UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 7, 2002

Mr. Biff Bradley
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

SUBJECT: SEPTEMBER 23 AND 25, 2002: SUMMARY OF MEETING WITH RISK-INFORMED TECHNICAL SPECIFICATION TASK FORCE (RITSTF)

Dear Mr. Bradley:

The purpose of this letter is to transmit the summary of a meeting with the RITSTF. The meeting was held at the U.S. Nuclear Regulatory Commission offices in Rockville, Maryland, on September 23, 2002, and September 25, 2002.

Sincerely,

Robert L. Dennig, Section Chief
Technical Specifications Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosures:
1. Meeting Summary
2. Attendance List
3. Agenda
4. RITSTF Initiative Status
5. Origin and Evolution of the Snubber LCO
6. Draft Proposal for TSTF-372, Rev 2 and Initiative 7a
7. Draft Proposed LCO 3.0.9 White Paper

cc w/encl: See attached page

October 7, 2002

Mr. Biff Bradley
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

SUBJECT: SEPTEMBER 23 AND 25, 2002: SUMMARY OF MEETING WITH RISK-INFORMED TECHNICAL SPECIFICATION TASK FORCE (RITSTF)

Dear Mr. Bradley:

The purpose of this letter is to transmit the summary of a meeting with the RITSTF. The meeting was held at the U.S. Nuclear Regulatory Commission offices in Rockville, Maryland, on September 23, 2002, and September 25, 2002.

Sincerely,

/RA/

Robert L. Dennig, Section Chief
Technical Specifications Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosures:
1. Meeting Summary
2. Attendance List
3. Agenda
4. RITSTF Initiative Status
5. Origin and Evolution of the Snubber LCO
6. Draft Proposal for TSTF-372, Rev 2 and Initiative 7a
7. Draft Proposed LCO 3.0.9 White Paper

cc w/encl: See attached page

DISTRIBUTION:
See next page

ADAMS ACCESSION NUMBER:
DOCUMENT NAME: G:\RORP\TSS\TJADER\RITSTF-MTGsum-9-23&25-02.wpd

| OFFICE | SRE:TSS:RORP:DRIP | SC:TSS:RORP:DRIP | | |
|---|---|---|---|---|
| NAME | TRTjader | RLDennig | | |
| DATE | 10/4/2002 | 10/7/2002 | | |

OFFICIAL RECORD COPY

Mr. Biff Bradley

cc via e-mail:

Mr. Tony Pietrangelo
Nuclear Energy Institute

Mr. Biff Bradley
Nuclear Energy Institute

Mr. Mike Schoppman
Nuclear Energy Institute

Mr. Alan Hackerott, Chairman
Omaha Public Power District

Mr. Jim Kenny
Pennsylvania Power & Light Company

Mr. James Andrachek
Westinghouse Electric Company

Mr. Jack Stringfellow
Southern Nuclear Operating Company

Mr. Donald McCamy
Browns Ferry Nuclear Plant

Mr. Ray Schneider
Westinghouse Electric Company

Mr. Frank Rahn
EPRI

Mr. Wayne Harrison
STP

Mr. Drew Richards
STP

Mr. Gabe Salamon
PSEG Nuclear

Mr. Rick Hill
General Electric Nuclear Energy

Mr. Michael S. Kitlan, Jr.
Duke Energy Corporation

Mr. Noel Clarkson
Duke Energy Corporation

Mr. Donald Hoffman
EXCEL Services Corporation

Mr. Ted Book
Framatech-ANP

Mr. R. J. Schomaker
Framatech-ANP

Mr. J. E. Rhoads
Energy Northwest

Ms. Deann Raleigh
Scientech

Mr. Ken Canavan
DS&S

Mr. Sam Chien
SCE

Mr. Gary Chung
SCE-SONGS

Mr. Courtney Smyth
PSEG Nuclear LLC

Mr. Jerry Andre
Westinghouse Electric Company

DISTRIBUTION:
ADAMS
PUBLIC
TSS R/F
TSS Staff
DMatthews/FGillespie (RidsNrrDrip)
WDBeckner (RidsNrrDripRorp)
GMHolahan (RidsNrrDssa)
RJBarrett (RidsNrrSpsb)
JZwolinski (RidsNrrDlpm)
JNHannon (RidsNrrDssaSplb)
TRQuay (RidsNrrDipmlqmb)
OGC (RidsOgcRp)
ACRS/ACNW (RidsAcrsAcnwMailCenter)
MKotzalas (MXK5)
MLWohl (MLW1)
NSaltos (NTS)
JWilliams (JFW1)
WScott (WES)
GSShukla (GSS)
FMReinhart (FMR)
AWMarkley (AWM)
SLMagruder (SLM1)
RFDudley (RFD)
DFThatcher (DFT)
JEDonoghue (JED1)
MLScott
EMMcKenna (EMM)
MACunningham (MAC3)
ASKuritzky (ASK1)
ASingh (AXS3)
MTMarkley (MTM)
SDAlexander (SDA)

SUMMARY OF THE SEPTEMBER 23 & 25, 2002, NRC/INDUSTRY MEETING OF THE RISK-INFORMED TECHNICAL SPECIFICATION TASK FORCE

The NRC staff met with the NEI Risk-Informed Technical Specification Task Force (RITSTF) on September 23, 2002, from 1:00 p.m. to 3:15 p.m., and on September 25, 2002, from 8:30 a.m. to 10:45 a.m. The meeting attendees are listed in Enclosure 2.

The agenda (Enclosure 3) consisted of discussions of the seven active RITSTF initiatives. The RITSTF provided a summary of the status of the initiatives (Enclosure 4). Following is a brief description of the status of the initiatives in the order in which they were discussed.

**Initiative 7,** Non-TS support system impact on TS operability determinations: The RITSTF submitted TSTF-372, Revision 2, on snubber inoperability, on August 7, 2002. The NRC staff and the RITSTF are working together to resolve open issues, which deal with single versus multiple train inoperabilities, supported system LCO entry, and the risk analysis. The staff presented a paper on the "Origin and Evolution of the Snubber LCO," enclosure 5, to present their concerns over the industry submittal. The RITSTF in turn presented in enclosure 6 revised wording for proposed LCO 3.0.8 with Bases for TSTF-372, and a proposed wording for an LCO 3.0.9 as a starting point for TSTF-427 discussions. The RITSTF also presented in enclosure 7 a white paper on LCO 3.0.9, dealing with barriers. The RITSTF will submit a new revision to TSTF-372 by October 15, 2002. The RITSTF will submit TSTF-427 by October 15, 2002.

