

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): **D.C. COOK NUCLEAR PLANT, UNIT 2** DOCKET NUMBER (2): **05000316** PAGE (3): **1 OF 05**

TITLE (4): **INOPERABLE FIRE BARRIERS**

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)
01	29	86	86	004	00	02	27	86			05000
											05000

OPERATING MODE (9): **1**

POWER LEVEL (10): **0.80**

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11):

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.38(a)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(a)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.38(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 360A)
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.405(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12):

NAME: **J.F. STIETZEL - QUALITY CONTROL SUPERINTENDENT** TELEPHONE NUMBER: **616465-5901**

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

CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC
B	K/Q	SEAL	Z999	N					

SUPPLEMENTAL REPORT EXPECTED (14):

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15):

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 words, i.e. approximately fifteen single spaced typewritten lines) (16):

ON JANUARY 29, 1986, AT 1215 HOURS, WITH UNIT 2 AT 80 PERCENT REACTOR THERMAL POWER, A DEFECTIVE FIRE PENETRATION (IEEE/SEAL) WAS DISCOVERED IN THE CONTROL ROOM CABLE VAULT. THE LACK OF SILICONE SEALANT IN THIS PENETRATION CONSTITUTES AN INOPERABLE FIRE BARRIER PER TECHNICAL SPECIFICATION 3.7.10. THE ACTION STATEMENT WAS FULFILLED AS A FIRE WATCH WAS POSTED WITHIN ONE HOUR, AND A PERMANENT SEAL WAS INSTALLED AND ACCEPTED ON JANUARY 31, 1986.

INVESTIGATION REVEALED THAT THE SILICONE SFAL WAS NOT INSTALLED WHEN THE PENETRATION WAS MADE AS PART OF A 1979 DESIGN CHANGE. SINCE THIS TIME THE PLANT HAS DEVELOPED A FIRE SEAL INSTALLATION PROGRAM WHICH WILL PREVENT THIS TYPE OF EVENT FROM RECURRING.

A SAFETY EVALUATION WAS PERFORMED. THE RESULTS OF THIS EVALUATION CONCLUDED THAT ANY DETECTABLE FIRE WOULD NOT SPREAD THROUGH THE SUBJECT PENETRATION. THIS EVALUATION IS BASED ON; 1) INSTALLED FIRE DETECTION AND PROTECTION SYSTEMS, 2) THE LIMITED COMBUSTIBLES IN THE AFFECTED AREAS, AND 3) THE PARTIAL SEAL AFFORDED BY THE CERAMIC FIBER IN PLACE.

PREVIOUS OCCURRENCES INCLUDE: 50-315/85-70, 50-315/85-56, 50-315/85-24, 50-315/85-18, 50-316/85-6.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

ON JANUARY 29, 1986, AT 1215 HOURS, WITH UNIT 2 AT 80 PERCENT REACTOR THERMAL POWER, A DEFECTIVE FIRE PENETRATION (IEEE/SEAL) WAS DISCOVERED IN THE CONTROL ROOM CABLE VAULT. THE LACK OF SILICONE SEALANT IN THIS PENETRATION CONSTITUTES AN INOPERRABLE FIRE BARRIER PER TECHNICAL SPECIFICATION 3.7.10. THE ACTION STATEMENT WAS FULFILLED AS A FIRE WATCH WAS POSTED WITHIN ONE HOUR, AND A PERMANENT SEAL WAS INSTALLED AND ACCEPTED ON JANUARY 31, 1986.

INVESTIGATION REVEALED THAT THE SILICONE SEAL WAS NOT INSTALLED WHEN THE PENETRATION WAS MADE AS PART OF A 1979 DESIGN CHANGE. SINCE THIS TIME THE PLANT HAS DEVELOPED A FIRE SEAL INSTALLATION PROGRAM WHICH WILL PREVENT THIS TYPE OF EVENT FROM RECURRING.

TECHNICAL EVALUATIONDETAILS:

DURING OUR INVESTIGATION THE FOLLOWING WAS REVEALED:

A) PENETRATION

- 1) UNDER RFC 12-2222 IN 1979, A PENETRATION WAS MADE IN THE FIRE BARRIER BETWEEN THE UNIT 2 CONTROL ROOM CABLE VAULT AND ELEVATION 609 OF THE AUXILIARY BUILDING (AB EL. 609).
- 2) CABLE TRAY NUMBER 2AZC112 WAS INSTALLED; THIS TRAY PENETRATED THE FLOOR AT AB EL. 609, THEN CONTINUED VERTICALLY UNTIL REACHING A POSITION JUST ABOVE THE HEIGHT OF THE CONTROL ROOM CABLE VAULT FLOOR, WHERE IT TURNED 90° AND PASSED THROUGH THE PENETRATION IN ITEM 1 ABOVE.

