10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
1	H	Open	**Criticality Control (RIS 2005-05):** Part 50 and Part 72 requirements apply during cask loading in pool. Requirements overlap and NRC (NRR and SFPO) burnup credit methods are not consistent. NRC requesting LARs from all affected plants as interim compliance measure.	LARs are not an acceptable interim resolution. Need to evaluate enforcement discretion or confining compliance to FSAR/50.59 space. Need NRC position on whether 50.36 criteria are met.	Agree on short term action not requiring LAR. Long term action to develop consistent BUC credit method across Part 50 and 72. Rule change may also be required.
1a	H	Open	**Criticality Accident Requirements: §72.124(c):** Regulations provide exemptions from monitoring when fuel is under water and in "storage configuration" During cask preparation (out of pool but before in "storage configuration"), no exemption applies and monitoring is required.	Appears rule change is necessary to clarify. See NRC letter to Holtec dated 8/1/00 for additional information.	Need petition. Address "hole" in 72.124(c) requiring in-process criticality monitoring.
2	H	Open	**Burnup Measurements:** ISG-8 recommends measuring burnup on a sampling basis to increase confidence in reactor records. Industry does not believe this is necessary.	Evaluate safety benefit of BU measurements and recommend guidance change, as appropriate (EPRI input)	Revise ISG-8
3	H	Open	**Damaged Fuel:** Definition in ISG-1, Rev. 1 is very broad and difficult to implement. Need a definition generated with industry participation before implementation. ISG is not the appropriate process. Need to ensure fuel previously loaded as intact for storage can be transported without re-packaging.	Determine damaged fuel criteria for storage and transportation. Issue RG or add as defined term in the rules. CoCs will need to be revised to reflect new guidance and/or rule. (EPRI input)	Delete ISG-1 and issue Reg. Guide or include definition in rule. Endorse ANSI Standard

10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
4	H	Open	**Control of Cask Licensing Basis:** a) backfit of changes to ongoing TS (cask surveillance) to previously deployed casks. b) Backward and forward compatibility of hardware. c) Removal of information from SAR/CoC that applies to previously deployed casks and/or site-specific licensee who incorporated the information by reference.	Licensees, CoC holders, and NRC may have different views on these issues. Need mutually agreeable position.	DSTF internal. FAQ issue
5	M	Open	**Regulatory Process:** Certain issues are being addressed outside of recognized regulatory processes and should be addressed in a more structured process, such as a Regulatory Guide, rulemaking, or other formal generic communication (i.e., GL), to allow front-end industry participation and independent backfit evaluation by NRC (CRGR). Examples: ISGs, cask Technical Specifications, RIS 2005-05, fuel-air issue.	Process feedback issue in 2/8/05 workshop. Work with NRC as topics arise to determine appropriate process to use.	Discuss between NEI and NRC senior management
6	M	Closed	**CoC Noncompliance:** What process governs if licensee discovers noncompliance with CoC after cask is in storage? There is no NOED process in Part 72.	GL 91-18 (or successor) can be used for degraded conditions not involving noncompliance with CoC. May need NOED process for CoC noncompliance.	None. Use plant corrective action program. NOED process not needed.
7	H	Open	**Burnup Credit:** ISG-8 does not allow fission product credit, making BUC methodology limited. SFPO method is different than NRR. Except for geometry, methods should be the same.	Acquire and evaluate French data to expand ISG-8 guidance. In parallel, evaluate Part 50 and SFPO criticality analysis and BUC methods and assumptions for differences. Resolve differences and recommend single criticality/BUC	Revise ISG-8.