**Initiative 1,** TS Actions End States Modifications: The BWR topical SER has been written, is in internal NRC review, and is expected to be signed by September 30, 2002. The BWR topical SER will then be provided the BWROG, to allow the RITSTF to map the requirements and prepare the BWR TSTF-423. The BWR TSTF-423 will be submitted by November 30, 2002. The RITSTF will submit a revision to CE TSTF-422 by October 15, 2002, to expand its applicability from a loss of single train to address a loss of LCO function, and add associated justifications.

**Initiative 3, TSTF-359,** Modification of mode restraint requirements of LCO 3.0.4 & SR 3.0.4: The first CLIIP Federal Register Notice was published on August 2, 2002, requesting public comments. Public comments have been received and are being addressed. The content of TSTF 359, Revision 7 was discussed; in particular the staff suggested deleting the mode applicability limits since they appear to be an unnecessary holdover from the old 3.0.4 specifications. The RITSTF will address staff concerns over the 3.0.4 mode applicability limits. The staff will publish the final CLIIP Federal Register Notice announcing availability as soon as all issues are resolved.

**Initiative 5,** Relocation of non-safety SRs (5a) and relocation of all SR frequency requirements (5b) out of TS: The RITSTF will develop a Guidance Document on an Initiative 5b methodology and provide it to the NRC by November 30, 2002. The RITSTF will get a pilot plant to test the proposed program and procedures. After NRC review and acceptance of the Guidance Document, the RITSTF will prepare and submit TSTF-425. The RITSTF will submit a TSTF to relocate some SRs under Initiative 5a by December 31, 2002.

**Initiative 6,** Modification of LCO 3.0.3 Actions and Completion Times: A CEOG submittal (on 6b/c) was received on January 24, 2001, and it was reviewed by the staff. RAIs were issued on May 9, 2001. Conference calls are being held as necessary to resolve questions. CEOG official RAI responses are expected by October 15, 2002. The staff is preparing an SER, and is expected to be complete by November 15, 2002. A comprehensive TSTF-426, for all OGs, is planned to be submitted by December 15, 2002.

**Initiative 8a**, Remove/Relocate non-safety and non-risk significant systems from TS that do not meet 4 criteria of 10 CFR 50.36: The NRC is currently developing guidance on plant specific application of Initiative 8a. The RITSTF will interface with the NRC in the development of the guidance. The RITSTF will develop a white paper on Initiative 8a, outline guidance, and prepare a methodology for implementing Initiative 8a by December 19, 2002. A TSTF will be developed by March 30, 2003.

**Initiative 4b**, Risk Informed AOTs, use of a configuration risk management program (CRMP): The NEI RITSTF will coordinate comprehensive and multiple pilots, including CEOG and STP pilots (Hope creek dropped out as a pilot). The RITSTF will seek to obtain a pilot plant that has converted to the STS (perhaps in conjunction as a pilot for DG-1122). While each pilot may not address the proposed methodology completely, the RITSTF will ensure the various approaches will prove the entire proposed methodology. The RITSTF will ensure a single coordinated methodology will emerge from and be supported by the individual pilots. The RITSTF will provide: a CEOG TSTF addressing a single system by October 31, 2002; a draft guidance document by December 31, 2002; an STP pilot application by December 31, 2002; and, an integrated TSTF-424 in March 2003.

The next NRC TSS/NEI RITSTF meeting is scheduled for December 19, 2002, at the NRC Headquarters in Rockville, MD.

The staff will provide the ACRS a status of the RITSTF initiatives early in November.

NRC/INDUSTRY MEETING OF THE
RISK-INFORMED TECHNICAL SPECIFICATION TASK FORCE ATTENDANCE LIST
SEPTEMBER 23, 2002

| NAME | AFFILIATION |
|---|---|
| TONY PIETRANGELO | NUCLEAR ENERGY INSTITUTE |
| BIFF BRADLEY | NUCLEAR ENERGY INSTITUTE |
| DONALD HOFFMAN | EXCEL SERVICES |
| JIM ANDRACHEK | WESTINGHOUSE/WOG |
| MIKE KITLAN | DUKE ENERGY |
| WAYNE HARRISON | STP/WOG |
| JACK STRINGFELLOW | SOUTHERN NUCLEAR OPERATING COMPANY |
| DEANN RALEIGH | LIS, SCIENTECH |
| BOB DENNIG | NRC/NRR/DRIP/RORB/TSS |
| BOB TJADER | NRC/NRR/DRIP/RORB/TSS |
| CARL SCHULTEN | NRC/NRR/DRIP/RORB/TSS |
| NICK SALTOS | NRC/NRR/DSSA/SPSB |
| WAYNE SCOTT | NRC/NRR/DIPM/IEHB |

Enclosure 2

NRC/INDUSTRY MEETING OF THE
RISK-INFORMED TECHNICAL SPECIFICATION TASK FORCE ATTENDANCE LIST
SEPTEMBER 25, 2002

| NAME | AFFILIATION |
|---|---|
| TONY PIETRANGELO | NUCLEAR ENERGY INSTITUTE |
| BIFF BRADLEY | NUCLEAR ENERGY INSTITUTE |
| J. E. DUSTY RHOADS | ENERGY NORTHWEST/BWROG |
| DONALD HOFFMAN | EXCEL SERVICES |
| JIM ANDRACHEK | WESTINGHOUSE/WOG |
| R. J. SCHOMAKER | FRAMATECH ANP |
| DREW RICHARDS | STP |
| WAYNE HARRISON | STP/WOG |
| RAY SCHNEIDER | WESTINGHOUSE/CEOG |
| GARY CHUNG | SCE/SONGS/CEOG |
| BOB DENNIG | NRC/NRR/DRIP/RORB/TSS |
| BOB TJADER | NRC/NRR/DRIP/RORB/TSS |
| NICK SALTOS | NRC/NRR/DSSA/SPSB |
| WAYNE SCOTT | NRC/NRR/DIPM/IEHB |

Enclosure 2

# AGENDA

TSB/NEI RITSTF Meeting
September 23, 2002 from 1:00 PM to 4:30 PM, in O-9B4
and
September 25, 2002 from 8:30 AM to 4:00 PM, in O-9B4

September 23, 2002

- Initiative 7, Non-TS Support System Operability Impact on TS System & TSTF-372
- Public Questions and Discussion

September 25, 2002

- Status of Initiatives
  - Initiative 7, Non-TS Support System Operability Impact on TS System & TSTF-372
  - Initiative 1, End States
    - BWR SER
    - CEOG TSTF-422
  - Initiative 3, LCO 3.0.4 & SR 3.0.4 (Mode Restraint) Flexibility
    - Public Comments
    - Final FRN
- Public Questions and Discussion
  - Initiative 5, STI Evaluation Methodology
  - Initiative 6, LCO 3.0.3 Actions and Completion Times
  - Initiative 8a, Remove/Relocate non-safety & non-risk significant systems from TS
  - Initiative 4b, RI AOTs with CRMP
    - Industry proposed approaches, pilots
    - Integration Plan
    - CEOG TSTF
- Public Questions and Discussion
- Schedule Next Meeting
- Closing Comments

