

### **Basis Document Peer Review Process**

1. Start Basis document reviews on Jan 16, 2006.
2. Fill out the checklist (attached) and provide a copy to the plant and to John Butler at NEI no later than Feb 14, 2006.
3. Plant will update basis document based on comments and resolve comments within 15 days.
4. Reviewer will review changes and agree.
5. All comments must be resolved, incorporated, and agreed to by March 15.
6. This will allow 15 days for final plant approval and posting final document by April 1.

Resource Estimate: TBD (utilize pilot application)

### **Peer review process using a dedicated team**

1. Send all licensees the peer review checklist by 12/12/2005.
2. Ask licensees to use the checklist to check their basis document and change it if necessary by 1/16/2006.
3. Develop a group of individuals that are very familiar with MSPI guidance, concept, and process and willing to assist in the peer review process (~ 1 week of effort) prior to 1/10/06.
  - a. Team membership should include a mix of PRA analysts, PWR, and BWR individuals.
4. Hold conference call or webcast to train the group on how to perform the peer review (~ 3 hours) on 1/10/06.
5. Split up the plants among the peer review taskforce members based on individual expertise.
6. Each member will review the cooling water basis document for each assigned plant.
7. Each member will fill out a checklist for each system reviewed.
8. All comments should be categorized as a "required change" or an "enhancement."
9. Taskforce members will review "required changes" as a group periodically during the review process. The first meeting will be held on 1/24/2006 at NEI offices.
10. Required comments that are agreed to by the group should be provided to the licensee as soon as possible for correction.
11. Taskforce members will determine necessary expansion of review scope based upon issues identified during cooling water system review.
12. Resolution of comments should be communicated to the reviewer who will check to see the comment was properly resolved.

## Peer Review Checklist

**A. System Boundaries**

This section contains a description of the boundaries for each train of the monitored system. A plant drawing or figure (training type figure) should be included and marked adequately (i.e., highlighted trains) to show the boundaries. The guidance for determining the boundaries is provided in Appendix F, Section 1.1 of NEI 99-02.

- Is a drawing included in the document?
- Is the drawing adequately marked to show boundaries or adequately described?
- Is a clear and concise description of the system included? For example:
  - the number of dedicated EDGs per unit
  - whether there are swing EDGs or other swing components
  - whether EDGs can supply all units or all safeguards buses
  - whether pumps can supply multiple trains or units
- If the segment approach is used, is the description of specific segments clear?
- Are segments only counted in one system?
- Are segments grouped in logical groups that minimize the number of segments if possible?
- Are segments that will be removed from service together in one segment?
- If a specific segment will not be monitored for unavailability is that clearly stated and justified?

**B. Risk Significant Functions**

This section lists the risk significant functions for each train of the monitored system. Risk Significant Functions are defined in section 2.2 of NEI 99-02. Additional detail is given in Appendix F, Section 2.1.1 and Section 5 "Additional Guidance for Specific Systems". A single list for the system may be used as long as any differences between trains are clearly identified. This section may also be combined with the section on Success Criteria if a combination of information into a table format is desired.

- Are the risk significant functions in 99-02 Appendix F listed?
- Is the risk significance of these functions stated in relation to the plant maintenance rule program?

**C. Success Criteria**

This section documents the success criteria as defined in Section 2.2 of NEI 99-02 for each of the identified risk significant functions identified for the system. Additional detail is given in Appendix F, Section 2.1.1. The criteria used should be the documented PRA success criteria. If the licensee has chosen to use design basis success criteria in the PRA, it is not required to separately document them other than to indicate that is what was used. If success criteria from the PRA are different from the design basis, then the specific differences from the design basis success criteria shall be documented in this section. Where there are different success criteria for different functions or initiators, all should be recorded and the most restrictive shown as the one used.

- Is the system/train success criteria listed (i.e. one of two trains, etc.)?
- Is the component success criteria listed (i.e. pressure, gpm, etc.) or stated that the design basis criteria is used in the PRA?
- If a combination is used is it clear?
- If PRA criteria differs from the design basis, has the most restrictive PRA criteria been used?

**D. Mission Time**

This section documents the risk significant mission time as defined in Section 2.3.4 of NEI 99-02 for each of the identified risk significant functions identified for the system.

- Is it clearly stated what mission time is used?
- If shorter than 24 hours is a justification provided or referred to?
- If shorter than 24 hours is the longest of the PRA mission times used?

