been satisfied.*"

Bin F - Manual actions that have been previously reviewed and approved by the NRC.

Manual actions that have been previously reviewed and approved by the NRC (as documented in approved exemptions/deviations/safety evaluation reports) can also be transitioned as recovery actions or defense-in-depth actions without the need to use the change evaluation process. Guidance for determining previous approval is discussed in Section 2.3.1 and 4.3.2 of this document and in Regulatory Guide 1.205.

In some instances the NRC may have reviewed and approved an OMA in an SER without granting an exemption/deviation request. In theses cases, change evaluations would not be required based on the following guidance:

- RIS 2006-10 states: "*For pre-1979 licensees, a staff decision in a safety evaluation report (SER) that approves the use of operator manual actions, in lieu of one of the means specified in paragraph III.G.2, does not eliminate the need for an exemption. Pre-1979 licensees who have SERs, but not a corresponding exemption, which approve manual actions should request an exemption under 10 CFR Part 50.12, citing the special circumstances of section 50.12(a)(2)(ii), citing the SER as the safety basis, and confirming that the safety basis established in the SER remains valid. The staff expects to grant the exemption on these bases without further review.*"

  During the transition, for pre-1979 licensees who have SERs, but not a corresponding exemption, which approves OMAs, should verify that the basis for acceptability in the SER is still valid. If the basis for acceptability is still valid, then no change evaluation is required.

- RIS 2006-10 states: "*Since plants licensed to operate on or after January 1, 1979 (post-1979 licensees), are not required to meet the requirements of paragraph III.G.2, a staff decision in an SER that approves the use of manual operator actions does not require exemption under 10 CFR 50.12. Post-1979 licensees may be requested to demonstrate, as part of the NRC Reactor Oversight Process, that the use of an operator manual action would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire consistent with their license.*"

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Bin G - OMAs to address spurious operations that affect the credited safe shutdown success path may or may not be allowed, depending upon the affect of the fire on the safe shutdown components. (See Figures B-7 and B-8)

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Figure B-7

A special case of "fire affected train" exists where two redundant trains have components/cables in a given fire area, and both trains take suction from a common tank. In this case, a manual action would be allowed (and no change evaluation would be required) to secure the fire affected train, since the credited train is protected (meets III.G.2 requirements) even though the manual action would need to be accomplished before the common tank level decreased to the point where operation of the credited train would be affected. This is acceptable since the common point in the system is the tank, which is still free of fire damage. This example was discussed in the June 9, 2006 public meeting. (ML061980016)

Figure B-8

An example where an OMA to address spurious operations that affect the credited safe shutdown success path would not be allowed is the case where the credited function is to inject water to one of the Steam Generators (reactor) and a spurious operation causes a diversion from the credited flow path. Even though the minimum required injection flow can be maintained and the OMA can be accomplished prior to the function being disabled, the operator manual action is not allowed and a change evaluation would be required since the credited train is not free of fire damage (the diversion of flow must be terminated at some point or the credited safe shutdown path will not be successful). An example of this configuration is BWR example 3 of the June 9, 2006 public meeting (ML061980016). This clarification of the 'credited train not being free of fire damage' was provided by the NRC on September 20, 2007. (ML072820168)

Examples of OMAs that are not allowed are provided in summary of the June 9, 2006 Public Meeting (ML061950327 and ML061980016).

Bin H OMAs are candidates for the risk-informed performance-based change evaluation process per NFPA 805 as part of the Nuclear Safety Performance Criteria Transition Review. See Section 4.4 and 5.3 of this document for additional information.

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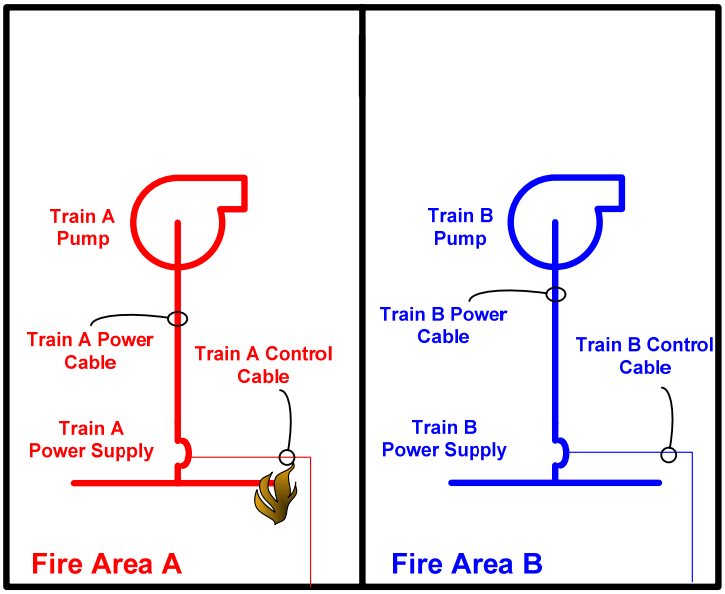

