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DOCKET #
 05000269

SUBJECT: LER 88-015-00: on 890921, inoperable containment isolation
 valves following failure to test after maint/mod.

W/8 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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DUKE POWER

October 23, 1989

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/89-15

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 269/89-15 concerning inoperable containment isolation valves following failure to test after maintenance/modification (resulting from inappropriate action and management deficiency).

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

M. S. Tuckman
Station Manager

SWB/ftr

Attachment

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LECC
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Oconee Nuclear Station, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 2 6 9										PAGE (3) 1 OF 2 4																					
TITLE (4) Inoperable Containment Isolation Valves Following Failure to Test After Maintenance/ Modification Resulting From Inappropriate Action and Management 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)								
																											Oconee, Unit 2						0 5 0 0 0 2 7 0								
0 9			2 1			8 9			8 9			0 1			5			0 0			1 0			2 1			8 9			Oconee, Unit 3						0 5 0 0 0 2 8 7					
OPERATING MODE (9) N						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																																			
POWER LEVEL (10) 0 7 5						20.402(b)						20.408(e)						80.73(a)(2)(iv)						73.71(b)																	
						20.408(a)(1)(i)						80.38(a)(1)						80.73(a)(2)(v)						73.71(a)																	
						20.408(a)(1)(ii)						80.38(a)(2)						80.73(a)(2)(vi)						OTHER (Specify in Abstract below and in Text, NRC Form 306A)																	
						20.408(a)(1)(iii)						80.73(a)(2)(i)						80.73(a)(2)(vii)(A)																							
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20.408(a)(1)(vi)						80.73(a)(2)(iv)						80.73(a)(2)(ix)																													
LICENSEE CONTACT FOR THIS LER (12)																																									
NAME Henry R. Lowery, Chairman Oconee Safety Review Group																TELEPHONE NUMBER AREA CODE 8 1 0 3 8 1 8 5 1 3 1 0 3 1 4																									
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																									
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC				CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC																					
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 September 21, 1989, with Unit 1 at 75 % Full Power (FP) and Units 2 and 3 at 100 % FP, during procedure review for an upcoming test, an engineer discovered that Penetration 53 had not been properly vented and drained during previous 10CFR50, Appendix J, Type A Leak Rate Tests on all three units. Further investigation showed that on Units 1 and 2 Penetrations 39 and 53 had not been properly tested since a modification had installed new building isolation valves in 1982. Continued investigation found that on Unit 2 they had not been retested following valve replacement in June, 1989. Several other containment isolation valves were also found to have not been tested following maintenance. By Technical Specifications Type C testing is not required for these penetrations, but Type A testing is required. Root Causes include Inappropriate Action, and Management Deficiency. Corrective actions include closure of backup valves, modification of Penetration 53 on Unit 1 to permit Type C tests, requests for Technical Specification change and a Waiver of Compliance, and commitment for future modifications to enable Type C testing.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

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

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

BACKGROUND

Oconee Nuclear Station Units 1, 2 and 3, were designed and built in the late 1960s and early 1970s with Unit 1, 2, and 3 receiving Operating Licenses Feb 6, 1973, Oct 6, 1973 and Jul 19, 1974, respectively.

10CFR50 Appendix J was approved and issued February 3, 1973. Appendix J provides the requirements for leak rate testing the Containment Building [EIIS:NH] (Type A or Integrated Leak Rate Test), building penetrations [EIIS:PEN] equipped with resilient seals such as personnel air locks, and electrical penetrations (Type B), and piping penetrations (Type C). Type B and C are also referred to as Local Leak Rate Tests.

In August 1975, the NRC requested that Oconee and other plants review the provisions of 10CFR50, Appendix J, and determine if they were in full compliance, recognizing that existing Technical Specifications (TS) might not assure compliance with Appendix J. Subsequently, Duke Power performed an extensive review of all penetrations and Appendix J requirements and submitted a proposed revision to TS 4.4 to the NRC on November 30, 1976. This submittal also included requests for exemption from requirements where Duke Power considered compliance impractical or impossible with existing configurations and backfit was not justified. The proposed TS was approved in 1981. This approved TS 4.4 requires periodic Integrated Leak Rate Tests (Type A), and Local Leak Rate Tests (Type B and C) of specific penetrations. Penetrations 39, 53, 56 and 59 are all identified on Table 4.4-1 as being vented to atmosphere during the Type A test, and no Type C test required. In addition, TS 4.4.1.3 requires either Type A, B, or C testing, as appropriate, following modification or replacement of components affecting containment integrity.

Technical Specification 3.6 defines the conditions when containment integrity is required and specifies corrective actions when containment integrity is not met. TS 3.6.3c specifies that, when a containment isolation valve is inoperable, continued operation is allowed if the affected penetration is isolated within four hours by the use of a closed manual valve.

EVENT DESCRIPTION

NOTE: A Sequence of Events is included as Attachment 1. Piping arrangements for affected penetrations are shown on Attachment 2.

In 1979, the NRC issued OIE Bulletin 79-02. As a result of evaluations performed by Design Engineering (DE) as part of the response to Bulletin 79-02, DE determined that the piping associated with Penetrations 39 and

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMS NO 3190-0104

EXPIRES 8/31/88

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TEXT (if more space is required, use additional NRC Form 206A-1/17)

53 on all units could not be documented to meet seismic criteria from a point inside the reactor building wall to CF-8 and CF-10 [EIIS:V], which were Core Flood System [EIIS:BP] check valves used as containment isolation valves inside the building. The resolution to this problem was to install new check valves, CF-42 and CF-44, closer to the Reactor Building wall with additional hangers [EIIS:SPT] as required to upgrade the short runs of pipe. This work was performed as Nuclear Station Modification (NSM) 1328.

