

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 1										PAGE (3) 1 OF 0 5																														
TITLE (4) Cold Leg Accumulator Discharge Isolation Valve Motor Operators Found To Contain Non-Environmentally Qualified Terminal Blocks Due To Manufacturing Deficiency																																																		
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 Catawba, Unit 2												DOCKET NUMBER(S) 0 5 0 0 0 4 1 4											
0 1			2 0			8 8			8 8			0 0			5 0			0 0			0 2			1 9			8 8			0 5 0 0 0 0 0 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 0 0									20.402(b)									20.405(e)									50.73(a)(2)(iv)									73.71(b)														
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									20.405(a)(1)(ii)									50.36(e)(2)									50.73(a)(2)(vii)									<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 365A)														
									20.405(a)(1)(iii)									50.73(a)(2)(i)									50.73(a)(2)(viii)(A)									Voluntary LER														
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LICENSEE CONTACT FOR THIS LER (12)																																																		
NAME Ju. io G. Torre, Associate Engineer - Licensing																				TELEPHONE NUMBER 710 14 317 13 1-18 1012 19																														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																		
CAUSE		SYS EM		COMPONENT		MANUFAC-TURER		REPORTABLE TO NPD'S		CAUSE		SYSTEM		COMPONENT		MANUFAC-TURER		REPORTABLE TO NPD'S																																
SUPPLEMENTAL REPORT EXPECTED (14)																				EXPECTED SUBMISSION DATE (15)										MONTH DAY YEAR																				
YES (If yes, complete EXPECTED SUBMISSION DATE)																				<input checked="" type="checkbox"/> NO																														

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

On January 20, 1988, while reviewing connection diagrams for a Duke Power Engineer discovered that the Cold Leg Accumulator (CLA) Discharge Isolation valves' motor operators contained terminal blocks manufactured by the Buchanan Company which were potentially not qualified for use in Containment. The Valve Motor Operators (VMOs) in question were supplied by Westinghouse Electric Corporation, who purchased them from Limitorque Corporation and provided the specifications. The CLA Discharge Isolation valves were declared inoperable and inspected. Unqualified terminal blocks were verified to be present. At the time this incident was discovered, Unit 1 was in Mode 5, Cold Shutdown, and Unit 2 was in No Mode, defueled. However, both Units have operated in all modes with the valves containing non-environmentally qualified terminal blocks since initial startup. This incident has been attributed to a manufacturing deficiency. The valve supplier did not ensure that the VMOs it provided met the requirements of the Design Specifications, and the VMO manufacturer did not ensure that environmentally qualified terminal blocks were utilized during the manufacturing process. The unqualified terminal blocks were then replaced with qualified Raychem splices on both Units. The unqualified components did not render the CLAs inoperable because the valves were left in the open position with their power removed during required operational modes. The CLAs were available to perform their safety function at all times, and no Technical Specification violation occurred. This incident was determined to be non-reportable, and this report is being submitted as a voluntary LER for information purposes only. The health and safety of the public were unaffected by this event.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104  
EXPIRES 8/31/85

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TEXT: If more space is required, use additional NRC Form 366A's (17)

BACKGROUND:

The Cold Leg Accumulators (EIIS:ACC) (CLAs) are part of the Emergency Core Cooling System (EIIS:JC) (ECCS) and are intended to help mitigate the consequences of an intermediate or large break loss of coolant accident (LOCA). There are four CLAs per Unit at Catawba, each connected to a separate cold leg in the Reactor Coolant (EIIS:AB) (NC) System. The system is designed to passively inject heavily borated water into the NC System when the NC pressure decreases below the nitrogen cover gas pressure in the CLA tanks (EIIS:TK) (approximately 600 psig).

Each CLA discharge line contains a motor (EIIS:MO) operated gate valve (EIIS:V) followed by two swing check valves in series. The purpose of the motor operated CLA Discharge Isolation valves is to provide the capability to isolate the CLAs from the NC System when the Unit is shutdown and depressurized. These valves will automatically open on a Safety Injection signal if closed, as long as the power supplies are connected. However, Technical Specification 3.5.1.1.1 requires that the valves be open in Mode 3, Hot Shutdown, or above. If the valve is not open in these modes, the CLA is considered to be inoperable regardless of the status of the power supplies. In addition, administrative controls exist to ensure that power is removed from these valves at all times, except when the valves are required to move during startup or shutdown. The valve breakers (EIIS:PBK) are padlocked in the OPEN position in order to prevent inadvertent operation and satisfy single failure criteria. The CLA Discharge Isolation valves are not required to move during power operation or in a post accident situation.