Fire Area A and B meet the separation criteria of 10 CFR 50 Appendix R Section III.G.1
A postulated fire in Fire Area A could result in the spurious starting of the Train A pump, which can be mitigated by an operator manual action to de-energize the Train A Power Supply to stop Pump A.

Figure B-5 Allowed OMA in Fire Area Meeting 10 CFR 50, Appendix R, Section III.G.1 Separation Criteria

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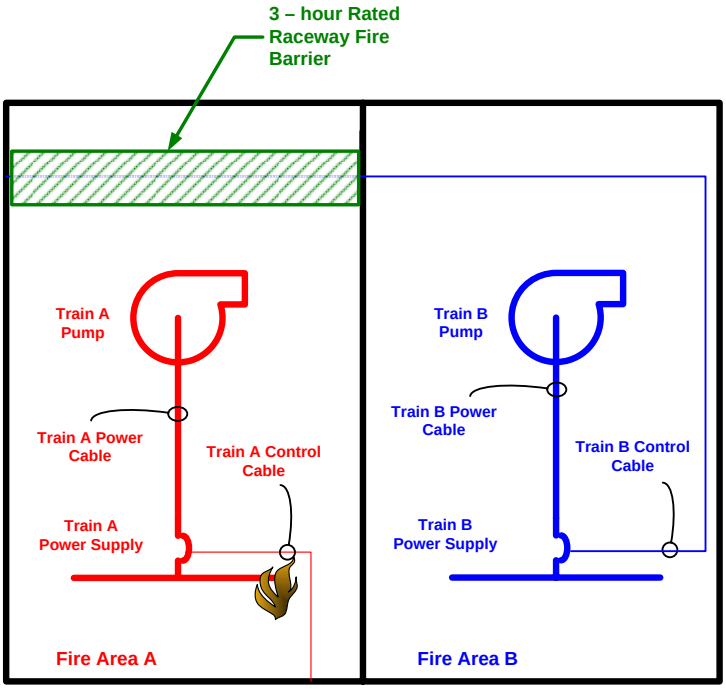

Fire Area B meets the separation criteria of 10 CFR 50 Appendix R Section III.G.2.a A postulated fire in Fire Area A could result in the spurious starting of the non-credited Train A pump, which can be mitigated by an operator manual action to de-energize the Train A Power Supply to stop Pump A. This is functionally equivalent to Case in Figure B-5.

Figure B-6 Allowed OMA in Fire Area Meeting 10 CFR 50, Appendix R, Section III.G.2 Compliant – OMA for Fire Affected Train