**E. Monitored Components**

This section documents the selection of monitored components as defined in Appendix F, Section 2.1.2 of NEI 99-02 in each train of the monitored system. A listing of all monitored pumps, breakers and EDG's should be included in this section. A listing of AOVs, HOVs, SOVs and MOVs that change state to achieve the risk significant functions should be

provided as potential monitored components. The basis for excluding valves in this list from monitoring should be provided. Component boundaries as described in Appendix F, Section 2.1.3 of NEI 99-02 should be included where appropriate.

- Is a list provided of all components that must change state to complete the monitored function?
- If any components are excluded is there sufficient justification provided?
- If valves were excluded based on birnbaum values was the CCF and IEC applied prior to exclusion?

**F. Basis for Demands/Run Hours (estimate or actual)**

The determination of reliability largely relies on the values of demands, run hours and failures of components to develop a failure rate. This section documents how the licensee will determine the demands on a component. Several methods may be used.

- Actual counting of demands/run hours during the reporting period
- An estimate of demands/run hours based on the number of times a procedure or other activities is performed plus actual ESF demands/run hours
- An estimate based on historical data over a year or more averaged for a quarterly average plus actual ESF demands/run hours

The method used is described and the basis information documented.

- Is there a clear statement whether estimates or actual demands will be used?
- If estimates are used are there separate estimates for Test demands and operational demands?
- Is the basis for the estimates presented in enough detail to understand how the number was derived?
- Is the document silent on how actual ESF demands will be counted?

### **G. Short Duration Unavailability**

This section provides a list of any periodic surveillances or evolutions of less than 15 minutes of unavailability that the licensee does not include in train unavailability. The intent is to minimize unnecessary burden of data collection, documentation, and verification because these short durations have insignificant risk impact.

- Is there statement if short duration unavailability will be excluded?
- If necessary is there a list provided of the applicable procedure numbers?

### **H. PRA Information used in the MSPI**

#### **1. Unavailability FV and UA**

This section includes a table or spreadsheet that lists the basic events for unavailability for each train of the monitored systems. This listing should include the probability, FV, and FV/probability ratio and text description of the basic event or component ID. An example format is provided as Table 1 at the end of this appendix.

- Is a table provided with the appropriate basic events?
- If Fail to Run is listed is there an explanation as to why? Does it make sense?
- If basic events names are not listed is there an explanation as to how the factors were developed? Does it make sense?

#### **a) Unavailability Baseline Data**

This section includes the baseline unavailability data by train for each monitored system. The discussion should include the basis for the baseline values used. The detailed basis for the baseline data may be included in an appendix to the MSPI Basis Document if desired.

- Is information provided for each train of a system?
- Is the information of sufficient detail to show how the UA baseline was developed for each train?
- For cooling water only is an unplanned unavailability baseline developed in enough detail to understand?

#### **b) Treatment of Support System Initiator(s)**

This section documents whether the cooling water systems are an initiator or not. This section provides a description of how the plant will include the support system initiator(s) as described in Appendix F of NEI 99-02. If an analysis is performed for a plant specific value, the calculation must be documented in accordance with plant processes and referred to here. The results should also be included in this section. A sample table format for presenting the results of a plant specific calculation for those plants that do not explicitly model the effect on the initiating event contribution to risk is shown in Table 3 at the end of this appendix.

- Does the section clearly state if support cooling is an initiator or not?

- Is the description of how the support system cooling initiator was developed included in the Support System Cooling section?
- Is there enough detail to understand how the plant did this?
- This section of the frontline systems may be marked as "N/A".

## 2. Unreliability FV and UR

There are two options described in Appendix F for the selection of FV and UR values, the selected option should be identified in this section. This section also includes a table or spreadsheet that lists the PRA information for each monitored component. This listing should include the Component ID, event probability, FV, the common cause adjustment factor and FV/probability ratio and text description of the basic event or component ID. An example format is provided as Table 2 at the end of this appendix. If individual failure mode ratios (vice the maximum ratio) will be used in the calculation of MSPI, then each failure mode for each component will be listed in the table. A separate table should be provided in an appendix to the basis document that provides the complete set of basic events for each component. An example of this for one component is shown in Table 3 at the end of this appendix. Only the basic event chosen for the MSPI calculation requires completion of all table entries.