Enclosure 3

# RISK INFORMED TECHNICAL SPECIFICATION TASK FORCE (RITSTF)
# RISK MANAGEMENT TECHNICAL SPECIFICATION INITIATIVE STATUS

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 1 | Technical Specification Required Actions Preferred End States | • TSTF 422 submitted to NRC on June 6, 2002. | • TSTF provided TSTF 422 to the NRC on 6/06/02.<br>• The NRC began review of TSTF 422 in early August, 2002.<br>• The BWROG SE is finalized and will go into technical concurrence ~~in 7/02.~~ | CEOG - TSTF 422 R0<br>BWROG - TSTF 423 R0<br>BWOG - TSTF 431 R0<br>WOG - TSTF 432 R0 |
| 2 | Missed Surveillances SR 3.0.3 | • TSTF 358, R6, has been approved and published for CLIIP adoption | • Initiative Complete<br>• Essentially all plants will have submitted a plant specific license amendment by 12/30/02. | TSTF 358 R6 |

Enclosure 4

**NEI RITSTF**

NEI Biff Bradley, 202 739-8083
Tony Pietrangelo, 202 739-8081
EXCEL Don Hoffman, 301 984-4400
EPRI Frank Rahn, 650 855-2037
John Gaertner, 704 547-6169

WOG Jack Stringfellow, Southern Nuclear, 205 992-7037
Jim Andrachek, Westinghouse, 412 374-5018
Jerry Andre, Westinghouse, 412 374-4723
BWOG Noel Clarkson, Duke, 864 885-3077
R. Schomaker, Framatome, 434 832-2917
Mike Kitlan, Duke, 704 373-8348

CEOG Alan Hackerott, OPPD, 402 533-7276
Gary Chung, SCE, 949 368-9431
Ray Schneider, CE, 860 731-6461
BWROG Rick Hill, GE, 408 925-5388
Dusty Rhoads, Energy Northwest, 509 377-4298
Don McAmy, TVA 256 729-4595



09/24/2002

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 3 | Increase Flexibility in Mode Restraints LCO 3.0.4 | • TSTF 359 R7 Federal Register Notice for comment published on 8/2/02. | • TSTF provided final TSTF 359 R7 to NRC with changes to match the final completed Safety Evaluation on 7/10/02.<br>• CLIIP Notice for Comment issued on 8/2/02.<br>• 4 sets of comments received.<br>• NRC currently resolving the comments and working to finalize the CLIIP Notice of Availability ~~by 10/02.~~ | TSTF 359 R7 |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 4a | Individual Risk Informed Allowed Outage Times (AOTs) | • Individual Owners Groups (OGs) and plants are pursuing individual Risk Informed AOTs through Topicals and license amendments. | • Ongoing<br>• NEI will send a letter to the OGs soliciting a pilot for DG 1122.<br>• Industry/NEI would like the NRC to work through a pilot prior to finalizing the RG to work out any issues. | Various |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 4b | Risk Informed AOTs With Configuration Risk Management Program or Maintenance Rule Backstop | • RITSTF provided the NRC a revised White Paper addressing the NRC comments on 2/27/02. | • NRC provided comments on the NEI White Paper.<br>• The CEOG Topical and TSTF will be submitted to the NRC by ~~10~~ 12/31/02.<br>• RITSTF will provide a draft Risk Management Guidance Document by 12/31/02.<br>• STP will coordinate with the Risk Management Guidance Document and will submit their plant specific pilot application by 12/31/02.<br>• RITSTF will continue to coordinate with CEOG and South Texas Project (STP) any the other pilot programs to ensure a single coordinated methodology and process for Initiative 4b. This single process and overall pilot for Initiative 4b will be supported by the multiple individual plant and Owners Group pilot plants.<br>• TSTF will provide TSTF 424 to the NRC by 3/03. | TSTF 424 R0 |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 5a | Relocate Surveillance Requirements Not Related to Safety | • Deterministic portion of Initiative 5 transferred to TSTF responsibility. | • TSTF reviewing candidate SRs to be relocated.<br>• TSTF will provide a TSTF to the NRC by 12/31/02. | None assigned |
| 5b | Relocate Surveillance Test Intervals to Licensee Control | • NRC provided comments on the RITSTF White Paper. | • NRC provided comments on the RITSTF White Paper. BWROG developed a Guidance Document from the White Paper and NRC and Industry comments and provided to RITSTF.<br>• RITSTF will provide a revised Guidance Document and responses to the RAIs to the NRC by 11/30/02.<br>• After NRC review and acceptance of the Guidance Document, RITSTF will develop a TSTF for Initiative 5 and submit to NRC. | TSTF 425 R0 |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 6a | Modify LCO 3.0.3 Actions and Timing 1 hour - 24 hours | • On hold. | • On hold for resolution of Initiative 6b and 6c to determine if Initiative 6a is required. | None assigned |
| 6b | Provide Conditions in the LCOs for Those Levels of Degradation Where No Condition Currently Exists to Preclude Entry Into LCO 3.0.3 | • Working with NRC to understand and address their concerns. | • CEOG is interfacing with the NRC to address the NRC issues/concerns.<br>• TSTF will provide TSTF 426 to the NRC by 11/30/02. | TSTF 426 R0 |
| 6c | Provide Specific Times in the LCO For Those Conditions That Require Entry Into LCO 3.0.3 Immediately | • Working with NRC to understand and address their concerns. | • CEOG is interfacing with the NRC to address the NRC issues/concerns.<br>• TSTF will provide TSTF 426 to the NRC by ~~11/30/02.~~ 12/15/02. | TSTF 426 R0 |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 7a | Impact of Non Technical Specification Design Features on Operability Requirements - Barriers | • RITSTF provided a White Paper to the NRC. NRC initial comments indicate no major issues and RITSTF can proceed.<br>• Subsequent NRC questions/comments indicates some concern with the approach. | • RITSTF/TSTF discussed TSTF 372 R2 and Initiative 7 at the end of the 6/4/02 TSTF meeting.<br>• RITSTF/TSTF developed a revision to TSTF 372 to address the NRC concerns and a draft was provided to the NRC on 8/7/02.<br>• NRC commented on the draft TSTF 372 in several conference calls and meetings.<br>• RITSTF/TSTF to develop a draft TSTF for TSTF 372 and submit to NRC by 10/15/02.<br>• RITSTF/TSTF to develop a draft TSTF for Initiative 7a and submit to NRC by 10/15/02. | TSTF 372 R2<br>TSTF 427 R0 |
| 7b | Impact of Non TS Design Features on Operability Requirements – All other SSCs not in Technical Specifications | | • RITSTF will develop a White Paper to outline the process to address this scope of SSCs by 2/1/03.<br>• RITSTF/TSTF will develop a TSTF and submit to NRC by 3/31/03. | None assigned |