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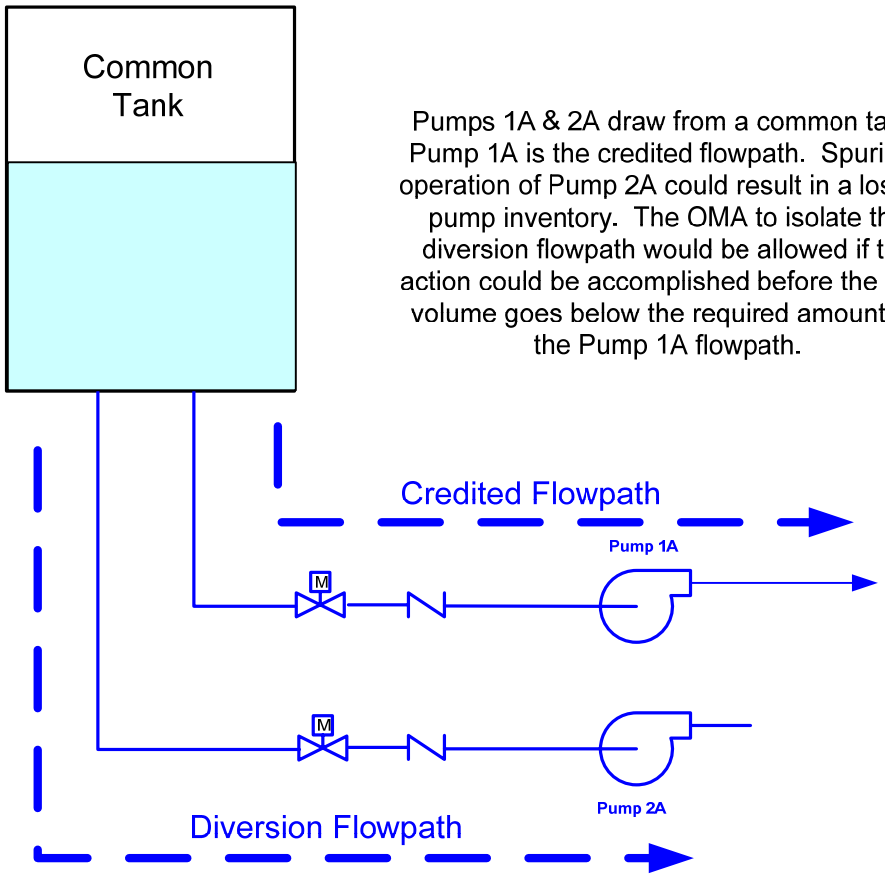

Figure B-7 Allowed Operator Manual Action – In Credited Success Path – Common Tank Suction

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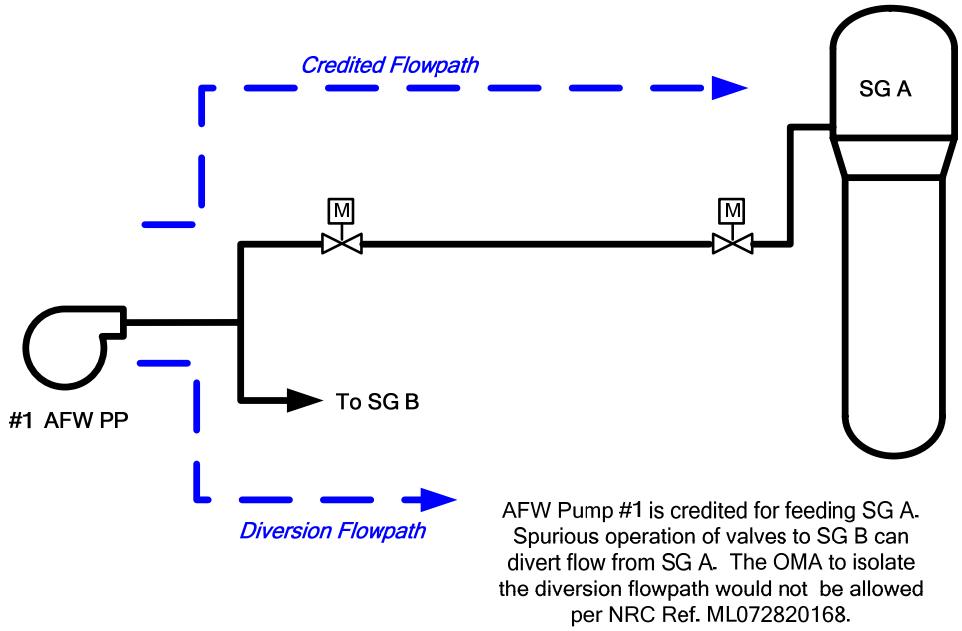

Figure B-8 OMA – In Credited Success Path – Auxiliary Feedwater Flow Diversion [not allowed per NRC Ref. ML072820168]

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B.2.2.4.2 Determination of Recovery Actions

In addition to the determination of the OMAs that require a change evaluation (i.e., determination of OMA evaluation groups in Section B.2.2.4.1), the process outlined in Figure B-9 should be used to determine the scope of recovery actions and defense-in-depth actions that will remain following NFPA 805 transition.

