Commonwealth Edison
Dresden Nuclear Power Station
R.R. #1
Morris, Illinois 60450
Telephone 815/942-2920

September 11, 1989

EDE LTR #89-702

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

Licensee Event Report #89-023-0, Docket #050237 is being submitted to provide additional information regarding a courtesy ENS phone call made on August 11, 1989.

L. F. Gerner for
E.D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/jt

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
File/NRC
File/Numerical

0659k

TE22
/1

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Dresden Nuclear Power Station, Unit 2/3	0 5 0 0 0 2 3 7	1 of 0 6

Title (4)

Possible Single Failure Loss of Unit 2 ACAD/CAM or Unit 3 CAM Due to a Design 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	Docket Number(s)
									Dresden Unit 3	0 5 0 0 0 2 4 9
0 8	1 1	8 9	8 9	0 2 3	0 0	0 9	1 1	8 9	N/A	0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 0 6 8

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (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)	X Other (Specify in Abstract below and in Text) voluntary
___ 20.405(a)(1)(iii)	___ 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	
Daniel G. Daly, Technical Staff Engineer Ext. 2347	8 1 5	9 4 2 - 2 9 2 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	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 August 11, 1989, during normal Unit 2 and Unit 3 operation at 68% and 99% rated core thermal power respectively, it was determined that a single failure could render the Unit 2 Atmospheric Containment Atmosphere Dilution (ACAD) system or Containment Atmosphere Monitoring (CAM) system or the Unit 3 CAM system inoperable. The root cause has been attributed to a design deficiency in the AC power supply to these systems. ACAD and CAM operating procedures have had temporary procedure changes implemented to inform operators of the loss of these systems during the postulated events described. Engineering is evaluating potential fixes to the design deficiency. A similar previous occurrence was reported in LER 89-013, Possible Single Failure Loss of Both Standby Gas Treatment Systems Due to a Design Deficiency. This report is being submitted to provide additional information regarding a "courtesy" ENS phone call made on August 11, 1989, at 1420 hours.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) Year	Sequential Number	Revision Number	Page (3)
Dresden Nuclear Power Station	0 5 0 0 0 2 3 7	8 9	- 0 2 3	- 0 0	0 2 OF 0 6

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 MWt rated core thermal power.

Nuclear Tracking System (NTS) tracking code numbers are identified in the text as (XXX-XXX-XX-XXXXX).

EVENT IDENTIFICATION:

Possible Single Failure Loss of Unit 2 ACAD/CAM or Unit 3 CAM Due to a Design Deficiency

A. CONDITIONS PRIOR TO EVENT:

Unit(s): 2(3) Event Date: August 11, 1989 Event Time: 1200 hours

Reactor Mode(s): N(N) Mode Name(s): Run(Run) Power Level: 68%(99%)

Reactor Coolant System (RCS) Pressure(s): 968(1005) psig

B. DESCRIPTION OF EVENT:

On August 11, 1989, at 1200 hours during normal Unit 2 and Unit 3 operation in the Run modes at 68% and 99% rated core thermal power respectively, it was determined that a design deficiency existed with the Unit 2 Atmospheric Containment Atmosphere Dilution/Containment Atmosphere Monitoring (ACAD/CAM) system and the Unit 3 CAM system. This determination resulted from an independent architectural engineer consulting firm review of the potential effects of DC power failures on Dresden Unit 2 and 3 shared systems. It was discovered that in the event of a Loss of Coolant Accident (LOCA) in conjunction with a Loss of Offsite Power (LOOP) and the failure of the Unit 2 Diesel Generator [EK] or either the Unit 2 or Unit 3 125 Volt DC Battery system [EJ], both Unit 2 ACAD system trains could be rendered inoperable until power could be locally restored to either one of the trains. Although the ACAD system has been included in the Unit 2 Updated Final Safety Analysis Report (UFSAR), the ACAD system design has never been approved by the Nuclear Regulatory Commission (NRC) and as such is not considered part of the design basis or licensing basis of the plant. Also, the ACAD system is not credited in the Dresden Emergency Operating Procedures.

In addition to identifying the design problems with the ACAD system, the architectural engineering firm identified a design problem with the CAM system for both Units 2 and 3. In the event of a LOCA with a LOOP and the failure of the Unit 2/3 Diesel Generator [EK], the power supply to the redundant train of the CAM system (B Train) would be load shed rendering the Primary Containment Hydrogen/Oxygen (H_2/O_2) and High Radiation Monitoring system (B channel) temporarily inoperable until operator action restored the power supply via Motor Control Center (MCC) 29-3/39-3 [ED]. In spite of the design problem, the radiation monitor logic would trip in the conservative direction initiating a Group II Primary Containment Isolation [JM].