NSM 1328 was requested June 22, 1979. The new check valves and hangers were installed on Unit 3 between July 18, and September 4, 1979 during a refueling outage. The 10CFR50.59 safety evaluation for this revision to NSM 1328 was signed on June 22, 1979, and does not address the change of Penetrations 39 and 53 from a closed system, not expected to be open to post accident atmosphere, to a system which is expected to be open and, therefore, require testing. Under the NSM program in effect at that time, station groups were notified of NSMs after completion. The completion notices were initiated April 18, 1980. The representative for the Technical Services group signed the notification sheet, indicating that no procedure changes were required, on April 29, 1980. There is no documentation to show that the Performance Section, the work unit within the Technical Services group with responsibility for performing containment integrity testing, was actually notified or given an opportunity to review the scope and impact of this modification. There was no Type A or Type C testing performed on these penetrations prior to the unit returning to service October 30, 1979. Therefore the post modification test requirements of Appendix J were not met.

During procedure preparation for a Type A test scheduled for the next Unit 3 refueling outage, Performance Engineer A noted that the new design would not permit the new check valves (CF-42 and CF-44) to be vented to the reactor building atmosphere such that the penetration could be challenged during a Type A test. Therefore, in December, 1980, he submitted a request for revision of the NSM design. The request was reviewed by Performance Section management prior to approval. This portion of the NSM was designed by station personnel, in the configuration requested by Performance, with review by Design Engineering. The 10CFR50.59 safety evaluation for this revision to NSM 1328 was signed on April 1, 1981, and does not address the change of Penetrations 39 and 53 from a closed system, not expected to be open to post accident atmosphere, to a system which is expected to be open and, therefore, require testing. Performance Engineer A had requested the addition of a vent valve on both penetrations between the new check valves and the building wall, in order to permit testing as required by Appendix J. However, a vent valve at the location requested still would not test the new check valve. During this investigation, Performance Engineer A could not recall the exact reasoning

Oconee Nuclear Station
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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED ONE NO 3180-0104

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TEXT (If more space is required, use additional NRC Form 302A (10-83))

for requesting this configuration, but he stated that he believed that his management had specified it due to some agreement with the NRC. No documentation of any agreement of this type could be found during this investigation. However, it was his understanding that these penetrations would be tested during Type A tests with the vent valves open such that only the outside boundary valve would be challenged. This method was interpreted as being conservative since only one boundary would be challenged.

NSM 1328 was installed during a refueling outage on Unit 3 and "tested" via a Type A test with these vent valves open in February, 1981. Due to the location of the test vent valves, the isolation function of the new isolation valves was not tested.

Subsequently, Performance Engineer A was reassigned to other duties and responsibility for the leak rate test program was assigned to Performance Engineer B. Performance Engineer B states that the turnover received from Engineer A was relatively short and he was not aware of NSM 1328. NSM 1328 was installed on Unit 1 in November, 1981, and on Unit 2 in April, 1982, during refueling outages which did not have Type A tests scheduled. No local leak rate tests were documented as having been performed in lieu of a Type A test.

The next Type A test performed at Oconee was Unit 1 in August, 1983. When Performance Engineer B prepared the procedure for venting and draining the reactor building penetrations prior to the test, he noted that Penetration 39 could be vented between CF-44 and CF-10 to the Reactor Building atmosphere via a connection to the Pressurizer. Therefore, Penetration 39 was tested in accordance with Appendix J. Penetration 53 did not have a similar vent path so Performance Engineer B lined it up such that CF-8 was challenged in front of CF-42. The result was that, if CF-8 held, the containment boundary valves for Penetration 53 would not be challenged. Performance Engineer B states that this lineup was recognized as "poor" but was considered the "best we could do." The Performance Section has a practice, which was in effect at the time, of reviewing procedures in detail via a Procedure Review Committee made up of the preparer, one or more Qualified Reviewers, and one or more Test Technicians. These reviews covered the procedure step by step, and, on Type A and C tests, reviewed the entire test line up of each tested penetration. As a result of the February, 1980 Unit 1 Type A test, when the NRC inspector had found that many of the penetrations were inadequately vented and drained, the August, 1983 test received additional detailed technical review by Performance Section management because it was to be the first test performed on Unit 1 with proper venting and draining of penetrations during the Type A test. Performance Section management and supervision participating in the review and approval of the venting and draining

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED ONS NO 3190-0104

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TEXT (If more space is required, use additional NRC Form 3054's) (17)

procedure for this test did not identify any commitment or other requirement, or direction to vent between CF-42 and the building wall as had been done on Unit 3.

In October, 1983, a Type A test was performed on Unit 2 using lineups identical to the Unit 1 test. Therefore, the Unit 2 Penetration 53 boundary valves were not properly challenged.

In May, 1984, Unit 3 was tested using the "new" lineup, such that Unit 3 Penetration 53 was not properly vented and challenged. The NRC inspector witnessing the test specifically reviewed the vent and drain lineup for Penetrations 39 and 53, among others, and identified no violations or deviations. All subsequent Type A tests have been performed using the same lineups for Penetrations 39 and 53.