| INITIATIVE | TITLE | INITIATIVE STATUS | NEXT ACTIONS/ SCHEDULE/ RESPONSIBILITY | TSTF NUMBER |
|---|---|---|---|---|
| 8a | Remove or Relocate Systems LCOs That Do Not Meet the 4 Criterion of 10 CFR 50.36 From Technical Specifications | • A BWROG specific list of candidate LCOs has been developed<br>• Other Owners Group specific lists being developed. | • NRC is currently developing guidance for plant specific application of Initiative 8a.<br>• RITSTF to interface with the NRC in the development of the guidance for plant specific application of Initiative 8a.<br>~~• RITSTF to develop a position paper by 10/31/02.~~<br>• RITSTF to interface with NRC on the development of the generic guidance and methodology document by ~~11/30/02.~~ 12/19/02.<br>• RITSTF/TSTF to develop a TSTF for submittal to NRC by ~~12/30/02.~~ 3/30/03 | None assigned |
| 8b | Modify 50.36 Rule to Permit Removal or Relocation of Non Risk Significant Systems out of Technical Specifications | • Requires Rulemaking | • RITSTF looking at coordinating Initiative 8a with longer term initiatives given the requirements for rulemaking. | Not applicable |

BWOG - Active in Initiatives 1, 4 and 7

BWROG - Active in Initiatives 1, 4, 5 and 8

CEOG - Active in Initiatives 1, 4, 5 and 6

WOG - Active in Initiatives 1, 4, and 5

Origin and Evolution of the Snubber LCO

Due to problems observed with hydraulic snubbers in 1973, the staff required a model technical specification as follows:

> "All hydraulic snubbers listed in Table____ shall be OPERABLE.
>
> APPLICABILITY: MODES 1, 2, 3 and 4
>
> ACTION:
>
> With one or more hydraulic snubbers inoperable, replace or restore the inoperable snubber(s) to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."

This LCO appeared in the first edition of the STS which the staff developed in the early 70s and published as a body in 1976. The safety evaluation supporting this standard LCO and actions states in part:

> "Because snubber protection is required only during low probability events, a period of 72 hours is allowed for repair or replacement of defective units before the reactor must be shutdown. The licensee will be expected to commence repair or replacement of a failed snubber expeditiously. However, the allowance of 72 hours is consistent with that provided for other safety-related equipment and provides for remedial action to be taken in accordance with 10 CFR 50.36(c)(2). Failure of a pipe, piping system, or major component would not necessarily result from the failure of a single snubber to operate as designed, and even a snubber devoid of hydraulic fluid would provide support for the pipe or component and reduce pipe motion. The likelihood of a seismic event or other initiating event occurring during the time allowed for repair or replacement is very small. Considering the large size and difficult access of some snubber units, repair or replacement in a shorter period of time is not practical. Therefore, the 72 hour period provides a reasonable and realistic period for the remedial action to be taken."

This specification required periodic visual inspection at power, and testing that required snubber removal during shutdown at 18 month intervals.

At some point (possibly as early as 1980) the specification actions changed to allow the 72 hours to be a period of time before the supported equipment must be "declared inoperable", which then permits another completion time to elapse before the reactor must be shut down. **We are trying to find the safety analysis that justified this time extension and now "unique feature" of the snubber LCO.**

In May 1986 [Denton to Norelius] the staff interpreted the above standard as follows:

> "The snubber surveillance requirements related to testing are addressed by item e. of specification 4.7.9 which states that these requirements are to be performed during the first refueling and every 18 months thereafter during shutdown. The TS are explicit that the 18 month surveillance is to be performed during shutdown. Therefore, this

requirement would not be met if the licensee had removed snubbers for testing when the unit was at power.

"Because some systems are required to be operable during shutdown, the 18 month surveillance requirement may necessitate the removal of snubbers from those systems for testing.....the licensees method for testing is to remove one or two snubbers from systems which are required to be operable. This is an acceptable approach to testing in this case.

"1. When a snubber is removed from the system for testing/surveillance purposes what, if any, portion of the Technical Specification (TS) on snubbers or the system apply?

Normally snubbers would only be removed from the system for testing/surveillance purposes at a time when the system is not required to be operable. If, however, a snubber is removed from service, for any purpose, for a system which is required to be operable, the action statement for snubbers would apply. The action statement requires that inoperable snubber(s), those removed for testing, be restored to operable service in 72 hours.

The action statement also requires that an engineering evaluation of the attached component be performed in accordance with specification 4.7.9.g. (4.7.9.g) notes that where snubbers are found inoperable, an engineering evaluation is to determine if the components to which inoperable snubbers are attached were adversely affected to assure that the component remains capable of meeting its designated service. The intent of this requirement is to assure that the system was not adversely affected by the inoperable snubber. This does not relate to the system or components capability to withstand a seismic event. Any degradation in seismic protection due to inoperable snubbers was taken into account in establishing the 72 hour allowed outage time.

When a snubber is removed from service for testing, an engineering evaluation need not be performed. If the snubber is not returned to service in 72 hours, that system would be declared inoperable at this time since the snubber allowable out-of-service time limit would be exceeded.

"2. How many snubbers may be removed at one time, for testing or surveillance activities without affecting system operability?

The TS does not place a limit on the number of snubbers which can be removed from service. The limiting condition for operation is that all snubbers shall be operable and that with one or more inoperable, all inoperable snubbers are to be restored to operable status in 72 hours. The affected systems are only declared inoperable when the snubbers are not restored to operable status after 72 hours.

"3. May the number of snubbers determined in 2 above be removed from multiple systems simultaneously?

The Technical Specifications do not preclude the removal of one or more snubbers from service or from multiple system(s) simultaneously. However, the

action requirements apply for systems required to be operable when snubbers are removed from service in excess of 72 hours."

Discussion of Snubber LCO as Developed Prior to Improved Standard Technical Specifications

No additional safety evaluation was written that modified the model supporting the initial standard specification in the early 70s. This safety evaluation supported the following operation and maintenance scenario:

1. Snubbers would be functional and in service when the structures, systems, and components they are attached to are required to be operable.

