

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
OFFICE OF NUCLEAR REACTOR REGULATION  
OFFICE OF NEW REACTORS  
WASHINGTON, D.C. 20555-0001

September 4, 2013

**NRC REGULATORY ISSUE SUMMARY 2013-11  
RESOLUTION OF LICENSING PROCESS EXPECTATIONS FOR  
PRESSURIZED WATER REACTOR FUEL ASSEMBLIES SUSCEPTIBLE  
TO TOP NOZZLE STRESS CORROSION CRACKING IN DRY CASK  
SPENT FUEL STORAGE AND TRANSPORTATION**

**ADDRESSEES**

All holders of licenses and certificates of compliance (CoC) for an independent spent fuel storage installation (ISFSI) license under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste" and 10 CFR Part 71 "Packaging and Transportation of Radioactive Material."

The U.S. Nuclear Regulatory Commission (NRC) is also sending a copy of this RIS to NRC 10 CFR Part 50 and 10 CFR Part 52 licensees for information because these entities may have a general license, pursuant to 10 CFR 72.210, "General License Issued," which allows persons authorized to possess or operate nuclear power reactors under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants" to store spent fuel in an ISFSI at power reactor sites. Also, these entities may have a general license pursuant to 10 CFR 71.17, "General License: NRC-approved package," which authorizes any applicable licensee of the Commission to transport, or to deliver to a carrier for transport, licensed material in a package for which a license, CoC, or other approval has been issued by the NRC.

**INTENT**

The NRC is issuing this regulatory issue summary (RIS) to communicate resolution of a regulatory issue regarding when license amendments would be necessary for pressurized water reactor (PWR) fuel assemblies susceptible to top nozzle stress corrosion cracking (SCC) in dry cask spent fuel storage and transportation. This RIS requires no action or written response by addressees.

**BACKGROUND INFORMATION**

On February 13, 2002, the NRC issued Information Notice 2002-09, "Potential for Top Nozzle Separation and Dropping of a Certain Type of Westinghouse Fuel Assembly" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML020440066), to alert addressees to some instances of nozzle separation and dropping of a Westinghouse fuel assembly during movement. Subsequently, industry developed a solution to this potential

**ML13081A125**

handling problem which included one or more of the following: (1) visual inspections of the top nozzle region, (2) specialized handling tools to bypass the affected region, and (3) specialized non-irradiated non-fuel hardware to bypass the affected region. The purpose was to verify or assure the structural integrity of the affected fuel assemblies such that they could be moved safely.

In January of 2010, the Nuclear Energy Institute (NEI) and industry requested NRC engagement on the licensing process surrounding the identified variations for mitigating failure of the top nozzle of PWR fuel assemblies susceptible to SCC in dry cask spent fuel storage and transportation (see NEI letter at ADAMS Accession No. ML100610054 – note that page 1 of that letter was inadvertently dated January 2009). Later that year, NRC and NEI had productive discussions on the need for public interactions to clarify when a license amendment may be necessary to implement variations on the handling of top nozzle fuel assemblies to address the risk of SCC (see plan for these interactions at ADAMS Accession No. ML103360394).

### **SUMMARY OF ISSUE**

NEI requested consideration of the need for license amendments in four variants of top nozzle assemblies, based on physical configuration and handling techniques:

1. Unmodified - by visual - top nozzle assembly without any physical modifications loaded using a standard grapple after visual inspections of guide tubes were performed to verify that the SCC-susceptible guide tube joints can withstand lifting loads.
2. Unmodified - by tool - top nozzle assembly without any physical modifications loaded using a handling tool (e.g., the "thimble grip" handling tool) that does not utilize the top nozzle for lifting, and ensures there is no lifting load transmitted through the SCC-susceptible guide tube joints.
3. Modified - by guide tube - top nozzle assembly with permanently installed anchors in the guide tubes. These assemblies are loaded using a standard grapple. The anchors ensure there is no lifting load transmitted through the SCC-susceptible guide tube joints.
4. Modified - by instrument tube - top nozzle assembly with a permanently installed instrument tube tie rod (ITTR). These assemblies are loaded using a standard grapple. The ITTR ensures there is no lifting load transmitted through the SCC-susceptible guide tube joints.

NRC held several public meetings on this matter, the final of which was held on February 14, 2012 (see meeting summary at ADAMS Accession No. ML12074A012), discussing the circumstances under which a license amendment would be needed to address this issue. In this meeting, NEI committed to documenting the proposed resolution in an issue closure form, which it submitted on February 22, 2012, via letter with an attachment (the NEI letter is at ADAMS Accession No. ML120540821, and the attached proposed closure form, which is appropriately not dated, is at ML120540931).

