

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
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FACILITY NAME (1)

Cook Nuclear Plant Unit 1

DOCKET NUMBER (2)

05000-315

PAGE (3)

1 OF 4

TITLE (4)

Fuel Handling Area Ventilation System Inoperable Due to Original Design Deficiency

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
04	22	1998	1998	029	01	08	04	1999	Cook Nuclear Plant Unit 2	05000-316
									FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
			20.2201(b)			20.2203(a)(2)(v)		X	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)		0%	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)			50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Lyle R. Berry, Compliance Engineer

TELEPHONE NUMBER (Include Area Code)

(616) 465-5901 x1623

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X

NO

EXPECTED

MONTH

DAY

YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 22, 1998, during preparation of the Radiation Monitoring System Design Basis Document (DBD), it was identified that the response time of the Fuel Handling Area Ventilation System, for transition from the normal to the emergency filtration mode, may not be adequate to prevent an unfiltered release from a refueling accident outside containment. Current off-site dose calculations assume filtration for an accident in the Auxiliary Building. This concern was identified by contractor personnel reviewing a statement made in response to NRC Question 9.4 for the SAR. This question requested design details to demonstrate that the response time of the charcoal adsorber bypass damper was adequate to prevent a potential "puff release" to the environment after a high radiation signal was received. After researching existing documentation and performing a scoping calculation, it was determined that the response time of the bypass damper described in reply to the SAR question was inadequate to prevent an unfiltered release. A release from a refueling accident (dropped fuel bundle) in the Spent Fuel Pool was calculated to reach the bypass damper before initiation of charcoal filtration. Consequently, since the Fuel Handling Area Ventilation System had been determined to be incapable of performing its specified function, it was declared inoperable. Since this condition was previously unknown, no compensatory actions had been historically taken. The Fuel Handling Area Ventilation System is common to both units.

On May 27, 1998, this condition was determined to be reportable pursuant to the requirements of 10CFR50.73(a)(2)(i)(B), as operation or condition prohibited by the plant's Technical Specifications. The root cause of this condition is a design deficiency, which has been present since plant construction. Evaluation of this condition has determined that even without the charcoal bed in service, the consequences of a postulated fuel handling accident are well within 10CFR100 limits. Based upon this information, this event had minimal impact on the health and safety of the public.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Conditions Prior to Event

Unit 1 Mode 5, Cold Shutdown

Unit 2 Mode 5, Cold Shutdown

Description of the Event

On April 22, 1998, during preparation of the Radiation Monitoring System Design Basis Document (DBD), it was identified that the response time of the Fuel Handling Area Ventilation System (EHS:VG), for transition from the normal to the emergency filtration mode, may not be adequate to prevent an unfiltered release from a refueling accident outside containment. Current off-site dose calculations assume filtration in the Auxiliary Building. This concern was identified by contractor personnel reviewing a statement made in response to NRC Question 9.4 (Amendment 20, March, 1972) for the SAR. This question requested design details to demonstrate that the response time of the charcoal adsorber bypass damper (EHS:VG/CDMP) was adequate to prevent a potential "puff release" to the environment after a high radiation signal was received.

The response to SAR Question 9.4 was as follows:

"Exhausted air from the spent fuel pit will reach the charcoal filter bypass dampers in 4 seconds (based on the shortest path). The time elapsed from receiving a high radiation signal at the radiation monitor to the full shut position of the carbon filter bypass damper is less than 3 seconds."

The investigation revealed that there is little existing documentation on this original design feature. After an extensive search, it was determined that no information could be located which supported, or provided a basis for, the statement in the SAR Question 9.4 response.

A scoping calculation was performed for the time expected for a release from the Spent Fuel Pool to reach the dampers. This calculation indicated that the air transit time was less than 1 second, which is less than the 3 second response time for the combination of radiation monitor actuation and bypass damper movement. Since no test data could be located to demonstrate that the transition to the emergency filtration mode was rapid enough to prevent a release, the system was considered to be inoperable. The Fuel Handling Area Ventilation System is common to both units.

Cause of Event

This condition is attributed to a deficiency in the original design. As no documentation of the original postulated air transport time versus time for damper operation could be located, it was not possible to reconstruct the design basis for radiation monitor actuation of the emergency filtration mode for the system.

Analysis of Event

On May 27, 1998, with both Unit 1 and Unit 2 in Mode 5, it was concluded that this event was reportable under 10CFR50.73(a)(2)(i)(B), as an operation or condition prohibited by the plant Technical Specifications. This conclusion was reached because the Fuel Handling Area Ventilation system was inoperable from time of plant startup and has remained inoperable. Technical Specification 3.9.12, which prohibits fuel movement with the system inoperable, was violated whenever fuel was moved without the charcoal filter being in service. The original delay in determining the reportability of this condition was primarily due to the scarcity of information pertaining to this design feature.

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No documentation or calculation could be found to support the response time and air transit times reported in the response to Question 9.4 of the SAR. A preliminary determination originally concluded that the condition was not reportable because there was no commitment or surveillance to time damper travel. The final determination of reportability was made when the results of the calculation were provided and proved to be less conservative than the value reported in response to Question 9.4 of the SAR.

