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May 24, 1996

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2; Docket Nos. 50-317 and 50-318;
License Nos. DPR 53 and DPR 69
Licensee Event Report 96-003
Discovery of Holes in the Containment Sump Screen to Facilitate Field Run Tubing

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

Very truly yours,

Peter E. Katz

PEK/CDS/bjd

Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
A. W. Dromerick, NRC
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NRC FORM 366 (4-95) U. S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES: 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENISNG PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs, Unit 1	05000 317	1 OF 08

TITLE (4)

Discovery of Holes in Containment Sump Screen to Facilitate Field Run Tubing

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 NAME	DOCKET NUMBER
									Calvert Cliffs, U2	05000 318
04	23	96	96	-- 003	-- 00	05	24	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)			
POWER LEVEL (10)	0	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	X 50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include Area Code)
Craig Sly, Senior Engineer	410-495-4858

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 15 single-space typewritten lines) (16)

Through utilization of industry experience, Calvert Cliffs identified several holes in each Units' Containment Sump Screen that were larger than described in the Updated Final Safety Analysis Report. The largest holes (3-inch by 6-inch) in the Unit 1 Containment Sump Screen had a very slight possibility of allowing debris to pass into the sump which could possibly affect the operability of one or more of the Emergency Core Cooling Systems (High and Low Pressure Safety Injection) or the Containment Spray System.

The 3-inch by 6-inch holes were most likely field-installed during initial plant construction to route level transmitter tubing through the screen. The holes were not shown on plant drawings. It is unlikely that the holes would have ever been observed other than by a deliberate inspection due to their difficult to access location and poor lighting in the area. The holes have been repaired. A requirement will be added to the sump visual inspection procedure to inspect for holes in the Containment Sump Screens during future refueling outages.

I. DESCRIPTION OF EVENT

Through utilization of industry experience, Calvert Cliffs Unit 1 has identified and corrected several holes in each Units' Containment Sump Screen that were larger than described in the Updated Final Safety Analysis Report. The largest holes were 3-inches by 6-inches and had a very slight possibility of allowing debris to pass into the sump and possibly clog the High Pressure Safety Injection (HPSI) header isolation valves or Containment Spray Nozzles at Unit 1. At the time of discovery, Unit 1 was shut down for refueling, Unit 2 was operating at 100 percent rated thermal power.

In 1994, Calvert Cliffs received INPO Significant Event Notification 115 concerning the discovery of holes in the containment sump screen of Arkansas Nuclear One that were larger than allowed by design. In response to this industry information, the System Engineer responsible for the Containment Emergency Sumps at Calvert Cliffs conducted a visual inspection of the Unit 2 sump screen during its spring 1995 Refueling Outage. He found two openings in the screen where instrument tubing to level transmitters (2-LT-4145 and 2-LT-4144) penetrated the screen. The gap between the screen and the tubing was approximately 1/2-inch, while the width opening specification in the Updated Final Safety Analysis Report for the screen is 0.244 inches. There is no Technical Specification criteria that addresses the size of openings in the screen.

The System Engineer prepared an Issue Report to document the non-conforming condition on March 30, 1995, on Unit 2. He had no operability concern due to the small size of the openings, their location (about a foot off the floor), and an evaluation of debris found inside the sump in 1991 that showed the HPSI, Low Pressure Safety Injection (LPSI), or Containment Spray Systems would remain operable.

A minor modification was completed that welded plates over the openings in the Unit 2 screens and returned the sump screens to a fully qualified status. This minor modification was completed prior to the end of the Unit 2 refueling outage. A similar visual inspection was scheduled for Unit 1 during its next refueling outage in the spring of 1996.

During the next refueling outage for Unit 1 (spring 1996), a visual inspection of its containment sump screen was performed. The inspection found two 3-inch by 6-inch holes through the screen. An inverted 3-inch by 6-inch C-channel ran through each opening to protect the instrument tubing to level transmitters 1-LT-4145 and 1-LT-4144 (see Figure 1). The holes were located at the bottom of the screen on top of the 1-foot curb surrounding the sump area. In addition, a small hole was discovered in each of the four corners of

the screen where the screen meets the concrete curb. These holes were all less than 1-inch at their largest dimension.