10CFR 51.49 defines the requirements for environmental qualification (EQ) of electrical equipment important to safety in a nuclear power plant. Design Engineering has the responsibility for specifying the applicable environmental parameters in procurement documents and reviewing and approving qualification documentation provided by vendors.

DESCRIPTION OF INCIDENT:

On February 25, 1974, Duke Power Company issued Design Specification CNS-1205.00-8, Revision 0, for ASME Section III Stainless Steel Gate, Globe, and Check Valves. The specification stated that all electric valve operators intended for inside Containment applications must conform to IEEE Standard 323-1971, General Guide for Qualifying Class 1 Electric Equipment for Nuclear Power Generating Stations. In addition, the specification stated that valves must be capable of withstanding an integrated radiation dose of 2ES rads without loss of integrity or function. Duke Power contracted Westinghouse to supply the CLA Discharge Isolation valves in accordance with this specification (purchase order A-98524). Westinghouse ordered electric valve motor operators (VMOs) for these valves from Limitorque Corporation. The VMOs ordered were Limitorque model number SDB-3-150. Environmental Qualification (EQ) documentation for this type of VMO is provided in Limitorque report number 600456.

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TEXT (if more space is required, use additional NRC Form 366A's) (17)

On May 5, 1978, the original Duke Power connection diagrams for Catawba Nuclear Station (CNS) CLA Discharge Isolation valves were approved by Design Engineering. These drawings showed terminal blocks (EIIS:BLK) on the VMOs and contained a note saying that the valves deviated from standard in order to conform with a Westinghouse supplied manufacturer's drawing. The CLA Discharge Isolation valves were subsequently installed in Units 1 and 2 with the unqualified motor power terminal blocks. On October 22, 1984, Unit 1 entered Mode 3, Hot Standby, for the first time. Unit 2 entered Mode 3 on April 23, 1986, for the first time.

On January 20, 1988, a Duke Power Design Engineer was reviewing connection diagrams for CNS safety related motor operated valves in order to determine if any VMOs had terminal blocks (in preparation for an upcoming NRC EQ inspection). He discovered the terminal blocks on the CLA Discharge Isolation VMOs and suspected that they may not be qualified for use in Containment. The Design Engineer contacted Limitorque Corporation and learned the terminal blocks were documented as being Buchanan model 0824 (which are made of nylon and rated at 1E5 cumulative rads). He contacted Limitorque again to verify this and was told that Westinghouse had ordered and provided Limitorque with specifications for these VMOs. The Design Engineer then verified that the CLA Discharge Isolation valves were on the required operability list and originated a Problem Investigation Report at approximately 1100 hours to notify appropriate station personnel of the potentially unqualified equipment. The CLA Discharge Isolation valves were declared inoperable at 1452 hours. IAE personnel wrote Work Requests 8835 IAE (Unit 1) and 8827 IAE (Unit 2) to inspect the VMOs and determine if the terminal blocks were unqualified. Only the motor power terminal blocks were found to be unqualified. Control power terminal blocks were found to be satisfactory. The motor power terminal blocks were replaced with qualified Raychem Splices on January 22, 1988, (Unit 1) and January 26, 1988, (Unit 2) under Nuclear Station Modification work requests.

CONCLUSION:

This incident has been attributed to a manufacturing deficiency. The VMOs were manufactured with nylon Buchanan model terminal blocks, which are not qualified for use in Containment due to the relatively low radiation rating of 1E5 cumulative rads. The Duke Power Design Specification utilized during procurement of the valves and VMOs specified that the valves must be qualified to 2E8 rads and that the VMOs must be in accordance with IEEE Standard 323-1971. Westinghouse supplied the specifications for the VMOs to Limitorque Corporation. Westinghouse maintains that they ordered VMOs qualified for inside Containment use and that the unqualified terminal blocks should not have been used by Limitorque. Limitorque has stated that Westinghouse approved the final Bill of Materials for the VMOs.