In March, 1989, Performance Engineer B was reassigned and Performance Engineer C was assigned as System Expert for the valve testing portion of the Inservice Inspection Program and the Containment Integrity System, which includes the leak rate testing program. As part of the familiarization process, he was assigned to review the implementation of the program against the requirements. On September 21, 1989, while reviewing the Unit 3 Type A vent and drain lineups prior to an upcoming outage with a scheduled Type A test, Performance Engineer C noted that the line up for Penetration 53 did not comply with Appendix J requirements. He questioned Performance Engineer B to confirm his interpretation and to verify that no documented exemption existed. Performance Engineer C then initiated a Problem Investigation Report (PIR) to document the problem and initiate an operability review. At this time, Unit 1 was operating at 75 % Full Power and Units 2 and 3 were operating at 100 % Full Power. On September 22, 1989, Unit 1 shutdown for unrelated maintenance.

Design Engineering personnel performed an operability review and, on September 22, 1989, determined that CF-42 was inoperable on all three units. Operations personnel closed and/or verified closed additional manual valves in the lines outside the building in accordance with Technical Specifications. Compliance and Licensing personnel notified the NRC. During discussions with the NRC it was recognized that the entire penetration was inoperable and that there is an operational necessity to periodically add nitrogen to maintain Core Flood Tank pressure. This act would require periodic opening of the valves used to isolate the penetration. Since closure of these valves was mandated by TS 3.6.3c, it was interpreted that they could not be periodically reopened with the requirements of the specification. Therefore, Duke Power asked for a Waiver of Compliance. The NRC granted a verbal temporary waiver pending receipt of a written submittal. Part of the basis for this waiver was a commitment for compensatory actions until proper testing can be performed on all three units.

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U.S. NUCLEAR REGULATORY COMMISSION

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TEXT: If more space is required, use additional NRC Form 300A's (1/7)

Duke Power made the decision to modify Penetration 53 on all three units to permit Type C testing and to request a Technical Specification change to add a Type C test requirement. NSM 12842 was performed to add test isolation, vent, and drain valves to the piping inside the Unit 1 reactor building on Penetration 53 to permit Type C testing. A test was performed on the penetration on Sept 29, 1989, prior to Unit 1 startup.

Also on September 29, 1989, Duke Power submitted the written requests for an emergency TS amendment and a Waiver of Compliance. The submittal committed Duke Power to also modify Units 2 and 3 during the next outage of sufficient length, and to perform Type C tests on the modified penetrations prior to restarting the units. Also, a Type A test will be performed during the next refueling outage on each unit. The NRC granted the temporary Waiver of Compliance that same day.

While reviewing maintenance records to verify the installation dates of the new check valves per NSM 1328, it was discovered, on September 29, 1989, that 2CF-42 had been replaced June 7, 1989, during the last refueling outage, under Exempt Change OE-2472. The documentation for this exempt change was reviewed for Post Modification Tests. As part of this review, Station Directive 3.2.1, which contains a list of components and required retests, was reviewed. Neither CF-42 nor CF-44 were listed as requiring retest. In spite of this omission, the work request (WR) showed that a retest by Performance had been specified, but that Performance Engineer C had stated on the work request:

"Leak rate test is impossible due to lack of test connection.

Valve will be challenged during next U2 ILRT. "

The Performance Section Manual, specifies that, if a test is delayed due to unit conditions, a "Memo of Inoperability" will be issued and that an entry on the WR will state that the component is inoperable until the test is done. Performance Engineer C did not state on the WR that 2CF-42 was inoperable until tested.

On October 2, 1989, Performance Engineer C was interviewed and it was determined that no "Memo of Inoperability" had been issued or other mitigating action taken. Subsequent to this interview, Performance Engineer C recalled similar treatment of a second valve during the outage, and determined that 2CF-44 had also not been either tested or declared inoperable following replacement during the outage. Compliance and Operations were notified of this additional inoperability, which affected Penetration 39, on the afternoon of October 2, 1989. Compliance notified the NRC.

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U.S. NUCLEAR REGULATORY COMMISSION

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During the evening of October 2 and continuing through October 4, Performance reviewed maintenance documentation to determine if any other reactor building isolation valves which do not require periodic Type C tests had missed Post Maintenance Tests after the last Type A test on each unit. This review discovered missed tests on 1N-131, 1CA-29, 1CF-3, and 1CF-4 on Unit 1, 2SF-81 on Unit 2, and 3N-131, 3CF-42, 3CF-3 and 3CF-4 on Unit 3. The Work Requests for these valves were written between 12-3-86 and 10-3-88.

Tests were performed to challenge 1N-131, 1CA-29, 1CF-3, and 1CF-4 on October 3, 1989, also prior to Unit 1 start up. The penetrations affected by the other valves were isolated by closing the next outside valve(s) in accordance with TS 3.6.3c.

On October 4, 1989, a written submittal for a revision to the September 29th request for TS amendment and Waiver of Compliance was sent to the NRC. This revision requested that the same TS changes and reliefs be applied to Penetration 39.

A second Temporary Waiver of Compliance dated October 5, 1989 was issued by the Nuclear Regulatory Commission. Also, on October 6, the NRC approved the requested TS amendment as revised.