Due to the size of the 3-inch by 6-inch openings, the System Engineer who discovered them had a concern that these holes could possibly allow debris to pass into the sump and present a safety injection header isolation valve clogging hazard, a Containment Spray Nozzle clogging hazard, or possibly damage the HPSI, LPSI or Containment Spray Pumps. An issue report was generated and a revision to the minor modification that repaired the holes in the Unit 2 sump screen was issued to repair the Unit 1 sump screen.

II. CAUSE OF EVENT

The holes in the sump screens for the tubing runs were most likely installed during original plant construction. They were part of a field installation that was not shown on plant drawings.

The location of the holes was between the screen and a wall with approximately one and one-half feet of space between the screen and the wall. This space is also a high radiation area and crawling or sliding between the screen and the wall constitutes a personal contamination hazard. Casual observations of the side of the sump screen with the holes could only be done from the opposite side of the sump. Due to poor lighting conditions inside the sump screen and the presence of the opposite screen, it is unlikely that the holes would have ever been observed other than by a deliberate inspection.

The Containment Sump surveillance procedure did not require a detailed inspection of the sump screen for holes. Technical Specification 4.5.2.e.2 requires a visual inspection of the Containment Sump, verifying that the subsystem suction inlets are not restricted by debris, and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion. This inspection is conducted once per refueling outage and does not include a step to inspect for holes in the sump screen. If debris is discovered inside the sump then a more thorough inspection is required from inside the screen. Otherwise the inspection is conducted from outside the screen.

Personnel performing the inspections were not sensitized to the fact that holes in the sump screen constitute a non-conforming condition that could possibly jeopardize the safety mission of the HPSI, LPSI, and Containment Spray Systems.

III. ANALYSIS OF EVENT

Separate suction headers from the Refueling Water Tanks are provided, one to each of two separate rooms that house the Engineered Safety Features pumps (LPSI, HPSI and Containment Spray). Separate headers, one to each of the pump rooms, are also provided from the Containment Sump.

Each Unit has a single Containment Sump. Both suction lines from the Containment Sump to the pump rooms are completely enclosed by a welded steel grating screen box which consists of three elements:

A. Supporting steel beams at approximately 3-foot centers.

B. Welded steel grating with a load-carrying capacity of 716 lbs/sq ft.

C. Square mesh steel wire tack-welded to the inside of the strainer box with a mesh size of 2-3/4 mesh/inch. The openings through the mesh are 0.244 inches.

The screen box is set onto a 1-foot-high concrete curb surrounding the sump. The 0.244-inch openings in the wire mesh are small enough to strain material that might have an adverse affect on the Emergency Core Cooling System (e.g., clogging of valves or destruction of pumps), while still being large enough to not easily clog.

After a loss-of-coolant accident, the HPSI, LPSI, and Containment Spray Systems take suction on a Refueling Water Tank. When the Refueling Water Tank level reaches a Recirculation Actuation Setpoint (RAS), the suction of the pumps automatically switches to the Containment Sump and the LPSI pumps are secured.

It is not likely the holes in the Containment Sump Screens could have had an impact on the HPSI, LPSI, or Containment Spray System's ability to perform their safety mission for the following reasons.

A. The configuration and location of the holes would make it very difficult to transport material through the holes. Since the post-RAS water level in Containment is well above the height of the holes in the screens, any floatable material would have to be lifted up into the inverted C-channel while water level was rising. Non-floatables would not be a threat because the holes were about a foot above floor level. In addition the flow velocities in and around the Containment Sump would be very low, making it very unlikely that any material would be lifted off of the Containment floor after a loss-of-coolant accident.

In 1991 we performed an analysis of some debris that was found inside the sump screens. The debris included small screws, nails, weld rod, dirt, and other materials that were small enough to fall through the screen mesh. The analysis concluded that this foreign material would not have interfered with the ability of the HPSI, LPSI, or Containment Spray Systems to perform their intended safety function.

While it is not possible that heavy materials such as nails, screws, or weld rod would be transported to the sump, it is remotely possible that neutrally buoyant or floatable material could have been transported through the holes. Neutral buoyancy and floatable material is generally not considered a threat to the mechanical operability of the pumps (generally, these materials are not strong or hard materials), but some could theoretically present a safety injection header isolation valve clogging hazard or Containment Spray Nozzle clogging hazard.

