NRC FORM 366
U.S. NUCLEAR REGULATORY COMMISSION
(4-95)

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station Unit 1	05000413	1 of 15

TITLE (4)
Technical Specification Required Shutdown and Operation Prohibited by Technical Specifications Associated with the Ice Condenser

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(S)
8	5	1998	1998	-	015	-	01	10	15	1998	Catawba Unit 2	05000414

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)			
POWER LEVEL (10)	100	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 (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		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	
	AREA CODE	
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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 fifteen single-space typewritten lines)* (16)

On August 5, 1998 at 1000 hours, with Unit 1 in Mode 1 at 100 percent power, while performing Technical Specification (TS) Surveillance Requirement 4.6.5.1b.2, unacceptable ice buildup in ice condenser flow passages was noted. The ice condenser was declared inoperable. A Unit 1 shutdown was initiated when the problem could not be resolved in the time allowed by the TS. Visual inspections of all flow passages revealed additional problems. A team investigation determined that the root cause of the flow channel degradation was lack of procedural guidance for ice condenser post maintenance inspection activities. The flow channels were cleaned and other problems that were found were resolved. Subsequent analysis determined that these problems would not have prevented the ice condenser from performing its safety function. Planned corrective actions include development of a post maintenance test procedure to verify flow channel operability and training on ice condenser Technical Specifications for appropriate maintenance personnel. Also, Catawba had not correctly performed TS 4.6.5.1b.2 in that the lower inlet plenum support structures and turning vanes had not been inspected. The root cause of this problem was a misinterpretation of the TS Surveillance Requirement. Corrective action was to revise procedures to reflect the correct interpretation.

BACKGROUND

On August 5, 1998, Unit 1 and Unit 2 were operating in Mode 1 at 100 percent power. During performance of Technical Specification (TS) Surveillance Requirement 4.6.5.1b.2, ice accumulation in excess of TS limits was discovered in bay 5 of the Catawba Unit 1 Ice Condenser [EIIS:COND]. The Unit 1 Ice Condenser was declared inoperable and action was initiated to clear the affected ice condenser flow channels. This action could not be completed within the 48 hour time allowed by the TS. Consequently there was a Technical Specification required shutdown of Unit 1 which is reportable per 10CFR50.73(a)(2)(i)(A). During the ensuing outage the Ice Condensers of Unit 1 was inspected and several additional problems were found and resolved. Also, during the outage a question arose about the scope of Surveillance Requirement 4.6.5.1b.2. After consultation with the NRC and other ice condenser plants, it was determined that Surveillance Requirement 4.6.5.1b.2 had not been perfo.med correctly in the past at Catawba. The surveillance as performed at Catawba covered only the ice basket [EIIS:BSKT] area (other areas of the ice condenser had not been included). This aspect of the event is a missed (inadequate) surveillance which is reportable per 10CFR50.73(a)(2)(i)(B). This affected both Unit 1 and Unit 2.

Catawba Nuclear Station, Unit 1 and Unit 2 are four loop Westinghouse pressurized water reactors. The units utilize the ice condenser containment design. The ice condenser functions to absorb the thermal energy which would be released in a Loss of Coolant Accident (LOCA) and to limit the initial peak pressure in the containment vessel. The main part of the ice condenser is a mass of sodium tetraborate ice stored in an annular chamber inside the containment shell. The chamber provides a flow passage from the lower containment through an ice bed to the upper containment during accident conditions. Ice is maintained in an array of vertical cylindrical columns. The columns are formed by perforated metal baskets with space between the columns forming flow channels for steam and air.

Technical Specification 3.6.5 which addresses the ice condenser ice bed states in part that the ice bed shall be operable with flow channels through the ice condenser. With the ice bed inoperable, it must be restored to operable within 48 hours or action must be taken to place the unit in Hot Standby in the next six hours and in Cold Shutdown within the following 30 hours. Technical Specification Surveillance Requirement 4.6.5.1b.2 states that the ice condenser shall be determined operable at least once per nine months by verifying, by visual inspection of at least two flow passages per ice condenser bay, that accumulation of frost or ice on flow

passages between ice baskets, past lattice frames [EIIS:FRM], through the top deck floor grating, or past the lower inlet plenum support structures and turning vanes is restricted to a thickness of less than or equal to .38 inch. When one flow passage per bay does not meet this criteria, twenty more passages in that bay are inspected. If no more problems are found then the one flow channel is deemed acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

Ice baskets in the ice condenser are filled with ice flakes or block ice. Block ice is flake ice that has been compressed into block form. Plastic bags are used in the process of loading ice into the ice baskets. During ice loading the bottom of the bag is secured closed and a weight is attached to hold it down while it is lowered through the flow channel between ice baskets. The bag is then inflated from the top end with a blower. When inflated, the plastic bag seals against the adjacent ice baskets to hold the ice flakes in place until filling of the ice basket is completed and the ice is compact enough to remain within the basket. The bags should be removed following ice loading and the area should be verified free of foreign materials.

