Duke Power Company
Catawba Nuclear Station
P.O. Box 256
Clover, SC 29710

(803)831-3000

DUKE POWER

November 20, 1991

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/91-28

Gentlemen:

Attached is Licensee Event Report 413/91-28, concerning TECHNICAL SPECIFICATION VIOLATION DUE TO EXCEEDING LIQUID WASTE RELEASE LIMITS AS A RESULT OF INAPPROPRIATE ACTIONS.

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

Very truly yours,

W. R. McCollum
Station Manager

ken:LER-NRC.WRM

xc: Mr. S. D. Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
Atlanta, GA 30323

M & M Nuclear Insurers
1221 Avenues of the Americas
New York, NY 10020

R. E. Martin
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, GA 30339

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

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NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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 7

TITLE (4) Technical Specification Violation Due To Exceeding Liquid Waste Release Limits As A Result Of Inappropriate Actions

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)
											CNS, Unit 2	0 5 0 0 0 4 1 4
1 0	2 4	9 1	9 1	-	0 2 8	-	0 0	1 1	2 0	9 1		0 5 0 0 0

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)	1 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. C. Futrell, Compliance Manager	8 0 3 8 3 1 - 3 6 6 5

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)

On October 24, 1991, between 1000 hours and 1120 hours, with Unit 1 in Mode 1, Power Operation, at 100% power and Unit 2 in Mode 5, Cold Shutdown, a Technical Specification (T/S) Violation occurred due to exceeding the Liquid Waste Release (LWR) limits because inadequate dilution flow was available for the LWR discharge rate selected for the LWR. The incident was discovered when Radiation Protection (RP) Specialist B reviewed the LWR because a Chemistry Assistant Technician questioned the validity of the dilution flow requirements specified by the LWR computer. RP Specialist B notified appropriate RP Management of the incident. The excessive discharge flow was selected for the LWR because Chemistry Specialist A misread the exponent on the dilution flow required for the discharge rate selected. Chemistry Assistant Technician B independently verified that the selected discharge rate and dilution flow were correct. This incident is attributed to Inappropriate Actions because the exponent was misread. Corrective actions included counselling the Chemistry Specialist A and Assistant Technician B and appropriate notifications of the incident. Planned corrective actions include procedure enhancements to RP/0/B/1004/04, Radioactive Liquid Waste Release, and OP/0/B/6500/60, Discharge of an AMT to the Environment, and changes to the LWR computer program to improve the information provided.

of the Liquid Radwaste [EIIS:WD] (WL) System is to collect, and process all radioactive and potentially radioactive liquids he plant. In general, all reactor grade liquids are recycled reactor grade liquids are processed and disposed of in accordance with applicable federal regulations. The system is designed to control and minimize releases of radioactivity to the environment.

The purpose of the Monitor Tank System is to provide additional processing capability to the existing WL System and the Steam Generator [EIIS:HX] Drain Tanks. It also provides condensate powdex processing capability and additional monitor tank capacity.

Three Auxiliary Monitor Tanks (AMTs) are provided to receive processed waste. Each AMT has capacity for 20,000 gallons of waste water.

Upon the need to release an AMT, the tank is recirculated and sampled. The sample is analyzed for radioactivity, and the release documentation is prepared. The radioactive isotopes and the quantity of each radioactive isotope from the sample analysis determine the minimum amount of dilution flow (from the Low Pressure Service Water [EIIS:KG] RL System) required for five discharge rates. The AMT discharges into the RL System which dilutes the AMT effluent and subsequently discharges into Lake Wylie. Chemistry personnel select the AMT discharge rate corresponding to the required minimum RL flow. The available RL System flow at the time of the release must be greater than or equal to the required Minimum RL Flow.

An RL flow interlock [EIIS:XC] is provided to automatically terminate the AMT release if the RL flow decreases below the required RL flow for the release.

