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April 18, 1990

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/90-16

Gentlemen:

Attached is Licensee Event Report 413/90-16 concerning TECHNICAL SPECIFICATION VIOLATION AS A RESULT OF A MISSED REFUELING WATER STORAGE TANK SAMPLE DUE TO INAPPROPRIATE ACTION.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Tony B. Owen
Station Manager

keb\LER-NRC.TBO

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 1	0 5 0 0 0 4 1 3	1 OF 0 9

TITLE (4) Technical Specification Violation As A Result Of A Missed Refueling Water Storage Tank Sample Due To Inappropriate Action

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 NAMES	DOCKET NUMBER(S)
										N/A	0 5 0 0 0
0 3	0 5	9 0	9 0	–	0 1 6	– 0 0	0 4	1 9	9 0		0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0	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
R.M. Glover, Compliance Manager	8 0 3 — 8 3 1 – 3 2 3 6

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 fifteen single space typewritten lines) (16)

During the period of February 5 through 26, 1990, samples for the Boric Acid Tank (BAT) and the Refueling Water Storage Tank (FWST) were collected by Chemistry (CHM) to comply with Technical Specification (T/S) requirements. On February 5, CHM had been informed by Operation (OPS) personnel that the BAT was the declared borated water source. From March 11 through March 13, the FWST was not placed into recirculation and was not sampled due to the use of the Refueling Water (FW) pump for draining of the reactor cavity. On March 14, 1990, Unit 1 was in Mode 5, Cold Shutdown. CHM contacted the Control Room Operator (CRO) to verify that the BAT was still considered the declared borated water source. CHM was informed that the BAT had been inoperable since March 1, 1990 due to 1NV236B, being tagged out for repair. Following CHM review of data, during the week of March 5 through 12, 1990, CHM missed a T/S sample of the FWST. This event was attributed to inappropriate action, due to the individuals involved not ensuring an operable borated water source. A contributing cause is assigned to deficient communications resulting from poor group interface between CHM and OPS. Corrective actions taken included CHM procedure revisions which will supply actions to take when T/S samples cannot be obtained as well as including a T/S Operability Sheet for T/S items. Also, the above mentioned CHM corrective acitons will be communicated to OPS Shift personnel.

BACKGROUND

REFUELING WATER SYSTEM

The Refueling Water [EIIS:CB] (FW) System provides a large source of borated water and the necessary equipment to:

1. Supply the Emergency Core Cooling System (ECCS) and the Containment Spray [EIIS:BE] (NS) System during the injection phase following a Loss of Coolant Accident (LOCA);

2. Transfer the borated water between the Refueling Water Storage Tank (FWST) and Refueling Cavity;

3. Provide cleanup of the refueling water by routing the water through the Spent Fuel Pool Cooling [EIIS:DA] (KF) System; and,

4. Provide for various other borated water requirements and miscellaneous flowpaths.

The FWST normal capacity of 395,000 gallons is sufficient to provide a useable volume exceeding 350,000 gallons. This capacity assures:

a. The volume of borated refueling water needed to increase the boron concentration of initially spilled water to a level that assures no return to criticality with the Reactor at Cold Shutdown and all control rods [EIIS:ROD], except the most reactive Rod Cluster Control Assembly (RCCA), inserted in the core.

b. The volume of water sufficient to refill the Reactor vessel [EIIS:VSL] above the nozzles [EIIS:NZL] after a LOCA.

c. A sufficient volume of water when combined with ice melt and Reactor Coolant [EIIS:AB] (NC) System spill in the containment recirculation sump following a LOCA to permit the initiation of the recirculation phase.

d. A sufficient volume of water to limit the radiation dose rate at the surface of the Refueling Cavity to approximately 2.5 mrem/hr during the period when a fuel assembly is transferred over the Reactor vessel flange.

e. A sufficient volume of water to allow the station operator adequate time to complete the valve [EIIS:V] alignment required to complete the switchover from the injection mode to the containment sump recirculation mode following a LOCA.

When draining the FWST, the water is routed to the Refueling Cavity and to one of the Boron Recycle [EIIS:CA] (NB) System Recycle Holdup Tanks (RHTs). Approximately 290,000 gallons of water is drained to the Refueling Cavity while the remainder is drained through the KF purification loop into either one of the RHTs.

The refueling water from the Refueling Cavity is routed back to the FWST by using the normal refueling drain procedure. The water in the RHT is rerouted through the recycle evaporator feed pumps [EIIS:P] into the FWST. The water is brought back into specification by adding demineralized water or boric acid from the boric acid blender.