During a LOCA, the flow passage for the steam-air mixture is from the lower containment through the ice condenser lower inlet doors, through the turning vanes, through the flow channels between the ice baskets, through the intermediate deck doors, through the upper deck grating (which is covered with insulation) and out to the upper containment.

EVENT DESCRIPTION

6-12-1996 Unit 1 Refueling Outage 1EOC9 started. This was a Steam Generator Replacement Outage.

6-25-1996 A block ice machine was temporarily installed in the Unit 1 ice condenser. The machine was located in the upper plenum of bay 5.

July 1996 During operation of the block ice machine there were periodic leaks. The leakage occurred only when the machine was operating.

8-7-1996 After about 30 ice baskets were filled with block ice, use of the block ice machine was stopped. The block ice machine was disassembled and removed from the containment.

8-8-1996	Ice accumulation was discovered in bay 5.
8-10-1996 through 8-27-1996	Ice condenser cleaning and inspection took place including bay 5. A special tool was obtained from another ice condenser utility to assist in cleaning bay 5. Bay 5 was cleaned to the criteria that was understood to be acceptable at the time.
8-28-1996	The nine month flow channel surveillance was completed. This surveillance did not include any of the flow channels that would be found obstructed in August 1998.
9-20-1996	Ice condenser work scheduled for the 1EOC9 outage was completed and a functional verification was successfully completed.
10-4-1996	Refueling Outage 1EOC9 was completed.
4-28-1997	The nine month flow channel surveillance was completed. This surveillance did not include any of the flow channels that would be found obstructed in August 1998.
11-28-1997	Refueling Outage 1EOC10 began.
December 1997	Inspection found 24 ice baskets stuck in bay 5. This was attributed to block ice machine leakage from the previous outage.
12-21-97	The nine month TS surveillance of flow channels was performed. None of the flow channels were inspected that would be found blocked in August 1998.
12-26-1997	Ice condenser work for the 1EOC10 outage was completed, ice condenser functional verification was performed, and the associated work orders were closed out.
1-4-1998	Refueling Outage 1EOC10 ended.
8-5-1998 1000	Operations was notified by Engineering that during a routine inspection of Unit 1 ice condenser flow channels per Technical Specification Surveillance Requirement 4.6.5.1b.2, a total of four flow channels in bays 13, 20, and 23 did not meet the acceptance criteria. The ice condenser was declared

inoperable and the 48 hour action statement of Technical Specification 3.6.5 was entered [Technical Specification Action Item (TSAIL) Log Entry C1-98-1914]. Maintenance began clearing the affected flow channels.

8-5-1998 1000 Engineering gave Maintenance an additional 80 flow channel locations to inspect (20 in bay 20, 20 in bay 23 and 40 in bay 13). During this inspection Maintenance found 10 obstructed flow channels. Also, a plastic bag was found in one of the ice baskets in bay 13. Engineering requested a 100 percent inspection of bay 13.

8-5-1998 1900 Maintenance was able to remove part of the plastic bag in bay 13. Work Requests were written to look for other plastic bags in the Unit 1 ice condenser (WR 98036586) and the Unit 2 ice condenser (WR 98036587).

8-5-1998 2200 Engineering requested Maintenance to inspect around all ice baskets loaded during the previous outage.

8-6-1998 0407 Maintenance completed removal of the plastic bag from bay 13 of the Unit 1 ice condenser.

8-6-1998 1200 Maintenance found 21 obstructed flow channels in bay 5.

8-6-1198 1300 Management decided to inspect 100 percent of the ice condenser.

8-6-1998 1545 A Management Team was formed due to continued discovery of obstructed ice condenser flow channels. At this time work was in progress to clean flow channels in bay 5 and bay 6. It became evident that this problem would not be resolved before the 48 hour action statement time expired (on 8-7-98 at 1000).

8-7-1998 Work was in progress to clean flow channels in bay 5, 6 and 7. Bays 8, 9, 10, 11, 12, 13, 14, and 15 were inspected and no additional obstructed flow channels were found.