Unit 1 was returned to criticality and placed on line October 6, 1989.

A series of tests were performed where possible on the affected penetrations in order to provide some higher level of assurance that containment integrity existed. On October 6, 1989, Unit 3 penetrations 39 and 53 were tested. On October 9, Unit 2 Penetration 53 was tested. The results of those tests showed that, although some individual valve leakages were higher than desirable, net leakage through the penetrations was acceptable.

On October 10, 1989, a test was attempted on Unit 2 Penetration 39 but the penetration could not be pressurized due to excessive leakage past 2N-131. In addition, water was found to be leaking into the penetration. Samples were taken and analyzed. The results indicate low boron concentrations and low levels of contamination. The Performance personnel believe the water to be condensed steam from the pressurizer steam space leaking through 2N-121 and 2CF-44. Therefore, the test indicates that both isolation valves appear to be leaking. All of the affected penetrations on Unit 2 and 3 will continue to be isolated by additional valves, in accordance with TS 3.6.3c and as described in the September 29 and October 4, 1989 letters requesting the waivers, until formal quantitative Type A or C tests are performed.

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TEXT IF more space is required, use additional NRC Form 2644's (17)

The work requests for these valves were reviewed to determine why the post-maintenance testing had been omitted. The historical review shows that the Maintenance planners identified all of the affected WRs in accordance with the IST manual in effect at the time the requests were written. 1CA-27, 1CA-29, 1CF-3, 1CF-4, 3CF-3, and 3CF-4 were initially identified by the maintenance planners as requiring retests, but the requirements were subsequently lined through or documented as not required. One work request, WR 52389H on 1CF-4, was changed to delete the Performance retest requirement without any documentation of discussion with Performance. The WRs on valves 1CA-27, 1CA-29, 1CF-3, 3CF-3, and 3CF-4 were changed to delete the Performance test requirement either by Performance personnel or after contacting Performance personnel. The Performance Unit Test Supervisors stated that, since Technical Specifications Table 4.4-1 specifies that Type C testing is not required on the affected penetrations, they interpreted that no test was required and failed to recognize that, by TS 4.4.1.3, some test was required, even if a Type A was the only possible test.

As previously stated, the retests following replacement for 2CF-42 and 2CF-44 were documented by Performance Engineer C as being impossible, but credit was taken for the next scheduled Type A test. The IST manual contains a generic relief request which specifies that packing leaks on containment isolation valves may be repaired at power and returned to service with the post maintenance Type A or Type C test deferred until the next scheduled test. The Performance Section Manual (PSM) 4.21 provides instructions for deferral of retests, but specifies that the components will be declared inoperable if the testing is deferred. Performance Engineer C discussed the deferral with his supervisor, Performance Support Engineer A, who concurred, but the topic of declaring the valves inoperable was not raised. Performance Engineer C did not review the documents to review the exact requirements and/or applicability for this situation. His supervisor expected him to comply with PSM 4.21. Neither individual apparently considered that, as a consequence of declaring the valves inoperable, the unit could not start up under the provisions of TS 3.6. Performance Engineer C states that it was his understanding at the time that the existing policies permitted the deferral without the necessity of declaring the valves inoperable.

Work requests on 2SF-81, 1N-131 and 3N-131 were never marked as requiring Performance retest, but they were not included in the IST program at the time.

Station Directive 3.2.1 contains a list of valves which require retest. By that directive, that list is to be used by the person planning the WR to identify retest requirements. However, the Inservice Inspection Program (IST) Manual, issued by Performance, contains the list of

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

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

components subject to ASME Section XI testing, in accordance with 10CFR50.55. A comparison of the two documents showed approximately 30 differences per unit. The list in Station Directive 3.2.1 has not been updated to include the revisions to the IST program made in November, 1988. This latest revision added valves CF-42, CF-44, N-129 and N-131, while it deleted N-128 and N-130, which had been included as penetration isolation valves in place of N-129 and N-131. Valve 2SF-81 is not included in the IST program, even though it is between 2SF-60, the identified penetration isolation valve, and the containment building wall.

It should be noted that the historical review also indicated that Maintenance Planning and Scheduling issued six of the affected WRs for implementation during outages when Type A Integrated Leak Rate Tests were not scheduled, even though Attachment 6 of SD 3.2.1 indicated that the required tests would be Integrated Leak Rate Tests.

CONCLUSIONS

There are several distinct items covered by this report:

1. Failure to perform post modification testing on Penetrations 39 and 53 (or CF-42 and CF-44, the penetration isolation valves) on Unit 3 following initial installation by NSM 1328.
2. Failure to perform post modification testing on Penetrations 39 and 53 (or CF-42 and CF-44, the penetration isolation valves) on Units 1 and 2 following initial installation by NSM 1328.
3. Failure to properly vent and challenge Penetration 53 on all three units during Type A Containment Integrated Leak Rate tests after 1981.
4. Failure to test valves 1CA-27, 1CA-29, 1CF-3, 1CF-4, 3CF-3 and 3CF-4 following maintenance/modification.
5. Failure to perform post modification testing on 2CF-42 and 2CF-44 following replacement by Exempt Changes OE-2472 and OE-2473.
6. Failure to test valves 1N-131, 2SF-81, and 3N-131 following maintenance/modification.