CHEMICAL AND VOLUME CONTROL SYSTEM

The Chemical and Volume Control [EIIS:CB] (NV) System is designed to provide the following services to the NC System:

1. Maintenance of programmed water level in the pressurizer.

2. Maintenance of seal-water injection flow to the NC pumps.

3. Control of water chemistry conditions, activity level, soluble chemical neutron absorber concentration and makeup.

4. Filling, draining, and pressure testing.

The water chemistry, chemical shim and makeup requirements of the NC System are such that the following functions must be provided:

1. Means of addition and removal of pH control chemicals for Startup and normal operation.

2. Control of oxygen concentration following venting and that due to radiolysis in the core region during normal operation.

3. Means of purification to remove corrosion and fission products.

4. Means of addition and removal of soluble chemical neutron absorber and makeup water at concentrations and rates compatible with all phases of plant operation including emergency conditions.

The function of soluble neutron absorber concentration control and makeup is provided by the Reactor Makeup Control System employing 4 wt. percent boric acid solution from the Boric Acid Tank (BAT) and Reactor makeup water from the

Reactor Makeup Water Storage Tank (RMWST). In addition, for emergency boration and makeup the capability exists to provide refueling water or 4 wt. percent boric acid from the BAT to the suction of the charging pumps.

Two boric acid tanks are provided. The combined capacity of the tanks contains sufficient boric acid to provide for refueling plus enough boric acid for one Cold Shutdown immediately following refueling with the most reactive control rod withdrawn. There is sufficient capacity with one tank one-third full, to provide Cold Shutdown for the Unit with the most reactive rod withdrawn.

Technical Specification 3.1.2.5 states that as a minimum, one of the following borated water sources shall be OPERABLE (in MODES 5 & 6):

a. A Boric Acid Storage System with:

1. A minimum borated water volume of 5100 gallons,
2. A minimum boron concentration of 7000 ppm, and
3. A minimum solution temperature of 65 degrees F.

b. The Refueling Water Storage Tank with:

1. A minimum borated water volume of 26,000 gallons,
2. A minimum boron concentration of 2000 ppm, and
3. A minimum solution temperature of 70 degrees F.

T/S Surveillance Requirement 4.1.2.5 requires that the above borated water sources shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the boron concentration of the water,
2. Verifying the contained borated water volume, and
3. Verifying the boric acid storage tank solution temperature when it is the source of borated water.

Chemistry procedures require sampling of the FWST once per week and sampling of the BAT twice per week.

EVENT DESCRIPTION

On February 5, 1990, Unit 1 was in Mode 6, Refueling. At 0630 hours, Chemistry (CHM) Technician A recorded in the Primary CHM logbook turnover notes that the Refueling Water Storage Tank (FWST) was in the process of makeup, and sampling was required. At 1400 hours, CHM Technician B telephoned the CRO to request that the FWST be placed in recirculation. The CRO informed the technician that makeup had stopped and that Operations (OPS) was concentrating on increasing the levels in the Boric Acid Tank (BAT). Due to the T/S requirement for once per

seven day samples to be taken on either the BAT or the FWST, if the FWST was the "declared borated water source" then the sample would need to be taken no later than February 6. The OPS Shift Supervisor informed CHM Technician B that the BAT was the borated water source.

From February 6 through 11, 1990, at 1022 hours, Unit 1 was in Mode 6. All required FWST and BAT samples were collected and analyzed by CHM personnel.

From February 11 through 26, 1990, Unit 1 was in No Mode, Core Defueled. CHM personnel collected and analyzed all required BAT and FWST samples.

On February 24, 1990, Unit 1 was in No Mode. CHM Technician C was informed by the CRO that the 1B Residual Heat Removal [EIIS:BP] ND Pump was on and that the Reactor cavity water was being pumped back to the FWST. At approximately 1439 hours, Diesel Generator (D/G) 1B was removed from service, as a result of work list items related to the Outage.

Unit 1 entered Mode 6 on February 28, 1990. On March 1, 1990, at 0220 hours, Unit 1 remained in Mode 6. OPS issued R&R 19-2838 on 1NV236B, Boric Acid to NV Pumps Suction, for MOVATS testing and also issued R&R 10-807 on A and B Boric Acid Transfer Pumps for the 1NV236B work. This action in combination with D/G 1B being out of service necessitated the determination, by OPS that the BAT was inoperable, due to the unavailable BAT water source alignment. This change in BAT status was unknown by CHM. BAT sampling continued at the prescribed interval.

On March 4, 1990, at 0725 hours, Unit 1 was in Mode 6. CHM Technician C contacted the Unit 1 CRO to request that the FWST be placed in recirculation for the weekly sample. CHM Technician C was told that the FW pump was currently pumping down the Reactor cavity, and OPS was not able to state when the pump would be available. The CRO would check with the Shift Supervisor about the situation. CHM Technician C called the CRO again at 0832 hours, and there had been no determination made. At 1930 hours, CHM Technician D discussed the FWST status with the Unit Supervisor and was advised that the draining of the cavity had to be completed to permit FWST sampling.