THIS TRAY IS TOTALLY ENCLOSED WHERE IT IS LOCATED IN AB EL. 609. IN ADDITION, IT IS ENCAPSULATED WITH MARINITE BOARD STARTING APPROXIMATELY FIVE FEET ABOVE THE AB FLOOR TO THE POINT WHERE IT ENTERS THE CABLE VAULT.

- 3) WHERE THE CABLE TRAY PENETRATES THE AB FLOOR AT EL. 609, THE REQUIRED PENETRATION SEAL, IN AND AROUND THE CABLE TRAY, IS PROVIDED. THIS WILL PREVENT A FIRE FROM SPREADING FROM THE AB EL. 587 VIA THE SUBJECT TRAY.
- 4) ON JANUARY 29, 1986, IT WAS FOUND THAT THE PENETRATION MADE IN THE WALL BETWEEN AB AND THE VAULT DID NOT HAVE A RATED FIRE SEAL. IT WAS FOUND THAT THE ENTIRE PENETRATION WAS STUFFED (BOTH IN AND AROUND THE CABLE TRAY) WITH A CERAMIC FIBER. ALTHOUGH THE DEPTH OF THE CERAMIC FIBER WAS NOT CONFIRMED, IT IS BELIEVED TO BE APPROXIMATELY 12". THIS IS BASED ON A WALL THICKNESS OF 24", A REQUIRED FOAM THICKNESS OF 12" AND THE PRACTICE OF FILLING ALL BUT 12" OF THE OPENINGS WITH THE CERAMIC DAMMING MATERIAL.

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APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

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NOTE: If more space is required, use additional NRC Form 88A's (17)

THERE ARE NO KNOWN FIRE TESTS OF A CERAMIC FIBER USED ALONE IN A CONFIGURATION SUCH AS THIS. HOWEVER, SOME ACCEPTED PENETRATION SEALS EXIST WITH 1" OF MARINITE BOARD ON BOTH SIDES OF A PENETRATION WITH A MATERIAL SUCH AS THIS ACTING AS PART OF THE BARRIER. ALSO, IT WAS APPARENTLY A TIGHT SEAL, SINCE THE HALON SYSTEM CONCENTRATION TEST WAS CONDUCTED SUCCESSFULLY AUGUST OF 1985.

- 5) UPON DISCOVERY OF THE DEFICIENCY, A FIRE WATCH WAS ASSIGNED, A PENETRATION SEAL NUMBER (W 5912) ASSIGNED, AND A PERMANENT FIRE SEAL INSTALLED AND ACCEPTED (JANUARY 31, 1986).

B) FIRE PROTECTION

- 1) INSIDE THE CABLE VAULT:

- A) AT THE TIME THE PENETRATION WAS MADE; THE VAULT HAD IONIZATION DETECTION, A HALON SYSTEM, A CO2 SYSTEM AND A SPRINKLER SYSTEM.
- B) AT THE TIME THE DEFICIENCY WAS DISCOVERED; THE VAULT HAD THE SYSTEMS LISTED ABOVE, PLUS A PROCEDURE CALLING FOR A SECOND DISCHARGE OF CO2 IN CASE OF FIRE.

- 2) IN THE AREA IN THE VICINITY OF THE OPENING AT AB 609:

- A) AT THE TIME THE PENETRATION WAS MADE; THE SUBJECT AREA HAD IONIZATION DETECTION, MOST PROBABLY PARTIAL SPRINKLER PROTECTION, AND MANUAL FIRE HOSE AND STANDPIPE PROTECTION. ALL INDICATIONS ARE THAT THE INSTALLATION OF THE SPRINKLERS IN THE AREA UNDER THE CABLE VAULT WOULD HAVE BEEN INSTALLED JUST PRIOR TO THE DRILLING OF THE SUBJECT PENETRATION, HOWEVER, EXACT EVIDENCE HAS NOT BEEN FOUND.
- B) AT THE TIME THE DEFICIENCY WAS DISCOVERED; THE AREA HAD THE IONIZATION DETECTION AND WAS COMPLETELY PROTECTED BY A PREACTION SPRINKLER SYSTEM.

SAFETY ANALYSIS:

BASED ON THE ABOVE INFORMATION, THERE ARE 6 POTENTIAL FIRE SITUATIONS WHICH MUST BE ADDRESSED; 3 AT THE TIME OF DEFICIENCY CREATION, AND THE SAME 3 AT TIME OF DEFICIENCY DISCOVERY. SINCE IN EACH CASE THE FIRE PROTECTION IS BETTER AT THE TIME OF DISCOVERY, ONLY THE SITUATIONS AT THE TIME OF DEFICIENCY CREATION WILL BE DISCUSSED.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

A) A FIRE STARTING IN THE CABLE VAULT:

BECAUSE OF THE EARLY WARNING DETECTION SYSTEM, A FIRE WOULD BE DISCOVERED IN ITS EARLY STAGES. OPERATION OF EITHER THE HALON OR CO2 SYSTEMS WOULD RESULT IN AN EXTINGUISHING CONCENTRATION BEING DISCHARGED INTO THE VAULT. IN ADDITION, IN BOTH CASES AS SETTLING OF THE GASES OCCURRED, A HIGHER CONCENTRATION WOULD BE DEVELOPED AND MAINTAINED LONGER NEAR THE FLOOR. SINCE THE HIGHEST PORTION OF THIS PENETRATION IS ONLY ONE FOOT ABOVE THE FLOOR, A FIRE INTERNAL TO THE VAULT WOULD NOT ENDANGER THE INTEGRITY OF THE CERAMIC FIBER IN THE PENETRATION.