A radiation monitor [EIIS:XT], 0EMF57, measures discharge radiation levels and indicates in the plant Control Room and on the Monitor Tank Building (MTB) control panel. On a high radiation signal, 1WLX28 automatically closes to terminate the release. 1WLX28 is an air operated plug valve [EIIS:V] that serves as an isolation for all discharges from the MTB to the RL System. 0EMF57 verifies that the AMT sample is representative of the AMT contents and that the sample analysis is correct. The setpoint for the high radiation signal is calculated on the isotopic concentrations from the sample analysis. 0EMF57 does not ensure that isotopic concentrations are within limits of Technical Specification 3.11.1.1 upon discharge into Lake Wylie. The AMT Discharge Rate and the available dilution flow determine the isotopic concentrations upon discharge into Lake Wylie.

T/S 3.11.1.1 states that the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to the concentrations specified in 10 Code of Federal Regulations (CFR) 20, Appendix B, Table II,

Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2 E-4 microcurie/ml (uCi/ml) total activity.

EVENT DESCRIPTION

On October 23, 1991, at approximately 1030 hours, RP Specialist A reviewed a sample analysis for AMT C and determined that the I-131 concentration of 1.096 E-4 uCi/ml exceeded the Chemistry Administrative Limit of 5.0 E-5 uCi/ml, and thus, required that Chemistry supervision be consulted prior to the release.

At 1040 hours, RP Specialist A notified Chemistry Specialist A that the I-131 concentration in AMT C exceeded the Chemistry Administrative Limit. Chemistry Specialist A informed RP Specialist A that the appropriate Chemistry Supervisor would be consulted with this information.

At 1150 hours, Chemistry Specialist A notified RP Specialist A that Liquid Water Release (LWR276) for AMT C was permissible per consultation with Chemistry Supervisor A.

At approximately 1521 hours, RP Specialist A prepared the release document for LWR276. The release document specified 5 Discharge Rates for AMT C in gallons per minute (gpm) with a Minimum Low Pressure Service Water (RL) Flow for each Discharge Rate. This information is provided on Page 1 of the release document (Release Rate Determination Form) in part C. Dilution Requirements and is shown as follows for LWR276:

C. Dilution Requirements

Discharge Rates (GPM)	Minimum RL Flow (GPM)
250	1.97 E+05
200	1.58 E+05
150	1.18 E+05
100	7.89 E+04
50	3.94 E+04

On October 24, between 0730 hours and 0800 hours, Chemistry Specialist A obtained LWR276 release documents from RP and initiated OP/0/B/6500/60, Discharge of an AMT to the Environment. Chemistry Assistant Technician B assisted with LWR276 and provided the necessary independent verification (I.V.) where applicable. RL flow rate was 57,000 gpm at the time.

At 0946 hours, Chemistry Specialist A selected the AMT C Discharge Rate of 250 gpm and the Minimum RL Flow (dilution flow) of 1.97 E+05 by circling these

values on the release document per Section 3.2.17 of OP/0/B/6500/60. Chemistry Assistant Technician B independently verified that Chemistry Specialist A selected these values. Specialist A and Assistant Technician B initialed the procedure section 3.2.17, but Specialist A signed the release document also because there is a signature required upon completion of this section. Specialist A and Assistant Technician B misread the exponent of E+05 on the Minimum RL Flow of 1.97 E+05 and thought that the value was 19,700 gpm. Thus, Specialist A and Assistant Technician proceeded with the release preparations.

Immediately prior to the release initiation, Specialist A documented the RL Flow Rate as 57,000 gpm on the release document and documented the RL Flow Interlock set at 25,000 gpm which ensured a minimum of 25,000 gpm dilution flow throughout the release. If the RL Flow Rate dropped below 25,000 gpm, the release would have been automatically terminated.

At 1000 hours, LWR276 was initiated, and at 1120 hours, LWR276 was terminated. Thus, between 1000 hours and 1120 hours, with Unit 1 in Mode 1, Power Operation, at 100% power and Unit 2 in Mode 5, Cold Shutdown, a T/S Violation occurred due to exceeding the LWR limits because inadequate dilution flow was available for the LWR discharge rate selected. During LWR276, 18218 gallons of radioactive water was released.