The NRC Resident Inspector was made aware of the situation, and a "courtesy" ENS phone call was made. Temporary procedure changes were made to Dresden Operating Procedure (DOP) 2500-1, ACAD Dilution Subsystem Operation, and DOP 2400-1, CAM System H_2 Detection Subsystem Operation, to add a precaution to make the operator aware of the unavailability of equipment as described above.

C. APPARENT CAUSE OF EVENT:

This report is being submitted voluntarily to provide additional information regarding a "courtesy" ENS phone call made on August 11, 1989, at 1420 hours. The root cause of this event has been attributed to a design deficiency.

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

There are two redundant ACAD system trains (A and B) per unit. The dilution air portion of the ACAD system relies on shared air compressors. Unit 2 ACAD air compressor 2-2501 feeds ACAD Train A for both units and Unit 3 ACAD air compressor 3-2501 feeds ACAD Train B for both units. Unit 2 ACAD air compressor 2-2501 is powered from 480 Volt MCC 29-1 and Unit 3 ACAD air compressor 3-2501 is powered from 480 Volt MCC 39-1. The Unit 2(3) ACAD Train A valves are powered from the 120 Volt distribution panel of 480 Volt MCC 28-2(38-2) [ED] and the Unit 2(3) ACAD Train B valves are powered from the 120 Volt distribution panel of 480 Volt MCC 29-3(39-3) [ED]. The power supplies for the ACAD system are depicted in the attached single line electrical diagram (Figure 1).

If a LOCA occurred on Unit 2 concurrently with a LOOP (both Units) and a loss of the Unit 2 Diesel Generator, both Unit 2 ACAD Trains (A and B) would be inoperable. The Unit 2 ACAD air compressor 2-2501 (Unit 2 Train A dilution) would be inoperable since it is ultimately powered by the Unit 2 Diesel Generator. The Unit 3 ACAD air compressor 3-2501 (Unit 2 Train B dilution) would be operable; however the Unit 2 ACAD Train B valves would be inoperable, since they are ultimately powered by the Unit 2 Diesel Generator. Thus, both Unit 2 trains of ACAD would be unavailable.

If a LOCA occurred on Unit 2 concurrently with a LOOP (both units) and a loss of the Unit 2 125 Volt DC Battery System, both Unit 2 ACAD Trains (A and B) would be inoperable. The Unit 3 Diesel Generator would be inoperable since the Unit 3 Diesel Generator start circuits rely on the Unit 2 125 Volt DC Battery System. Unit 3 ACAD air compressor 3-2501 (Unit 2 Train B dilution) would be inoperable since it is ultimately powered from the Unit 3 Diesel Generator. The 2/3 Diesel Generator would not be available to Unit 2 because the Unit 2 Division I electrically operated switchgear breakers need the Unit 2 125 Volt DC Batteries to operate. Although the Unit 2 ACAD air compressor (Unit 2 Train A dilution) would be available, the ACAD Train A valves would be inoperable since they are ultimately powered by the Unit 2/3 Diesel Generator. Consequently, both Unit 2 Trains of ACAD would be unavailable.

If a LOCA occurred on Unit 2 concurrently with a LOOP (both Units) and a loss of the Unit 3 125 Volt DC Battery System, both Unit 2 ACAD Trains (A and B) would be inoperable. The Unit 2 Diesel Generator would be inoperable since the Unit 2 Diesel Generator start circuits rely on the Unit 3 125 Volt DC Battery System. Unit 2 ACAD air compressor 2-2501 (Unit 2 Train A dilution) would be inoperable since it is ultimately powered by the Unit 2 Diesel Generator. Although the Unit 3 ACAD air compressor (Unit 2 Train B dilution) would be available, the ACAD Train B valves would be inoperable since they are ultimately powered by the Unit 2 Diesel Generator. Consequently, both Unit 2 Trains of ACAD would be unavailable.

If a LOCA occurred on Unit 2(3) concurrently with a LOOP on Unit 2(3) and loss of the 2/3 Diesel Generator, the CAM system for Unit 2(3) would be inoperable. The normally closed Unit 2(3) Train A H_2/O_2 analyzer inlet valves and the Unit 2(3) A Drywell High Radiation Monitor [IL] would be inoperable since they are ultimately powered by the Unit 2/3 Diesel Generator. MCC 29-3(39-3) is fed from Bus 29(39). Load shedding caused by the LOOP would trip the breaker between Bus 29(39) and MCC 29-3(39-3). The normally closed Unit 2(3) Train B H_2/O_2 analyzer inlet valves and the Unit 2(3) B Drywell High Radiation Monitor would be inoperable since they are powered by MCC 29-3(39-3). Consequently, the Unit 2(3) CAM System would be inoperable until power can be restored to MCC 29-3(39-3).