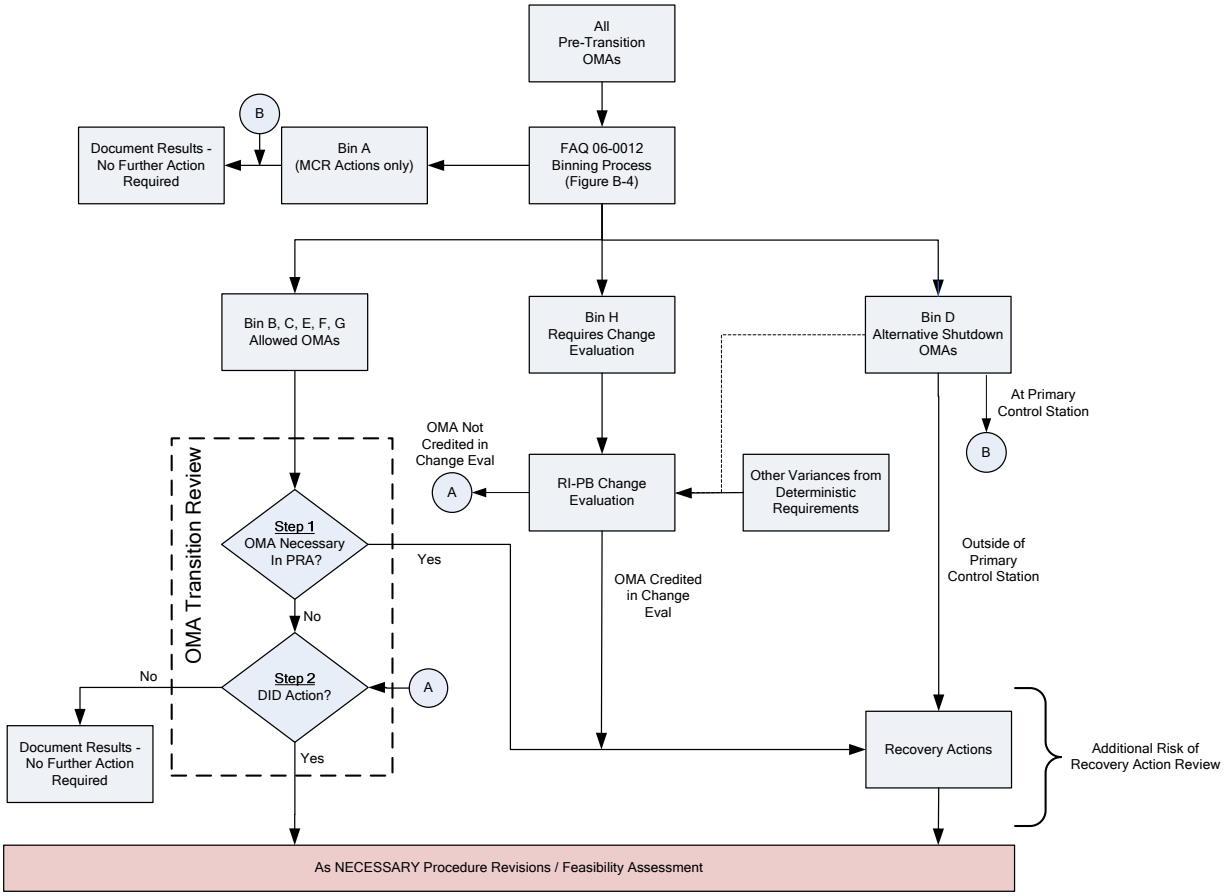

Figure B-9 Determination of Post-Transition Recovery Actions and Necessary Supporting Analyses

FAQ 06-0012 OMA Binning

The process should begin with the binning of all pre-transition OMAs per FAQ 06-0012, as described in Section B.2.4.4.1. The outcome of the binning process, with respect to the determination of credit taken for recovery actions, results in the following:

- Bin H OMAs, which are candidates for the risk-informed performance-based change evaluation process per NFPA 805 as part of the Nuclear Safety Performance Criteria Transition Review.