2. During power operation, one or more snubbers might be found by visual inspection to have failed. Failed snubbers so discovered could be removed, repaired/replaced at power if the work could be completed within 72 hours. No explicit restrictions were placed on the number of snubbers undergoing such repair, nor was explicit consideration given to the equipment they supported (e.g., consideration of redundancy). This simplifying approach was made possible by the expectation that such failures would be limited in number and that explicit consideration of multiple train impact was not necessary. Deliberate removal of multiple snubbers for testing was not allowed at power.

3. Removal of snubbers for testing must be done during shutdown. If a system is required to be operable during shutdown, one-at-a-time removal and replacement was acceptable; multiple removal was not acceptable.

With the restrictions of these scenarios as boundary conditions or assumptions, the safety analysis justified 72 hours to repair or replace each snubber before the supported equipment must be "declared inoperable." The essence of the safety evaluation is as follows:

> "Because snubber protection is required only during low probability events, a period of 72 hours is allowed for repair or replacement of defective units before the reactor must be shutdown..... Failure of a pipe, piping system, or major component would not necessarily result from the failure of a single snubber to operate as designed, and even a snubber devoid of hydraulic fluid would provide support for the pipe or component and reduce pipe motion. The likelihood of a seismic event or other initiating event occurring during the time allowed for repair or replacement is very small."

The change to allow this 72 hours in addition to the completion time for the supported equipment effectively doubled the time allowed for loss of individual snubbers.

Discussion of Relocation of the Snubber LCO

As a result of the joint effort of the NRC and industry to improve standard technical specifications in the late 80s and early 90s, the snubber LCO was approved for removal from the technical specifications and the detailed requirements placed under licensee control. These "improved standard technical specifications" also included two rules for the relationship between support equipment and the equipment supported. When both the support equipment and the

supported equipment are in technical specifications, LCO 3.0.6 applies. When the support equipment is not in technical specifications, the relationship is governed by the definition of OPERABILITY, which stipulates that the supported equipment is inoperable if the support function is not being supplied. When relocated outside of technical specifications, snubbers passed from LCO 3.0.6 control to operability definition control. This change eliminated the 72 hour "delay" before entering the actions for the supported equipment in technical specifications. Industry recognized this shortly after the early conversions and disputed this interpretation. Staff has responded in writing that the 72 hour delay is nullified by the definition of OPERABILITY.

Today, plants that have not converted have retained the 72 hour "delay" as part of their current technical specifications. At least one licensee converted but chose not to relocate the snubber LCO in light of this consequence.

Licensees that have relocated the LCO are required to (1) make an operability determination when snubbers are inoperable due to failure in service or removal from service; (2) declare the supported equipment inoperable if the seismic support function is not being provided; (3) comply with the actions and associated completion times of the supported equipment. In general, this results in 72 hours before commencing a shutdown, which aligns with the original safety evaluation written when snubbers were first placed in technical specifications in the early 70s. Licensees have expressed the desire to restore the delay time and the provision that permits them to not declare the supported equipment inoperable during the delay time.

Recent Staff and Industry Efforts to Address Snubbers

The inconsistent treatment of snubbers is not a significant safety problem, nor is there an urgent need for a solution. The staff has offered to work with licensees experiencing undue impact on maintenance or operations to provide limited temporary relief consistent with safety while a comprehensive generic solution is worked out. To pursue a solution, the staff and industry chose to work within the framework of an industry initiative to risk-inform technical specifications, Initiative 7. As stated in the NEI white paper dated June 2001:

> "The goal of this initiative is to develop a risk-informed approach that allows for deferred entry into an LCO for situations involving temporary degradation of design features. The deferral time would be a function of the frequency of the initiating event for which the design feature provides protection. The maintenance rule (a)(4) assessment would be controlling, since it addresses the specific plant configuration at the time of the degradation, but the deferral time would be expected to be consistent with the (a)(4) approach for most situations.
>
> "The proposed change would be effected through a new limiting condition for operation..which would reference a basis listing of the deferral times. Simplified risk analysis, based on initiating event frequencies, would be used to determine the deferral times. Some restrictions may be necessary relative to simultaneous treatment of redundant trains."

The slow pace of progress has been due to resistance by owners groups to supporting the "simplified risk analysis" for the configurations it wishes to justify. Rather, parts of the industry have focused on restoring the 72 hour delay time, relying solely on the past staff determination

that it is acceptable. (This is ascribable, at least in part, to the industry's overwhelming preference for seismic margins analysis vice seismic risk assessment for meeting NRC's request for risk assessment for external events, the former not being useful for configuration management of seismic risk.) However, aside from the desire to pursue a general approach for the initiative, the staff believes that the safety evaluation supporting the 72 hour deferral needs to revisited because: 1. It is based on risk (" low probability events," "The likelihood of a seismic event or other initiating event occurring during the time allowed for repair or replacement is very small."); 2. the risk analysis is purely subjective, while we now have the ability to quantify that judgement and guidance for the acceptability of risk metrics; and 3. the configurations that industry wishes to justify need to be made explicit to ensure that the risk analysis is bounding. It is not clear that the current safety evaluation supports practices like removing snubbers from multiple trains at power.

The staff and industry have now established the rudiments of a generic risk analysis that supports removal of snubbers from single trains of redundant systems in any mode of operation for a period of 72 hours. If this time is meant as a "delay time" before starting subsequent LCO clocks in supported equipment LCOs, then the risk analysis will have to cover this additional fault exposure time, on the order of an additional 100 hours. The results of these analyses are being judged against the quantitative risk management thresholds in the (a)(4) guidance.

The concept of a "delay" time has the drawback that it implies risk is not accumulating during this time. However, as long as the underlying risk analysis covers the appropriate total fault time, it can be used as a device in the context of technical specification logic to link to existing LCOs. Its meaning and purpose can be made clear in the safety evaluation and the bases.

Use of a "delay" in "declaring inoperable" the supported equipment and entering the action statements appears to also support the proper management of risk for one train lacking seismic support and the redundant train becoming inoperable for another reason. This configuration should occur rarely if at all, requiring either a random single failure of a snubber with a random single failure of another component, or a random single failure on a protected train in conjunction with a planned removal of seismic supports from the other. (The possibility of one train planned loss of seismic support combined with the other train unplanned snubber failure should be precluded by visual inspection of one train before removing the other from service.) If either of these scenarios should occur, it seems reasonable that repair of the non-seismic failure should not be complicated by preparations to shut down, and should have the "one train inoperable" completion time rather than the nominal shutdown limit of 36 hours.

