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A PECO Energy/British Energy Company

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September 28, 2000
2130-00-20261

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Oyster Creek Nuclear Generating Station
Facility License No. DPR-16
Docket No. 50-219
Licensee Event Report 00-006, Revision 1: Skin Dose Associated with Control Room HVAC System B Exceeds Limit after Revaluation

Enclosed is Licensee Event Report 00-006, Revision 1. The revision provides the results of recalculating the X/Q values as identified in the original LER dated June 6, 2000. Bars in the margin of this revision indicate the area of change. This event did not affect the health and safety of the public or plant personnel.

If any additional information or assistance is required, please contact Mr. Robin Brown of my staff at 609-971-4139.

Very truly yours,

Ron J. DeGregorio
Vice President
Oyster Creek

RJD/GWB:ew

Enclosure

cc: Administrator, USNRC Region I
USNRC Senior Project Manager
USNRC Senior Resident Inspector

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Skin Dose Associated with Control Room HVAC System B Exceeds Limit after Revaluation

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
										05000
05	26	2000	2000	-- 6 --	1	09	28	2000	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	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)	X	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	TELEPHONE NUMBER (Include Area Code)
John Yuen, System Engineer	609-971-2306

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)			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-spaced typewritten lines) (16)

The "B" control room (CR) heating, ventilation and air conditioning (HVAC) system was installed during the cycle 12R refueling outage. Atmospheric dispersion coefficients (X/Q values) for the B system have been recently determined to be more limiting than the A CR HVAC system with respect to turbine building ground level releases due to a slight but meaningful difference in air intake location. X/Q values were not calculated for the B CR HVAC system at the time of installation. An evaluation using recently calculated X/Q values (Murphy-Campe) for the B CR HVAC system has indicated that the skin dose to control room personnel would exceed the allowable limit if the B CR HVAC system is in operation during the design basis accident. An evaluation of atmospheric dispersion characteristics associated with the B CR HVAC system has been performed using the more recent ARCON96 methodology. The results confirm that ARCON96 X/Qs for the B system are smaller than the original X/Qs for the A system and, consequently, the doses will be less than currently calculated in the licensing basis. X/Q values for both CR HVAC systems were developed using newer (ARCON96) atmospheric dispersion methodology. New dose rates for the CR HVAC systems will be calculated using the ARCON96 X/Qs and the licensing basis will be revised to reflect the use of the ARCON96 methodology.

I. Plant Operating Conditions before event:

The plant was operating at 100% power when the condition was discovered.

II. Status of Structures, Systems, or Components that were Inoperable at the Start of the Event and that Contributed to the Event:

None

III. Event Description:

The original control room (CR) heating, ventilation and air conditioning (HVAC) system (EIIS-VI) was designed to maintain a suitable environment for equipment and personnel during normal and emergency plant conditions. The system is capable of purging the area of smoke and fumes in case of a fire. The system is also capable of providing 14,000 cfm of outside air during accident conditions without exceeding radiological dose limits to control room (EIIS-NA) personnel. A system modification during the cycle 12R refueling outage (1988) provided an additional independent HVAC system for the areas served by the original system. The new system, designated CR HVAC system B, in combination with system A, was designed to mitigate the effects of single active component failures. The new HVAC system consists of a rooftop air-cooled air conditioning unit (EIIS-ACU) with outside air and recirculation air dampers (EIIS-FCV), duct-mounted electric heating coil (EIIS-H), exhaust and isolation dampers (EIIS-ISV) and associated controls.

Dose rate calculations demonstrated acceptable whole body and skin doses based on the air inlet location of the A system. Since flow rates for the new B system were the same as the original and the intakes were in close proximity, it was assumed that there was no impact on radiological safety and a X/Q analysis for the B system was not performed. It was therefore determined that either the A or B CR HVAC system could perform the radiological safety function of protecting control room personnel in the event of the limiting accident. This accident is a loss of coolant accident (LOCA) assuming the worst single failure, i.e., failure of a main steam isolation valve (MSIV) (EIIS-ISV) to close.

A recent review identified that the X/Q values for CR HVAC system B are less conservative than the X/Q values for the A CR HVAC system. An evaluation of control room personnel dose indicates that the limit of 30 Rem beta (skin) dose would be exceeded using the X/Q values for the B CR HVAC system. This condition is considered to be outside the design basis of the plant and reportable pursuant to 10 CFR 50.73(a)(2)(ii).

IV. Assessment of the Safety Consequences and Implications of the Event:

Dose rate is calculated using an atmospheric dispersion model that considers isotope concentration and geometry in calculating dose to the skin and whole body (beta/gamma). The X/Q values for CR HVAC system A were used to determine a dose of 29.1 Rem to the skin for both CR HVAC systems.