- Pre-transition allowed OMAs, which do not conflict with regulatory requirements (Bins B, C, E, F, and G).[2] These actions are assessed in the OMA Transition Review to determine if the actions should be:
  - Recovery actions, or
  - Defense-in-depth actions, or
  - Neither recovery actions nor defense-in-depth actions.
- Bin D OMAs to support implementation of alternative shutdown capability per 10 CFR 50, Appendix R, Section III.G.3 (C.5.c of NUREG-0800) which are allowed under the current regulations. Due to the unique circumstances associated with alternative shutdown capability, the retention of these actions as recovery actions by the NSCA should be considered. Note that the definition of recovery actions in Section 1.6.52 of NFPA 805 includes only those actions "…outside of the main control room or outside of the primary control station(s)…" Therefore, Bin D OMAs at the primary control station are not considered recovery actions and need not be addressed by the OMA Transition Review for additional considerations, other than impact of these primary control station actions on the performance of other actions (e.g., timing, coordination of actions, etc.).

  An option to the characterization of the Bin D OMAs as recovery actions would be to eliminate/modify the Bin D OMAs using the change evaluation process as part of the NFPA 805 transition process.
- Bin F OMAs are those not associated with alternative shutdown that have prior NRC approval. These actions may be treated as recovery actions without additional OMA Transition Review. A licensee may choose to treat these in other Bins as appropriate and disposition them in accordance with the process.

Note: This process is applicable to the transition to NFPA 805. Post transition OMAs (recovery action) considerations will be clarified under a separate FAQ to update the change process. All fire protection changes will be evaluated under the NFPA 805 change process post transition, including any proposed new or modified recovery actions.

Other Variances from Deterministic Requirements

Depending on how variances from the deterministic requirements are characterized, a variance may or may not be designated as a Bin H OMA. For example, a variance may be characterized as a cable lacking protection/separation per the pre-transition deterministic criteria. In these instances, the change evaluation will initially assess the condition for acceptability without crediting an OMA. An output of the change evaluation may be the need for a recovery action (that did not exist as a pre-transition OMA), or the need for a post-transition defense-in-depth action (that did not exist as a pre-transition OMA). These actions should be included as part of the OMA Transition Review.

[2] Bin A (actions taken in the main control room) are not considered OMAs (pre-transition) or recovery actions (post-transition), and can be excluded from additional consideration.

NFPA 805 Change Evaluation

Bin H OMAs should be evaluated as part of the risk-informed, performance-based change evaluation process, as described in Section 5.3 and Appendix J. Typically, the condition that necessitated the need for the pre-transition OMA is evaluated. For example, the condition could be a spurious operation of a component due to potential fire damage to a cable. If the OMA is credited to meet the change evaluation acceptance criteria and is modeled in the Fire PRA, then the OMA is considered a post-transition recovery action.

If the OMA is not credited to meet the change evaluation acceptance criteria, the OMA should be included with the currently allowed OMAs as part of the OMA Transition Review to determine if the OMA should be characterized as a post-transition "defense-in-depth" action.

OMA Transition Review

"OMA Transition Review" is the process for reviewing OMAs that are not initially categorized as recovery actions to determine if they warrant additional consideration as recovery actions, defense-in-depth actions, or neither.

The first step in the OMA transition review is to assess allowed OMAs characterized as Bin B, C, E, F, and G for their necessity in the Fire PRA. This step is intended to identify OMAs that are modeled in the Fire PRA and are credited as providing a risk benefit worthy of characterization as a "recovery action." Those OMAs that are either not modeled in the Fire PRA or that are modeled in the Fire PRA but do not provide a risk benefit worthy of characterization as a "recovery action" are assessed further for retention as a defense-in-depth action. This determination of risk is part of the process for evaluating the additional risk of the use of recovery actions discussed in Section B.2.2.4.3.

The second step of the OMA transition review determines whether these remaining OMAs (including those that were not credited as recovery actions in the change evaluations) should be considered as defense-in-depth actions. This review requires judgment and is based on factors such as:

- Relevant scenarios in the Fire PRA that involve the OMA/cable discrepancy of concern. For example, an action that was not credited as a recovery action may exist in a fire area with higher fire risk or in scenarios with a high calculated CCDP/CDF. These types of actions would be considered good candidates for defense-in-depth actions.
- The timing of the action. An OMA, although not considered a recovery action, may need to be accomplished in a short time frame (for example, within 2 hours) under deterministic fire damage assumptions.
- Integration of other elements of defense-in-depth. A fire area with an inadequate balance of defense-in-depth elements may warrant strengthening of the third element of defense-in-depth: "Providing an adequate level of fire protection for structures, systems, and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed"(NFPA 805 Section

1.2(3)). For example, an area without automatic detection and a high scenario CCDP may warrant a defense-in-depth action. Although the OMA Transition Review is not a formal change evaluation, the principles in Section 5.3 can be used as a guide for review of defense-in-depth.