8-7-1998 0355 Another plastic bag was found in bay 16.

8-7-1998 0920 A review of the remaining work confirmed that it would not be completed in the allowable time and therefore a unit shutdown

would be necessary.

8-7-1998 0940 Operations commenced shutdown of Unit 1.

8-7-1998 1521 Unit 1 was taken off line.

8-7-1998 1540 Maintenance began an inspection of flow channels from the lower ice condenser to ensure the lower sections of the flow channels met the surveillance requirement.

8-7-1998 1551 Unit 1 entered Mode 3 (Hot Standby).

8-8-1998 0030 Engineering expressed a concern about compliance with the existing surveillance procedure versus the requirement in Technical Specification Surveillance 4.6.5.1b.2 which addresses inspection of ice condenser flow channels. The procedure used for the nine month inspections did not include the turning vanes. The decision was made to declare the Unit 2 ice condenser inoperable because the problem was considered to be a missed (inadequate) surveillance. The Unit 2 ice condenser was retroactively declared inoperable at 2330 on 8-7-98. (TSAIL Entry C2-98-1949).

8-8-1998 0135 Operations commenced cooldown of the Unit 1 Reactor Coolant System.

8-8-1998 0900 It was determined that Technical Specification Surveillance Requirement 4.6.5.1b.2 applies only to the ice bed area of the ice condenser.

8-8-1998 0925 Unit 1 entered Mode 4 (Hot Shutdown).

8-8-1998 2125 Unit 1 entered Mode 5 (Cold Shutdown).

8-9-1998 1245 Unit 2 ice condenser was declared operable based upon discussions between Catawba Nuclear Station and McGuire Nuclear Station. It was agreed that Technical Specification Surveillance Requirement 4.6.5.1b.2 applies only to the ice bed area of the ice condenser.

8-9-1998 1600 All inspections from the Unit 1 upper ice condenser were completed. Work continued in bay 5. All other bays were clear as inspected from the upper ice condenser.

8-10-1998 Inspections from the Unit 1 lower ice condenser and work to clear bay 5 flow channels continued.

8-11-1998 1547 Inspections from the Unit 1 lower ice condenser were completed except for bay 5 and bay 16.

8-12-1998 0454 All Unit 1 bays except bay 5 were cleaned. In bay 5, 41 of 80 flow channels as viewed from the upper ice condenser were still obstructed and 27 of 80 flow channels as viewed from the lower ice condenser were still obstructed.

8-12-1998 1336 The Unit 2 ice condenser was declared inoperable (TSAIL Entry C2-98-2008) because the position on what constitutes a "flow channel" was not consistent with the viewpoint of the NRC and that of other industry ice condenser plants. The Catawba interpretation of a "flow channel" did not include the ice condenser lower inlet plenum support structure and turning vanes. A Notice of Enforcement Discretion (NOED) was requested from the NRC.

8-13-1998 1624 Maintenance removed the intermediate deck doors to gain better access to Unit 1 bay 5 flow channels.

8-13-1998 2001 The NOED concerning inspection of the turning vanes was granted by the NRC. The Unit 2 ice condenser was declared operable.

8-14,15-1998 Dents were discovered in several Unit 1 ice baskets. These required engineering evaluation.

8-16-1998 Several additional issues developed, such as a tear in an ice basket, loose bolting on intermediate deck doors, and foreign material items that could not be removed.

8-17-1998 Unit 2 was checked for intermediate deck door bolting problems similar to those discovered in Unit 1.

8-17-1998 2117 A missing bolt was found in Unit 2 bay 1 on an intermediate deck door. The Unit 2 ice condenser was declared inoperable and the 14 day TS Action Statement was entered.

8-19-1998 to 8-29-1998 Work continued to resolve the problems with the Unit 1 and Unit 2 ice condensers.

8-29-1998 0447 All Unit 2 ice condenser work was completed and the Unit 2 ice condenser was declared operable.

1157 All Unit 1 ice condenser work was completed and the Unit 1 ice condenser was declared operable.

9-4-1998 1700 Duke Power became aware of a Westinghouse communication to another industry ice condenser plant. A question arose about the exact area of inspection for a flow channel to comply with T.S. 4.6.5.1b.2. It was decided that further inspection of the Unit 1 ice condenser was necessary to determine if the criteria described in this letter was met.

9-10-1998 1830 Engineering began the inspection of the Unit 1 ice condenser.