The root cause of item 1 is Management Deficiency: inadequate policy/directive. The modification program in effect at the time of this omission was inadequate to properly identify and/or control post modification testing. Proper notifications did not occur prior to

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installation of the modification. Test requirements and provisions were not included as part of the design. Since that time both station and Design Engineering procedures and programs have been significantly upgraded. The program now requires specific reviews for, and documentation of, test requirements as part of the design review process, prior to implementation of modifications.

The exact root cause for item 2 cannot be determined this long after the event. This failure is different than item 1 because appropriate Performance personnel had become aware of the scope of NSM 1328 and the need to perform appropriate testing. Contributing factors for failure to test after installation on Units 1 and 2 appear to be:

- a. Inadequate detail during turnover of duties from Performance Engineers A to B (Inappropriate Action: deficient communication).
- b. Failure by Performance Engineer B to adequately review scheduled work and identify the need for testing on NSM 1328 (Inappropriate Action: no action taken because the need was not recognized). Under the administrative controls in effect at the time, Maintenance personnel had provided prior notice of the work when Performance Engineer A was informed. No additional notification was required.
- c. Inadequate involvement of supervision and management by not assuring that an employee had been informed of work in progress affecting new work assignments (Management Deficiency: insufficient supervision).
- d. The inability to perform a test on the portion of the penetration actually modified (Design Deficiency: mechanical equipment configuration deficiency). This deficiency can further be considered a failure to request a more adequate configuration (Inappropriate Action: action taken was not the best alternative).

The root cause of item 3, failure to vent Penetration 53 during Type A tests, is Management Deficiency: deficient procedure preparation and issuance. Due to the extensive review of the test lineup, both initially in 1983 and on each subsequent Type A test, by a large number of Performance personnel and management, it is apparent that this line up was not considered improper in light of the existing configuration. Again, a contributing cause is failure to request a more adequate configuration when requesting revision of NSM 1328 (Inappropriate Action: action taken was not the best alternative).

The root cause of item 4, failure to test valves 1CA-27, 1CA-29, 1CF-3, 1CF-4, 3CF-3 and 3CF-4 following maintenance/modification, is Inappropriate Action: failure to adhere to procedure/policies. Technical

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Specification (TS) 4.4.1.3 requires either Type A or Type C testing following modification or replacement of components affecting Reactor Building integrity. However, a contributing cause is Management Deficiency: lack of/inadequate policy/directive. These valves were identified in TS and the IST manual as not requiring Type C testing. The involved Unit Test Supervisors interpreted that no testing was required because routine Type C tests were not required by Table 4.4-1. They failed to recognize that the maintenance/modification established an additional requirement from TS 4.4.1.3.

The root cause for item 5, failure to perform post modification testing on 2CF-42 and 2CF-44 following replacement by Exempt Changes OE-2472 and OE-2473, is Inappropriate Action: failure to adhere to directives. Performance Engineer C thought that his actions were acceptable, but did not reference or apply existing directives. A contributing cause is Management Deficiency: inadequate supervision, in that Performance Support Engineer A did not adequately recognize that Performance Engineer C was new to the section and, therefore, specifically assure that he applied the correct directive. Both individuals also committed another Inappropriate Action: no action taken because of failure to recognize the need. If the valves had been declared inoperable in accordance with Section Manual 4.21, the unit would have been unable to start up in compliance with TS 3.6. Therefore, deferral of the test was not an acceptable option and some additional corrective action should have been initiated.

An additional contributing cause for both items 4 and 5 is Management Deficiency: inadequate planning and scheduling, because WRs have historically been issued to the field even though the required testing is impossible or difficult to perform in the existing system conditions and/or proper testing cannot be performed without significant impact on schedules.

The root cause for item 6, failure to test valves 1N-131, 2SF-81, and 3N-131 following maintenance/modification, is Management Deficiency: deficient procedure review and issuance, because these valves were not included in the IST manual at the time the work requests (WR) were written and planned. Therefore, the Maintenance planners could not be expected to identify a test requirement.

A significant deficiency was observed during this investigation in that Station Directive 3.2.1 had not been updated following the last revision of the IST manual, issued November 16, 1988. The IST manual defines the Oconee ASME Section XI pump and valve Inservice Inspection Program, and is, therefore, the controlling list. SD 3.2.1 is the directive which gives instructions for completing the WR. Attachment 6 of SD 3.2.1, which contains a list of components requiring retest after maintenance, is the

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list to be used by the planner when identifying post maintenance tests. Maintenance has elected to use Attachment 6 for two reasons. First, the directive includes more than just pump and valve test requirements, and, second, it provides a single point reference. The existence of approximately 30 differences between Attachment 6 in SD 3.2.1 and the IST manual indicates that the Attachment 6 has not been updated adequately. The failure to update SD 3.2.1 is considered to be a Management Deficiency: deficient procedure review and maintenance.

All of the above root and contributing causes are either Inappropriate Action or Management Deficiency. Therefore, these are considered the root causes of the event.

Post Modification Testing is considered a special case of Post Maintenance Testing. Both programs have been identified as Recurring Problems at Oconee Nuclear Station due to past events. Another Recurring Problem involved in this event is lack of adherence to policies and directives.

This event is considered a RECURRING EVENT. A review of recent station events shows two events directly related to missed surveillance of containment isolation valves following maintenance. LER 269/88-01 was failure to test LRC-7 following maintenance when a test requirement was not identified properly due to management deficiency with a contributing cause of inadequate communications. LER 287/89-03 was failure to test 3LWD-1 following maintenance, again when a test requirement was not identified properly due to inadequate communications.