The most important remaining issue is the risk analysis of configurations where redundant trains, required to be operable, are simultaneously impacted by loss of seismic support. In general, justification requires (1) demonstration that the change in CDF is acceptably small and will exist for an acceptably short duration, and (2) defense-in-depth is appropriately considered. The meaning of (2) in the context of technical specifications is still evolving; we plan to address this in the upcoming revision of RG 1:177. At this time, it seems reasonable that defense-in-depth for configurations comprising a loss of all capability specified in an LCO should involve a demonstrable decrease in the probability of an initiating event, and/or the ability to provide the necessary mitigation capability through other means (preserve key safety functions). We note that in the case of snubbers, the staff historically did not place any prohibition on impacting redundant trains simultaneously within the 72 hour "delay" window. It seems reasonable to assume that this was due to reliance on planned snubber testing being performed only during

shutdown, thus limiting entry into such configurations to rare instances of simultaneous random failure of one or more snubbers in each train.

For the case of forced (vs. planned) entry into configurations where both redundant trains become inoperable due to random snubber failures, it seems unreasonable to require immediate preparations for shutdown for such scenarios. This is especially true for cases where failure of a single snubber would impact both trains. Again, the Farley licensee has identified a number of cases where this single failure scenario is possible for their design. Forced entry into loss of seismic support should be a rare occurrence; nonetheless the industry has expressed a desire to cover this eventuality in technical specifications, permitting recovery time before commencing a shutdown. While a more complete risk analysis might well justify more time, 72 hours (clocks running simultaneously for both trains prior to declaring each train inoperable) plus the nominal 36 hour shutdown time if restoration is not successful should be justifiable based on extrapolation of the single train risk assessment and consideration of the "coping" nature of the scenario.

What risk management strategy is appropriate (justified) for planned simultaneous removal of seismic supports from redundant trains, and/or from redundant trains of multiple systems? Is there a risk-informed reason why this should be allowed, and if so with what limits in technical specifications? How should the question of defense-in-depth be handled?

It might be argued that the same time as that justified for forced entry should be justified for planned entry, since the risk contribution is the same regardless of the cause. While this might be true for the instantaneous risk for one incident for one system, it is not true for the cumulative risk. In the forced case the number of incidents will be rare and limited to no more than one system. However, in the planned case the plant can enter the condition numerous times with multi-system impact. Under these circumstances, there is no way to reasonably assess the cumulative risk. Licensees seeking this flexibility need to provide information on how often they would plan to be in configurations that impact more than one train of each system, and how they would maintain key safety functions during such periods. The latter is required by the industry guidance supporting (a)(4).

There is no compelling reason to make an entry into this configuration for planned maintenance or testing, unless the following two circumstances are present: 1. seismically supported pipes or components are shared by both trains and thus both trains are simultaneously affected by the removal of certain snubbers (if trains are independent, then standard good practice of one train in maintenance, one train operable and protected will suffice), and 2. there are no modes of operation when the affected systems are not required to be in service. The Farley licensee has identified one case where both conditions are satisfied: in Modes 5 and 6 both trains of RHR are impacted by the removal of snubbers on shared components and at least one train must be in service. The licensee stated that "(D)eclaring RHR inoperable forces scheduling of snubber work while the core is offloaded or prevents movement of fuel during such work." Also, in this case the technical specifications just direct that RHR be made operable immediately, an action that does not make sense given that the cooling function has not been lost.

**Draft proposal for TSTF-372, Rev.2**
**and**
**Proposed RITSTF Initiative 7.a LCO 3.0.9**

Draft TSTF-372, Rev. 2 Proposed Change

LCO 3.0.8 When one or more required snubbers or other seismic restraints are unable to perform their associated support function(s), any affected supported LCO(s) are not required to be declared not met solely for this reason for up to 72 hours. At the end of this 72 hours, the required snubbers or other seismic restraints must be able to perform their associated support function(s), or the affected supported LCO(s) shall be declared not met.

Draft RITSTF Initiative 7.a Proposal

LCO 3.0.9 When one or more required barriers are unable to perform their associated support function(s) for a single train, any affected supported LCO(s) are not required to be declared not met solely for this reason for up to 30 days. At the end of this 30 days, the required barriers must be able to perform their associated support function(s), or the affected supported LCO(s) shall be declared not met.

**Draft proposal for TSTF-372, Rev.2**
**and**
**Proposed RITSTF Initiative 7.a LCO 3.0.9**

Draft TSTF-372, Rev. 2 LCO 3.0.8 Bases

LCO 3.0.8 LCO 3.0.8 establishes an exception to LCO 3.0.2 for snubbers and other seismic restraints. This exception is provided because LCO 3.0.2 would require that a system be considered inoperable when snubbers or other seismic restraints required to support the system are not capable of providing their required support function. LCO 3.0.8 allows 72 hours before declaring the LCOs associated with the supported system(s) not met. This exception is justified because the actions that are required to ensure the unit is maintained in a safe condition are specified in the snubber and seismic restraint requirements, which are located outside of the Technical Specifications (TS) under licensee control. The snubber and seismic restraint requirements are located outside of the TS because they have been determined to not meet the criteria for retention in the TS located in 10 CFR 50.36(c)(2)(ii), and, as such, have been determined to be appropriate for control by the licensee.

When one or more snubbers or seismic restraints are not capable of providing their support function required for OPERABILITY of one or more supported system's LCO(s), time is provided to allow necessary maintenance, testing, and/or repair before considering the supported system inoperable. Licensee-controlled documents may also require other compensatory actions to be taken. If the 72 hours expires and the snubber(s) or seismic restraint(s) are unable to perform their associated support function, the affected supported system's LCO must be declared not met and their Conditions and Required Actions entered in accordance with LCO 3.0.2.

LCO 3.0.8 will normally only be applied when one or more snubbers or seismic restraints are not capable of providing their associated support function to a single train of a multiple train supported system or to a single train in a single train supported system. LCO 3.0.8 may not be used to remove one or more snubbers or seismic restraints when more than one train of a multiple train supported system is affected, except for those snubbers and seismic restraints that are designed to support more than one train of a multiple train supported system. For example, a snubber or seismic restraint may support a common header on a multiple train system. In this case, LCO 3.0.8 may be applied when these snubbers and seismic restraints are not capable of providing their associated support function to these multiple train supported systems provided plant risk is evaluated and managed.

The LCO 3.0.9 Bases will be provided with the proposed TSTF.

NEI

# DRAFT

Barriers

**Proposed LCO 3.0.9**

**Treatment of barriers not described in technical specifications with respect to supported systems LCO.**

When the OPERABILITY of a single train of a multi-train safety system is impacted solely due to inability of one or more barriers (as described below) to perform its related protection function, the risk impact should be assessed and managed, and the required actions and associated conditions should be entered within the time identified by the risk assessment, not to exceed 30 days. This is an exception to LCO 3.0.2.