10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
				analysis method. (EPRI input)	
8	L	Open	**Moderator Exclusion:** 71.55(b) does not permit moderator exclusion by design for normal conditions outside of limited exceptions (i.e., entire cask designs cannot be excepted from moderator intrusion). Regulations (per ISG-19) permit moderator exclusion for accident conditions. Seems contradictory.	Work with NRC on regulatory issues associated with a rule change. Rule change may have broad (i.e., YM EIS) implications (EPRI input)	Rulemaking. Does NRC want a petition?
9	M	Open	**High Burnup Fuel:** ISG-11, Rev 3 does not provide guidance for transportation of HBU fuel.	Determine criteria for review of transport requirements for high burnup fuel. Delete ISG-11 and issue RG. (EPRI input)	Delete ISG-11 and issue Reg. Guide
10	L	Open	**Cask Technical Specifications (NUREG-1745):** Level of detail in cask TS and CoCs (e.g., fuel parameters) is not commensurate with risk. Fuel parameter change process in NUREG-1745 is not consistent with regulations.	Issue Work with NRC to make risk-based rule change to add inclusion criteria and/or revise NUREG-1745. Need cask loading PRA issued.	Need petition to revise Part 72 to develop TS criteria.
11	M	Open	**Risk Informed regulations and review guidance:** Cask loading PRA needs to be issued.	Tracking item.	Finish the PRA.
12	L	Closed	**Part 71 QA Program (RIS 2004-18):** Some Part 50 licensees who use Part 71-certified packages under a previously approved QA program (i.e., their Appendix B program) are required to have their Part 50 QA programs separately approved under Part 71. NRC issues a Form 311 indicating their approval under Part 71. The Part 50 QA program can be modified by the licensee	Work with NRC to clarify whether a Form 311 for Part 50 licensees to use a previously approved program under Part 71 is necessary. If so, how do QA program changes get implemented, given the authority of 50.54?	None. NRC working.

10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
			under 10 CFR 50.54 without prior NRC approval provided the commitments in the program are not reduced. There is no such provision in Part 71 and renewal is required every 5 (now 10) years. These rules appear to conflict.		
13	L	Open	**72.48 Guidance:** Based on experience since 4/01, NEI guidance on malfunctions, consequences, and methods of evaluation may need updating and more customizing for casks. For example, casks do not typically have single failure criteria requirements and often accidents have no offsite dose consequences.	Based on lessons learned, issue FAQs to clarify implementation of 72.48.	DSTF internal. FAQ
14	L	Open	**Licensee 72.48 Processing:** a) What are GL obligations (i.e., timing, actions) for processing CoC holder 72.48s? b) What's required if GL does not adopt? c) What is effective date for CoC holder-issued 72.48s on GLs (e.g., operating changes)? d) What is CoC holder 72.48 deletes or modifies information incorporated by reference by an SL and SL does not want to change?	FAQs and/or other communication vehicle to establish industry consensus.	DSTF internal. FAQ
15	M	Open	**Computational Modeling Software (ISG-21):** Follow up on comment letter from NEI dated 8/11/05.	ISG is not necessary.	Withdraw the ISG. Draft ISG describes a QA process, not a licensing process
16	M	Open	**Retrievability:** NRC is developing an ISG on this issue. Industry needs to review and comment.	Review and comment on ISG after issuance.	Status? FAQ?

10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
17	New	Closed	**Amendment Applications:** There are a variety of difference formats for amendment applications (i.e., with or without SAR markups). Should industry develop guidance?	Is there a consensus for developing a standard template for amendment requests?	None. Each CoC holder has a process.
18	L	Open	**SRP Updates:** NRC needs to update SRPs to incorporate ISGs.	Tracking item.	NRC action
19	L	Open	**Reg Guide Updates:** NRC needs to update RGs 3.48, 3.61 and 3.62 to match SRP format.	Tracking item.	Delete RGs?
20	New	Closed	**Review Schedules:** Include front and back end activities in total review schedule.	NRC has provided some information. Emailed info to DSTF 2/15/05.	Complete
21	L	Open	**Part 72 License Renewal:** Modify rule to extend license renewal period beyond 20 years.		NRC working
22	New	Closed	**Use of RG 1.91 for ISFSI Licensing:** The 1 psig overpressure value for missiles may not be appropriate for use in ISFSI licensing.	Revise guidance specific for ISFSI licensing	None.
23	L	Open	**CoC Amendments:** Rulemaking is required for all Part 72 CoC amendments. This is an unnecessarily burdensome process. Results in exemptions as a normal licensing process.	NWPA uses term "by rule" for cask amendments	Need petition
24	L	Open	**GSI-196, BORAL Degradation:** NRC recently identified BORAL blistering as a generic safety issue. What effects, if any, does the blistering have on the design function of the BORAL?	Tracking item. NRC Research is gathering data at this point. Support, with EPRI as necessary.	None.
25	H	Open	**Fuel Cladding Integrity Analysis:** Cask designers have not historically analyzed fuel cladding integrity. Fuel material data is limited. Guidance in ISG-12 only addresses buckling.	Broaden licensing guidance in SRP.	~~NRC~~ clarify guidance