Both of these reports included corrective actions to address the inadequate planning and scheduling. LER 269/88-01 required groups outside Maintenance to identify required testing and known testing limitations to the planner when contacted by the planner prior to performance of the work. LER 287/89-03 required the planner to make such contact prior to performance of the work. However, the revisions to directives required by LER 269/88-01 were not in affect when many of the affected WRs were written. The revisions required by LER 287/89-03 have not yet been completed. Proper implementation of these revisions should significantly reduce the probability of a WR being issued to the field without proper evaluation of the benefits of the maintenance versus the potential impact of test requirements on the schedule and/or system conditions.

Another corrective action following LER 269/88-01 was issuance of Performance Section Manual 4.21, which provides specific guidance to require a component to be declared inoperable if required testing must be deferred. The inappropriate deferral of testing on CF-42 and CF-44 indicates that Performance Section Manual 4.21 did not adequately meet the intent of the corrective action from LER 269/88-01. Planned actions by

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Performance to clarify their policy on test deferrals, with associated training, should eliminate misinterpretations of existing policy provisions.

Two previous events did occur for which the corrective actions should have identified the omissions from the IST program noted in this event. One corrective action following LER 269/88-01 was a review by Operations personnel to assure that Station Directive 3.2.1, Attachment 6, included all containment isolation valves. This review was completed June 20, 1988, without identifying 2SF-81 as being omitted. LER 269/88-02 involved failure to identify the safety related function of several valves in the Diesel Starting Air System [EIIS:LC] for the Oconee Standby Shutdown Facility and, therefore, to include them in the IST program. One of the corrective actions from LER 269/88-02 was a review of all safety related check valves at Oconee for proper inclusion in the IST program. This review was completed in May 1988 and approximately 54 check valves were added to the IST manual by Revision 15. However, this review did not identify the omission of 1,2,3N-129 and 131, which were added by Revision 16. Had these valves been added by Revision 15, one of the failures to retest following maintenance might have been prevented.

The immediate and subsequent actions taken were adequate to provide reasonable assurance that containment integrity exists on all three Oconee Units.

Planned action to modify Penetrations 39 and 53 to permit Type C testing, along with a Technical Specification change to require such tests, will permit full compliance with Appendix J for those penetrations.

The problem of inadequate detail during turnover should be improved due to the adoption of the System Expert Program. As part of this program, the assigned System Expert is required by Station Directive 4.4.5 to assemble and maintain documentation of the assigned system/program. This includes documentation of requirements, decisions, and commitments. This should help prevent loss of information due to personnel reassignments.

There were no personnel injuries or releases of radioactive materials during this event. There were no NPRDS reportable failures associated with this event.

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CORRECTIVE ACTIONS

Immediate

1. Performance Engineer C initiated a Problem Investigation Report, PIR 4-089-0145, to report the initial problem of inadequate venting on Type A leak rate tests and initiate an operability review.
2. Design Engineering determined that Penetration 53 was inoperable on all three Oconee units.

Subsequent

1. Operations closed additional valves outside the Penetration 53 boundary on Units 2 and 3, in accordance with Technical Specification 3.6.3c.
2. A Temporary Waiver of Compliance was requested and granted by the NRC. A request for a revision to Technical Specifications was submitted with the waiver request.
3. Unit 1 Penetration 53 was modified to permit Type C testing and was tested successfully.
4. The additional affected penetrations were isolated. Administrative actions were taken to assure appropriate compensatory actions are taken if/when affected penetration isolation valves are opened for testing, sample collection, etc.
5. Tests were performed on Penetrations 39, 59 on Unit 1, and Penetrations 39 and 53 on Units 2 and 3.

Planned

1. Modifications will be made to permit Type C testing of Penetrations 39 and 53 on all three units.
2. An Integrated Leak Rate Test (Type A) will be performed during the next refueling outage on each unit.
3. Performance will review the entire containment leak testing program against current interpretations of requirements and verify that all requirements are either met or have approved exceptions. Furthermore, approved exceptions, including those in Technical Specifications, will also be reviewed to assure that

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the justifications are valid. All containment boundaries, including piping and components inside the reactor building in systems which are identified as extensions of containment, such as feedwater and main steam, will be included.

4. Performance will review the philosophy of deferral of testing and upgrade policy/directives to positively state a uniform policy. This policy must provide for full, retrievable documentation of each deferred test, including justification for the deferral, and an operability statement for the affected component and system. Appropriate levels of review, approval, and notification shall be specified. Upon approval of this policy, all Performance personnel shall receive appropriate training.
5. Maintenance will revise Station Directive 3.2.1 to resolve the discrepancies between Attachment 6 and the Inservice Inspection Program Manual.
6. Personnel involved in these deficiencies will receive appropriate counselling.

SAFETY EVALUATION

Penetrations 39 and 53 are both one inch piping penetrations used for filling and making up to Core Flood Tanks B and A respectively. Make up from outside the Reactor Building can come from the High Pressure Injection, Chemical Addition, or High Pressure Nitrogen systems. The lines are normally subjected to pressures in excess of 600 psi, well in excess of the 60 psi design post accident pressure. Make up with either High Pressure Injection or Chemical Addition water is very rare while a unit is critical. Nitrogen make up occurs more frequently, from once per shift to weekly.

