ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8902150514 DOC.DATE: 89/02/07 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 05000315
50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
AUTH.NAME AUTHOR AFFILIATION
ALEXICH,M.P. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
RECIP.NAME RECIPIENT AFFILIATION
MURLEY,T.E. Office of Nuclear Reactor Regulation, Director (Post 870411

SUBJECT: Forwards results of evaluation of PORV reliability.

DISTRIBUTION CODE: A046D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: OR Submittal: TMI Action Plan Rgmt NUREG-0737 & NUREG-0660

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-1 LA	1	0	PD3-1 PD	5	5
	STANG,J	1	1			
INTERNAL:	AEOD/DSP/TPAB	1	1	ARM/DAF/LFMB	1	0
	NRR/DEST/ADS 7E	1	0	NRR/DEST/MEB 9H	1	1
	NRR/DREP/EPB 10	1	1	NRR/DREP/RPB 10	1	1
	NUDOCS-ABSTRACT	1	1	OGC/HDS1	1	0
	REG FILE 01	1	1	RES/DSIR/EIB	1	1
	RES/DSR DEPY	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 21 ENCL 17

RIDS/ADDS

RIDS/ADDS

Indiana Michigan
Power Company
P.O. Box 16631
Columbus, OH 43216

INDIANA MICHIGAN POWER

AEP:NRC:0678AF

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
NUREG-0737 ITEM II.F.1.1; MAIN STEAM SYSTEM NOBLE GAS MONITORING

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Attn: T. E. Murley

February 7, 1989

Dear Dr. Murley:

This letter is in response to a request from your staff to provide an evaluation of the reliability of the power operated relief valves (PORVs) installed in the main steam systems at the Cook Nuclear Plant. This request was made as part of the NRC staff review of the acceptability of the Cook Nuclear Plant's method of compliance with the requirements of NUREG-0737 for monitoring noble gas releases to the environment from the main steam system following a postulated accident. The results of our evaluation of PORV reliability during postulated accident conditions are provided in the attachment to this letter.

This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,

M P. Alexich
Vice President

MPA/eh
Attachment
cc: D. H. Williams, Jr.
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Charnoff
G. Bruchmann
A. B. Davis - Region III
NRC Resident Inspector - Bridgman

8902150514 890207
PDR ADOCK 05000315
P PDC

A046
1/1

ATTACHMENT TO AEP:NRC:0678AF

POWER OPERATED RELIEF VALVE RELIABILITY EVALUATION

Background

The radiation monitors installed at the Cook Nuclear Plant to monitor post-accident releases of noble gases from the main steam system are located on the power operated relief valves (PORVs) on each main steam line. This location was chosen since installing the monitors on the main steam lines themselves was judged to be impractical because the area around the main steam lines is extremely congested, and the temperature on the outside of the steam lines exceeds the monitors' operational temperature limit of 180°F.

A justification of the location of our noble gas radiation monitors for the main steam lines was requested by your staff on December 19, 1985 as part of our program of compliance with NUREG-0737 Item II.F.1, Attachment 1. Our response to the request (AEP:NRC:0678T dated May 20, 1986) provided the results of our evaluation of potential releases of radioactivity through the PORVs following a steam generator (S/G) tube rupture. It was concluded that the reliability and design setpoints of the valves were such that post-accident radioactivity releases to the environment through the main steam system could be monitored in accordance with the NUREG-0737 requirements. Accordingly, our May 20, 1986 submittal requested NRC concurrence with our method of compliance with NUREG 0737 in this area.

The method we have proposed for monitoring noble gas releases from the main steam lines following a postulated S/G tube rupture was again discussed in a meeting with members of your staff on October 18, 1988. At that time, it was recommended that we perform a reliability study on the PORVs to show that they would function as specified when challenged in an accident situation.