B. The surface area of the sump screen is large when compared to the surface area of the holes, making it highly probable that any neutral buoyancy material would be sucked against the screen elsewhere.

C. The design of materials utilized inside Containment are analyzed to minimize the potential for transport to the sump screen after a loss-of-coolant accident.

D. Over the past year, Calvert Cliffs has implemented a more aggressive Foreign Materials Exclusion (FME) program to better control the foreign materials that are used in the plant. The Containment is one area that has been designated as an FME area. The new FME program dictates that each person working in or near any FME area, including Containment, should attend Foreign Materials Management Program Training. The training covers the philosophies, management expectations, requirements, and methods for controlling foreign materials at Calvert Cliffs in general and in FME areas in detail.

E. Calvert Cliffs has a comprehensive set of controls to ensure the Containment remains free of debris. Calvert Cliffs procedure MN-1-109, "Foreign Material Exclusion" is designed to among other things, prevent introduction of foreign materials into plant systems and components. The Containment general area has been designated a Zone 4 Foreign Material Exclusion Area. Zone 4 systems have a structured set of controls to minimize the potential for introduction of foreign materials into the zone and control the materials that are allowed inside the zone. All Zone 4 systems are required to have a detailed closeout inspection. This closeout inspection is documented for Containment

during each plant startup in Operation Procedure OP-6, "Pre-Startup Checklist" prior to entering Mode 4.

Based on the above, it is very unlikely that any material threatening the post-RAS operability of the HPSI, LPSI, or Containment Spray Systems could have been transported through the holes. Additionally, it is likely that any material that was transported through the holes would not have presented a threat to the operability of the HPSI, LPSI, or Containment Spray Pumps. The only credible threat from materials that could be transported through the holes is a clogging threat to the safety injection header isolation valves or the Containment Spray Nozzles. Based on the above, this issue is concluded to have presented an insignificant threat to plant safety and an insignificant threat to the health and safety of the public.

This event is considered reportable under the requirements of 10 CFR 50.73(a)(2)(··); any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to: (a) shutdown the reactor and maintain it in a safe shutdown condition; (b) remove residual heat; (c) control the release of radioactive material; or (d) mitigate the consequences of an accident. This event is considered reportable under this criteria due to the possibility that material could be transported through the 3-inch by 6-inch holes and present a potential clogging hazard to the safety injection header isolation valves or the Containment Spray Nozzles.

IV. CORRECTIVE ACTIONS

A. The sump screens for both Units have been visually inspected for the presence of holes. Unit 2 was completed during its last outage in spring 1995, and Unit 1 was completed during its spring 1996 outage. In addition to the holes for the transmitter tubing, a small hole (less than 1-inch) was found in each corner of the Unit 1 screen where the screen meets the concrete curb.

B. The holes discovered in the Containment Sump Screens for both Units have been repaired.

C. We will add steps to our Containment Sump visual inspection procedures to inspect for holes in the sump screen during future refueling outages. These changes will be completed prior to the next refueling outage (next use) for each Unit. The change will include the addition of an information statement to sensitize personnel performing the surveillance that holes in the sump screen constitute a condition not in accordance with the Updated Final Safety Analysis Report.

D. We will issue an INPO NETWORK message to communicate this issue to other nuclear facilities.

V. ADDITIONAL INFORMATION

A. Component Identification

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
HPSI Pump	BQ	P
LPSI Pump	BP	P
Containment Spray Pump	BE	P
Containment Sump Screen	NF	SCN
Level Transmitter	BQ	LT
Refueling Water Tank	BQ	TK
Containment Spray Nozzle	BE	NEL
Valve	BQ, BP, BE	V

B. Previous Similar Events

There have been no previous similar reportable events involving the Containment Sump Screens at Calvert Cliffs.

We conducted a search of our internal computer data bases to determine if there has been a history of problems with field run components in the past at Calvert Cliffs. The search disclosed that in 1991, field run tubing was determined to have been rigidly run across the expansion joint between Containment and the Auxiliary Building during initial plant construction. Actions were taken at that time to identify similar field run tubing configurations and prevent new installations of similar unacceptable tubing configurations.

Based on the fact that only two such problems have been documented during our operating history, we do not feel that field run tubing is a generic problem at our facility. Nonetheless, an issue report was prepared to document these two cases where field run tubing installed during initial construction has caused long standing degraded and/or non-conforming conditions at our facility.