On April 17, 2012, the NRC issued a letter indicating that it had reviewed the issue closure form and determined it accurately documents the resolution of the issue (see ADAMS Accession No. ML12109A137). The NRC also entered the closure form into ADAMS and dated it April 17, 2012 (see ADAMS Accession No. ML12108A180; this form is also enclosed with this RIS). The

letter also indicated that the NRC would issue a RIS to document the issue and this RIS serves that purpose.

The closure form contains guidance that licensees may wish to consider when CoC holders and licensees make determinations on whether a license/CoC amendment is necessary for modified or unmodified top nozzle assemblies. While the determination of whether an amendment is required is case dependent, the following generally identifies which variants may not require a license or CoC amendment and those that may:

#### 10 CFR Part 72

- Modified and unmodified fuel assemblies will generally not require a license/CoC amendment if the 10 CFR 72.48 process and other 10 CFR Part 72 regulations and NRC guidance are used as intended.

#### 10 CFR Part 71

- Unmodified fuel assemblies evaluated pursuant to 10 CFR Part 71 regulations and NRC guidance will generally not require an amendment as long as there are no changes to the conditions specified in the CoC or the Safety Analysis Report (SAR).
- Modified fuel assemblies evaluated pursuant to 10 CFR Part 71 regulations and NRC guidance will generally require an amendment request because no change authority exists in 10 CFR Part 71 and these modifications will generally not be bounded by the CoC or the SAR.

### **BACKFITTING AND ISSUE FINALITY DISCUSSION**

This RIS is intended to set forth the NRC's position regarding the circumstance under which license amendments are necessary for PWR fuel assemblies susceptible to top nozzle SCC in dry cask spent fuel storage and transportation. The RIS is addressed to holders of ISFSI licenses, and holders of CoCs for ISFSI and transportation casks issued under 10 CFR Part 71 and 72. The RIS also provides guidance to future ISFSI licensees and holders of CoCs under Parts 71 and 72. The RIS requires no action or written response on the part of any addressee. Issuance of this RIS does not constitute backfitting as defined in 10 CFR 50.109, nor is it otherwise inconsistent with the issue finality provisions in 10 CFR Part 52. The staff's position is based upon the following considerations.

#### *No backfitting protection in 10 CFR Part 71*

There are no backfitting or issue finality provisions in Part 71. Therefore, no applicant, licensee or holder of a CoC under Part 71 is protected by any backfitting provision in Part 71. Although nuclear power plant licensees may also be a holder of a general license for a transportation cask as authorized by the NRC under Part 71, the discussion in this RIS is directed to nuclear power plant licensees as a general licensee for the transportation cask. The RIS is not directed at activities controlled by the nuclear power plant operating license (including a Part 52 combined license). Hence, the backfitting and issue finality provisions in the Backfit Rule, 10 CFR 50.109 and Part 52 are inapplicable to the nuclear power plant licensee who use the transportation cask generally licensed under Part 71.

*The RIS positions do not constitute backfitting under Part 72 and nuclear power plant licensees are not protected from changes in guidance on the subject matter of this RIS*

The RIS does not address matters which constitute backfitting under 10 CFR 72.62. The RIS addresses the circumstances under which change initiated by either the ISFSI licensee or CoC holder requires a license amendment. Changes in NRC's position on such matters do not fall within the definition of backfitting under § 72.62.

*The RIS positions do not apply to holders of early site permits, design approvals, design certifications, and combined licenses under Part 52, or holders of operating licenses under Part 50*

The RIS does not apply to holders of early site permits, design approvals or design certifications. The matters which are resolved and accorded issue finality under the applicable issue finality provisions of Part 52 do not extend to the safety and security issues addressed in the spent fuel storage and transportation cask systems which are the subject of this RIS. Although an ISFSI licensee who is an addressee of this RIS may also be a Part 52 combined license holder or a holder of an Part 50 operating license, the discussion in this RIS is directed to nuclear power plant licensees as a general licensee for the transportation cask. The RIS is not directed at activities controlled by the nuclear power plant operating license. Hence, the backfitting and issue finality provisions in the Backfit Rule, 10 CFR 50.109 and Part 52 are inapplicable to the nuclear power licensees who are also holders of either specific or general ISFSI licenses under Part 72.

*Backfitting and issue finality do not – with limited exceptions not applicable here – protect current or future applicants*

Applicants and potential applicants are not, with certain exceptions, protected by either the Backfit Rule or any issue finality provisions under Part 52. This is because neither the Backfit Rule nor the issue finality provisions under Part 52 – with certain exclusions discussed below – were intended to apply to every NRC action which substantially changes the expectations of current and future applicants. The exceptions to the general principle are applicable whenever an applicant references a Part 52 license (e.g., an early site permit) and/or NRC regulatory approval (e.g., a design certification rule) with specified issue finality provisions. However, the matters covered in this RIS are not subject matters or issues for which issue finality protection is provided.