Engineering Evaluation of Main Steam Line Radiation Monitoring

The main steam line noble gas monitors at the Cook Nuclear Plant are located downstream of the PORVs on the PORV discharge line. In addition to the PORV discharge line, there are five safety valve discharge lines on each of the four main steam lines on each unit that do not have monitors. The current configuration is shown in the attached figure. Radioactivity released into any of the main steam lines will pass through the PORV and safety valve discharge lines before being released to the environment. The PORVs on each main steam line are calibrated so that they will

open when a pressure setpoint of 1055 psig is reached. The five safety valves on each main steam line have the following pressure set points: two safety valves are set at 1065 psig, two are set at 1075 psig and one is set at 1085 psig.

It is anticipated that the PORVs will open automatically before the safety valves during a pressure surge because of their lower setpoints. The PORVs can also be opened by a switch in the control room or manually near the valves themselves. However, because the pressure spike associated with a release through this pathway is so large, both the PORV and the safety valves are expected to open simultaneously. Therefore, any radioactivity released to the environment through the safeties following a postulated S/G tube rupture will be released through the PORV at the same concentration and can be detected by the monitor on the PORV discharge line. It should be noted that, as discussed in our FSAR analysis of a S/G tube rupture, any release of radioactivity through the safety valves and PORVs would occur only in the event of a loss of off-site power coincident with the tube rupture accident. With off-site power available, steam release would be to the condenser steam dump.

Assessment of PORV Reliability

As part of our evaluation of PORV reliability, the valve manufacturer, Fisher Controls, Inc., was contacted in order to establish the details of the manufacturer's testing program. Every valve is tested by the manufacturer prior to its release. A review of the testing procedures showed that the testing included demonstrating that the actuator has adequate force to open and close the valve. The valves are also tested to demonstrate that no mechanical damage or permanent deformation of valve components will occur as a result of valve operation and that accessories function properly. In addition, a report was generated from data in the Institute of Nuclear Power Operations (INPO) Nuclear Plant Reliability Data System (NPRDS) that contained failure information on PORVs for 52 nuclear units across the United States. Our evaluation of the NPRDS data, however, concluded that the amount and format of PORV failure information for the industry is not adequate to permit a direct quantitative assessment of reliability.