- Is it clearly stated which of the two methods is used (FV/UR max or individual FV/UR ratios)?
- Is each monitored component in the system listed in a table with the basic events applicable to it?
- Is it clear which value for a component will be used in MSPI?
- Is a separate table provided in an appendix to the basis document that provides the complete set of basic events for each component?

### a) Treatment of Support System Initiator(s)

This section documents whether the cooling water systems are an initiator or not. This section provides a description of how the plant will include the support system initiator(s) as described in Appendix F of NEI 99-02. If an analysis is performed for a plant specific value, the calculation must be documented in accordance with plant processes and referred to here. The results should also be included in this section. A sample table format for presenting the results of a plant specific calculation for those plants that do not explicitly model the effect on the initiating event contribution to risk is shown in Table 3 at the end of this appendix.

- Does the section clearly state if support cooling is an initiator or not?
- Is the description of how the support system cooling initiator was developed included in the Support System Cooling section?
- Is there enough detail to understand how the plant did this?
- Is the correction applied prior to excluding any components on birnbaum?
- This section of the frontline systems may be marked as "N/A".

### b) Calculation of Common Cause Factor

This section contains the description of how the plant will determine the common cause factor as described in Appendix F of NEI 99-02. If an analysis is performed for a plant specific value, the calculation must be documented in accordance with

plant processes and referred to here. The results should also be included in this section.

- Is it clear how the plant applied the CCF?
- Are CCF listed here?
- If a plant specific calculation is performed is it referred to here or listed here.

### **I. Assumptions**

This section documents any specific assumptions made in determination of the MSPI information that may need to be documented. Causes for documentation in this section could be special methods of counting hours or runtimes based on plant specific designs or processes, or other instances not clearly covered by the guidance in NEI 99-02.

- If any assumptions are listed are they clear and do they make sense?

## **II. PRA REQUIREMENTS**

### **PRA MSPI Documentation Requirements**

A. Licensees should provide a summary of their PRA models to include the following:

1. Approved version and date used to develop MSPI data
2. Plant base CDF for MSPI
3. Truncation level used to develop MSPI data

- Is PRA version and approval date listed?
- Is plant base CDF listed?
- Is truncation level listed at least 7 orders of magnitude below the base CDF?
- If truncation level listed is not at least 7 orders of magnitude below the base CDF, is a statement included to show FV convergence is acceptable?

B. Licensees should document the technical adequacy of their PRA models, including:

1. Justification for any open category A or B F&Os that will not be resolved prior to December 31, 2005.

- Are any open F&Os listed (A or B)?
- Are open F&Os resolved and demonstrated not to impact MSPI?
- If not resolved is there a statement that the penalty will be used?

2. Justification for any open issues from:

- a. the self-assessment performed for the supporting requirements (SR) identified in Table 4, taking into consideration Appendix B of RG 1.200 (trial), with particular attention to the notes in Table 4 of the MSPI PRA task group report.

- Are any open self assessment issues listed?

- Are open self assessment issues resolved and demonstrated not to impact MSPI?
- If not resolved is there a statement that the penalty will be used?

- OR -

b. identification of any candidate outliers for the plant from the industry owners group cross-comparison.

- Are any open candidate outlier issues listed?
- Are open candidate outlier issues resolved and demonstrated not to impact MSPI?
- If not resolved is there a statement that the penalty will be used?

# MSPI Basis Document Checklist – Cooling Water

Plant Name \_\_\_\_\_

**Name of Cooling Water System Evaluated:** \_\_\_\_\_

(Note: Use this worksheet if this cooling system provides cooling to (1) only the RHR system or (2) to a number of monitored systems or (3) to the closed cooling water system. If this cooling water system provides cooling to only one monitored system, verify the licensee included the cooling water system with the monitored component.)

**Trains Defined by :** # of Pumps (\_\_\_\_) / # of Heat Exchangers (\_\_\_\_) / Segments (\_\_\_\_)  
 If Segments, beginning and end point clearly defined: Yes / No / Ques / N/A

