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 LICENSING 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)
Indian Point 3	5000286	1 OF 7

TITLE (4)

Control Room Ventilation System and Component Leakage Design Bases Not Met Due To Deficiencies In Input To Surveillance Testing

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
01	20	1983	1998	-- 004 --	00	07	13	1998	N/A	05000
									FACILITY NAME: N/A	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)	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)
Stephen Prussman, Senior Licensing Engineer	(914)736-8856

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).	✓	NO				

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

At approximately 1655 hours on May 13, 1998, with the plant at 100 percent power, NYPA notified the NRC that, on six prior occasions, the Control Room Ventilation System (CRVS) would not have been able to keep Control Room (CR) doses within limits. The plant design basis limit not met was the 30 rem thyroid required to meet 10 CFR 50, Appendix A, General Design Criterion (GDC) 19. This report was made following an evaluation of CR habitability that considered two past events. First, the CRVS had been degraded between January 1983 and June 1997. Surveillance testing did not assure that the air flows assumed in the CR habitability dose calculation could be achieved. Second, the leakage from systems outside containment had exceeded the leakage used in the CR habitability dose calculation on six occasions while the CRVS was degraded. Both conditions were corrected prior to the assessment of effects on habitability. Subsequent to the notification on May 13, a second evaluation determined that the CRVS would have maintained control room doses within 30 rem (thyroid). The NRC notification was updated to report this information on May 29, 1998. This voluntary report is being submitted for NRC information.

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

DESCRIPTION OF EVENT

Note: The Energy Industry Identification System codes are identified within the brackets [ ].

At approximately 1655 hours on May 13, 1998, with the plant at 100 percent power, NYPA notified the NRC that, on six prior occasions, the Control Room Ventilation System (CRVS) would not have been able to keep Control Room (CR) doses within limits. The plant design basis limit not met was the 30 rem thyroid required to meet 10 CFR 50, Appendix A, General Design Criterion (GDC) 19. This report was made following an evaluation of CR habitability that considered two past events. First, the CRVS had been degraded between January 1983 and June 1997. Surveillance testing did not assure that the air flows assumed in the CR habitability dose calculation could be achieved. Second, the leakage from systems outside containment (that would or could contain highly radioactive fluid during recirculation after a Loss of Coolant Accident (LOCA)) had exceeded the leakage used in the CR habitability dose calculation on six occasions while the CRVS was degraded. Both conditions were corrected prior to the assessment of effects on habitability. Subsequent to the notification on May 13, a second evaluation determined that the CRVS would have maintained control room doses within 30 rem thyroid. The NRC notification was updated to report this information on May 29, 1998.

The following chronological description identifies occurrences that were considered in assessing this event:

- The original plant Technical Specification (TS) 4.4.I identified a leakage limit of 2 gallons per hour (gph) for portions of the Residual Heat Removal System [OP] outside containment. The purpose, stated in the basis, was to limit off-site exposures due to leakage to insignificant levels relative to calculated values.

- In a February 3, 1980 letter to NRC, NYPA identified systems that would or could contain highly radioactive fluid outside containment following a postulated LOCA. The February 3 letter stated that a program had been established to identify and reduce leakage from those systems. The letter identified the results of the first leakage test (44.5 cubic centimeter per minute(cc/min) or 0.7054 gallons per hour (gph)). The NRC approved this program with an acceptance criteria of 2 gph on February 21, 1980. License condition 2.L was added in License Amendment 38 requiring leakage testing, preventive maintenance and visual inspection to reduce leakage.

- In a March 23, 1981 letter to the NRC, NYPA provided a response to the post-TMI CR radiological habitability requirement. This response identified the calculated CR dose as 28.8 rem thyroid, 1.8 rem whole body and 28.2 rem beta skin. These values are currently found in the FSAR (Table 14.3-14G). The letter identified a portion of the dose due to leakage outside containment. The leakage used to calculate the CR dose reflected the as found value reported for the first test (i.e., 0.7054 gph). The use of this leakage was not identified in the letter.

- In a January 27, 1982 letter, the NRC issued an SER approving the radiological habitability evaluation. Several months later, surveillance test procedure 3PT-C01 was revised to track leakage from systems outside containment that would or could contain highly radioactive fluid during recirculation after a LOCA. The revision used a 2 gph leakage acceptance criteria rather than 0.7054 gph.