The initial test of Penetrations 39 and 53 following installation of NSM 1328 on Unit 3 challenged only the outside isolation valves. This was conservative. The failure to test Unit 1 and 2 following modification is significant because previous Type A tests may have challenged only the inside valve. Actual integrity of the outside isolation valves was unknown. Due to the failure to properly vent Penetration 53 during subsequent Type A tests, the penetration isolation valves were not challenged. Because of the non-seismic piping design between CF-42 and CF-8, the assumption was that, in a seismic event concurrent with a LOCA, the pipe would fail, exposing CF-42 and an untested penetration to building atmosphere. Piping in the system external to the building was also postulated to fail. Therefore, the worst case scenario for this

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event is loss of containment integrity due to leakage through untested valves following system piping failure associated with a seismic event and a concurrent LOCA.

Design Engineering has performed an analysis of the non-seismic piping associated with Penetration 53 between CF-42 and CF-8. They conclude that "Although the pipe in question is not seismically designed, from a practical engineering viewpoint, it is as reliable under seismic loads as fully qualified pipe."

Chapter 3 of the Oconee FSAR discusses Containment Integrity and the use of redundant valves for Containment isolation. The FSAR assumes that at least one of the two isolation valves will seal the penetration when containment integrity is required. Although several valves on each unit have not been properly tested, a qualitative test was performed on each affected penetration, except Unit 2 Penetration 56, which does not have test connections. These tests indicate that the affected penetrations are adequately sealed with the possible exception of the Unit 2 Penetration 39 which would not hold pressure well enough to permit a test.

All of the affected penetrations are currently isolated with an additional valve in line with the outside isolation valve(s).

FSAR Chapter 15 includes analysis of containment leakage after a Loss Of Coolant Accident (LOCA) and after a Maximum Hypothetical Accident (MHA). Both of these analyses assume a containment leak rate of 0.25 weight percent per day of the containment atmosphere for the first 24 hours followed by a rate of 0.125 per cent per day after 24 hours. For a post-accident mixture of air and steam, the 0.25 per cent per day rate computes to approximately 13 standard cubic feet per minute. Half of this leakage is assumed to be released through the Penetration Room Ventilation System, which has carbon filters with an assumed efficiency of 90 per cent. The calculated two hour thyroid dose at the site boundary is 5.0 rem.

Penetrations 39, 53, and 59 are all one inch diameter lines. Depending on the engineering assumptions made, the maximum flow rate through a ruptured one inch line will be less than 1300 standard cubic feet per minute under accident conditions. However, since these release paths are all within the Penetration room, all of this leakage would be subject to filtration. Therefore the effective dose rates after filtration are approximately about 20 times the FSAR dose value, or 100 rem. This is less than the 300 rem two hour dose limit given in 10CFR100.

If Penetrations 39, 53 and 59 all failed, or if the larger Penetration 56 failed, the 10CFR100 limits would probably be exceeded. However, these

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penetrations have been challenged to some extent by past Type A tests, and experience on similar penetrations which are type C tested indicates a reasonable degree of reliability. Also, complete failure would require that the system piping fail between the containment isolation valves and the next valve in the line, which is normally closed.

Therefore, although the worst case scenario, total failure of the untested containment valves with simultaneous failure of both inside and outside piping, for this event postulates that a loss of containment integrity could have resulted, the probability of such a combination of additional events is extremely low. In reality, no additional event occurred. There were no personnel injuries or releases of radioactive materials. The health and safety of the public was not impacted by this event.

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ATTACHMENT 1

SEQUENCE OF EVENTS

DATE	EVENT
Feb. 3, 1973	10CFR50 Appendix J issued
Feb. 6, 1973	Unit 1 licensed
Oct. 6, 1973	Unit 2 licensed
Jul. 19, 1974	Unit 3 licensed
Aug. 1975	NRC requests Oconee to review existing requirements vs Appendix J.
Nov. 30, 1976	Duke Power submits proposed Technical Specification revision.
Feb. 1979	NRC issues OIE Bulletin 79-02
Jun. 22, 1979	Design Engineering determines piping on Penetrations 39 and 53 requires upgrade. NSM 1328 initiated to install check valves CF-42,44.
Jul. 18 to Oct. 3, 1979	New check valves installed on Unit 3 by NSM 1328.
Oct. 30, 1979	Unit 3 restarts after refueling outage without test. Appendix J retest requirement violated.
Feb. 1980	Unit 1 Type A test performed. NRC inspector determines that procedure did not adequately vent and drain. Additional compensatory Type C tests performed after Type A.
Dec. 1980	Performance Engineer A requests revision to NSM 1328 to add vent valves.
Feb. 1981	Vent valves installed on Unit 3 by NSM 1328.
Feb. 1981	Type A test performed on Unit 3, with valves open. This tests the outside isolation valves but not the new check valves CF-42,44.