The Fuel Handling Area Ventilation System (EHS:VG) is one of the subsystems of the Auxiliary Building Ventilation System (EHS:VF). The fuel handling area is shared between units and its ventilation system is therefore a shared facility consisting of an exhaust system and a supply system. The supply portion of the system consists of four supply air handling units and associated ductwork. Normally all four supply air handling units operate drawing outside air through intake louvers and discharge it into the fuel handling area. The combined capacity of the four supply air handling units is less than that of a single exhaust fan; thus the fuel handling area is normally maintained at a slightly negative pressure.

The fuel handling area exhaust system is comprised of two 30,000 cfm fans, with a normal configuration of one operating fan and one in standby. The exhaust fans draw air through a common inlet plenum and filter assembly from across the surface of the Spent Fuel Pool via inlet grilles arranged along the north side of the pool. The fans discharge the exhaust air to the outside atmosphere via the Auxiliary Building Vent stack.

The Fuel Handling Area Ventilation System exhaust filter assembly is composed of roll media roughing filters, high efficiency particulate air filters and charcoal filters. There is a normally open bypass damper and normally closed outlet damper on the charcoal filter. Upon receipt of a high radiation signal from the Spent Fuel Pool area radiation monitor, the bypass damper closes and the charcoal filter outlet damper opens to permit exhaust air flow to pass through the charcoal bed and filter the air before being exhausted up the plant vent.

The basic function of the air filter assembly is to remove particulate matter as well as radioactive elemental iodine from the fuel handling area, after receipt of a high radiation signal, by passing exhaust air through HEPA and charcoal filters prior to discharge to the plant vent. Associated with the Fuel Handling Area Ventilation System air filtration unit, are pneumatically operated face and bypass dampers, whose basic function is to direct air flow either through or around the charcoal adsorbers. There are six normally open, fail-closed dampers (two sets of three dampers mounted in series) in the bypass and two normally closed, fail-open dampers (one set of two parallel dampers) on the discharge side of the charcoal adsorber.

The Fuel Handling Area Ventilation System is designed to limit offsite releases following a fuel handling accident. A high radiation signal from the fuel handling area will cause the system to shift to the emergency filtration mode of operation. The supply fans will trip, the filtration unit charcoal adsorber bypass dampers will close and the dampers downstream of the charcoal adsorber will open, thus diverting exhaust through the charcoal filters.

As discussed above, the response time of the Fuel Handling Area Ventilation System, for transition from the normal to the emergency filtration mode, may not be adequate to prevent an unfiltered release from a Spent Fuel Pool accident. However, evaluation of this condition has revealed that even without the benefits of charcoal adsorption, the consequences of such an accident are well within 10CFR100 limits.

As documented in the Safety Evaluation Report (SER) for Unit 1 Amendment No. 124 and Unit 2 Amendment No. 211, dated May 19, 1989, the NRC performed an independent analysis of the consequences of a fuel handling accident in the Auxiliary Building. In this analysis, no credit was given for removal of radioiodine by the charcoal filters.

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Based upon the analysis, the staff concluded that the site boundary thyroid dose, without credit for charcoal filtration or containment, meets the intent of Standard Review Plan (SRP) section 15.7.4, "Radiological Consequences of Fuel Handling Accidents," acceptance criteria of "well within" the 10CFR100 exposure guideline values. Based upon the above information, this event had minimal impact on the health and safety of the public.

CORRECTIVE ACTIONS

The Fuel Handling Area Ventilation System was declared inoperable with Technical Specification action statement 3.9.12 in effect on April 22, 1998.

A radiological calculation was completed July 3, 1999, which addresses a fuel handling accident outside containment with the existing fuel sources, specific to the currently planned offload/reload for Units 1 & 2. This calculation demonstrates that even without Fuel handling Area exhaust filtration, the radiation exposure to personnel in the Control Room would be well within the GDC-19 limits. Although the calculation is specific to Control Room doses, conservative assumptions used in the calculation provide additional assurance that a fuel handling accident would result in offsite doses much lower than 10CFR100.

In accordance with the guidance of Generic Letter 91-18, an operability evaluation was completed July 19, 1999, to address the identified condition. This evaluation concluded that the Fuel Handling Area Ventilation System is operable, but degraded. As compensatory action, during the upcoming Unit 1 and Unit 2 core offload and subsequent reload, for operations involving movement of fuel within the storage pool or crane operation with loads over the storage pool, the system will be operated continuously in the emergency filtration mode. The appropriate operating and surveillance procedures have been revised to support this mode of operation.

AEP:NRC:1260GH, "Enforcement Actions 98-150, 98-151, 98-152 and 98-186 Reply to Notice Of Violation October 13, 1998", dated March 19, 1999, responded to identified programmatic weaknesses in the plant Design and Licensing Basis. As part of the Restart effort, System and Programmatic assessments in the Expanded System Readiness Reviews and Licensing Basis Reviews are reestablishing and documenting the plant's Design and Licensing Basis.

The radiological analysis for the Spent Fuel Handling Accidents in the Auxiliary Building is being redone and is scheduled to be completed by August 30, 1999.

SIMILAR EVENTS

315/99-013-00
315/99-018-00
315/99-012-00
315/99-011-00
315/99-010-00