- In January 1983, revision 3 to the CRVS refueling interval surveillance test procedure 3PT-R32C was approved. That revision incorporated the air flow rates used in the habitability analysis. Revisions 3 to 5 measured makeup air flow (acceptance criteria was 250 cubic feet per minute (cfm) and later 250 to 400 cfm with a tolerance of 5 percent) and air flow through the filters (acceptance criteria was 1,250 cfm with a tolerance that ranged from 5 to 10 percent) to determine recirculation air. Revision 6 measured air flow through the filters (acceptance criteria was 1125 to 1400 cfm) and recirculation air flow (no acceptance criteria) to determine outside makeup air flow (acceptance criteria of 250 to 400 cfm). Testing in the above manner allowed recirculation flow to be set less than assumed in the CR dose calculations and described in the FSAR. This occurred seven (7) times for fan 32 and twice for fan 31 during nine tests between January 1983 and November 1993. Revision 7 measured air similiar to revision 6 but changed the acceptance criteria so that recirculation air flow was 1125 to 1400 cfm and makeup air flow was 250 to 400 cfm. This made the test methodology acceptable to measure the assumed air flows. At this time the acceptance criteria did not reflect margin for filter loading as discussed later.

- On May 20, 1992, NYPA issued LER 92-005 to report that the plant was operated outside the TS limit of 2 gph leakage. The effect on CR habitability was not recognized or assessed at that time.

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

- In September 1992, a design document open item was written to track an issue related to system pressure drop. The open item description stated that the booster fan [FAN] motors were sized based on a three (3) inch water gage pressure drop across the filtration unit while the TS allowed a six (6) inch pressure drop. The effect of the higher pressure drop was to be evaluated. The comments noted that the fan design was for 2000 cfm with a static pressure of three (3) inch water gage across the filtration unit. The fans were being operated to provide 1400 cfm and the corresponding differential pressure was not known.

- On September 11, 1995, NYPA issued LER 95-016 to report that the plant had operated on two occasions with leakage exceeding the TS limit of 2 gph. The LER also reported that the surveillance test procedure for leakage from systems outside containment had not incorporated the leakage limit assumed in the CR habitability analysis. The LER also identified a recalculated leakage limit (1.34 gph). This was based on a change in the assumed time for leakage to begin from 30 minutes to 14 hours which was consistent with a plant safety analysis for external recirculation.

- On June 11, 1996, a proposed Technical Specification change to the allowable leakage rate outside containment was submitted to the NRC. This proposed change was based on the 1.34 gph leakage limit discussed in LER 95-016.

- Deviation Event Report (DER) 97-1439 was written on June 19, 1997 to document an operability concern with the CRVS (i.e., would the dose limits of GDC 19 be met since no design value for loading of the filter had been defined or tested). That concern was identified when resolving the September 1992 design document open item. A subsequent assessment concluded that the dose limits of GDC 19 would be met. The assessment looked at actual CRVS surveillance test results to determine initial system performance, degraded that performance over time to account for filter loading (this resulted in loss of pressurization and filtration in less than 30 days) and used a ratio of the 1981 dose calculation to assess dose. This assessment did not consider whether the 0.7054 gph leakage assumed in the CR habitability analysis had been exceeded and assumed that there was no in-leakage following loss of pressurization.

- On February 23, 1998, an Emergency Operating Procedure was changed to increase minimum recirculation flow requirements. In response to NRC questions, the change was reviewed and the potential for operators to go to external recirculation prematurely was identified. On April 10, 1998, DER 98-0592 was written which required a reasonable expectation of operability (REO). The REO found that CR doses were within GDC 19 limits even though there was leakage greater than 1.34 gph at the time. The calculation to support this used criteria different from the FSAR, including: 1) the dose conversion factors of ICRP 30 rather than TID-14844 were used, and 2) a flashing fraction of 4.9 percent rather than 10 percent was used.