For these reasons, the NRC did not prepare a backfit analysis for this RIS or further address the issue finality criteria in Part 52.

#### **FEDERAL REGISTER NOTIFICATION**

The NRC did not publish a notice of opportunity for public comment on this RIS in the *Federal Register* because this RIS is informational and does not represent a departure from current regulatory requirements.

Moreover, a series of public meetings were held and opportunities were provided for the public to comment. In light of those interactions, the staff does not believe any further public comment is necessary.

## **CONGRESSIONAL REVIEW ACT**

This RIS is not a rule as designated by the Congressional Review Act (5 U.S.C. §§ 801–808) and, therefore, is not subject to the requirements of the Act.

## **PAPERWORK REDUCTION ACT STATEMENT**

This RIS does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget (OMB), approval numbers 3150-0008 and 3150-0132.

## **PUBLIC PROTECTION NOTIFICATION**

The NRC may not conduct or sponsor, and a person is not required to respond to, an information collection unless the requesting document displays a currently valid OMB control number.

## CONTACT

Please direct any questions about this matter to the technical contact listed below.

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Enclosure: USED FUEL STORAGE AND TRANSPORTATION ISSUE CLOSURE FORM,  
Issue Number I-10-01, titled PWR Fuel Top Nozzle Stress Corrosion Cracking

Note: List of Recently Issued NRC Regulatory Issue Summaries may be found on NRC public  
web site, <http://www.nrc.gov>, under NRC Library/Document Collections

## USED FUEL STORAGE AND TRANSPORTATION ISSUE CLOSURE FORM

Issue Number: I-10-01

Title: PWR Fuel Top Nozzle Stress Corrosion Cracking

### I. Closure Summary

#### **Issue Resolution**

NRC and Industry reached agreement on issue resolution during the NRC Public Meetings on December 21, 2011 and February 14, 2012. The agreed upon issue resolution satisfies both Success Criteria #1 and #2 for all of the four variants of Top Nozzle SCC susceptible fuel assemblies ("Top Nozzle Assemblies"). The agreed upon resolution to the issue is as follows:

#### **Variants of Top Nozzle Assemblies**

There are currently four variants of Top Nozzle Assemblies, based on physical configuration and handling techniques:

1. Unmodified –by visual– Top Nozzle Assembly without any physical modifications loaded using a standard grapple after visual inspections of guide tubes were performed to verify that the SCC-susceptible guide tube joints can withstand lifting loads.
2. Unmodified –by tool– Top Nozzle Assembly without any physical modifications loaded using a handling tool (e.g., the "thimble grip" handling tool) that does not utilize the top nozzle for lifting, and ensures there is no lifting load transmitted through the SCC-susceptible guide tube joints
3. Modified –by guide tube– Top Nozzle Assembly with permanently installed anchors in the guide tubes. These assemblies are loaded using a standard grapple. The anchors ensure there is no lifting load transmitted through the SCC-susceptible guide tube joints.
4. Modified –by instrument tube– Top Nozzle Assembly with a permanently installed instrument tube tie rod (ITTR). These assemblies are loaded using a standard grapple. The ITTR ensures there is no lifting load transmitted through the SCC-susceptible guide tube joints.

Variants #1 and #2 are hereafter referred to as "unmodified", and variants #3 and #4 are referred to as "modified".

#### **License/CoC Amendment Determination**

The following guidance should be considered when CoC Holders and Licensees make their determination on whether a license/CoC amendment is necessary for modified or unmodified Top Nozzle Assemblies.

#### **Cases where Storage (Part 72) License/CoC Amendment May Not Be Required**

A license/CoC amendment may or may not be required for Top Nozzle Assemblies (variants #1, #2, #3 and #4) in storage casks. CoC holders and licensees are permitted, under 10 CFR 72.48, to evaluate whether changes to the storage cask or ISFSI FSAR are permitted without prior NRC approval. The following should be considered for each variant:

For unmodified assemblies (variants #1 and #2), fuel classification and actions (e.g., canning) will be performed according to the applicable NRC guidance (e.g. ISG-1 Revision 2) and any specific CoC or license requirements. This is the same process used for any fuel assembly with potential physical damage of some kind. The classification criteria and results of the classification for each fuel assembly are documented and subject to NRC inspection. No change to the CoC, specific license, or supporting FSAR is required. The classification criteria and results of the classification for each fuel assembly are documented and subject to NRC inspection.