9-11-1998 0200 The Unit 1 ice condenser inspection was completed. The Unit 1 ice condenser was determined to be operable although bay 5 was slightly degraded.

10-6-1998 An engineering analysis of the combined effects of all problems found in the Unit 1 ice condenser showed that the ice condenser would have performed its safety function with the discrepancies as found.

CONCLUSION

Unit 1 was shut down as a conservative measure since the extent of the degradation of the ice condenser could not be determined in the time allowed by the TS. Subsequent engineering analysis determined that, in the as found condition, the Unit 1 ice condenser could have performed its safety function.

The investigation of this event by an Event Investigation Team concluded that the root cause of the degraded flow channel aspect of the event was lack of procedures/guidance to perform post maintenance testing/inspection to verify ice condenser flow channel operability.

The following two causal factors identify significant missed opportunities that could have prevented this event.

a. Inadequate questioning attitude and follow-up by Engineering regarding the conditions in bay 5 following the block ice machine leak.

b. Inadequate understanding of ice condenser Technical Specification requirements and lack of questioning attitude by Maintenance.

The root cause of the missed (inadequate) Technical Specification Surveillance was determined to be a misinterpretation of the surveillance requirement. The initial understanding of the surveillance requirement was that it should cover only the ice basket area of the ice condenser. The lower inlet plenum support structures and turning vanes were not considered part of the ice condenser bay flow passage and were not inspected in the past. Consultations with the NRC and other industry ice condenser plants indicate that the correct approach was for the surveillance to cover the entire flow passage.

During the previous 24 months there have been no other similar reportable events involving the Ice Condenser System, procedures related to ice condenser work activities, or the work group involved in ice condenser maintenance. Therefore that aspect of this event is not recurring.

During the previous 24 months there have been 17 other reportable events involving missed (inadequate) surveillances. Many of these events involved work that was done more than 24 months ago. These LERs are:

LER 413/96-009, LER 414/96-006, LER 413/96-010, LER 413/96-013,
LER 413/97-004, LER 414/97-004, LER 413/97-005, LER 413/97-006,
LER 413/97-012, LER 413/98-003, LER 413/98-004, LER 413/98-005,
LER 413/98-006, LER 413/98-007, LER 414/98-003, LER 413/98-009,
LER 413/98-014

A commitment has already been made to address this issue. A team has been formed to evaluate the procedures that implement surveillance requirements for the Improved Technical Specifications to ensure that the implementing procedures actually do what the surveillances require.

There are no EPIX reportable equipment failures associated with this event.

CORRECTIVE ACTIONS

Immediate

1. The Unit 1 ice condenser was declared inoperable.

Subsequent

1. An Event Investigation Team was formed to investigate the event.

2. A NOED was obtained to allow Unit 2 to operate until the refueling outage which began on 9-5-98.

3. A license amendment request was submitted for both Catawba Unit 1 and Unit 2 to change the required frequency of TS 4.6.5.1b.2 from 9 months to 18 months for the lower inlet plenum support structures and turning vanes. This change will allow visual inspections of the lower inlet plenum support structures and turning vanes during refueling outages when lower containment is more radiologically accessible. License Amendment 172 for Unit 1 and 163 for Unit 2 were issued on 9-10-98.

4. Unit 1 and Unit 2 ice condensers were inspected and problems that were noted were resolved. These problems included obstructed flow channels, ice basket integrity problems, intermediate deck door bolting problems, foreign materials, damaged top deck blankets on Unit 1. Intermediate deck door bolting problems were noted on Unit 2.

5. A post maintenance test procedure has been developed to verify ice condenser flow channel operability.

6. A procedure has been developed to address proper installation of intermediate deck door frame bolting.

Planned

1. A procedure will be developed to address proper inspection of top deck blankets.

2. An industry group of utilities that own ice condenser plants will perform a study to (a) provide a clear statement of the ice condenser Design Basis, (b) propose revisions to the ice condenser Technical Specifications and (c) provide guidance on repair/replacement methodologies for ice condenser components.

3. Training will be provided to appropriate maintenance supervisors to ensure that they have an adequate understanding of ice condenser Technical Specification requirements.

SAFETY ANALYSIS

A consolidated evaluation was performed of all the problems found with the Catawba Unit 1 ice condenser. These problems included:

1. Flow passage blockage from ice buildup and foreign material in the ice bed
2. Ice basket integrity issues
3. Intermediate deck bolting discrepancies
4. Top deck blanket assembly issues, and
5. Effects of foreign material on the operability of the reactor building sump

These problems were considered individually and collectively with regard to their effect on the ice condenser and containment systems ability to perform their safety function. It was concluded that the ice condenser would have performed its safety function with the degradation that was found.