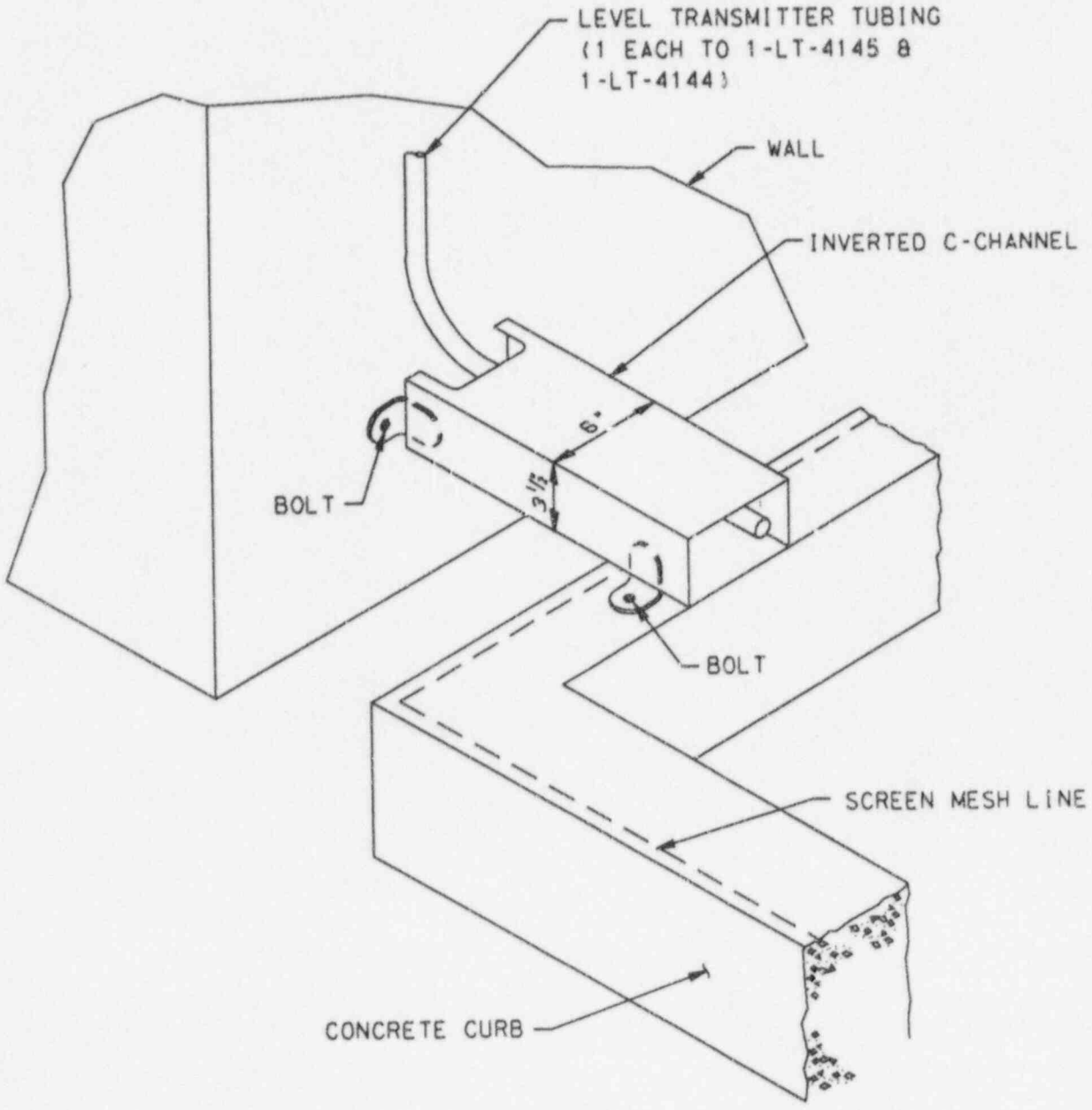

FIGURE 1

TYPICAL DETAIL OF A 3-INCH BY 6-INCH HOLE THROUGH
CALVERT CLIFFS UNIT 1 CONTAINMENT SUMP SCREEN