Barriers are defined as follows:

Insulation, doors, walls, floor plugs, curbs, hatches, installed barriers, mechanical devices, or other barriers, not explicitly described in technical specifications, and designed to provide for the performance of the safety function for the technical specification system in the event of the following low frequency initiators:

1. Small, medium or large loss of coolant accidents
2. High energy line breaks outside containment
3. Feedwater line breaks
4. Internal or external flooding
5. Turbine missile ejection accident

The following conditions must be met to use this provision (Technical Specification Bases material):

1. The use of this provision is limited, at a given time, to one train of multi-train systems designed to mitigate the consequences of the specified initiating events or combinations thereof.

2. The provision may be used on more than one system at a given time, as long as at least a single train of mitigation is preserved for the specified initiating events.

3. The provision is not applicable to barriers that protect more than one train of a multi-train safety system, or barriers that protect the control room.

4. The degraded barrier will be evaluated and managed under the maintenance rule plant configuration control requirement, 10 CFR 50.65(a)(4), and associated industry guidance (NUMARC 93-01,

Revision 3). Should the assessment and risk management actions for a specific plant configuration provide for a completion time that is shorter than 30 days, the (a)(4) risk management action shall be implemented.

5. This provision is applicable whether the barrier degradation is due to maintenance or due to a discovered condition.

## Risk impact of 30 day completion time for barriers

The risk impact of the barrier(s) out of service must be addressed pursuant to the risk assessment and management provision of the maintenance rule, 10 CFR 50.65 (a)(4), and associated implementation guidance (NRC Regulatory Guide 1.182). This guidance provides for the consideration of dynamic plant configuration issues, emergent conditions, and other aspects pertinent to power operation with the barrier(s) out of service.

In order to estimate the risk impact of barrier-out-of-service conditions, the following simplified risk analysis is provided. This analysis is not intended to envelope or bound all potential plant configuration or barrier-out-of-service conditions. It is intended to demonstrate that barrier-out-of-service conditions produce small risk impacts within the range of other maintenance activities carried out under 10 CFR 50.65 (a)(4), and that the 30 day limit for restoration of the barrier is appropriate.

An appropriate value for the completion time, Tc, can be determined by an expression for the incremental conditional core damage probability (ICCDP) that would be attributed to the barrier-out-of-service condition during power operation. This involves the probability of the appropriate initiating event occurring during the completion time and failing a specific piece of Technical Specification equipment. For example, while curbs used to prevent flooding were removed to permit the transport of some heavy equipment, a flood occurs, which causes the failure of one train of a safety injection system.

This determination will consider three different parameters:

1. the length of time the out of service barrier is unavailable, or the completion time, Tc (hours)
2. the initiating event (frequency) for which the out of service barrier is designed to mitigate
3. the importance (to core damage frequency, CDF) of the Technical Specification equipment (train or component) for which the out of service barrier is designed to protect

The first parameter can be used to estimate the unavailability of the out of service barrier over the period of one year. This is estimated as:

$$\frac{Tc}{8766}$$

The second parameter will be accounted for as the ratio of the specific initiating event frequency (e.g., flood) to the total initiating event frequency, i.e., the fraction of the total initiating event frequency that must be considered. This must be multiplied by the unavailability of the out of service barrier to account for only the time when the initiating event could damage the protected Technical Specification train or component. Thus, the second parameter, which will account for the change in CDP, is estimated as:

$$\frac{Tc}{8766} \times \frac{Specific\ Initiating\ Event\ Frequency\,(/\ reactor\text{–}year), IE_i}{Total\ Initiating\ Event\ Frequency\,(/\ reactor\text{–}year), IE_T}$$

The third parameter is the risk achievement worth (RAW) for the protected Technical Specification equipment (train or component). This parameter will account for the increase in CDP as a result of the initiating event occurring while the protective function is unavailable.

Therefore, the ΔCDP or the Incremental Conditional Core Damage Probability (ICCDP) can be estimated as follows:

$$ICCDP = \frac{T_C}{8766} \times \frac{IE_i}{IE_T} x[(RAW_j \times CDF_{base}) - CDF_{base}]$$

where $RAW_j$ is the risk achievement worth for the Technical Specification equipment (train or component) that normally would be protected from the effect of the initiating event (with frequency $IE_i$) by the out of service barrier.

Solving the above equation for $T_C$ (in hours), yields:

$$T_C = \frac{ICCDP \times 8766}{\frac{IE_i}{IE_T} \times [(RAW_j \times CDF_{base}) - CDF_{base}]}$$

# DRAFT

Regarding the initiating event frequency, $IE_i$:

The relevant initiating events consist of floods (internal and external), high energy line breaks (HELB), feedwater line breaks, small, medium, and large loss of coolant accidents (LOCAs), and turbine missiles. Initiating event frequencies for each of these, with the exception of turbine missiles and external floods, is provided in NUREG/CR-5750, "A Review of Rates of Initiating Events at U.S. Nuclear Power Plants: 1987 – 1995", February 1999.

A turbine missile frequency of 1.64E-4 per reactor year is provided in EPRI, NSAC-60, June 1984, "A Probabilistic Risk Assessment of Oconee Unit 3", Section N3.1, based on previous work by the Pacific Northwest Laboratories. This same EPRI reference provides an analysis of external flood events. Various dam failure references are cited with a final bounding value of 2.5E-5 per year. These values are consistent with, or bound, other studies.

Review of the above sources provided the following mean frequencies per critical year, for the relevant initiators. The NUREG CR5750 data is from Table G-1 of the NUREG, which excludes the first four months of commercial plant operation:

| Initiating Event | NUREG 5750 Table G-1 Category | Mean frequency per critical year |
|---|---|---|
| Large LOCA, BWR | G7 | 3E-5 |
| Large LOCA, PWR | G7 | 5E-6 |
| Medium LOCA, BWR | G6 | 4E-5 |
| Medium LOCA, PWR | G6 | 4E-5 |
| Small pipe break | G3 | 5E-4 |
| Very small LOCA/leak | G1 | 6.3E-3 |
| RCP seal LOCA, PWR | G8 | 2.5E-3 |
| Steam line break outside containment | K1 | 9.1E-3 |
| Feedwater line break | K2 | 3.5E-3 |
| Internal flood | J1 | 3.5E-3 |
| External Flood | EPRI NSAC-60 | 2.5E-5 |
| Turbine missile | EPRI NSAC-60 | 1.64E-4 |

cannot add applicable initiating events

largest contributor

As ~~can be~~ seen, the frequency for steam line breaks outside containment is the bounding case for this application. This frequency is given as 9.1E-3 per critical year per reactor (Table G2, functional impact category K1). Given an industry average capacity factor of approximately 90%, this equates to a frequency per reactor year of 9.1E-3 x 0.9 = 8.2E-3.

