August 7, 2002

MEMORANDUM TO: Christopher I. Grimes, Program Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Joseph L. Birmingham, Project Manager ***/RA/***
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF JULY 24, 2002, MEETING WITH INDUSTRY TO DISCUSS THE REACTOR PRESSURE VESSEL HEAD AND PENETRATION INSPECTION PLAN

On July 24, 2002, Nuclear Regulatory Commission (NRC) staff met with representatives of the Nuclear Energy Institute (NEI), the Electrical Power Research Institute (EPRI) Material Reliability Program (MRP), and industry in a public meeting at NRC headquarters in Rockville, Maryland. Additional industry representatives participated via teleconference. At this meeting, industry presented a revised inspection plan for detection and control of leakage and corrosion in the reactor vessel head and penetration areas. The revised inspection plan is available in the Agencywide Documents Access Management System (ADAMS) under Accession number ML022100029. Earlier, on July 1, 2002, industry had provided the staff with the technical bases documents for the inspection plan. Those documents are in ADAMS under Accession numbers ML021860065 and ML021860072. Attachment 1 provides a list of meeting attendees.

After introductions, Charles Casto, of the NRC, stated that the NRC goal for the meeting was to understand the industry inspection plan. He also said that, based on a preliminary review, the staff felt there was a need to fill in areas of the plan. He indicated that the staff needed a better understanding of how the plan addressed issues such as crack growth rates, the morphology of vessel head corrosion, and the relationship to technical specifications (TS) on leakage rates.

Alex Marion, of NEI, responded that industry considered the meeting an opportunity to present the revised inspection plan and to answer the staff's questions on the plan and the technical bases documents. He then introduced Michael Lashley, from the South Texas Project, who gave the presentation of the plan. The EPRI presentation material is provided in Attachment 2 to this summary (ADAMS Accession number ML022040177).

Mr. Lashley began his presentation by noting that the Inspection Plan and the technical bases were presented to the NRC staff on May 22, 2002, and that NRC comments on the plan were incorporated in this revision. Mr Lashley stated that the purpose of the plan was to provide inspection guidance and the basis for a graduated degradation management program for reactor pressure vessel (RPV) head penetrations. The plan requires inspections to allow early detection of leakage or cracking prior to challenging structural integrity. The plan applies to RPV head material fabricated from Alloy 600 with Alloy 82/182 weld material. Alloy 690/152/52 head material would be addressed when appropriate technical information is available. Mr. Lashley indicated that the plan would be re-evaluated periodically.

Highlights of the plan include a penetration inspection schedule based on a risk-informed analysis of nozzle cracking in Babcock & Wilcox (B&W) designed and manufactured RPV nozzle material and head geometry, use of a probabilistic fracture mechanics analysis to determine probability of penetration leakage and nozzle ejection versus time, and determination of susceptibility based on effective degradation years (EDY), i.e., effective full power years at 600° Fahrenheit, and separation of plants into three categories based on susceptibility. Criteria for the susceptibility categories can be found in Attachment 2.

The inspections would consist of bare metal visual examination of specified areas of the RPV head and penetrations, a supplemental visual examination applicable to the RPV head area that would be undertaken every other outage if bare metal examination or non-visual examination (NVE) was not required, and NVE as needed to detect cracking on the surface and root area of the J-groove weld. Additional details on the examination types are in Attachment 2.

During the presentation of the inspection plan, the staff asked several questions on the plan. Steve Long,of the NRC, commented on whether the risk assessment actually bounds the material and conditions of concern. Mr. Long indicated that, at this time, the staff did not agree with the risk assessment in the technical bases documents. He indicated that, rather than presenting a risk assessment of the worst-case scenario, the staff believes the risk assessment more represents an average case. Mr. Long commented that the current inspection plan did not adequately ensure that licensees would look to find leaks that were masked and did not specify when non-visual examination needed to be performed if visual inspection was done. After much discussion, industry agreed to take these comments as items for further discussion with the staff. Industry answered several other staff questions on the supplemental inspection and how it would expand on the inspections being implemented in response to Generic Letter 88-05.

The staff asked if the visual inspection of the reactor head provided full coverage around the penetrations. Industry answered that the plan required a 360° inspection of all penetrations. A comment was made that during a recent inspection, the use of remote visual inspection equipment allowed a complete examination around all penetrations except for an approximate 5° area near one penetration. This missed area was found to be acceptable because it was smaller than would have been found significant under the plan requirements.