- On April 10, 1998, DER 98-0594 was written to identify that 33 charging pump [P] recirculation line leakage was 1.5 gph. This exceeded the leakage limit of 1.34 gph identified in LER 95-016. An operability determination concluded that the FSAR limit of 28.8 rem thyroid could be met with leakage up to 2.2 gph. The calculation to support this used criteria different from the original habitability analysis, including: 1) the dose conversion factors of ICRP 30 rather than TID-14844 were used, and, 2) the leakage was assumed to begin in 14 hours rather than 30 minutes.

- On May 13, 1998, calculations were done to address NRC staff questions regarding the assessment of operability made in response to DER 97-1439. The NRC had observed that unfiltered in-leakage had not been considered after pressurization stopped. The NRC also observed that periods of leakage in excess of 0.7054 gph were not considered. The initial recalculation concluded that GDC 19 was exceeded for six cases where the leakage exceeded 0.7054 gph (i.e., leakage of 1.26 gph from August 23, 1987 to June 19, 1989; leakage of 2.69 gph from April 13, 1990 to May 5, 1990 (reported in LER 95-016); leakage of 0.9 gph from December 14, 1990 to April 19, 1992; leakage of 2.24 gph from April 14,1992 to April 20, 1992 (reported in LER 92-005); leakage of 1.47 gph from October 9 to December 14, 1992 (reported in LER 95-011); and, leakage of 0.98 gph from January 8, 1993 to February 4, 1993. DER 98-0779 documented the conclusion and an ENS notification was made. A subsequent evaluation, reported to the NRC on May 29, 1998, concluded that the criteria of GDC 19 had

been met. That evaluation used performance data for the degraded CRVS based on a conventional system resistance curve developed to establish the fan operating point due to filter loading. Based on this curve, the pressurization and filtration functions would have been performed for 30 days after a postulated LOCA although at a reduced flow rate. The dose calculation used criteria different from the original habitability calculation, including: 1) the dose conversion factors of ICRP 30 rather than TID-14844 2) a flashing fraction of 4.9 percent rather than 10 percent 3) a 95 percent rather than 90 percent charcoal filter efficiency for those cases where testing showed charcoal efficiency greater than 99 percent; and , 4) booster fan flow rates were based on surveillance test results and system curves accounting for filter loading.

CAUSE OF EVENT

The causes of the individual events were as follows:

- In a January 27, 1982 letter, the NRC issued an SER approving the radiological habitability evaluation. The acceptance criteria of surveillance test procedure 3PT-C01 was changed to 2 gph leakage rather than 0.7054 gph due to a lack of design control when incorporating regulatory requirements and design bases into procedures.

- The January 1983 revision to surveillance test procedure 3PT-R32C did not properly test flow assumed in the habitability analysis due to a lack of design control that did not assure regulatory requirements and design bases were adequately incorporated into procedures.

- The lack of a design value for loading of the filter system is due to a lack of this design value in the original design.

CORRECTIVE ACTIONS

Corrective action has been taken as follows:

- Surveillance test procedure 3PT-R32C has been revised to ensure as-left conditions meet CR habitability calculation assumptions when adjusted for filter loading.

- Surveillance test procedure 3PT-C01 has been revised to ensure that leakage is controlled within the assumption of the CR habitability calculation.

ANALYSIS OF EVENT

This voluntary report is being made to describe past instances of inadequate design control and the evaluations done to assess those occurrences. As noted above, the issues seem to have been caused by inadequate documentation of the system design bases and inadequate implementation of design bases into surveillance tests. The CR Ventilation System was evaluated and found to be operable for those past events.

SAFETY SIGNIFICANCE

There was no effect on the public health and safety since the CR would have remained habitable. This conclusion is based on the calculations that determined the CR dose would have remained within GDC 19 limits. The significant assumptions in the evaluations leading to this conclusion that were changed from the original habitability analysis are reasonable for the following reasons:

- Use of ICRP 30 dose conversion factors has been accepted for a number of plants.
- The Standard Review Plan allows the use of a flashing fraction of less than 10% when justified and this was done for the operability determination.
- The 95 percent charcoal filter efficiency was based on the tested charcoal efficiency of greater than 99 percent based on the guidance of Generic Letter 83-13.
- The 14 hour duration before leakage starts was based on the planned operation of the plant emergency systems following a postulated LOCA with a single failure.