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R. E. DENTON
GENERAL MANAGER
CALVERT CLIFFS

January 24, 1991

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 or 2; Docket Nos. 50-317 or 318;
License No. DPR 53 or DPR 69
Licensee Event Report 90-002, Revision 01

Gentlemen:

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have any questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

RED/DWM/bjd
Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs, Unit 1	0 5 0 0 0 3 1 7	1 OF 0 4

TITLE (4): Fuel Repair Activities Performed on More Than One Assembly at a Time in Violation of Fuel Handling Incident Safety Analysis

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 1	1 6	9 0	9 0	0 0 2	0 1	0 1	2 4	9 1	Calvert Cliffs, Unit 2	0 5 0 0 0 3 1 8
										0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)		
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)		
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)			
		20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)			
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
D. W. Muth, Compliance Engineer	3 0 1 2 6 0 - 3 5 9 2

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On December 11, 1989, with Unit 1 in MODE 5 and Unit 2 defueled, we determined that our previous practice of reconstituting more than one spent fuel assembly at a time was not bounded by the assumptions of the Fuel Handling Incident safety analysis, which assumes that only one fuel assembly could be damaged in the event of a fuel handling incident. On January 16, 1990 this practice was determined to place the plant in a condition outside its design basis as described in the Updated Final Safety Analysis Report (UFSAR).

The root cause of this condition was a deficient procedure which did not prevent movement and placement of fuel assemblies such that more than one could be damaged in the event of a fuel handling incident.

Fuel handling procedure FH-48 has been revised to require that only one assembly at a time be placed in a designated location for reconstitution. This change ensures that no more than one assembly could be damaged in a fuel handling incident.

All fuel handling procedures have been reviewed against the UFSAR with no discrepancies identified. Future changes to fuel handling procedures will be reviewed against UFSAR accident analysis assumptions.

I. DESCRIPTION OF EVENT

On December 11, 1989, with Unit 1 in MODE 5 and Unit 2 defueled, we determined that our previous practice of reconstituting more than one spent fuel assembly at a time was not bounded by the assumptions of the Fuel Handling Incident safety analysis in the Updated Final Safety Analysis Report (UFSAR). Reconstitution of more than one assembly in the Spent Fuel Pool (SFP) at a time opens the possibility that more than one assembly could be damaged in the event of a fuel handling incident. The UFSAR assumes that only one fuel assembly could be damaged in the event of a fuel handling incident. On January 16, 1990 this practice was determined to place the plant in a condition outside its design basis as described in the UFSAR. This item is reportable under 10 CFR 50.73(a)(2)(ii)(B).

Section 14.18 of the UFSAR describes the fuel handling incident safety analysis. The analysis assumes a fuel assembly is dropped during fuel handling, striking the Spent Fuel Pool (SFP) floor vertically and rotating to a horizontal attitude, striking a protruding structure. Only one assembly is assumed to be damaged. All other assemblies in the SFP are assumed to be stored within the spent fuel storage racks at the bottom of the SFP. The top of the rack extends at least ten inches above the top of the stored fuel assemblies. A dropped assembly could impact a stored assembly only in an end-on fashion. Analysis indicates that the force of this impact could be absorbed with no fuel rod failures.

In order to reconstitute fuel assemblies in the SFP these assemblies are placed in a single row of designated spent fuel storage rack locations at the bottom of which are placed 20 1/2 inch tall rack spacers upon which the assemblies to be repaired are set. The assemblies, having been placed on top of the spacers, protrude roughly ten inches above the top of the spent fuel storage racks. Reconstitution requires the removal of the upper end fittings from the assemblies. Placing the assemblies such that they protrude above the level of the spent fuel racks allows the removal of the upper end fittings.

In the past, there were no procedural controls to prevent the movement of fuel assemblies in the vicinity of the assemblies protruding above the top edge of the storage racks. Past practice has been to work on several assemblies at one time. This called for assemblies to be moved to storage rack locations directly adjacent to locations containing protruding assemblies. Movement was allowed into locations adjacent to assemblies the upper end fittings of which had been removed.

This inadequacy was found during the revision of fuel handling procedure FH-48, which governs the inspection, testing and repair of fuel assemblies in the SFP. FH-48 is revised prior to each refueling outage during which these activities are scheduled to occur. A new, more stringent procedure review process used for revising this procedure required the comparison of the procedure against the

UFSAR. As a result of this review, FH-48 was revised to prevent reconstitution of more than one assembly at a time. The revised procedure was used for the Unit 2's eighth refueling outage.

II. CAUSE OF CONDITION

The root cause of this condition was a deficient procedure which did not prevent movement and placement of fuel assemblies such that more than one could be damaged in the event of a fuel handling incident in the SFP. The procedure methodology was developed prior to the first Unit 1 refueling outage in 1977 and has been reviewed every refueling outage since then. This inadequacy was not identified during initial development of the methodology or in any previous revision of the procedure. This inadequate issue discovery is a contributing cause of this event.

III. ANALYSIS OF CONDITION

The manner in which fuel reconstitution was performed prior to the Unit 2's eighth refueling created the possibility of more than one assembly being damaged in the event of a fuel handling incident. Given the fuel reconstitution practices in use, the worst case fuel handling incident would involve an assembly being dropped next to the fuel reconstitution platform and falling across all of the fuel assemblies being reconstituted. That an assembly would fall in exactly this manner is highly unlikely.

A review of fuel reconstitution history found that the maximum number of assemblies that could have been damaged was 11 and that the minimum time between unit shutdown and reconstitution of any assemblies was 15 days. The site boundary dose resulting from the clad failure of one assembly (failure of all 176 fuel rods) removed from the core 15 days after shutdown is 4.55E-3 REM Whole Body and 9.30E-2 REM Thyroid. Assuming clad failure of all fuel rods in all 11 assemblies (which is highly unlikely) site boundary dose is 0.050 REM Whole Body and 1.023 REM Thyroid. These values are significantly lower than the 10 CFR 100 site boundary limits of 6.25 REM Whole Body and 75 REM Thyroid.

IV. CORRECTIVE ACTIONS

Fuel handling procedure, FH-48, which governs the inspection, testing and repair of core components in the SFP, has been revised to require that only one assembly at a time be placed in a designated location for reconstitution. The procedure requires that once an assembly is in the reconstitution station, the Spent Fuel Handling Machine (SFHM) is moved to a remote location in the SFP and de-energized. The SFHM may only be re-energized when it has no fuel assembly grappled and is directed by the procedure to retrieve the assembly from the reconstitution station. While an assembly is protruding above the top level of the storage racks, no other assemblies may be moved in the SFP. This change

ensures that no more than one assembly could be damaged in a fuel handling incident.

All fuel handling procedures currently in use have been reviewed under the ongoing Procedure Upgrade Project. This review includes a comparison of each procedure against the accident assumptions of the UFSAR with no discrepancies identified. Future changes to these procedures are governed by Calvert Cliffs Instruction CCI-101, which requires review against pertinent documents, including UFSAR accident analysis assumptions.

V. ADDITIONAL INFORMATION

A similar event was documented in LER 88-15, Movement of Heavy Loads Over the Spent Fuel Pool. In that LER, an administrative control was not properly maintained and a heavy load was moved over the SFP.

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
SFP	N/A	DB
Spent Fuel Storage Rack	RK	DB
SHHM	FHM	DF