Regarding the need to revise the inspection plan to address the information from Davis-Besse, EPRI told the staff it was sponsoring a workshop on boric acid corrosion and that one objective of the workshop was to determine if the EPRI guide needed to be revised in light of the RPV head corrosion at Davis-Besse. In response to a question from the staff, EPRI indicated that the proceedings would be available to the staff.

Mr. Lashley summed up the presentation by observing that industry had confidence that the graduated degradation control program and the required inspections in the inspection plan would allow early detection of leakage or cracking prior to challenging structural integrity.

After the industry presentation, the staff stated that, although there were good points in the inspection plan, it still had questions about many aspects of the issue. The staff continued to have questions about management by leakage, needed to better understand crack growth rates, needed more information on RPV corrosion rates, and needed to understand how

the length of the crack above the J-groove weld was a factor. These questions were not adequately answered in the technical bases documents or the inspection plan. Industry indicated that an additional report was to be submitted in about two weeks.

Regarding near-term regulatory actions, the staff indicated it was following the associated processes and expected to issue a generic communication requesting information on licensee inspection plans to address the RPV head corrosion and penetration cracking issues. In addition to requesting information, the staff hoped to provide a description of an inspection which, although not a requirement, would be a reasonable generic method for examining the RPV head and penetrations. The staff hoped to issue the generic communication soon to allow licensees to incorporate any actions into their fall outages.

The group agreed that the meeting had been beneficial in furthering the staff's understanding of the plan but that there was additional work to be done to adequately resolve the issue.

Having concluded the discussion, the meeting was adjourned.

Project No. 689
Attachment: As stated
cc: w/att: See list

List of Attendees for July 24, 2002 Meeting
Material Reliability Program for RPV Head and Penetrations

NAME	ORGANIZATION
Alex Marion	NEI
Mitch Singer	NEI
David Steininger	EPRI
Christine King	EPRI
Michael Lashley	STP
Larry Matthews	Southern Nuclear
Dan Schlader	Framatome ANP
Mike Hacker	Framatome ANP
Dick Labott	PSEG Nuclear LLC
T. Satyan Sharma	American Electric Power
John Crane	Westinghouse
John Hall	Westinghouse
John Hamilton	Entergy Nuclear
Leslie Spain	Dominion Generation
Al Butcavage	Ginna Station
Tom Alley	Duke Energy
Martin Robinson	Duke Energy
Martin Murphy	Calvert Cliffs
Daniel Horner	McGraw Hill
Altheia Wyche	SERCH Licensing Bechtel
Deann Raleigh	LIS SCIENTECH
Charles Casto	NRC/NRR/DE
William Bateman	NRC/NRR/EMCB
Wichman Keith	NRC/NRR/EMCB
Terence Chan	NRC/NRR/EMCB
Tim Steingass	NRC/NRR/EMCB
Christopher Long	NRC/NRR/EMCB
Nathan Sanfillipo	NRC/NRR/EMCB
Andrea Lee	NRC/NRR/EMCB
Michael Marshall	NRC/NRR/EMCB
Joseph Birmingham	NRC/NRR/RPRP
Mike Switzer	NRC/RES/DET/MEB
Steve Long	NRC/NRR/DSSA/SPSB
Theresa Valentine	NRC/NRR/DSSA/SPSB
Giovanna Longo	NRC/OGC

Attachment 1

cc: Via email

cc:
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Larry Matthews, Chairman
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Distribution: Mtg w/NEI&EPRI RPV head and penetrations inspection plan Dated 7/ /02
ADAMS/PUBLIC OGC ACRS

DISTRIBUTION: MTG. SUMMARY w/NEI &EPRI Re Hot-Leg Weld Crack Dated 01/02/01
EMail
SCollins/RZimmerman
JJohnson
WBorchardt
BSheron
DMatthews
CGrimes
SWest
CCasto
WBateman
KWichman
MSatorius, OEDO
OPA
JBirmingham
Debbie Jackson
SBloom
BWetzel
MMarshall
SLong
TChan
ALee
GLongo
CLong

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OFFICE	RPRP	EMCB	RPRP
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DATE	08/01/2002	08/01/2002	08/07/2002

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