

POLICY ISSUE
(Notation Vote)

July 29, 2004

SECY-04-0138

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations /RA/

SUBJECT: DENIAL OF A PETITION FOR RULEMAKING TO REVISE 10 CFR PART 50
AND ASSOCIATED GUIDANCE TO SPECIFICALLY ADDRESS THE IMPACT
OF FOULING ON THE PERFORMANCE OF ALL HEAT EXCHANGE
SURFACES IN A NUCLEAR POWER PLANT (PRM-50-78)

PURPOSE:

To obtain Commission approval to deny a petition for rulemaking (PRM) on 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

BACKGROUND:

In PRM-50-78, the petitioner, Mr. Robert H. Leyse, requested that the Nuclear Regulatory Commission (NRC) develop regulations that would require addressing the impact of fouling on the performance of all significant heat transfer surfaces throughout nuclear power plants (NPPs). The requested rule changes would also require that consideration of fouling impact be included in NRC funded-test programs and NRC-produced computer codes that are used to assess cooling and heat exchanger performance. The petitioner contended that fouling of heat exchange surfaces is not adequately considered in the licensing and compliance inspections of NPP, for example, licensing bases and technical specifications do not specifically limit fouling on fuel elements. The petitioner also requested that regulations be added to require publicly available performance reports on these surfaces, including records of mechanical degradation, and cleaning procedures and their effectiveness.

CONTACT: Alan K. Roecklein, NRR/DRIP
301-415-3883

In addition, the petitioner contended that fouling restricts fuel element cooling so that axial growth beyond design limits causes fuel rods to bow, and contact other fuel rods and control rod guide tubes. The petitioner claimed that this would restrict cooling leading to a safety problem. In addition, the petitioner proposed that the rules should require investigating grossly off-normal performance of heat exchange equipment. For example, the petitioner stated that fouling of steam generator tubes should be investigated because it has occasionally reduced heat transfer effectiveness to force operation at below-normal secondary side pressure, creating a safety issue.

PRM-50-78 was received by the NRC on September 9, 2002. A notice of receipt of the petition and request for public comment was published in the *Federal Register* (FR) on October 31, 2002 (67 FR 66347). The public comment period closed January 16, 2003. Four letters of public comment were received in response to the FR notice. Two were from the petitioner, who noted in support of his petition that the Advisory Committee on Reactor Safety (ACRS) did not address fouling of heat exchange surfaces during a meeting with Electric Power Research Institute (EPRI) in October 2002 and that one of the numerous heat transfer tests done for the NRC by Westinghouse (FLECHT Run 9573) resulted in tube failure.

The Nuclear Energy Institute (NEI) opposed the petition, noting that current reporting requirements in 10 CFR 50.72 and 50.73 require reporting any event or condition that could interfere with a safety function of any system needed to shutdown the reactor and maintain it in a safe shutdown condition, remove residual heat, control release of radiological material, or mitigate accident consequences.

The Strategic Teaming and Resource Sharing (STARS) group, a consortium of nuclear utilities, opposed the petition noting that these same concerns were previously addressed by industry organizations in comments on PRM-50-73, PRM-50-73A, and PRM-50-76. These petitions were submitted by the same petitioner who submitted PRM-50-78 which is the subject of this SECY paper. In STARS' view, this latest petition restates the same concern in a different context but without presenting any further evidence as a basis for revising the regulations. The STARS licensees believe that the requested additional reporting burden is not justified by the unproven and questionable scenarios presented in the petition.

NRC STAFF TECHNICAL EVALUATION

This section provides a brief summary of the detailed technical evaluation in the attached *Federal Register* notice. The staff reviewed each of the petitioner's requests and concluded that none of the requests justified the initiation of rulemaking.

The NRC staff disagreed with the petitioner's assertion that new regulations are needed to address the impact of fouling on the performance of heat exchange surfaces including fuel elements, steam generators, condensers, fan coolers, etc., throughout licensed nuclear power plants.

The petitioner's assertion that regulations are needed to address the impact of fouling on fuel elements was addressed previously in a *Federal Register* notice of denial of PRM-50-73 and PRM-50-73A (also submitted by the petitioner) published at 68 FR 41963 on July 16, 2003.

The petitioner did not submit any new information or provide any additional considerations in PRM-50-78 that would cause the NRC to reconsider the denial of PRM-50-73 and PRM-50-73A.