- Additional actions related to modeling differences between the Fire PRA and NSCA. There are known modeling differences between a Fire PRA and nuclear safety capability assessment due to different success criteria, end states, etc. Although an OMA may be associated with a function that is not considered a significant contribution to core damage frequency, the OMA may be considered important enough to the NSCA to retain as a defense-in-depth action. An example would be components in the NSCA associated with maintaining natural circulation at a pressurized water reactor that are not modeled explicitly in the Fire PRA since they are not part of a core damage sequence.

Resolution of vulnerabilities identified as part of the Fire PRA related to the loss of function associated with the pre-transition allowed OMAs should be included in the overall integrated decision-making process associated with the NFPA 805 transition. For example, the fire-induced cable losses prompting the need for an allowed OMA may be a significant contributor to risk in the Fire PRA. Although a change evaluation is not required to address these risk contributors, other decisions to reduce fire risk may include enhancements to address these items.

Following the Operator Manual Action Binning, Change Evaluations, and OMA Transition Review, each pre-transition OMA should be characterized as a "recovery action," "defense-in-depth action," or neither.

Those "defense-in-depth actions" that will continue to be used in the fire safe shutdown procedures should be demonstrated to meet the feasibility criteria provided in Section B.2.2.4.4. Recovery actions should be given priority over defense-in-depth actions in the development/revision of the fire safe shutdown procedures.

B.2.2.4.3 Evaluation of the Additional Risk of the Use of Recovery Actions

NFPA 805 Section 4.2.3.1 does not allow recovery actions when using the deterministic approach to meet the nuclear safety performance criteria. However, the use of recovery actions is allowed by NFPA 805 using a performance-based approach, provided that the additional risk presented by the recovery actions has been evaluated by the licensee in accordance with NFPA 805 Section 4.2.4.

Section 4.2.4 of NFPA 805 (2001) states:

> 4.2.4* Performance-Based Approach. This subsection shall provide for a performance-based alternative to the deterministic approach provided in 4.2.3. When the use of recovery actions has resulted in the use of this approach, the additional risk presented by their use shall be evaluated. When the fire modeling or other engineering analysis, including the use of recovery actions for nuclear safety analysis, is used, the approach

described in 4.2.4.1 shall be used. When fire risk evaluation is used, the approach described in 4.2.4.2 shall be used.

The explanatory material in Appendix A to NFPA 805 states:

> A.4.2.4 Where recovery actions are the primary means to recover and re-establish any of the nuclear safety performance criteria (e.g., inventory and pressure control; decay heat removal), in lieu of meeting the deterministic approach as specified by 4.2.3, risk can be increased. The risk for the fire area and the risk presented by the implementation of recovery actions to recover the nuclear safety function should be compared to the risk associated with maintaining the function free of fire damage in accordance with the deterministic requirements specified in Chapter 4. Additional fire protection systems and features might have to be provided in the fire area to balance the risk.

The treatment of additional risk may vary in approach based on its characterization in previous steps and its level of modeling in the Fire PRA. The categories used to define the methods for treatment of additional risk presented by the use of recovery actions are:

- Alternative Shutdown Recovery Actions (B.2.2.4.3.1)
- Non-Alternative Shutdown Actions (B.2.2.4.3.2)

In addition, the review of potential negative risk for OMAs (B.2.2.4.3.3) and a summary of methods for modeling of actions in the Fire PRA (B.2.2.4.3.4) are discussed below:

B.2.2.4.3.1. Alternative Shutdown Recovery Actions

Due to the unique circumstances associated with alternative shutdown capability, the retention of the Bin D actions as recovery actions by the NSCA should be considered. Fire PRAs performed as part of NFPA 805 transition include the evaluation of alternative shutdown fire areas. The additional risk presented by the use of recovery actions for alternative shutdown fire areas (addressed by 10 CFR 50, Appendix R Section III.G.3/NUREG-0800 Section C.5.c) is addressed by inclusion of these fire areas in the Fire PRA performed as part of the NFPA 805 transition.