The design basis function of the ice condenser is to provide an adequate supply of ice for thermal energy absorption such that peak pressure in containment is limited in the event of a LOCA or high energy line break. The ice must be distributed evenly so that no part of the ice in the ice condenser melts quickly enough to provide a bypass flow path.

The existence of multiple discrepancies within the ice condenser was evaluated to determine the cumulative effect on the ice condenser's ability to perform its intended function. Specifically, the effects on thermal absorption, steam flow and the recirculating sump were addressed. Each of these issues was evaluated individually and potential interaction and overlap was evaluated as well.

Flow Passage Issues

The area of the flow passages through the ice bed should not be reduced by more than 15% in any TMD Section of the ice condenser as defined by Westinghouse. A TMD Section is a portion of the ice condenser represented in a computer model. This flow passage area is affected by three of the issues found during the August 1998 forced shutdown. The dominant issue affecting the flow passages was ice build-up found in bay 5. Other contributors to flow passage degradation are foreign materials and basket integrity.

The combined effects of the ice build-up and foreign materials found in the ice bed were evaluated. Following the forced shutdown, a thorough inspection of the ice condenser was performed to determine the amount of ice in all bays. Both ice buildup and foreign materials were found in the flow channels. A detailed tabulation of the as found condition in each TMD section was documented in calculation CNC 1201.17-00-0007 "CNS Unit 1 Ice Condenser Flow Passage Operability Evaluation". The maximum amount of ice accumulation was found in TMD Section 5 which had a 17.54% equivalent obstruction. All other TMD Sections were obstructed by less than 15%. These results were reviewed by Westinghouse since TMD Section 5 exceeded the 15% criteria. Westinghouse conservatively assumed a uniform obstruction of 17.54% throughout the ice condenser as compared to the actual results. Their analysis concluded that the increase in loading on the subcompartment walls (due to the obstruction in excess of 15%) would be 3%. The uniform 17.54% obstruction assumed throughout the entire ice bed would more than account for the effects of the localized obstructions created due to basket buckling which is the failure mode postulated in the basket integrity issues portion of this evaluation. Therefore the effect of the basket integrity issue on flow passage obstruction would not change the 3% loading increase determined by Westinghouse.

During design of the Catawba Reactor Building, the original subcompartment differential pressures supplied by Westinghouse were increased by 40%. Therefore, a significant margin of safety exists. Assuming a 15% obstruction, the Upper Crane Wall has the least amount of margin at 32%. Therefore, the presence of the obstruction described above, and the resulting 3% loading increase would not challenge the integrity of the Reactor Building internal structure and would not have jeopardized the ability of the ice condenser to perform its safety function.

Basket Integrity Issues:

A total of 58 baskets were found with discrepancies. These discrepancies were 53 dented baskets, one torn basket, three baskets with loose or missing J-Bolts and one basket with a mispositioned swage fitting on the cable cruciform system. No basket was found with more than one type of discrepancy. Therefore the basket discrepancies have no interaction with each other during a postulated event.

Dented Baskets:

The denting identified on the baskets would not be of concern during a LOCA since the blowdown forces put the basket in tension and would act to

straighten the baskets. The ability of the baskets to maintain their integrity during a seismic event was also evaluated. The failure mode of concern is local buckling of the column section. The lattice frame supports would eliminate bend buckling. Typical deformation shape would be a lateral displacement (bulge) in the column section until equilibrium is achieved. The lattice frame supports are expected to carry the displaced load in the event of a buckling failure and also to prevent the basket from significantly contacting adjacent baskets. In the event of buckling, the ice would still be contained within an acceptable geometry. The net effect on the flow area is negligible since a decrease in the size of the flow channel on one side would result in an increased size on the opposite side. It was determined that the baskets would still be functional following a buckling failure. Therefore the dented ice baskets would not have prevented the ice condenser from performing its safety function.

Torn Basket:

One torn basket contained two vertical tears spanning four and five grids respectively spaced one grid apart. This basket was considered inoperable. However, per Westinghouse one inoperable ice basket would not have prevented the ice condenser from performing its safety function.

Improperly Installed J-Bolts:

During inspections in the Unit 1 ice condenser, improper installation of J-Bolts was discovered on three baskets. Analysis showed that the affected ice baskets would still have been able to perform their safety function based on the ability of other bolts to carry the postulated loading.