D. SAFETY ANALYSIS OF EVENT:

ACAD/CAM is provided in order to assure that containment integrity is not endangered due to a postulated ignition and combustion of flammable gas mixtures following a LOCA. This protection supplements that provided by the Emergency Core Cooling systems and the Primary Containment Nitrogen Inerting system. Primary containment radiation and hydrogen levels are monitored, and control of the postulated gas concentrations is accomplished by providing for dilution of the evolved hydrogen with air. The concentration of combustible gases in the primary containment following a LOCA is monitored by CAM and can be controlled via air dilution by ACAD.

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

The CAM system consists of redundant hydrogen and radiation monitoring subsystems in primary containment. The monitoring system is intended to automatically activate upon the occurrence of a LOCA. The system will remain in operation at all times after initiation, unless turned off with a keyswitch.

The ACAD system controls gas concentrations following a LOCA by diluting the evolved hydrogen with air. The system prevents the hydrogen concentration in the primary containment from exceeding the allowable level of 4%, as established in Regulatory Guide 1.7 and Branch Technical Position CSB-2. The resulting pressure increase in the primary containment is controlled to well below the design pressure by intermittent bleeding of the primary containment atmosphere into the Standby Gas Treatment (SBGT) system [BH].

Following a LOCA, the combustible gas concentration in both the torus and drywell atmospheres is postulated to increase due to radiolysis and water-metal reactions. This buildup of hydrogen gas will be observed by the control room operator via hydrogen monitoring instrumentation. The hydrogen concentration in both the drywell and torus will continue to increase due to radiolysis, and if allowed to do so is postulated to eventually approach the 4% by volume control limit. Introduction of dilution air prevents the concentration of combustible gases from reaching 4% by volume, however, the introduction of dilution air also increases the primary containment internal pressure. The introduction of dilution air could continue intermittently as necessary to keep hydrogen concentration below the control limit, until the primary containment high pressure operating limit is reached. At this time, the pressure bleed system will isolate and the dilution air stopped (if in operation) by the Primary Containment ACAD System Isolation logic. The primary containment atmosphere may then be bled off through the selected redundant loop and routed to the SBGT system thereby reducing the primary containment pressure. Dilution of the primary containment will continue until the generation of combustible gases has ceased or been reduced to an insignificant level.

The ACAD system is intended for manaual initiation from the control room when the hydrogen concentration in the primary containment reaches 3.5% volume. An alarm will be annunciated by the CAM system once the high hydrogen setpoint is reached. Primary containment dilution would continue until hydrogen concentration falls below 3.3%.

Although the ACAD system has been included in the Unit 2 UFSAR, the ACAD system design has never been approved by the NRC and as such is not considered part of the design basis or licensing basis of the plant. At this time, the necessity of ACAD is an unresolved issue with the NRC and therefore its ultimate resolution is still under review. Additionally with the ACAD system inoperable, vent and purge capabilities for the drywell and torus remain available. Furthermore, the High Radiation Sample System (HRSS) [IP] is designed to monitor containment atmosphere for combustible gas mixtures during a post accident condition. Lastly, the likelihood of a LOCA concurrent with a LOOP and failure of the Unit 2 Diesel Generator or the Unit 2/3 Diesel Generator or either Unit's 125 Volt DC Battery system is extremely remote.

For the above reasons, the safety significance of this event is considered to be minimal.

E. CORRECTIVE ACTIONS:

The immediate corrective actions involved changing procedures DOP 2500-1, ACAD Dilution Subsystem Operation, and DOP 2400-1, CAM System H_2 Detection Subsystem Operation, to precaution the operator of the unavailability of the equipment affected by the design deficiency. Vent and purge operation for the control of hydrogen accumulation in the containment will be addressed in the next revision of the Dresden Emergency Operating Procedures (DEOPs) which implements Revision 4 of the Owners' Group Emergency Operating Procedures. These revised DEOPs are currently scheduled to be implemented by December 31, 1989. Boiling Water Reactor (BWR) System Engineering is also evaluating potential fixes for long term corrective actions for the CAM system (200-237-89-12301).