Note that the definition of recovery actions in Section 1.6.52 of NFPA 805 includes only those actions "…outside of the main control room or outside of the primary control station(s)…" Therefore, Bin D OMAs at the primary control station are not considered recovery actions, and any evaluation of additional risk does not need to consider actions taken at the primary control station(s).

OMAs relied upon in alternative shutdown fire areas can be assessed qualitatively or quantitatively to determine risk impact. OMAs may or may not be explicitly modeled in the Fire PRA for alternative shutdown fire areas. Fire areas relying on control room abandonment for pre-transition deterministic compliance (e.g., Control Room fires) are modeled in the Fire PRA using guidance from NUREG/CR-6850 Task 11 (Section 11.5.2). As discussed in NUREG/CR-6850, the quantification of risk may involve an overall failure probability of the alternative shutdown means or a more detailed integration of the alternative shutdown procedures into the

plant response model. Therefore, the risk of specific recovery actions for alternative shutdown may be explicit or embedded into the overall risk associated with the modeled fire scenarios.

OMAs that can contribute significantly to the overall integrated decision-making process associated with the NFPA 805 transition should be identified along with the basis.

As discussed in Section B.2.2.4.2, an alternative approach to characterization of the Bin D OMAs as recovery actions would be to eliminate/modify the Bin D OMAs using the change evaluation process as part of the NFPA 805 transition process.

B.2.2.4.3.2. Non-Alternative Shutdown Actions

Change Evaluation Recovery Actions

Pre-transition unallowed OMAs (Bin H OMAs per FAQ 06-0012) that are to be credited as recovery actions in a risk-informed, performance-based change evaluation, including modeling in the Fire PRA, should be specifically addressed using the Fire PRA for additional risk presented by their use. NFPA 805, Section 4.2.4.2 states that the risk evaluation should compare the risk associated with implementation of the deterministic requirements with the proposed alternative (in this case the recovery actions).

Other Actions (e.g., Defense-in-Depth)

NFPA 805 requires the evaluation of additional risk when the use of recovery actions is credited to meet the nuclear safety performance criteria. Since these actions are defense-in-depth actions an assessment of the additional risk is not necessary. Note that a negative risk impact described in Section B.2.2.4.3.3 provides a mechanism for identifying adverse risk associated with performing an OMA.

Note: As part of the Fire PRA development, OMAs were typically not included in the Fire PRA model unless a more realistic treatment could result in a risk benefit. Therefore, a detailed assessment of risk of performing these actions would not be necessary and the risk of the individual scenarios without credit for the action would bound the risk of crediting the action in the Fire PRA. This bounding approach would be applicable to any actions determined not to be modeled in the Fire PRA as part of Step 1 of the OMA Transition Review and that should be retained as a defense-in-depth action. While the process shown in Figure B-9 does not explicitly require an assessment of the additional risk (since defense-in-depth actions are not “credited recovery actions”), the bounding approach envelopes any additional risk associated with these actions.

Markup of NEI 04-02 Revision 2 (Reflects FAQ 06-0011 and 0012)

Recovery Actions

For pre-transition allowed OMAs[3] that were credited in the Fire PRA model (i.e., those that were already included as well as those that were added to the model), a quantitative assessment of risk similar to that required for a Bin H (unallowed) manual action should be performed (or a qualitative bounding assessment) to determine if the action provides a risk benefit worthy of characterization as a recovery action. In this assessment, similar to the evaluation of a non-compliance, the additional risk presented by the use of the action is essentially a comparison of the risk of the action compared to maintaining the function free of fire damage.

B.2.2.4.3.3. Fire PRA Review for Negative Risk Impact

In addition to the evaluation of risk presented by the use of recovery actions per Section 4.2.4 of NFPA 805, additional reviews should be performed to determine those actions that could have a negative impact on plant risk. Those that have a negative risk impact should be resolved during NFPA 805 implementation via an alternate strategy that eliminates the need for crediting the action for success in the NSCA. Defense-in-depth actions should also be evaluated to ensure there are no adverse impacts on NSCA performance.

B.2.2.4.4 Evaluation of the Feasibility of Recovery and Defense-in-Depth Actions

Recovery actions and defense-in-depth actions should meet the feasibility criteria shown below in Table B-4.