**System Boundary Assessment:**

- Suction source (UHS/surge tank) Yes / No / Ques / N/A
- Pumps Yes / No / Ques / N/A
- Cooling to the Pumps Yes / No / Ques / N/A
- Cooling System Heat Exchangers Yes / No / Ques / N/A
- Isolation valves to non-essential loads Yes / No / Ques / N/A
- Flow paths to the last valve to the:
  - ECCS room coolers Yes / No / Ques / N/A
  - Pump heat exchangers
    - RHR Yes / No / Ques / N/A
    - SI Yes / No / Ques / N/A
    - Charging/hi head Yes / No / Ques / N/A
    - AFW Yes / No / Ques / N/A
    - HPCS Yes / No / Ques / N/A
  - EDGs Yes / No / Ques / N/A
  - RHR Heat Exchangers Yes / No / Ques / N/A
- Cross-tie capability with other unit Yes / No / Ques / N/A
- Breakers/Handswitches discussed Yes / No / Ques / N/A
- (other) \_\_\_\_\_ Yes / No / Ques / N/A

**Risk Significant Function described:** Yes / No / Ques / N/A

**Success Criteria:** Design / PRA / Ques  
 • If PRA, included adequate justification Yes / No / Ques / N/A

**Monitored Components:**

- All Pumps and Drivers included Yes / No / Ques / N/A
- Considered all valves that change state
  - failure alone fail train Yes / No / Ques / N/A
  - failure with another fails all trains Yes / No / Ques / N/A
- Valves were excluded because:
  - Less than E-6 Yes / No / Ques / N/A
  - Values included Yes / No / Ques / N/A
  - CCF before exclusion Yes / No / Ques / N/A
  - Smallest Birnbaums Yes / No / Ques / N/A
  - Symmetry considered Yes / No / Ques / N/A
- Redundancy Yes / No / Ques / N/A

# MSPI Basis Document Checklist – Cooling Water

## Demand and Run Hours

- |   |                       |
|---|-----------------------|
| • Determined by                             | Estimate / Actual     |
| • If Estimate Method – information provided | Yes / Ques / N/A      |
| o Procedure + ESF demands/hours             | Yes / No / Ques / N/A |
| o Historical quarterly average + ESF hours  | Yes / No / Ques / N/A |

## Short Duration Unavailability

- |  |                 |
|--|-----------------|
| • Surveillances or Evolutions < 15 minutes |                 |
| o If not counting UA time, list provided   | Yes / Ques / NA |
| o Adequate justification provided          | Yes / Ques / NA |

## Unavailability FV/UA

- |  |                               |
|--|-------------------------------|
| • Actual train unavailability hours provided                                     | Yes / Ques / NA               |
| • Plant specific baseline hours provided   | Yes / Ques / NA               |
| • Generic Baseline Unplanned = MR 2002-2004                                      | Yes / Ques / NA               |
| • System Impacts Initiating Events   | Yes / No / Doesn't state      |
| o Modeling method used   | 1 / 2 / 3 / 4 / Doesn't state |
| • All components in path/segment were considered when determining max FV/UA      | Yes / Ques / NA               |
| • Max FV/UA value provided for   |                               |
| o all paths/trains which include pumps   | Yes / Ques / NA               |
| o all isolable segments (path can be isolated without tripping unit)             | Yes / Ques / NA               |
| o unisolable segments, no FV/UA provided   | Yes / Ques / NA               |
| • Determining max FV/UA :  |                               |
| o No initiator contribution or Method 1 – no correction: FV/UA max = (TM or FTS) | Yes / Ques / NA               |
| o Method 2, 3, 4: correction value applied                                       | Yes / Ques / NA               |
| • Quick check of math (see pg F-13 for calc)                                     | No problems / Question        |
| • Verify values provided for both units  | Yes / No / NA                 |

## Unreliability (FV/UR)

- |  |                               |
|--|-------------------------------|
| • Identify option  | 1 / 2 / Doesn't state         |
| • Verify not CC or TM for max (FV/UR)  | Yes / No / NA                 |
| • System Impacts Initiating Events   | Yes / No / Doesn't state      |
| o Modeling method used   | 1 / 2 / 3 / 4 / Doesn't state |
| • Determining max FV/UR :  |                               |
| o No initiator contribution or Method 1 – no correction: FV/UA max = (TM or FTS) | Yes / Ques / NA               |
| o Method 2, 3, 4: correction value applied                                       | Yes / Ques / NA               |
| • CCF Adjustment used for each component   | Generic / Plant Specific      |
| o Consistent with NEI 99-02 Table 3  | Yes / No / NA                 |
| o Plant Specific Properly documented   | Yes / No / NA                 |
| • CCF applied AFTER initiator calcs  | Yes / No / NA                 |
| • Quick check of math (see pg F-27)  | Yes / No / NA                 |
| • Verify values provided for both units  | Yes / No / NA                 |