

August 30, 2002

Dr. George E. Apostolakis, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: VESSEL HEAD PENETRATIONS AND VESSEL HEAD DEGRADATION

Dear Dr. Apostolakis:

During the 493rd meeting of the Advisory Committee on Reactor Safeguards (ACRS), on June 6, 2002, the Committee heard presentations on the cracking and leaking observed in pressurized water reactor vessel head penetrations and reactor pressure vessel head degradation. The Materials and Metallurgy and the Plant Operation Subcommittees were briefed by the NRC staff, First Energy Nuclear Operating Company representatives, and Electric Power Research Institute representatives on June 5, 2002. In a letter, dated June 20, 2002, the Committee provided several conclusions and recommendations on certain elements of the June 5th presentations. The enclosure summarizes the NRC staff response to the ACRS conclusions and recommendations. In addition, the Committee also stated that, "...it would be appropriate for the industry to initiate programs that will quantify improvements in stress corrosion resistance in Vessel Head Penetration assemblies and determine the impact that this has on inspection methods and frequencies for alloy 690 and 152." The staff agrees with the ACRS statement, and we are engaging the industry, through the Nuclear Energy Institute, on this matter. As the staff continues to work with industry during the development of more effective inspection programs for detecting reactor pressure vessel head degradation and reactor vessel head penetration nozzle cracking, the staff will continue to meet with the Committee to obtain input on the ongoing and planned technical work.

Sincerely,

/RA by William F. Kane Acting For/

William D. Travers
Executive Director
for Operations

Enclosure: As stated

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
SECY

Dr. George E. Apostolakis, Chairman
 Advisory Committee on Reactor Safeguards
 U.S. Nuclear Regulatory Commission
 Washington, D.C. 20555-0001

August 30, 2002

SUBJECT: VESSEL HEAD PENETRATIONS AND VESSEL HEAD DEGRADATION

Dear Dr. Apostolakis:

During the 493rd meeting of the Advisory Committee on Reactor Safeguards (ACRS), on June 6, 2002, the Committee heard presentations on the cracking and leaking observed in pressurized water reactor vessel head penetrations and reactor pressure vessel head degradation. The Materials and Metallurgy and the Plant Operation Subcommittees were briefed by the NRC staff, First Energy Nuclear Operating Company representatives, and Electric Power Research Institute representatives on June 5, 2002. In a letter, dated June 20, 2002, the Committee provided several conclusions and recommendations on certain elements of the June 5th presentations. The enclosure summarizes the NRC staff response to the ACRS conclusions and recommendations. In addition, the Committee also stated that, "...it would be appropriate for the industry to initiate programs that will quantify improvements in stress corrosion resistance in Vessel Head Penetration assemblies and determine the impact that this has on inspection methods and frequencies for alloy 690 and 152." The staff agrees with the ACRS statement, and we are engaging the industry, through the Nuclear Energy Institute, on this matter. As the staff continues to work with industry during the development of more effective inspection programs for detecting reactor pressure vessel head degradation and reactor vessel head penetration nozzle cracking, the staff will continue to meet with the Committee to obtain input on the ongoing and planned technical work.

Sincerely,
/RA by William F. Kane Acting For/
 William D. Travers
 Executive Director
 for Operations

Enclosure: As stated

cc: Chairman Meserve
 Commissioner Dicus
 Commissioner Diaz
 Commissioner McGaffigan
 Commissioner Merrifield
 SECY

Distribution: See next page. **ADAMS PACKAGE ACCESSION NUMBER: ML022060185; INCOMING ACCESSION NUMBER: ML021780007; RESPONSE ACCESSION NUMBER: ML022030174**

OFFICE	EMCB:DE		EMCB:DE		EMCB:DE		EMCB:DE	
NAME	MMarshall*		TChan*		SCoffin*		WBateman*	
DATE	07/22 /02		07/23/02		07/23 /02		07/ 23 /02	
OFFICE	RES/DD		NRR/DE		Tech Editor		NRR/ADPT	
NAME	JStrosnider*		CCasto*		PKleene*		BSheron*	
DATE	08/28/02		07/25/02		07/24/02		08/06/02	
OFFICE	NRR/OD		EDO					
NAME	SCollins*		WTravers					
DATE	08/15/02		08/ 30/02					