The installation of the B CR HVAC system intake placed it closer to the radiological source than the A system intake. The concentration of radioactive isotopes in the air stream would, therefore, be somewhat greater than determined for the A system. Due to this placement, the skin dose rate calculated for the B CR HVAC System, using the same methodology, would exceed the allowable limit of 30 Rem specified in the bases of Technical Specifications 3.17 and 4.17.

The atmospheric dispersion coefficients (X/Q) were calculated for the A CR HVAC system using Murphy-Campe methodology for a diffuse ground level release. The Murphy-Campe method conservatively determines a X/Q considering building wake effects upon a release. The methodology does not consider the effects of plume meander during low wind speed conditions and does not depict variations in concentrations near buildings with a high degree of accuracy. The methodology tends to over-predict concentrations at low wind speed conditions.

The ARCON96 approach (sponsored by the NRC) provides an alternative to the Murphy-Campe method that provides for a more accurate determination of concentrations in building wakes by considering the effects of meander at low wind speeds. It also provides for a refinement of the effects of building wakes based upon recent studies of field data. This model, with the guidance provided by the NRC, results in a more accurate prediction of X/Q for control room habitability assessments than previously existed. Utilization of the ARCON96 approach has been recommended as an acceptable replacement model to Murphy-Campe for control room assessments. An evaluation of calculated ARCON96 X/Qs shows the 30 Rem skin dose limit would not be exceeded for the B CR HVAC system. Moreover, the control room doses using the ARCON96 X/Q's will be less than those currently stated in the licensing basis.

V. Extent of Condition:

This condition is limited to CR HVAC system B.

VI. Component Data:

There are no equipment failures associated with this event.

VII. Previous Events of a Similar Nature

There have been no previous events of a similar nature.

VIII. Identification of Root Cause

The apparent cause of this event was an analysis deficiency attributed to the use of an incorrect assumption in a calculation. This incorrect assumption related to the atmospheric dispersion model and dose analysis for the B CR HVAC system. Since the B CR HVAC system design parameters were the same as the existing system and since the air intakes were in close proximity to each other, it was incorrectly assumed that the X/Qs would be the same. Consequently, the X/Qs values for the B CR HVAC system intake were not calculated. The A system X/Q values were used to determine control room personnel dose with either the A or B system in operation. This design work was performed circa 1985 and the determination of the exact root cause with available information is not possible due to this time interval.

An apparent contributing cause was ineffective reviews of the design documents. The design verification and safety review performed at the time of the modification (mid-to-late 1980s) did not uncover the incorrect assumption. A more thorough review during the design phase may have uncovered this condition. It has not been possible to determine, with any certainty, the circumstances associated with these reviews due to the time lapse from the original design work. However, if the apparent cause is valid, weaknesses in safety review, calculation and design verification processes in effect at the time of the modification are contributory causes.

XI. Corrective Actions

A. Immediate Corrective Actions

A preliminary evaluation of atmospheric dispersion characteristics associated with the B CR HVAC system was performed using the more recent ARCON96 methodology. This method has been accepted by the NRC but not specifically applied to Oyster Creek at this time. The results are that the new X/Qs for the B system are smaller than the original X/Qs for the A system and, consequently, the doses are less. Based upon this evaluation, the B CR HVAC system is considered operable.

The identified contributing cause implicates the review processes in place at the time of design. Significant efforts since the early 1990s enhanced the processes used in design work for Oyster Creek. Process and procedure improvements were implemented to strengthen the safety review, calculation and verification processes. Training, which was conducted at the time of process improvement implementation, provided management expectations for thorough design reviews and presented similar past events as examples of areas that could be improved. These process improvements and subsequent training have stressed the responsibilities of document preparers and reviewers to accurately determine the appropriateness of design inputs and assumptions.

B. Long Term Corrective Actions

ARCON96 X/Qs for CR HVAC systems A and B have been calculated. The impact on dose rates for the CR HVAC systems was evaluated based on the ARCON96 X/Qs. It has been concluded that dose rates will be less than those in the current licensing basis since the X/Q values are less than the value for the A CR HVAC used in the current licensing basis. Consequently, the control room HVAC remains capable of maintaining radiation doses to control room operators within the limits of the current licensing basis. However, a change to the licensing basis is in preparation to request NRC review and approval of the doses using the ARCON96 methodology as it has not been previously approved for use at Oyster Creek. Submittal of the Licensing Basis Change Request is currently scheduled for November 23, 2000.