Given that the initiating event occurs, several other conditions must be met to address the impact on core damage frequency, including break size, spatial considerations, remaining mitigation capability and recovery actions. These conditions are discussed below. The initiating event frequency relevant to this application, that is a high energy line break that damages nearby equipment with out-of-service barriers, is calculated as follows:

The NUREG CR-5750 initiating event frequency is based on pipe breaks of one inch effective diameter and larger, in any steam, feedwater or condensate line that contains main turbine working fluid at or above atmospheric saturation conditions, and does not necessarily constitute a design basis HELB. According to EPRI TR-102266, "Pipe Failure Study Update," 85% of all generic pipe failures have an effective diameter of less than 6 inches. Therefore the frequency referenced above accounts for all applicable breaks, but is dominated by small breaks, many of which would release insufficient energy to cause damage to other plant systems, even with barriers removed. We believe it is conservative to assume that 50% of breaks would be of sufficient effective diameter to potentially effect adjacent equipment.

Another conservative assumption is that the line break consequences would always result in failure of the non protected safety system function, when in reality, even for those breaks releasing sufficient energy to conceivably cause damage, this would be a function of spatial considerations, and it is thus approximated that in 50% of cases the equipment function would be lost.

The net impact of the above factors is an initiating event frequency considerably below the generic "steam line break outside containment" frequency from NUREG 5750.

8.2E-3 x 0.5 (break size) x 0.5 (spatial considerations) = 2.05E-3

For the purposes of this application, the initiating event frequency is therefore defined as 2 E-3.

The total initiating event frequency, i.e., the sum of all initiating events considered in a probabilistic risk assessment (PRA), is on the order of 1.0/reactor-year. For this application, given the $IE_i$ noted above, the ratio $IE_i/IE_T$ is therefore assumed to be 2E-3.

The risk impact is a function of baseline CDF (and LERF) and the RAW value for the component normally served by the out of service barrier. Baseline internal events CDF varies over a range of approximately 1E-4 to 1E-6 for existing plants. Baseline LERF values are at least an order of magnitude lower.

RAW values for barrier-protected equipment can range over a variety of values. The RAW value would generally be a component RAW for a main component (pump, valve, or other component necessary for system function) of the barrier-protected system. The maximum RAW value would be inherently limited due to the limitation of the LCO provision to a single train. In other words, single train system or component (such as the condensate storage tank) which typically have large RAW values, are precluded from using the barrier LCO by the wording of the LCO. Thus, components with very large RAW values need not be considered for this analysis.

Regarding mitigation, the conditions of this application stipulate that the barrier-out-of-service must be limited to one train of a multi train system, so the redundant safety grade train would be available. For barriers protecting risk significant components, maintenance unavailabilities would be controlled through the §50.65(a)(4) program (see risk management actions discussion). Thus, the failure probability of the remaining train would be approximately 1E-2. The RAW values for the equipment with barriers out of service (see following tables) are normally calculated for the baseline PRA with time averaged unavailabilities. Given that maintenance unavailabilities for the redundant train would be controlled, the RAW values listed in the table below are conservative with respect to their impact on CDF and LERF.

Recovery actions (manual actions, etc), as modeled in the PRA, would continue to be pertinent for this situation. Recovery actions could result in restoration of equipment damaged by the initiating event.

LERF, and ILERP, need also be considered. It can be conservatively assumed that the delta LERF, and ICLERP values resulting from the barrier-out-of-service would be at least an order of magnitude less than the delta CDF and ICDP values, respectively. Containment bypass scenarios, such as interfacing system LOCA or steam generator tube rupture (which tend to be CDF independent) would not be uniquely affected by this application. Therefore, the delta LERF (and ICLERP) would typically correspond to the delta CDF (and ICCDP), and all plants have a conditional early containment failure probability of less than 0.1.

The following tables demonstrate the ICCDP and ICLERP value when $T_C$ is set to 30 days (720 hours), for a range of RAW values, at various baseline CDFs.

# DRAFT

Baseline CDF = 1E-6:

| RAW | ICCDP | ICLERP |
|---|---|---|
| 2 | 1.6E-10 | 1.6E-11 |
| 10 | 1.5E-9 | 1.5E-10 |
| 50 | 8E-9 | 8E-10 |
| 100 | 1.6E-8 | 1.6E-9 |

Baseline CDF = 1E-5:

| RAW | ICCDP | ICLERP |
|---|---|---|
| 2 | 1.6E-9 | 1.6E-10 |
| 10 | 1.5E-8 | 1.5E-9 |
| 50 | 8E-8 | 8E-9 |
| 100 | 1.6E-7 | 1.6E-8 |

Baseline CDF = 1E-4:

| RAW | ICCDP | ICLERP |
|---|---|---|
| 2 | 1.6E-8 | 1.6E-9 |
| 10 | 1.5E-7 | 1.5E-8 |
| 50 | 8E-7 | 8E-8 |
| 100 | 1.6E-6 | 1.6E-7 |

**Comparison with maintenance rule (a)(4) guidance:**

NRC Regulatory Guide 1.182, guidance for implementation of §50.65(a)(4), provides the following table of ICDP values and risk management actions:

*ICDP and ILERP, for a specific planned configuration, may be considered as follows with respect to establishing risk management actions:*

| *ICDP* | | *ILERP* |
|---|---|---|
| *> $10^{-5}$* | *- configuration should not normally be entered voluntarily* | *> $10^{-6}$* |
| *$10^{-6}$ - $10^{-5}$* | *- assess non quantifiable factors*<br>*- establish risk management actions* | *$10^{-7}$ - $10^{-6}$* |
| *< $10^{-6}$* | *- normal work controls* | *< $10^{-7}$* |

**Conclusion:**

These results justify the use of the 30 day completion time for a barrier-out-of-service for a single train of a system, or systems, used to mitigate the listed initiating events. As can be seen, the ICDP and ILERP for the highest CDF and RAW values from the above tables is still within the "normal work controls" range for all but the limiting case of RAW=100 and baseline CDF =1E-4, and even that case is just above the thresholds for establishment of risk management actions.

It is recognized that the above values are calculated using the internal events PRA. Consideration should also be given to the CDF and LERF contribution from external events. Since these metrics are not quantified, or integrated with internal events at many plants, it is reasonable to provide some margin to account for their contribution. Therefore, it would be prudent to consider risk management actions for the removal of barriers from components with higher RAW values, even if the ICCDP and ICLERP are within the "normal work controls" region. In particular, controls on maintenance unavailabilities of the remaining train should be considered.