10 CFR 71/72 DSTF ISSUES MATRIX

ISSUE NO.	PRIORTY	STATUS	ISSUE DESCRIPTION	RESOLUTION	ACTION
26	L	Open	**DOE Standardized Canister:** DOE proposes to use a standard fuel canister that will be compatible with the waste package at YM.	Tracking issue. Establish industry policy and work with DOE/NRC to integrate with Part 71/72.	None. Tracking item.
27	L	Open	**10CFR72.13:** Some sections may not be appropriately listed.	Review and make suggestions to NRC for rule change	Need petition.
28	M	Open	**Tornado Missiles:** How do general licensees compare site-specific missiles against generic missiles? By spectrum or missile by missile comparison?	Develop industry consensus.	DSTF internal. FAQ
29	H	Open	**Fuel-in-Air:** NRC has had conversations with plants and CoC holders regarding air coming into contact with fuel.	What is the safety issue?	Need information from NRC

Additional Pertinent Licensing Issues Identified in Licensing Process Conference

ISSUE NO.	PRIORITY	STATUS	ISSUE DESCRIPTION	STATUS
1	Low	Open	**Sensitive Information:** SFPO would like NEI's input on developing procedures for the treatment of sensitive information in incoming documents. The NMSS staff's criteria for determining sensitive information will be disseminated in the near future.	
2	Low	Open	**Correcting CoC Errors:** SFPO is considering how to correct errors in an existing CoC. SFPO will engage stakeholders at appropriate time. This may relate to issue no. 6.	
3	Medium	Open	**Repetitive RAIs:** Similar RAIs issued by staff on applications submitted by different licensees or vendors.	
4	Low	Open	**NRC's plan and schedule for caseworks:** Industry provide "look-ahead" schedule for application submittals. NRC would provide timeliness goals and general scheduling criteria available to public.	

NEI/NRC Public Meeting on RIS 2005-05

- **PURPOSES OF THIS MEETING**
  - To discuss RIS 2005-05 including NRC and nuclear industry near-term actions to facilitate cask loadings and long-term actions to resolve differences in criticality analysis approaches between Part 72 and Part 50.
  - *To continue a dialogue with interested stakeholders on the criticality* methodology issues identified in RIS 2005-05.
- **MEASURE FOR SUCCESS OF THIS MEETING**
  - The interested stakeholders reach an understanding of future NRC actions focused on resolving the issue.

NRC Criticality Methodology Presentation

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Background

- RIS 2005-05 - March 23, 2005
  - Identified criticality analysis differences between NRR and NMSS methodologies for satisfying 10 CFR Part 50 and Part 72.
  - Provided acceptable approaches for resolving the differences and complying with NRC regulations
- NEI Letter - July 25, 2005
  - Raised "concerns" with implementation of RIS 2005-05
  - Suggested near- and long-term NRC-actions related to resolving the issue
- NRC Response Letter - October 3, 2005
  - Responded to NEI suggestions
  - Described NRC near- and long-term actions

General Criticality Analysis Differences

- Part 72
  - Generic Analyses
  - Partial burnup credit available (Actinides)
  - 75 to 90% credit for fixed neutron absorbers (poisons)

⇒ **Soluble Boron Credit needed to maintain subcriticality**

- Part 50
  - Plant-specific Analyses
  - Full burnup credit permitted
  - Full credit for fixed neutron absorbers with a surveillance program

⇒ **No Soluble Boron Credit permitted to maintain subcriticality**

10 CFR 50.68

- 10 CFR 50.68(a) –

  Each holder of a construction permit or operating license for a nuclear power reactor issued under this part [50] or a combined license for a nuclear power reactor issued under part 52 of this chapter; shall comply with either 10 CFR 70.24 of this chapter or the requirements of paragraph (b) of this section.