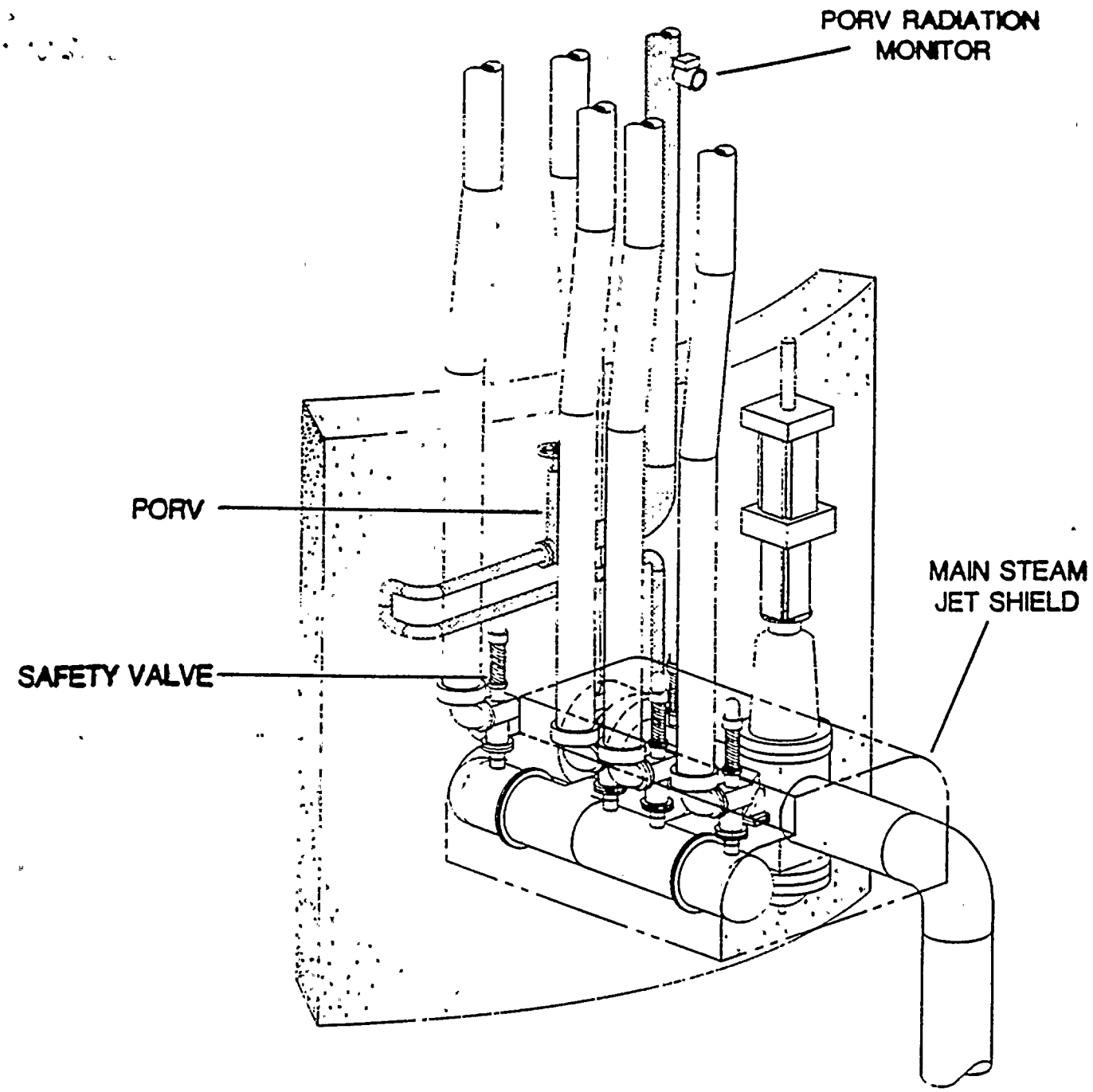
The only plausible scenario for a radiation release through the main steam line is a S/G tube rupture. The Oconee Unit 3 Probabilistic Risk Assessment data in NSAC 60 states that the probability of a tube rupture is 8.6E-03/year. In addition, as previously stated, a release of radioactivity to the atmosphere

through the safety valves and PORVs would only occur at the Cook Nuclear Plant in a case where off-site power was lost coincident with the S/G tube rupture event. On the basis of this information, in conjunction with a qualitative assessment of the information from the INPO database discussed above, we have concluded that the potential for a radiation release not detected by the PORV monitor to occur following a postulated S/G tube rupture is extremely remote. This conclusion is consistent with that provided in our May, 1986 submittal.

It should also be noted that the Cook Nuclear Plant's ability to monitor a radiation release from the main steam line in the absence of data from the PORV monitor is supplemented procedurally. In the event of a steam generator tube rupture, the plant's emergency plan procedures would be in use. The Cook Nuclear Plant has in place an emergency plan procedure that contains two separate methods for determining release levels from the main steam system in the event the PORVs fail to open. The first method requires sending a Radiation Monitoring Team from the Operations Staging Area to obtain post-accident sampling system (PASS) samples. The noble gas release rate is then calculated using a conservative flow rate for the PORV and the safeties, an activity factor determined from graphs found in the procedure, and the dose rate determined from the PASS sample.

The second of the alternative methods involves the use of a logic diagram. The user provides, on the diagram, what information is available and conservative default values are provided for missing information. Using both the known and default values, an effluent concentration can be calculated from the completed diagram. The results calculated by either of these methods are transmitted to the Environmental Assessment Coordinator at the Emergency Operations Facility.

In the unlikely event of a simultaneous steam generator tube rupture, PORV failure and loss of off-site power, the release levels could still be determined by one of the above methods. This redundancy further reduces the potential for an unmonitored release through the main steam system to occur at the Cook Nuclear Plant.



PORV & SAFETY VALVES CONFIGURATION