F. PREVIOUS EVENTS:

LER/Docket Number	Title
89-013/050237	Possible single Failure Loss of Both Standby Gas Treatment (SBGT) Systems Due to a System Deficiency It was discovered that during a postulated LOCA on Unit 3 concurrent with a LOOP on Unit 3, a failure of the Unit 2 125 Volt DC Battery system would render both the A and B SBGT trains inoperable due to a design deficiency in the AC power supply to the SBGT system. The long-term corrective action was to initiate a modification to modify the AC feeds to the A SBGT train to ensure that at least one SBGT train remains operable during the proposed scenario.

G. COMPONENT FAILURE DATA:

Since there were no component failures during this event, an industry-wide NPRDS search was not performed.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION — Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) Year	Sequential Number	Revision Number	Page (3)
Dresden Nuclear Power Station	0 5 0 0 0 2 3 7	8 9	- 0 2 3	- 0 0	0 6 OF 0 6

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

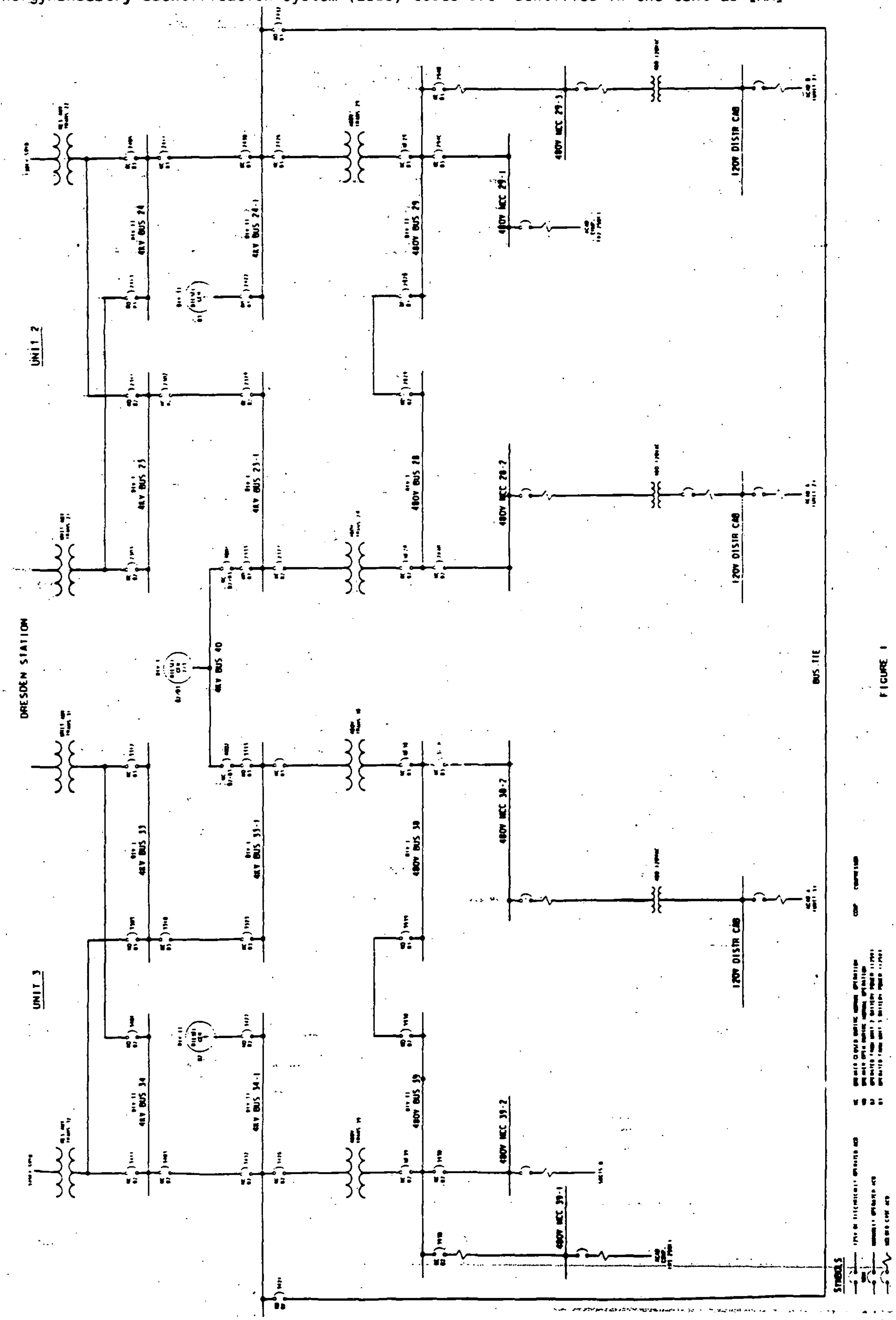

FIGURE 1