NRC Response to NEI Near-Term Suggestions

- General Exemption
  - Exemptions granted based on plant-specific analyses
  - No provision in 10 CFR Part 50 to grant "general" exemptions
- Enforcement Discretion
  - Current issue does not result in an unintentional violation of the regulations
  - NRC will not grant enforcement discretion for a willful violation of the regulations

Attachment 5

NRC Near-Term Actions

- Exemptions (10 CFR 50.12)
  - NRC will review exemptions if specific special circumstances can be demonstrated
  - Significant Disadvantages
    - NRC discourages "Regulation by exemption"
    - Some licensees may not be able to provide an acceptable justification
    - 10 CFR 50.59 process unavailable for evaluating changes
- Amendments (10 CFR 50.90)
  - NRC staff-preferred approach
  - Significant Advantages
    - Licensees comply with the regulations
    - Allows use of the 10 CFR 50.59 process
    - Quicker reviews than exemptions

Applying 10 CFR 50.59 to RIS 2005-05

1. To apply the CFR 50.59 process, a licensee must be in compliance with the regulation in question.
2. The NRC staff believes that licensees are unlikely to meet the following 50.59 criteria:
   - A change in the TSs is not required
   - Results in more than a minimal increase in the frequency of an FSAR accident
   - Results in the departure from a method of evaluation described in the FSAR.

NEI Long-Term Resolution Suggestions

- A single, acceptable set of inputs and assumptions for burnup credit analysis across the agency
  - NMSS adopt NRR burnup credit analysis methodology

Differences in Spent Fuel Confinement Systems

- Casks (Part 71/72)
  - Generic analyses
  - No site-specific in-core depletion data available
  - Analyses must bound all plants and fuel designs
  - Multiple environments – storage, transport, pools
  - Short-term storage in moderated environment
  - Intermittent monitoring
  - Stored and transported in open environment
  - Mobile and passive system
- Spent Fuel Pools (Part 50)
  - Plant Specific Analyses
  - In-core depletion data available
  - Analyses specific to that plant and associated fuel designs
  - Single environment – spent fuel pools
  - Long-term storage in moderated environment
  - Continuous monitoring
  - Maintained in closed, confined, and controlled environment
  - Stationary and active system

NRC Long-Term Actions

- A full burnup credit methodology
  - Holtec MPC-32 application
  - National and international data
  - Burnup credit ANSI 8.27 standard
- In parallel, NRC is evaluating 10 CFR 50.68 revision as part of its FY 2006 Rulemaking plan

Holtec MPC-32 Application

- A proprietary application for transporting MPC-32 using major actinides plus fission product isotopes
- Staff issued RAIs and applicant has provided responses
- Staff expects to make a determination on the application in the near future

National and International Data on Burnup Credit

- Sandia National Laboratory experiments
  - Provides data on fission product worth
  - Results for Rh-103 available
- French data
  - Assay data on, and criticality experiments with, fission products and actinides
  - Being made available through DOE/EPRI funding
- Belgian REBUS program
  - Assay data on, and criticality experiments with, fission products and actinides

Burnup Credit ANSI 8.27 Standard

- NRC actively participating with industry on an ANSI Burnup Credit Standard Committee
- Provides guidance for criticality evaluation of fuel which has undergone burnup in a light water reactor
- Examples of burnup credit in spent fuel pool, storage/transport casks, and disposal packages being developed as appendices

NRC Rulemaking

- NRC evaluating 10 CFR 50.68 to facilitate loading casks in reactor pools
- Mechanics of rulemaking to be explored on a parallel path to NMSS's effort on burnup credit approval

Summary of NRC Actions

- **Near-term** – review and grant exemptions and amendments to resolve issue on a case-by-case, plant-specific basis
- **Long-term** – work on full burnup credit that may be used by cask designers
- **Long-term** – In parallel, evaluate a 10 CFR 50.68 revision as part of FY 2006 Rulemaking plan

CST ASSOCIATES, LLC

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RIS 2005-05, Criticality Control during Spent Fuel Cask Loading Operations

Brian Gutherman, P.E.