Improperly Installed Swage Fitting:

During the ice condenser inspections, a swage fitting was found improperly installed on one ice basket. Although this would have potentially allowed the cable cruciform assembly (a method of suspending ice baskets) and the remaining ice to drop approximately ten feet following a blowdown, the ice would still have been contained in a geometry suitable to support long term cooling. The potential blockage in the flow passages due to the buckling of this basket is insignificant even if it occurred in conjunction with the other damaged baskets as concluded in the evaluation of the dented baskets discussed above. Also, any basket deformation would occur following the initial blowdown, hence this configuration would not impair the ability of the ice condenser to fulfill its safety function.

Summary of Basket Integrity Issues:

No ice basket had more than one of the discrepancies discussed above; therefore, there are no overlapping or compounding effects. These problems would not have reduced the ice condenser's thermal absorption capability and therefore would not have prevented the ice condenser from fulfilling its safety function.

Intermediate Deck Issues:

The intermediate deck consists of support/center beams bolted to the lattice frame structure, intermediate deck door frames secured to the beams, and the intermediate deck doors attached to the frames. The function of the intermediate deck doors is to remain closed during normal operation and to open during a design basis accident to allow steam to exit the ice condenser. A number of bolting anomalies were identified during an intermediate deck inspection. Various nuts and bolts were found loose or missing from various locations. These anomalies were evaluated to determine if the intermediate deck doors would have opened as intended during an accident. Two of these anomalies involving missing nuts on an intermediate deck support beam and a center beam were determined to be the most significant and were evaluated by Westinghouse. Westinghouse concluded that the intermediate deck doors would have opened and fulfilled their intended function during an accident. After the doors opened, the blowdown forces would continue to lift the unrestrained beams potentially damaging air handling units and ductwork located in the area. This would have generated debris in large metallic pieces which would have remained within the ice condenser and would not have been transported to the sump. The potential impact of the glycol on sump pH was evaluated. The pH would be slightly reduced but would have remained within the acceptable range. None of the as found joint configurations would have impeded the opening of the intermediate deck doors. Therefore, the doors would have performed their safety function.

Top Deck Issues:

Three concerns were identified with regard to the top deck. These were: four damaged top deck blankets, missing retainer clips, and broken angle bolting securing tape utilized on the top deck blankets.

The damaged blankets were evaluated and it was determined that the blanket panels would have remained intact. This condition would not prevent the ice condenser from performing its intended function. Foreign material

considerations associated with tape found on the top deck blankets and the missing retainer clips are documented in the Recirculating Sump analysis below. None of the top deck problems would have prevented it from adequately performing its safety function.

Recirculating Sump Issues:

All items that could potentially block the containment sump were quantified in calculation CNC-1223.12-00-0059 "Operability Evaluation for Containment recirculation Sump Screen Including ECCS and Containment Spray Systems". The plastic bag debris would behave similar to a poorly applied unqualified coating which degrades in the form of sheets, torn fragments, flakes and chips. Exposure to LOCA blowdown temperature in the lower ice condenser would reduce the size of plastic flakes and chips and improve their ability to float. The UFSAR licensing basis limit on unqualified coatings is not exceeded by the conservatively calculated area of plastic bag material. A small fraction of plastic bag debris is postulated to reach the sump. This debris would be likely to float on the water surface rather than deposit the sump screen surfaces. If particles smaller than 1/8" reached the sump screens, these pieces would pass through any of the ECCS pumps, throttle valves, and Containment Spray nozzles without damaging these components or clogging the flow path. Core cooling following the design basis LOCA is not adversely affected due to the existence of fine bottom nozzle debris filters on replacement fuel assemblies as evidenced in industry data on this subject.

Engineering analysis determined that the debris resulting from the plastic bags, insulation, and other less transportable items could not be both transported to the sump and cause restriction of the ECCS pump suctions greater than 50% blockage during LOCA conditions.

The existence of flow passage obstruction, basket anomalies, intermediate deck bolting discrepancies, top deck issues and associated foreign material concerns were evaluated and found to have negligible impact on the thermal absorption capabilities, steam flow passage and recirculating sump operability. Based on the above evaluation, none of these issues occurring singularly or collectively would have affected the ability of the ice condenser or the recirculating sump to perform their safety function.

There was no actual or potential safety significance associated with this event. The health and safety of the public were not affected by the event.