On March 5, 1990, Unit 1 was in Mode 6. At 0030 hours, the weekly FWST T/S sample for boron analysis was due, but was not collected as a result of the FW pump being in service for Reactor cavity draining. The FWST was last sampled at 0050 hours on February 26.

On March 9, 1990, Unit 1 was in Mode 6, and at 1000 hours, CHM Technician B called the Unit Supervisor and asked about the FWST status. The Supervisor stated that the FW pump had been tagged out and that OPS was planning to clear the tagout later in the day.

CHM Technician D called the CRO at 2037 hours on March 10, 1990, requesting a FWST sample. Unit 1 was in Mode 6. The CRO was asked to place the FWST on the recirculation pump so that the tank could be sampled in approximately 30 minutes. At 2045 hours, the CRO called CHM Technician D and said that the recirculation pump would not operate and asked if CHM could sample off of the FW pump The CHM Technician explained that their sample point was on the line off of the recirculation pump. CHM Technician D completed sampling the FWST at 2130 hours.

On March 12, 1990, Unit 1 was in Mode 6. OPS had completed the Reactor cavity draining at 0500 hours. At 0600 hours, CHM Technician D inquired about the FWST sampling, and was told that the FWST was still aligned to the cavity and recirculation had not begun. Unit 1 entered Mode 5 at 1800 hours.

CHM Technician B called the CRO on March 14, 1990, with Unit 1 in Mode 5, to verify that the BAT was the declared borated water source, and that the latest FWST sample was collected and analyzed on March 10, 1990. At that time, CHM was informed of the inoperability of the BAT, due to 1NV236B being inoperable. Due to the 1B D/G being out of service, 1NV236B did not have an alternate power source available. CHM personnel were not aware of this condition. At 0900 hours, the CRO called CHM Technician B and stated that the FWST had been placed on the FW pump and should be ready for sampling by 1800 hours.

On March 15, 1990, Unit 1 was in Mode 5. At 0140 hours, the Unit Supervisor and CHM Technician E sampled the FWST off of a low point drain, 1FW14, Refueling Cavity to FW Pump Strainer Lo-Point Drain. This sample was taken to ensure that the FWST was sampled within the seven day time frame. At 0800 hours, CHM Technician B called the Unit Supervisor and asked about the BAT lineup and also asked if the transfer pumps were still tagged out. CHM Technician B discussed the conversation on March 14, 1990 with the CRO, stating that the FWST was the declared borated water source. CHM Technician B then asked the CRO how OPS could declare the source without sample results. The response was that the CRO was using the percent level for the FWST to consider it operable.

Following a review of the previous FWST and BAT sample results, the Primary CHM group determined that during the week of March 5 through 12, 1990, CHM personnel missed sampling the FWST on March 5, which violated T/S 4.1.2.5.A.1, sampling frequency of the borated water source.

On April 5, 1990, Unit 1 entered Mode 3, Hot Standby, at 0526 hours. Changes were approved for Chemistry Management Procedure 3.4.17 which incorporated notification to OPS of T/S required samples and the possibility of T/S violations if samples are not collected before an appropriate time. A requirement was established for use of a Technical Specification Operability Notification Sheet (TSONS) for samples that are Out-of-Spec or unattainable.

CONCLUSION

This Technical Specification violation is attributed to Inappropriate Action, as a result of the individuals involved not recognizing the need to ensure an operable borated water source. The Chemistry personnel, though having contacted OPS personnel on numerous occasions to place the FWST in recirculation for sampling, did not pursue a timely resolution to the problems when continuing interferences occurred. In addition, the information discussed by CHM personnel and OPS personnel, concerning the T/S samples, was not carried out by OPS personnel in a timely manner to avoid missing a T/S sample. In the past, Chemistry personnel have understood that the boron concentrations are provided to OPS to fulfill the requirements of T/S 4.1.2.5.a.1. The requirements of 4.1.2.5.a.2 & 3 are supplied to the CRO by way of the Operator Aid Computer and as required in PT/1/A/4600/02 E, F, & G, Periodic Surveillance procedures. Therefore, Operations is responsible for the determination of OPERABILITY as stated in T/S 3.1.2.5. CHM personnel concluded that if OPS did not place the FWST in recirculation during the period of March 1 through 15, OPS must have maintained the BAT as the declared borated water source. In addition, CHM had been told by OPS personnel earlier in the outage that the BAT was the borated water source. Communication between the groups is considered a contributing cause in that it did not achieve the necessary clarity and responsiveness to avoid the T/S violation.