In regard to other heat exchange surfaces, regulations and guidance addressing fouling effects on heat exchanger performance already exist for the primary and secondary sides of NPPs. The staff cites 10 CFR 50.65 which requires licensees to monitor numerous performance parameters and to provide corrective actions, including increased maintenance to ensure that all safety related structures, systems, or components, including heat exchangers, are capable of performing their intended functions. Part 50, Appendix A, Criteria 14, 44, 45, and 46, require design and testing protocols to ensure the integrity of the reactor coolant pressure boundary (including steam generators), require provision of a cooling system to transfer heat from structures, systems, and components to a heat sink under normal operating and accident conditions, and require inspection and testing of cooling water systems to ensure system integrity and adequate performance. In addition, licensee analysis for loss-of-coolant accidents (LOCAs) and transients consider the effects of fouling of steam generator tubes among the impacts on heat transfer as specified in Standard Review Plan (SRP) Section 4.4. If it is determined that such fouling has an effect, it is incorporated into the assumed heat transfer coefficient and correlations.

NRC guidance such as Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment," July 18, 1989, specify that inspections address the effects of fouling, and licensees monitor performance parameters such as coolant flow rates, temperature, pressure and radioactivity levels indicative of heat exchanger performance. The NRC staff monitors the implementation of GL 89-13. The staff has determined that existing guidelines and ongoing procedural improvements are adequate to prevent any significant compromise of safety. Furthermore, NRC staff action would be taken if any adverse trends in plant performance due to fouling were to be observed. The staff does not believe that any new regulations are needed to address this issue.

The NRC staff did not agree with the petitioner's request that new regulations be developed to require reporting on heat exchanger performance, such as cleaning procedures and records of degradation. The NRC is interested in system performance and degradation to the extent that a situation might compromise safe performance, not in routine operational matters. The staff is confident that 10 CFR 50.72, "Immediate notification requirement for operating nuclear power reactors," and 10 CFR 50.73, "Licensee event report system," provide reporting requirements on safety-significant systems, including heat exchangers, that are adequate to permit ample time to respond to any situation that might compromise safety.

The NRC staff does not agree with the petitioner's claim that axial growth caused by crud induced overheating will lead to fuel rod bowing and cause contact of fuel pins with other structures. Both pressurized-water reactor (PWR) and boiling-water reactor (BWR) fuel assembly designs provide space to allow for axial thermal expansion for all ranges of operating temperatures, and if some fuel pin bowing does occur, sufficient spacing of fuel pins exists to preclude a bowed fuel pin from causing safety problems.

The NRC staff does not agree with the petitioner's assertion that fouling of heat transfer surfaces is inadequately considered in licensing and compliance inspections of NPPs. License reviews by the staff include extensive analysis of safety system design, including heat

exchangers. Compliance inspections of safety systems are performed in accordance with Appendix A to Part 50, "General Design Criteria for Nuclear Power Plants." The NRC staff evaluated the petitioner's request for rulemaking with respect to the four performance goals of the Commission. The petitioner's requests would not contribute to maintaining safety, would not enhance public confidence, would not improve efficiency and effectiveness, and would increase unnecessary regulatory burden.

Based on its technical evaluation, the NRC staff recommend that this petition for rulemaking be denied. NRC regulation and oversight of nuclear power plants includes the establishment of regulations, operating licenses, technical specifications, and continuous inspections and technical reviews of licensee programs and plant performance. When viewed in total, these regulatory requirements and related oversight practices provide confidence in the safety of operating nuclear power plants. The staff believes that even though no specific regulation explicitly addresses fouling of heat exchangers, no rulemaking is required because the existing structure of regulations, technical specifications, and licensee programs subject to NRC inspection provide the necessary confidence that plant safety features, including heat exchangers, are properly designed and maintained.

The integration of the various requirements and related NRC oversight functions provide reasonable assurance that systems important to safety such as heat exchangers will perform their intended functions. The addition of specific requirements to regulations to address heat exchanger performance is not necessary.

RECOMMENDATION:

That the Commission:

- (1) Approve denial of the subject petition for rulemaking and publication of the *Federal Register* Notice of the denial (Attachment 1).
- (2) Note that:
 - a. A letter is attached for the Secretary's signature, informing the petitioner of the Commission's decision to deny his petition (Attachment 2).
 - b. The appropriate Congressional Committees will be informed.

The Commissioners

5

COORDINATION:

The Office of the General Counsel has no legal objection to the denial of this petition.

/RA Martin J. Virgilio Acting For/

Luis A. Reyes
Executive Director
for Operations

Attachments:

1. *Federal Register* Notice
2. Letter to Petitioner

The Commissioners

5

COORDINATION:

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Attachments:

1. *Federal Register* Notice
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DATE	3/8/04	3/9/04	3/19/04	3/23/04	3/22/04	3/16/04	06/14/04

OFFICE	ADM	OGC	DSSA	NRR	NRR	EDO
NAME	MLesar (Via memo)	STreby	SBlack	BSheron	JDyer	LReyes
DATE	3/16/04	6/09/04	07/06/04	07/14/04	07/15/04	7/29/04

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