At approximately 1400 hours, Chemistry Assistant Technician B discussed the Minimum RL Flow required for LWR277 with Specialist C. Assistant Technician B thought that there was an error in the LWR computer program because the Minimum RL Flow required was 3.14 E+05 gpm for the discharge rate of 250 gpm.

Assistant Technician B discussed the abnormally high Minimum RL Flow required for LWR277 with RP Specialist B. RP Specialist B informed Chemistry Assistant Technician B that the abnormally high Minimum RL Flow was required because the Iodine 131 activity was high. At this point, the Chemistry Assistant Technician B questioned the Minimum RL Flow for the previous LWR (276). The RP Specialist reviewed LWR276 and discovered that the Minimum RL (dilution) Flow required was 1.97 E+05 and that the RL Flow Rate of 57,000 gpm during the release was inadequate. The RP Specialist concluded that a T/S violation may have occurred.

The RP Specialist notified RP Scientist A, who concluded that a T/S Violation had occurred. The RP Scientist A notified the RP Shift General Supervisor, who initiated a Problem Investigation Report (PIR) Number O-C91-0398.

CONCLUSION

This incident is attributed to Inappropriate Actions, lack of attention to detail, due to Chemistry Specialist A and Assistant Technician B misreading the exponent of E+05 on the Minimum RL Flow for the release. Specialist A and

Assistant Technician B misreading the exponent as E+04 allowed the release of LWR276 with inadequate RL dilution flow resulting in a violation of T/S, Section 3.11.1.1. The IV performed by Assistant Technician B was less than adequate, and is considered a contributing factor.

T/S Section 3.11.1.1 states that the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to the concentrations specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 uCi/ml. LWR276 contained 20 radioactive isotopes. Of these 20 radioactive isotopes, only 1 radioactive isotope, I-131, exceeded the 10CFR20 Maximum Permissible Concentration (MPC) at the point of discharge into Lake Wylie. The I-131 MPC limit per 10CFR20 is 3E-7 uCi/ml. The diluted I-131 concentration released into Lake Wylie was 4.48 E-7 uCi/ml. 10CFR20, Appendix B also states that if the identity and concentration of each radionuclide in the mixture are known, the limiting values should be derived as follows. Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix B for the specific radionuclides when not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e., unity). The ratio of the diluted I-131 concentration to the MPC value is 1.5 which exceeds the limit of 1 without adding the ratios of the other radionuclides released during LWR276.

When this incident was discovered, an RP Scientist, an RP General Supervisor, and a Chemistry Supervisor were notified. The RP General Supervisor issued PIR 0-C91-0398 and notified Compliance. The Chemistry Supervisor investigated the incident and counselled the Chemistry Specialist A and the Chemistry Assistant Technician B due to the Inappropriate Actions taken in performing LWR276. The Chemistry Supervisor stated that LWR276 should have never occurred because the Discharge Rate would have been restricted to 50 gpm to comply with the required Minimum RL Flow. Using 50 gpm as the Discharge Rate for LWR276 could have resulted in AMT pump damage because the pump is not designed to operate at this low flow rate. The WL System engineer also confirmed that the AMT pumps should not be operated in this range. The Chemistry Technicians were aware that the 50 gpm Discharge Rate could not be used for AMT releases. The Chemistry Supervisor stated that the AMT C water should have been reprocessed to reduce the radioactivity to acceptable levels per 10CFR20.

The Chemistry Supervisor also stated that the K Demineralizer had become exhausted and this is the reason that the I-131 concentration was so high in AMT C. K Demineralizer was removed from service and J Demineralizer was placed in service. K Demineralizer resin will be sluiced (removed).

The Chemistry Supervisor communicated this incident to all Chemistry personnel

qualified to perform LWRs. The Chemistry Supervisor also issued a Technical Memorandum to the qualified Chemistry personnel to communicate potential improvements to the release document through changes to the LWR computer program.