**USED FUEL STORAGE AND TRANSPORTATION ISSUE CLOSURE FORM**

**Issue Number:** I-10-01

**Title:** PWR Fuel Top Nozzle Stress Corrosion Cracking

For modified assemblies (variants #3 and #4), the ITTR/GTA hardware does not need to be explicitly listed in the cask's "Approved Contents" in the CoC or license because they are non-separable constituent hardware, integral to the fuel assembly. For these variants, a revision to the "Approved Contents" in the CoC or license is not necessary as long as 1) the assembly type being modified is already included in the "Approved Contents", 2) the assembly, as modified, is bounded by the parameters for that assembly listed in the "Approved Contents" (e.g., total weight, overall length, etc), AND 3) the 72.48 review for storing this hardware concludes prior NRC approval is not required. (Reference 1)

For modified assemblies (variants #3 and #4), the 72.48 process will determine whether or not there is a need for prior NRC approval in order to store IITR/GTA hardware integral to Top Nozzle Assemblies (variants #3, and #4). The 72.48 review will be performed based upon the analyses/evaluations discussed below, which ensure safety and regulatory compliance. If the 72.48 screening or evaluation determines that prior NRC approval is not required, then a license/CoC amendment is not required for storage of assemblies containing these components. In these cases, a description of the modified assembly hardware (ITTR and/or GTA) and any supporting analysis/evaluation results, as applicable, will be added to the cask or ISFSI FSAR. The analyses/evaluations and 72.48 review are subject to NRC inspection.

Cases where Transport (Part 71) License/CoC Amendment May Not Be Required

A Part 71 CoC amendment may not be required for unmodified assemblies (variants #1 and #2) in transportation casks. Fuel classification will be performed for these assemblies according to the applicable NRC guidance (e.g. ISG-1 Revision 2) and any specific CoC requirements. If there is no need to change the conditions specified in the CoC or SAR, based upon the fuel classification and any analyses and evaluations (as described below), if applicable, then unmodified assemblies may be loaded without a CoC amendment. This is the same process used for any fuel assembly with potential physical damage of some kind. The classification criteria and results of the classification for each fuel assembly are documented and subject to NRC inspection.

Cases where Transport (Part 71) License/CoC Amendment May be Required

Currently, there is no SAR change authority for CoC holders of a transportation cask certified under Part 71. If the spent fuel configuration with the additional hardware (e.g. ITTR or GTA) is not defined in the SAR supporting application, then a CoC amendment is required for modified assemblies (variants #3 and #4) in transportation casks. This is because the SAR supporting the Part 71 CoC will require revision and that would put the new SAR revision in conflict with the SAR revision listed on the CoC. (Reference 1)

**Analyses/Evaluations**

Modified fuel assemblies require analyses and evaluation in the technical areas of structural, criticality, shielding, thermal, confinement/containment, and retrievability (storage only). All analyses will be documented and retained as quality records, available for NRC inspection. These analyses/evaluations provide the bases for the 72.48 review in storage and for the CoC amendment application in transportation.

Unmodified top nozzle fuel assemblies require analysis or evaluation in the same technical areas listed above to the extent necessary to support the fuel classification process.

**USED FUEL STORAGE AND TRANSPORTATION ISSUE CLOSURE FORM**

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**Title: PWR Fuel Top Nozzle Stress Corrosion Cracking**

<p><b>References</b></p> <p>1) NRC Letter from Ms. Vonna Ordaz to NEI's Mr. Rod McCullum, "NRC Response to NEI White Paper on Contents Definition for Spent Fuel Casks and Transportation Packages", September 22, 2011.</p> <p><b>Additional Actions</b></p> <p>This issue closure form documents the resolution as agreed upon by NRC and Industry. However, a durable regulatory record is needed to achieve final issue closure. The NRC has committed to develop a durable regulatory record. Due to the timeframe for developing and issuing a durable record, industry recommends that the NRC issue a generic communication as an interim durable record. This closure form will serve as a record until the generic communication is issued by the NRC.</p>
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**II. Tracking Items and Responsibility**

NRC to issue a letter to NEI or generic communication to industry on the issue resolution as an interim durable record.	April 30, 2012
NRC to issue a durable record on the issue resolution as the final durable regulatory record on issue closure.	To be determined as defined in the above communication

**III. Measurement of Success**

Industry will monitor implementation of the agreed-upon closure resolution, assess its effectiveness and provide feedback to licensees and NRC.
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Date: 4/17/12

**CONTACT**

Please direct any questions about this matter to the technical contact listed below.

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