NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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	05000286	1 OF 5

TITLE (4) Plant Outside Design Basis Due to Error In Original Design That Did Not Identify RWST Purification Loop Isolation Requirements

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
05	8	97	97	-- 006 --	00	06	06	97		05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	95%

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

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)	✓	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Frank Conte, System Engineer	(914) 736-8316

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-spaced typewritten lines) (16)

On May 8, 1997, with the plant at 95 percent power, Engineering determined that the plant had been operated outside the design basis in the past when the Refueling Water Storage Tank (RWST) was aligned to the non-seismic purification loop of the Spent Fuel Pit Cooling Loop because design requirements for isolation had not been identified and proceduralized. A failure of the purification loop pressure boundary, without proper provisions for isolation, would affect the RWST inventory available for the safety injection system. The event was due to personnel error during the original design process. The corrective action was to establish administrative controls to require a trained person at isolation valves AC-727A and AC-727B during operation of the RWST purification loop while above cold shutdown to assure the system is isolated following an earthquake, safety injection or as required by the control room. The feasibility of plant modifications is being assessed. An extent of condition review is underway. There was no significant effect on public health and safety.

DESCRIPTION OF EVENT

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

At approximately 1038 hours on May 8, 1997, with the plant at 95 percent power, Engineering determined that the plant had been operated outside the design basis in the past when the Refueling Water Storage Tank [TK] (RWST) was aligned to the non-seismic purification loop of the Spent Fuel Pit Cooling Loop [DA] because design requirements for isolation had not been identified and proceduralized. Deviation event report (DER) 97-0933 was written to document this event. A failure of the purification loop pressure boundary, without proper provisions for isolation, would affect the RWST inventory available for the safety injection system [BP, BQ].

The purification loop is a non safety system that is part of the Spent Fuel Pit Cooling Loop. The RWST discharge line to safety injection has a two inch line, with a manual isolation valve, connected to the purification loop. A 2 inch return line is connected to the safety injection mini flow line returning to the RWST.

Engineering reviewed a nuclear network message reporting that the RWST had been aligned to non-seismic systems during tank purification. Engineering wrote DER 96-1972 on August 29, 1996 to document that Indian Point 3 (IP3) had operated with the same alignment in the past and had not addressed the potential for leakage due to a failure following a seismic event. Immediate corrective action was taken to prevent alignment of the RWST to either the recirculation or purification loop until the issue could be assessed. The engineering review did not initially recognize that the seismic / non-seismic interface placed the plant outside design basis because there were no mode restrictions on operation (the alignment was listed in the original Westinghouse Plant Manual and was discussed in the FSAR). This initial engineering review considered the potential for line break following a seismic event. The initial engineering evaluation identified the need to lock closed the isolation valves [ISV] to the RWST purification loop (i.e., AC-727A and AC-727B), pending further engineering evaluation to allow operation of the system, as well as valves to the RWST recirculation loop (i.e., SI-957 and 958) which was not intended for use during normal operation. During the interdisciplinary review process of a change to an operational seismic procedure that was to identify system operating requirements, reviewers identified the requirement to evaluate the effect on a loss of coolant accident (LOCA) of failure of non-seismic components.

The effect of a loss of purification loop integrity on a LOCA was assessed by several departments and the following established:

- The FSAR identifies operation of the purification loop during normal plant operation and the FSAR figures show that loop isolation valves are manually operated.
- The time available to isolate the purification loop valves following loss of system integrity is 4.3 minutes (based on RWST with an initial minimum operating level and multiple pipe ruptures in the purification loop) before the RWST would be drained to the minimum required RWST volume identified by Technical Specification.
- To perform the required isolation of the RWST, a dedicated person has to be stationed on the 41 foot elevation of the plant auxiliary building near isolation valves AC-727A and AC-727B (located on the 41 foot and 34 foot elevations of the plant auxiliary building, respectively) and remain during purification loop operation. The dedicated person has to be trained to close the valves following direction from the control room, loss of normal area lighting (lost within approximately 2 seconds following a safety injection signal) or a seismic event.
- Valves AC-727A and AC-727B are accessible following a loss of coolant accident (LOCA) for purposes of isolating the purification loop.

An extent of condition review is in progress to determine whether other non-seismic systems that are connected to seismic systems during normal operation could cause or increase the severity of a LOCA. The extent of condition review will be completed prior to startup from the current outage. If additional interface problems are identified, action will be initiated to update this LER.

CAUSE OF EVENT

The event was caused by personnel error during the original design process. The requirements for prompt RWST isolation were not identified and addressed in the original plant and system design. The cause of the personnel error cannot be determined due to the passage of time.

CORRECTIVE ACTION

The following corrective action have been taken to correct this event:

- Administrative controls have been issued to prevent opening of the non-seismic recirculation loop connections to the RWST during plant operation.
- Off Normal Operating procedure (ONOP-S-1) was revised to ensure isolation of the RWST from non-seismic piping following a seismic event.
- Administrative controls (SOP-SI-3, TPC 97-362) have been issued to require a dedicated person who is trained to isolate valves 727A and 727B to be stationed at the 41 foot elevation of the plant auxiliary building during operation of the RWST purification loop while above cold shutdown.

ANALYSIS OF EVENT

The event is being reported under 10 CFR 50.73 (a)(2)(ii)(B). The plant design basis requires seismic piping where the failure of piping could affect the severity of a Loss of Coolant Accident (LOCA). Past operation of the non-seismic purification loop while the plant has been in normal operation was outside the plant design basis since requirements for isolation of the purification loop following a design basis event had not been defined. The RWST purification loop has been in service while the plant was in power operation for recirculation of the RWST for chemistry mixing and for water purification prior to a refueling outage. The conservatively estimated time in service in any one year would have been sixty days since recirculation of the RWST for chemistry takes approximately 4 days and occurs once per month, at most (recirculation prior generally occurred 3 times per year or less), and purification for refueling of 12 days.

Similar events, a failure to meet the plant design basis due to original design deficiencies, were identified over the past three years in LERs 94-005, 94-006, 95-003, 96-004 and 96-008.

SAFETY SIGNIFICANCE

This event had no significant effect on the public health and safety. The safety significance was evaluated by looking at the actual and potential safety significance of the event.

There has been no actual safety significance since there has been no demand for the RWST with a loss of integrity of the purification loop.

There has been no significant potential safety significance for the following reasons:

- The purification loop will not interfere with the function of the safety injection system unless the integrity of the system is lost since the loop is merely recirculating fluid.

- The loss of purification loop integrity would not be significant to safety unless a LOCA were to occur at the same time. If there were no LOCA, the loss of RWST level would be annunciated in the control room and the level restored (this would require isolation of the pipe break) or the plant shutdown.

- A seismic event could cause the mechanistic failure of the purification loop, however, the reactor coolant system is seismically designed and no concurrent LOCA is postulated. The core damage frequency would be less than 10E-6 for a small break LOCA (a large break is not considered since it is less probable) and seismic events greater than 0.05 g.

- The frequency is about 1.9E-8 per year that there would be a pipe rupture concurrent with a LOCA while the purification loop was in operation (at most 60 days per year assuming maximum operation).