



**Entergy  
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September 7, 1994

1CAN099401

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Mail Station P1-137  
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
Voluntary Report 50-313/94-V01-00

Gentlemen:

Enclosed is the voluntary report concerning the Hydrogen Analyzer system.

Very truly yours,

Dwight C. Mims  
Director, Licensing

DCM/RHS

enclosure

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cc: Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-8064

Institute of Nuclear Power Operations  
700 Galleria Parkway  
Atlanta, GA 30339-5957

## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Arkansas Nuclear One, Unit One

DOCKET NUMBER (2)

05000313

PAGE (3)

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TITLE (4) Voluntary Report Concerning a Personnel Oversight During the Design Change Process Which Resulted in the Potential for a Blocked Hydrogen Analyzer Outlet Flowpath Being Undetectable During Functional Testing.

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
08	04	94	94	-- V01 --	00	09	07	94	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
POWER LEVEL (10)		100	20.402(b)		20.405(c)		50.73(a)(2)(iv)		70.71(b)	
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		70.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		<input checked="" type="checkbox"/> OTHER	
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Specify in Abstract Below and in Text	
			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

Richard H. Scheide, Nuclear Safety and Licensing Specialist

TELEPHONE NUMBER (Include Area Code)

501-858-5000

## 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)

YES		NO		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
(If yes, complete EXPECTED SUBMISSION DATE).		<input checked="" type="checkbox"/>					

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On August 4, 1994, at approximately 1110 CDT, it was determined by ANO Systems Engineering personnel that the functional test procedure for the Reactor Building hydrogen analyzers was not adequate to alert plant personnel of the presence of a blocked analyzer outlet flowpath and therefore, was not adequate to assure system operability. If the analyzer flowpath were to become blocked due to foreign material buildup, failure of the analyzer outlet check valve to open, or a manual isolation valve being closed, a recirculation flowpath would be established through the analyzer, the compressor, and the bypass line. The functional test, which is not a Technical Specifications required test, would not identify this condition since the system flow switch, which is in-line with the compressor, would not alarm to alert the operators that a sample was not being drawn from the Reactor Building. The bypass line and an additional compressor were added to the system in 1986 to improve sample transport time. The analyzers were conservatively declared inoperable at 1110 on August 4 and the provisions of Technical Specification 4.0.3 were implemented, allowing twenty-four hours to complete a valid functional test. The Hydrogen Analyzer test procedure was revised and a successful functional test was completed. The hydrogen analyzers were declared operable at 1751 on August 4. The cause of this condition was determined to be personnel oversight during the design change process. A memorandum regarding this event was issued to appropriate Engineering personnel for "lessons learned" purposes. Design change procedures in place at the present time are considered adequate to prevent occurrence of similar conditions. It was determined that this condition is not applicable to ANO-2. This is a voluntary report.

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION  APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
<b>LICENSEE EVENT REPORT (LER)</b> <b>TEXT CONTINUATION</b>		ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

### A. Plant Status

At the time this condition was identified, Arkansas Nuclear One, Unit-1 (ANO-1) was operating at approximately 100 percent power.

### B. Event Description

On August 4, 1994, at approximately 1110 CDT, it was determined by ANO Systems Engineering personnel that the functional test procedure for the Reactor Building hydrogen analyzers [BB] would not alert plant personnel of the presence of a blocked analyzer outlet flowpath and therefore, was not adequate to assure system operability.

In 1986, a design change was implemented on both trains of hydrogen analyzers which installed a bypass flowpath in parallel with the existing analyzer, compressor and in-line flow switch and added another compressor in the analyzer outlet path to decrease sample transport time from the Reactor Building to the analyzer.

The hydrogen analyzer functional test consists of ensuring that a proper system valve alignment exists, starting the sample compressors, verifying that the system low flow alarm clears, locally inspecting the analyzers, and operating the analyzers for one hour. While reviewing the procedure to verify that it was adequate to prove system operability, it was identified that it would not detect blockage in the analyzer outlet flowpath. If the analyzer outlet path were to become blocked due to foreign material buildup, a failure of the analyzer check valve to open, or the manual isolation valve being closed, a recirculation flowpath would be established through the analyzer, compressor and the bypass line. The flow switch, which is in-line with the compressor, would not alarm to alert the operator that a sample was not being drawn from the Reactor Building.

Upon discovering that the functional test procedure was inadequate to assure hydrogen analyzer operability, the analyzers were conservatively declared inoperable and the action requirements of Technical Specifications 4.0.3 were implemented. This specification allows delaying the applicable LCO action statement requirements for up to twenty-four hours to permit completion of a surveillance test. The procedure was revised and the hydrogen analyzer functional tests were successfully completed, assuring the analyzers were operable. The analyzers were declared operable at 1751 on August 4, 1994.

### C. Root Cause

The root cause of this condition was determined to be a personnel oversight during the design change process that installed the bypass line and the additional compressor. It was not identified during preparation of the design change that the bypass line created a potential recirculation path that would defeat the system flow switch function if the outlet flowpath was obstructed.

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Since the potential recirculation flowpath was previously unidentified, the hydrogen analyzer functional test procedure was not structured to identify an obstructed analyzer outlet flowpath.

#### D. Corrective Actions

The hydrogen analyzer functional test procedure has been revised by adding steps to verify that an outlet flowpath exists from the analyzers to the Reactor Building.

This condition was reviewed by ANO-2 Systems Engineering personnel and was determined not to be applicable to Unit-2 based on the piping configuration of the ANO-2 hydrogen analyzers.

A memorandum discussing this event was distributed to applicable Engineering organizations for "lessons learned" purposes.

The relocation of Design Engineering on-site in 1990 allows for increased Design Engineering involvement during the construction, testing, and closeout of design change packages. Additionally, the design change process has been substantially improved since the modification to the hydrogen analyzers was completed in 1986. The design change procedures in place at the present time require more detailed documented reviews of design changes and are considered adequate to prevent the occurrence of similar conditions.

#### E. Safety Significance

The successful completion of a valid functional test provided assurance that the hydrogen analyzers were operable.

The likelihood of the occurrence of undetected blockage of the analyzer outlet flowpath is low considering that the remotely controlled valves in the system are equipped with position indication and the manually operated valves are controlled by procedure. System transport time measurements performed in 1986 and 1990 verified that flow had remained consistent, indicating little, if any, foreign material buildup. Additionally, the system check valves have been demonstrated to be very reliable since there have been no known failures since installation. Therefore, this condition is considered to be of low safety significance.

#### F. Basis for Reportability

ANO-1 Technical Specifications require that both channels of hydrogen analyzers be operable. With respect to surveillance requirements, the specifications require only that the analyzers be calibrated once per 18 months. The functional test, which is performed monthly, is not a Technical Specifications required test. Based upon the results of the functional test, there were no indications that the hydrogen analyzers would not have previously performed their design requirement. Therefore, the discovered inadequacy in the procedure does not represent a



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reportable condition under 10CFR50.73. However, ANO believes that this condition is significant and that it may be of interest to the NRC. Therefore, a voluntary report is being submitted.

#### G. Additional Information

There have been no previous similar conditions reported by ANO in which a design change resulted in a functional test becoming inadequate.

Energy Industry Identification System (EIIS) codes are indicated in the text by [XX].