Table B-4
Feasibility Criteria –Recovery Actions and Defense-in-Depth Actions
(Based on NFPA 805 Appendix B.5.2(e)and NEI 04-02 Revision1)

1	**Demonstrations** The proposed recovery actions should be verified in the field to ensure the action can be physically performed under the conditions expected during and after the fire event.
2	**Systems and Indications** Consider availability of systems and indications essential to perform the recovery action.
3	**Communications** The communications system should be evaluated to determine the availability of communication, where required for coordination of recovery actions.
4	**Emergency Lighting*** The lighting should be evaluated to ensure sufficient lighting is available to perform the intended action. Note NFPA 805 contains no requirement for emergency lighting with eight-hour battery power supply.

[3] Bin A (Actions taken in the main control room) are not considered OMAs (pre-transition) or recovery actions (post-transition), but are included here for alignment with FAQ 06-0012. The evaluation described in this section does not apply to control room actions. Emergency control station actions that are applicable to alternative shutdown actions would be characterized as Bin D. Note that the definition of recovery actions in Section 1.6.52 of NFPA 805 includes only those actions "…outside of the main control room or outside of the primary control station(s)…" Therefore, Bin D OMAs at the primary control station (i.e., pre-transition "emergency control station" are not considered recovery actions.

Table B-4
Feasibility Criteria –Recovery Actions and Defense-in-Depth Actions
(Based on NFPA 805 Appendix B.5.2(e)and NEI 04-02 Revision1)

5	**Tools-Equipment*** Any tools, equipment, or keys required for the action should be available and accessible. This includes consideration of SCBA and personal protective equipment if required. (This includes staged equipment for repairs)
6	**Procedures** Written procedures should be provided.
7	**Staffing** Walk-through of operations guidance (modified, as necessary, based on the analysis) should be conducted to determine if adequate manpower is available to perform the potential recovery actions within the time constraints (before an unrecoverable condition is reached), based on the minimum shift staffing. The use of essential personnel to perform actions should not interfere with any collateral industrial fire brigade or control room duties.
8	**Actions in the Fire Area*** When recovery actions are necessary in the fire area under consideration or require traversing through the fire area under consideration, the analysis should demonstrate that the area is tenable and that fire or fire suppressant damage will not prevent the recovery action from being performed.
9	**Time*** Sufficient time to travel to each action location and perform the action should exist. The action should be capable of being identified and performed in the time required to support the associated shutdown function(s) such that an unrecoverable condition does not occur. Previous action locations should be considered when sequential actions are required.
10	**Training** Training should be provided on the post-fire procedures and implementation of the recovery actions.
11	**Drills** Periodic drills that simulate the conditions to the extent practical, (e.g., communications between the control room and field actions, the use of SCBAs if credited, the appropriate use of operator aids)

* This feasibility criterion (items 4, 5, 8 and 9) will be performed for time-critical recovery and defense-in-depth actions (less than two hours)

B.2.2.4.5 Evaluation of the Reliability of Recovery Actions

The reliability of actions addressed by this process depends upon its characterization.

- The reliability of recovery actions that are modeled specifically in the Fire PRA is addressed using Fire PRA methods (i.e., HRA).
- The reliability of recovery actions that were pre-transition alternative/dedicated shutdown actions (i.e., actions not at a primary control station), if modeled specifically in the Fire PRA, is addressed using Fire PRA methods (i.e., HRA). Actions not explicitly modeled due to bounding treatment for additional risk (as described in Section B.2.2.4.3.1) do not require explicit reliability determination due to the bounding treatment.
- Defense-in-depth actions, by definition, do not have additional risk presented by their use and have been evaluated for potential negative risk impact. Therefore, they should be

addressed by feasibility, but no explicit treatment of reliability is required (e.g., per NUREG-1852 or other methods).

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[Note: Additional information included in Rev. 1 of NEI 04-02 related to Criteria for Demonstrating Reliability, Reference Basis for Acceptance Criteria of Recovery Actions, Additional Considerations for DID Assessment for Recovery Actions, and Additional Considerations for SM Assessment for Recovery Actions will be addressed in another FAQ related to Change Evaluation Lessons Learned – FAQ 08-0054]