NEI Dry Storage Task Force Meeting with NRC
White Flint, MD
November 10, 2005

MEETING OBJECTIVES

- Explain industry and NRC viewpoints on RIS 2005-05
- Define a pathway forward
  - Interim
  - Long term

Attachment 6

Background

- Used fuel is moved from storage racks in the spent fuel pool to casks in a location contiguous to the SFP
- Cask loading under water is analyzed for criticality and licensed by the NRC under the Part 72 site-specific license or cask CoC assuming:
  - Fresh fuel
  - Optimum moderation in SFP
  - Soluble boron credit, if necessary
  - Other assumptions per NUREG-1536 or -1567
- Part 72 site-specific TS or generic cask TS based on this analysis
- Many casks loaded with soluble boron for criticality control per Part 72 with no criticality events over 10 years

Background (cont'd)

- In 1998, §50.68 was created to provide options to complying with or getting exemptions from §70.24, but does not recognize cask loading in SFP in the rule or in the FR notice issuing the rule
- In 2003, NRC decides §50.68 applies to cask loading
- In 2005, RIS 2005-05 compels affected licensees to perform criticality analyses to demonstrate §50.68 compliance and create new Part 50 TS requirements
- Part 50 controls unnecessarily overlap Part 72 controls for cask loading
- Many Part 72 general licensees now require Part 50 licensing action to load casks

Issues with RIS 2005-05

- Does not recognize that Part 72 provides reasonable assurance of safety for cask loading operations
  - Does not recognize years of safe cask loading with no criticality events
- Cask loading is not "storage," it is a transient Part 72-related operation
- Does not address unloading of casks previously loaded
- Creates unnecessary regulatory burden for licensees without commensurate increase in safety
- LARs are expensive ($500k) with no safety benefit
- Compels licensee action and should have been considered a backfit under §50.109

Issues with RIS 2005-05 (cont'd)

- Request for license amendments has caused licensees to delay cask loading campaigns
- Review of Part 50 LARs re-directs limited NRC resources to reviewing an activity already licensed under Part 72
- A single license amendment will not necessarily cover all future storage technologies at a plant, resulting in potential additional LARs
- Part 50 burnup curves make Part 72 soluble boron requirements duplicative and unnecessary
- License amendments may require a second LAR to undo the amendment when the permanent solution is finalized

Interim Solution

- Goal is to have an interim solution that is regulatory compliant, less burdensome, and risk-informed, recognizing a permanent solution is being developed
- Preferred Interim Solution:
  - NRC recognize 10CFR72 as the sole set of governing regulations for cask loading operations as the rules intend by formally concluding:
    - Neither §70.24 nor §50.68 applies to cask loading operations
    - In-pool cask loading operations are analyzed, licensed and controlled via TS under Part 72
    - Part 72 analyses and controls are sufficient to assure safety of cask operations, otherwise they wouldn't be licensed

Interim Solution (cont'd)

- Options
  - (1) NRC can use enforcement discretion or continue granting plant-specific exemptions by recognizing that Part 72 criticality analyses and controls meet the underlying purpose of §50.68 for cask loading operations
    - Industry is asking NRC to recognize the intent of the Part 50 rule is being met through diverse means.
  - (2) Apply §50.68 without requiring LARs
    - Industry does not agree that §50.68 applicability for casks results in a TS LCO per §50.36(c)(2)(ii) or a TS Design Feature per §50.36(c)(4)
      - Cask loading is not associated with a Part 50 DBA or transient
      - Cask is not part of "the facility" as defined in the Part 50 licensing basis
    - Licensees can comply via BUC analysis, update their Part 50 FSARs, and include minimum burnup vs. enrichment curves and boron concentration in cask loading procedures
    - This allows use of §50.59 for "doing" and "undoing" when permanent solution is completed while still having appropriate controls

Permanent Solution

- Modify Part 50 to recognize Part 72 as the sole governing set of regulations for all criticality control aspects of cask loading operations
  - Consistent with general license concept
- NRC and industry to agree on a single criticality methodology and acceptance criteria