Planned corrective actions include changing the LWR computer program to improve the information provided on the release document, and changing HP/0/B/1004/04 and OP/0/B/6500/60 to include the LWR computer program changes.

A review of the Operating Experience Program Data Base for the previous 24 months revealed that there have been no other incidents (Licensee Event Reports) in which release limits violated T/S due to Inappropriate Action, lack of attention to detail. Therefore, this incident is not considered a recurring problem in accordance with Nuclear Safety Assurance guidelines.

CORRECTIVE ACTION

SUBSEQUENT

1) Chemistry Specialist A and Assistant Technician B were counselled due to a lack of attention to detail.

2) This incident was communicated to all Chemistry personnel involved in performing LWRs.

3) The Chemistry Supervisor issued a Technical Memorandum informing qualified Chemistry personnel of potential improvements to the release document through changes to the LWR computer program.

PLANNED

1) The LWR computer program will be changed to improve the information provided on the release document.

2) RP procedure HP/0/B/1004/04, Radioactive Liquid Waste Release, will be changed to include the LWR computer program changes.

3) Chemistry procedure OP/0/B/6500/60 will be changed to include the LWR computer program changes.

SAFETY ANALYSIS

During this incident, the inadequate dilution flow for LWR276 resulted in only 1 radioactive isotope (I-131) exceeding the limit specified in 10CFR20, Appendix B, Table II, Column 2 per T/S 3.11.1.1. This limit ensures that the levels of radioactive materials in liquid effluents in UNRESTRICTED AREAS will result in exposures within the Section IIA design objectives of Appendix I,

10CFR50, to a MEMBER OF THE PUBLIC, which are less than or equal to 3 millirem (mrem)/year total body dose and less than or equal to 10 mrem/year to any organ. These limits are also specified in T/S 3.11.1.2 which also addresses quarterly limits of less than or equal to 1.5 mrem/quarter to the whole body and less than or equal to 5 mrem/quarter to any organ.

The resultant dose calculations for LWR276 are as follows:

4.24 E-02 mrem (maximum organ thyroid dose for child consumption of fish)

3.58 E-03 mrem (total body dose for adult fish consumption)

These calculations are based on 57,000 gpm dilution available during LWR276.

The maximum organ dose of 4.24 E-02 mrem attributed to LWR276 is .424% of the yearly organ dose limit and is .848% of the quarterly organ dose limit.

The 3.58 E-03 mrem total body dose attributed to LWR276 is .12% of the yearly total body dose limit and is .24% of the quarterly total body dose limit. Therefore, the potential dose attributed to this incident is actually less than indicated in these calculations because no credit is taken for the radioactive decay of the isotopes prior to the release into Lake Wylie. The radioactive concentrations used in these calculations are based on the sample date and time of October 23, 1991, at 0920 hours. The LWR occurred on October 24, 1991, at 1000 hours, which provided over one day for radioactive decay to further reduce the dose attributed to this incident. The half life for I-131 is 8.04 days.

The Final Safety Analysis Report (FSAR), Section 15.7.2, analyzes a Radioactive Liquid Waste (WL) System leak or failure. The accident is defined as the uncontrolled atmospheric release from the 112,000 gallon recycle holdup tank due to the postulated rupture of the tank. The tank is the highest potential atmospheric release source because of its activity level and volume. The resultant Offsite Doses are 1.3 Rem Whole Body and 3.0 Rem Thyroid per Table 15-14 of the FSAR, page 15-36. Thus, a comparison of the resultant doses from LWR276 to the Offsite Doses from a leak or failure of the WL System reveals that the Whole Body dose from LWR276 was 2.76 E-4% and the Thyroid dose from LWR276 was 1.42 E-3% of the Offsite Doses per the FSAR. Therefore, the dose attributed to LWR276 is not significant, and this incident had no affect on the health and safety of the public.