B) A FIRE STARTING IN TRAY 2 AZC 112 AT AB 109:

IF A FIRE WERE TO START IN THE CABLE TRAY, IT WOULD BEGIN AS A SLOWLY PROPAGATING, SMOKY FIRE BECAUSE OF THE LIMITED OXYGEN IN THE FULLY ENCLOSED TRAY. A SUBSTANTIAL AMOUNT OF SMOKE WOULD EXIT THE TRAY TO EITHER AREA BEFORE PROPERTIFS, SUCH AS HEAT NECESSARY TO PROPAGATE FIRE, COULD EXPOSE ANY COMBUSTIBLES IN EITHER AREA. THIS WOULD RESULT IN AN EARLY FIRE ALARM, AND FIRE FIGHTING WOULD TAKE PLACE BEFORE THE FIRE COULD SPREAD FROM THE TRAY TO EITHER AREA.

C) A FIRE STARTING IN THE VICINITY OF THE SUBJECT PENETRATION AT EL. 609 OF THE AUXILIARY BUILDING:

THIS AREA HAD A VERY LOW FIRE LOADING, MOST OF WHICH IS IN CABLE TRAYS, AND MANY OF THE CABLE TRAYS ARE ENCLOSED. IF A FIRE OCCURRED IN ONE OF THESE TRAYS, IT WOULD BE DETECTED IN ITS EARLY STAGES BY THE IONIZATION DETECTORS. THIS WOULD ALLOW MANUAL FIRE FIGHTING TO BEGIN BEFORE A FIRE INVOLVING EVEN THE NEAREST COMBUSTIBLE TO THE OPENING COULD SPREAD THROUGH THIS CERAMIC FIBER PROTECTED OPENING.

ANOTHER POSSIBILITY FOR THIS AREA COULD HAVE BEEN A TRANSIENT FIRE AT THE FLOOR LEVEL. BECAUSE OF THE CONFIGURATION OF THE ROOM, A FLOOR FIRE WOULD BE DETECTED AND SUPPRESSED BEFORE THE HEAT OR FLAMES COULD AFFECT THE SUBJECT PENETRATION. THIS IS BECAUSE THE OPENING IS AT LEAST 15 FEET OFF THE FLOOR LEVEL, AND THE CEILING EXTENDS SEVERAL FEET ABOVE THE OPENING. THESE FEATURES WOULD MINIMIZE ANY CHANCE OF DIRECT EXPOSURE OF A FLOOR FIRE ON THE OPENING.

SINCE WE CANNOT BE ABSOLUTELY CERTAIN THAT THE PARTIAL SPRINKLER SYSTEM FOR AB 609 WAS INSTALLED PRIOR TO THE PENETRATION, THE ABOVE DISCUSSION DID NOT TAKE CREDIT FOR THE SYSTEM. IF THE SYSTEM WERE IN, IT WOULD HAVE FURTHER RESTRICTED THE CONSEQUENCES OF CERTAIN FIRES.

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CONCLUSION:

THE THREE POTENTIAL FIRE SITUATIONS WHICH COULD HAVE CHALLENGED THE SUBJECT DEFICIENT PENETRATION SEAL WERE DISCUSSED ABOVE. THE THREE SITUATIONS DISCUSSED WERE BASED ON THE FIRE PROTECTION SYSTEMS AVAILABLE AT THE TIME THE PENETRATION WAS CREATED SINCE THAT WAS THE PERIOD OF LEAST PROTECTION. FOR EACH OF THE THREE SITUATIONS, IT WAS SHOWN THAT BECAUSE OF THE DETECTION, PROTECTION, LIMITED COMBUSTIBLES, AND PARTIAL SEAL THAT ANY IDENTIFIABLE FIRE WOULD NOT SPREAD FROM ONE SIDE OF THE FIRE BARRIER TO THE OTHER THROUGH THE SUBJECT PENETRATION. IT THEN FOLLOWS THAT BECAUSE OF THE CONSTANT IMPROVEMENT OF FIRE PROTECTION FOR THESE AREAS SINCE THAT TIME, THE SAME CONCLUSION IS APPLICABLE THROUGH THE PRESENT.