*see previous concurrence

OFFICIAL RECORD COPY

DISTRIBUTION:

EMCB R/F	BBoger, NRR	SBloom, NRR	AMendiola, NRR
JGrobe, RIII	SLong, NRR	JLarkins, ACRS	NChokshi, RES
AThadani, RES	MWeston, ACRS	JShapaker, NRR	AHiser, NRR
MMayfield, RES	EHackett, RES	JZwolinski, NRR	RCaruso, NRR
GHolahan, NRR	AHowle, RIV	SCoffin, NRR	TChan, NRR
ALee, NRR	MKirk, RES	WCullen, RES	CPaperiello, EDO
WKane, EDO	PNorry, EDO	JCraig, EDO	SBurns, OGC
KCyr, OGC	ISchoenfeld, EDO	ACRS File	RidsWpcMail
SBozin	RidsEdoMailCenter		G20020391

**STAFF RESPONSE TO ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)
COMMENTS ON NRC AND INDUSTRY ACTIVITIES TO ADDRESS CRACKING AND
LEAKING OBSERVED IN PRESSURIZED WATER REACTOR VESSEL HEAD
PENETRATIONS AND REACTOR PRESSURE VESSEL HEAD DEGRADATION**

ACRS Conclusion and Recommendation #1

The draft "Vessel Head Penetration Nozzle Cracking Action Plan," developed by the Office of Nuclear Reactor Regulation is sufficiently comprehensive to allow the short- and long-term management of cracking issues associated with Alloy 600.

Staff Response

The Committee's support for the draft action plan prepared by the staff is appreciated. We plan to continue managing the Alloy 600 reactor pressure vessel (RPV) and vessel head penetration (VHP) issues through the action plan. As we learn new information, it may be necessary to update and/or revise the action plan. We plan to keep the Committee informed of any changes to the plan.

ACRS Conclusion and Recommendation #2

The approach proposed by industry to manage cracking incidents in vessel head penetration assemblies through the use of various inspections methods is reasonable in principle, and is in line with NRC's goal to move toward risk-informed regulation. Prior to issuance of another generic communication, certain questions regarding the specific inspection techniques and frequencies, now the subject of ongoing discussions between the staff and industry, should be resolved.

Staff Response

The staff acknowledges the potential benefits of resolving questions related to specific inspection techniques and frequencies prior to issuance of another generic communication. However, the completion date for ongoing and planned technical work by the industry to develop a better technical basis for the Electric Power Research Institute's Material Reliability Program (MRP) proposed inspection techniques and frequencies is uncertain. Because of uncertainties in the ability to predict wastage/corrosion due to through-wall axial cracks, the staff does not believe that visual inspections alone are sufficient at this time for inspecting VHP's in high susceptibility category plants. Therefore, the staff believes it is appropriate to issue a generic communication to pressurized water reactors, at this time.

Once the technical basis for more effective inspection programs has been developed by the industry and reviewed by the staff, the staff will choose the appropriate regulatory vehicle to incorporate the inspection guidance into the regulatory framework.

ACRS Conclusion and Recommendation #3

We agree with the staff's conclusion that there are no plants with conditions similar to those that lead to the degradation at Davis-Besse. This conclusion is based on the initial responses to Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," dated March 18, 2002, and on interactions with licenses, resident inspectors, regional staff, and other information provided to the staff.

Staff Response

The Committee's support for the staff's conclusion that there is no other "Davis-Besse" in the operating PWR's is appreciated. The main basis for the staff's conclusion was its review of licensees' responses to Bulletin 2002-01 and subsequent phone calls to follow up on questions that arose from their review of licensees' responses.

ACRS Conclusion and Recommendation #4

In order to define the inspection frequencies, corrosion rates in low-alloy steel adjacent to vessel head penetrations should be determined.

Staff Response

The staff recognizes the need to develop a better understanding of material wastage, including corrosion rates. The staff will continue to review the technical basis and revisions to the proposed MRP inspection plan for RPV head and reactor VHPs. The proposed plan includes non-destructive examination methods and recommended frequencies. During a public meeting held on May 22, 2002, on the proposed plan, the staff informed the MRP that the scope of the plan, which was limited to VHP cracking, needed to be expanded to address the material wastage. Research efforts are currently in the planning stage, by NRC/RES, to further investigate wastage/corrosion rates of low alloy steel.