The inoperability of D/G 1B and the tagout of 1NV236B necessitated the inoperability of the BAT, due to loss of its boron injection flow path. This INOPERABILITY was declared based on T/S 4.1.2.1b, which requires at least once per 31 days that each valve in the flow path is in its correct position. The current Chemistry sampling schedule for FWST and for the BAT is established in CHM procedures. If this schedule is followed as stated, regardless of concerns with the "declared borated water source", the required analyses should be completed per T/S.

The CHM staff completed changes to Chemistry Management Procedure 3.4.17, on April 5, 1990, which state that if a system needs to be placed in recirculation to collect a T/S sample, OPS is to be informed at the time of the recirculation request, that, if the requested action is not taken by an appropriate time, a T/S violation will occur.

Chemistry Management Procedure 3.4.17 was also changed to include statements on FWST and BAT sampling enclosures which states that the inability to collect a T/S sample is considered the same as being Out-of-Spec. A T/S Operability Notification Sheet (Attachment 1 of Station Directive 3.1.15, Activities Affecting Station Operations) will be issued by Chemistry with a comment that the T/S sample is Out-of-Spec or unattainable.

As a result of this event, emphasis will be placed on ensuring clear communication, focusing on clear description of needed actions and clear understanding of the importance of such actions.

A search of the Operating Experience Program database for the past 24 months revealed two events, LER 414/89-018 and LER 414/89-05, that involved a missed Technical Specification sample. LER 414/89-018 was concerned with a missed sample of the Cold Leg Accumulator as a result of deficient communication. This event involved insufficient, unclear information communicated during CHM shift turnover. Also, an additional root cause was improper action; with no action taken when required because of lack of attention to detail. Corrective actions included meetings with the shift technicians to emphasize the need for effective turnover information. LER 414/89-05 involved Radiation Protection (RP) and a Turbine Building sump radiation monitor (2EMF31) sample which was not collected in a timely manner due to an inadequate sampling policy. In this event, RP procedures were changed to ensure correct, timely sample collection. This event is not considered a recurring event.

CORRECTIVE ACTION

SUBSEQUENT

1) Chemistry Management Procedure 3.4.17 was revised to include:

   a. Steps that will ensure that, if a system/component needs to be placed in recirculation or a valve needs to be manipulated in order to collect a T/S sample, OPS personnel are to be informed at the time of the recirculation or valve manipulation request, that if the system is not put in the configuration requested by an appropriate time, then a T/S violation will occur.

   b. Steps in Enclosures for Primary Chemistry sampling that direct the CHM Technicians to complete a T/S Operability Statement (TSONS) when a T/S sample is unattainable (which is considered to be the same as being Out-of-Spec). The TSONS will provide the specific information for OPS to follow-up direct actions pertaining to T/S operability.

PLANNED

1) OPS Shift personnel will be informed of the Chemistry section's April 5, 1990 procedure changes to 3.4.17.

2) Management will emphasize the accountability of all personnel to ensure clear communication and understanding of needed action and its importance. This effort will include review and (as much as practical) standardization of each group's methods and paths of communication with Operations. This effort will be discussed with Operations personnel with emphasis on their obligation to "reach into" interfacing activity areas and ensure understanding and appropriate action.

SAFETY ANALYSIS

The usable capacity of the FWST is based on the requirement for filling the refueling cavity to a depth that limits the radiation at the surface of the water to 2.5 mrem/hr during the period when a fuel assembly is transferred over the Reactor vessel flange. This function requires more water than is necessary for a post-LOCA safe shutdown.

The NV System maintains the coolant inventory in the NC System within the allowable pressurizer level range for all normal modes of operation. This sysem also contains sufficient makeup capacity to maintain the minimum required inventory in the event of minor NC leaks. Other than the centrifugal charging pumps and associated piping and valves, the NV System is not required to function during a LOCA. During a LOCA, the NV System is isolated except for the centrifugal charging pumps and the piping in the safety injection and seal injection path.

When the Reactor is subcritical, i.e., during Cold or Hot Shutdown, refueling and approach to criticality, the neutron source multiplication is continuously monitored and indicated. Any appreciable increase in the neutron source multiplication, including that caused by the maximum physical boron dilution rate, is slow enough to allow ample time to start a corrective action to prevent the core from becoming critical.

During the period from March 5 through 10, 1990, following the missed FWST boron sample analysis, the Unit was in Mode 6. The FWST was considered the declared or assured borated water souce. All parameters for tank volume, and solution temperature were maintained within required T/S limits. The boron concentration from the February 26 analysis was 2071 ppm, and the concentration from the March 10 analysis was 2148 ppm. It is considered that the concentration did not significantly decrease during this period based on the values for these two samples.

The health and safety of the public were unaffected by this incident.