The use of unqualified terminal blocks in the CLA Discharge Isolation VMOs is apparently an isolated incident. The use of terminal blocks in VMOs is contrary to Duke Power's standard construction procedures and the review of the connection diagrams indicated no other affected valves inside Containment. One valve was found outside Containment. There has been one previous incident investigation report at CNS involving non-environmentally qualified components being discovered

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in Limitorque VMOs. Duke power Incident Investigation Report (IIR C86-112-1) documented the discovery of unqualified wiring that was attributed to a Manufacturing Deficiency. The VMOs involved in this incident were inspected but the unqualified terminal blocks were not discovered at this time. At the time, the personnel performing the inspections had no reason to believe the terminal blocks were unqualified and the inspections were limited to the wiring. This is considered to be a recurring event.

CORRECTIVE ACTION:SUBSEQUENT

- (1) The CLA Discharge Isolation valves were declared inoperable.
- (2) IAE originated two work requests and inspected the terminal blocks to determine if they were environmentally qualified.
- (3) Unqualified motor power terminal blocks for all Unit 1 and 2 CLA Discharge Isolation valves were replaced with qualified Raychem splices (under NSM work requests).
- (4) Design Engineer completed his review of the connection diagrams and verified that no other safety related VMOs used in Containment are documented to contain terminal blocks.

SAFETY ANALYSIS:

The non-environmentally qualified motor power terminal blocks did not affect the ability of the CLAs to perform their safety function in the event of a LOCA. The CLA Discharge Isolation valves are required by Technical Specifications to be open with power removed in all operational modes above Mode 3, Hot Shutdown. The valves are also required to be open in Mode 3 before NC System pressure exceeds 1000 psig. A review of past Incident Investigation Reports (IIRs) for Catawba has revealed only one incident involving the CLA Discharge Isolation valves in which this Technical Specification was violated. LER 413/85-15 reported an incident in which the valves were open with power removed, however, the valve breakers were not padlocked as required. This incident concurrent with the non-environmentally qualified terminal blocks would still not have prevented the CLAs from functioning as designed.

During a normal cooldown and depressurization, the Control Room Operators are required to restore power to these valves and shut them as NC pressure drops below 1000 psig. This is to prevent discharging the contents of the CLAs into the NC System. If the valves did not respond due to the unqualified terminal blocks, the Unit could still be placed in Mode 5, Cold Shutdown. The CLAs would discharge, resulting in additional fluid that would require processing in the Boron Recycle System, but no nitrogen would enter the NC System as long as pressure remained above approximately 165 psia. This pressure could easily be maintained as long as NC System integrity was maintained. If it became necessary to further decrease NC System pressure, the CLA nitrogen gas could be vented into



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Containment using existing operating procedures and without leaving the Control Room. The Containment Design Evaluation performed in the Final Safety Analysis Report (FSAR) Section 6.2.1.1.3.1 states that the evaluation of peak Containment pressure during a LOCA includes nitrogen from the accumulators in the calculation. Therefore, the venting of CLA nitrogen gas into Containment would not challenge Containment Integrity. In addition, the CLA Discharge Isolation valves could be manually closed by making an entry into Containment if necessary.

During a postulated large break LOCA as analyzed in the FSAR Chapter 15, the NC System pressure rapidly decreases to a value approaching that of Containment pressure. The CLAs empty into the core within two minutes. No credit is taken in this analysis for the CLA Discharge Isolation valves moving either automatically or manually. It is assumed that the Control Room Operators take no action to close these valves after the CLAs have emptied, thus preventing nitrogen from entering the NC System. Therefore, the FSAR analysis is still bounding with respect to CLA operation during a LOCA.

This report is being submitted as a voluntary LER for information purposes only.

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

DUKE POWER COMPANY

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February 19, 1988

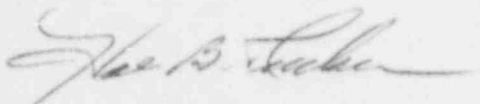
Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Units 1 and 2  
Docket Nos. 50-413 and 50-414  
LER 413/88-05

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Licensee Event Report 413/88-05 concerning the discovery of non-environmentally qualified terminal blocks in cold leg accumulator discharge isolation valve motor operators due to a manufacturing deficiency. This event was considered to be of no significance with respect to the health and safety of the public. This voluntary report is being submitted for information purposes only.

Very truly yours,



Hal B. Tucker

JGT/1441/sbn

Attachment

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