Central File

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September 7, 1979
AEP:NRC:00153A

Donald C. Cook Nuclear Plant Units No.1 and 2
Dockets No. 50-315 and 50-316
Licenses No. DPR-58 and DPR-74
Response to IE Bulletin 79-01A

Mr. Norman C. Moseley, Director
Division of Reactor Operations Inspection
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Moseley:

Our letter dated June 28, 1979 (AEP:NRC:00153) supplied information requested in IE Bulletin 79-01 and indicated that information regarding the ASCO solenoid valves that provide a safety related function would be provided later. This letter provides the requested information for those solenoid valves installed in the Donald C. Cook Nuclear Plant Units No. 1 and 2.

The solenoid valves that provide a safety related function and are installed inside the containment are the ASCO's model No. 831654F. These solenoid valves contain coils which are recommended by ASCO for high temperature service, up to a 176°F ambient. However, IE Bulletin 79-01A raises concerns regarding the environmental qualification of Buna N elastomer and acetal materials, which are used in these solenoid valves. ASCO recommends replacement of thesolenoid valves containing these materials with series NP solenoid valves which contain either ethylene propylene or viton elastomers.

We intend to replace the solenoid valves that provide a safety-related function and are inside the containment with the ASCO model NP 831654V which uses viton elastomer and a NEMA 4 enclosure. A summary description of the environmental qualification evidence for this solenoid valve model is provided in Attachment A. The replacement will be done in each Unit at the first outage of sufficient duration to perform the task following the receipt of the material. Upon installation of the new solenoid valves a preventive component maintenance program will be established in accordance with the manufacturer's recommended instructions.

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The safety related function for which these ASCO solenoid valves are used in the Donald C. Cook Nuclear Plant Units 1 and 2 is actuation of certain containment isolation valves located inside containment. This function consists of venting the air operators on the containment isolation valves for the following systems:

1) Ice Condenser Refrigeration Supply and Return

2) Upper Containment Purge Supply and Exhaust

3) Lower Containment Purge Supply and Exhaust

4) Instrument Room Ventilation Supply and Exhaust

Continued operation of the Donald C. Cook Nuclear Plant Units 1 and 2 until the solenoid valves are replaced is justified as follows.

According to IE Bulletin 79-01A, the acetal components reportedly have a service limit of 400,000 Rad and 200°F and the Buna N material reportedly has a service limit of 7 Megarad and 180°F. Therefore, continued operation with these components, until the valves are replaced, would be justified if the valves will not be required to perform after exposure to a combination of 400,000 Rad and 180°F.

In case of a Design Basis Accident inside containment in the Cook Nuclear Plant, the containment isolation function for the Refrigeration Supply and Return will be performed within ten seconds after initiation of the safeguards actuation signal. For the other three systems listed, the containment isolation function will be performed within five seconds.

The limiting radiation level for the D. C. Cook Nuclear Plant is due to a Loss of Coolant Accident (LOCA). The total radiation exposure for these solenoid valves from forty years of normal operation inside the containment plus the first ten seconds of a LOCA is estimated to be less than 44,000 Rad. Thus, the integrated radiation dosage is well below the service limit stated in IE Bulletin 79-01A. Therefore, the ability of these solenoid valves to perform their function under LOCA conditions will not be impaired by radiation.

The limiting temperature environment inside the containment is due to a Main Steam Line Break (MSLB). The solenoid valves for the first two systems listed above are located in the upper containment. It has been established in the D. C. Cook Plant Final Safety Analysis Report, Appendix Q, Response to Question 022.9, that the maximum upper containment temperature due to the worst MSLB is less than 160°F. Thus, the limiting temperature at the location of the solenoid valves in the upper containment is below the maximum service limit stated in IE Bulletin 79-01A. Therefore, neither temperature nor radiation will impair the ability of these valves to perform their intended function.

The solenoid valves for the third system listed are located in the lower containment and during an accident might be exposed to a temperature higher than that indicated in IE Bulletin 79-01A for the maximum service limit. The literature on radiation effects on plastics and elastomers indicates that these materials are often more sensitive to the combination of high radiation and high temperature. The failure of Buna N components described in IE Bulletin 78-14 may be an example of the effect of accelerated aging due to this combination. Since no postulated accident at the Donald C. Cook Nuclear Plant exposes any of these solenoid valves to the combination of both sufficiently high radiation and sufficiently high temperature, continued use of the existing solenoid valves until their replacement will not prevent the performance of the intended function.

The solenoid valves for the fourth function listed above are located in the Instrument Room, which is separated from the general containment atmosphere. Due to this separation, the Instrument Room air temperature during a MSLB has been shown to remain less than 121°F during the first five seconds, and will not reach 180°F for at least nine minutes. Thus, the limiting temperature at the location of the solenoid valves in the Instrument Room is below the maximum service limit stated in IE Bulletin 79-01A. Therefore, neither temperature nor radiation will impair the ability of these valves to perform their intended function.

In addition to these considerations, we point out that for each of the four affected systems listed above, the containment isolation function is performed redundantly by two valves in series, one of which is located outside of the containment. The solenoid valve associated with the isolation valve located outside of the containment is not exposed to the adverse containment environment and thus can be expected to operate properly. In addition, the isolation valves are all designed to be fail-safe on loss of power to the solenoid valves, on loss of Plant control air pressure, or on venting of the air operator. Any of these failure mechanisms will cause the isolation valve to close if open or to remain closed if closed.

For the above reasons, we believe that continued operation of both Units is fully justified until the replacement solenoid valves are available and an outage occurs in each Unit of sufficient duration to allow the replacement.

Very truly yours,

John E. Dolan

John E. Dolan
Vice President

JED:em

Attachment

cc: J. G. Keppler, NRC Region III
R. C. Callen
G. Charnoff
D. V. Shaller -Bridgman
R. S. Hunter
R. W. Jurgensen

PLANT NAME: Donald C. Cook Nuclear Plant Units 1 and 2

ITEM	EQUIPMENT DESCRIPTION	TIME REQ'D.	ENVIRONMENT (LOCATION)			QUAL. METHOD*	DOC. REF.	REMARKS
			PARAMETER	SPEC.	QUAL.			
	Automatic Switch Company	10 sec.				SEQ.	**	
	Solenoid Valves -		Temp. (°F)	328.2	346			
	Model NP 831654V		Press.(psia)	35.2	110			
			Rel. Hum.	100%	100%			
			Radiation(Mrad)	.044	150			
			Chem.	2000 ppm B	3000 ppm B pH 10			
			Temp. (°F)					
			Press.(psia)					
			Rel. Hum.					
			Radiation					
			Chem.					
			Temp. (°F)					
			Press. (psia)					
			Rel. Hum.					
			Radiation					
			Chem.					

** Automatic Switch Company Test Report AQS 21678/TR.

This list is a compilation of items by component.
Do not list the same type of component more than once.
Use limiting environment where more than one applies.
* Use ANAL, TEST, SEQ., SIMUL., ONGOING, or OTHER for entries into this space.

ATTACHMENT A