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ATTACHMENT 1

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SEQUENCE OF EVENTS

DATE	EVENT
Nov. 6, 1981	Revised Technical Specification 4.4 approved. Added Table 4.4-1 which specifies which penetrations are vented during Type A tests and which penetrations are Type C tested. Penetrations 39 and 53 are shown as not Type C tested.
Nov. 1981	NSM 1328 installed on Unit 1, no leak rate tests documented.
Apr. 1982	NSM 1328 installed on Unit 2, no leak rate tests documented. Performance Engineer A reassigned, Performance Engineer B assigned to Leak Rate test program.
Aug. 1983	Type A test performed on Unit 1. Penetration 53 vented via Core Flood Tank, challenges 1CF-8 in series with 1CF-42.
Oct. 1983	Type A test performed on Unit 2. Penetration 53 vented via Core Flood Tank, challenges 2CF-8 in series with 2CF-42.
May 1984	Type A test performed on Unit 3. Penetration 53 vented via Core Flood Tank, challenges 3CF-8 in series with 3CF-42. NRC inspector reviews vent and drain lineup for Penetrations 39 and 53, find no error or deficiency.
Apr. 1986	Type A test performed on Unit 1. Penetration 53 vented via Core Flood Tank, challenges 1CF-8 in series with 1CF-42.
Feb. 1987	Type A test performed on Unit 3. Penetration 53 vented via Core Flood Tank, challenges 3CF-8 in series with 3CF-42.
Oct. 5, 1987	Performance Unit Test Supervisor A voids retest on WR 04250C on 1CA-27
Oct. 7, 1987	1N-131 replaced without leak test on WR 52743, EC 1209.
Oct. 9, 1987	Performance Unit Test Supervisor A voids retest on WR 51750F on 1CA-29.

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ATTACHMENT 1

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SEQUENCE OF EVENTS

DATE	EVENT
Dec. 15, 1987	Missed stroke test on 1RC-7. Discovered Jan 7, 88 and reported as LER 269/88-01.
Feb. 22, 1988	Oconee adopts System Expert program.
Mar. 28, 1988	Type A test performed on Unit 2. Penetration 53 vented via Core Flood Tank, challenges 2CF-8 in series with 2CF-42.
May 9, 1988	WR 08230C completed on 3N-131, no LRT performed.
Sept. 6, 1988	Performance Unit Test Supervisor A voids retest on WR 51517G and 51518G on 3CF-3 and 4.
Nov. 17, 1988	Performance issues Performance Section Manual 4.21 specifying that components must be declared inoperable if PMI is deferred.
Nov. 17, 1988	Performance issues Revision 16 to IST manual. Revision adds CF-42,44, N-129,131 to IST.
Jan. 25, 1989	WR 52389H, work begins on 1CF-4 operator. Procedure indicates NA for notification of Performance prior to work. At some point, Performance retest changed to show no retest.
Jan. 27, 1989	WR 52419H, Performance Unit Test Supervisor A contacted prior to work on 1CF-3 operator. Performance retest requirement changed to show no retest.
Feb. 28, 1989	Station Directive 3.2.1 revised. Does not include changes due to Rev 16 of IST manual.
Mar. 1989	Performance Engineer B reassigned, Performance Engineer C assigned to Leak Rate test program.
June 9, 1989	WR 17487C completed on 2SF-81, no LRT performed.

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ATTACHMENT 1

(CONTINUED)

SEQUENCE OF EVENTS

DATE	EVENT
June 12, 1989	Performance Engineer C defers Post Maintenance Tests on 2CF-42 and 44 without declaring them inoperable. (Refueling outage in progress.) WR 53311H and 51546H
July 27, 1989	Missed LRT on 3LWD-1. Discovered Aug 11,89 reported as LER 287/89-03
Sept. 21, 1989	Performance Engineer C discovers Penetration 53 is not properly vented by Type A test procedure. Problem Investigation Report initiated.
Sept. 22, 1989	Design Engineering determines Penetration 53 is inoperable on all three units. Operations closes additional manual valves outside the Reactor Buildings per TS 3.6.3c. Compliance notifies NRC.
Sept. 28, 1989	Qualitative LRT performed on Unit 2 Penetration 53. 2N-129 leaked less than 0.53 lbm/hr. Leakage past 2CF-8 and 42 in series was below measurable levels.
Sept. 29, 1989	NSM 12842 installed to permit Type C test of Penetration 53 on Unit 1. Type C test performed and passed.
Sept. 29, 1989	Written request for Waiver of Compliance and emergency Technical Specification amendment. Temporary Waiver approved.
Sept. 29, 1989	Investigation discovers missed surveillance on 2CF-42 following WR 53311H.
Oct. 2, 1989	Discussion with Performance Engineer C about 2CF-42. Performance Engineer C recalls deferral of 2CF-44 also. 2CF-44 declared inoperable and Penetration 39 isolated.

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ATTACHMENT 1

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SEQUENCE OF EVENTS

DATE	EVENT
Oct. 2-4, 1989	Performance personnel review for other missed post maintenance tests on containment isolation valves. Investigation finds valves acting as containment isolation valves not included in IST program, valves in IST program not listed in Station Directive 3.2.1, and missed PMT on several valves.
Oct. 3, 1989	Penetrations 39 and 59 tested on Unit 1.
Oct. 4, 1989	Supplemented Waiver and TS amendment request to cover Penetration 39.
Oct. 5, 1989	NRC grants second Temporary Waiver of Compliance.
Oct. 6, 1989	Unit 1 restarted.
Oct. 6, 1989	Emergency TS amendment approved by NRC.
Oct. 6, 1989	Penetrations 39, 53 tested on Unit 3
Oct. 9, 1989	Penetration 53 tested on Unit 2
Oct. 10, 1989	Penetration 39 tested on Unit 2

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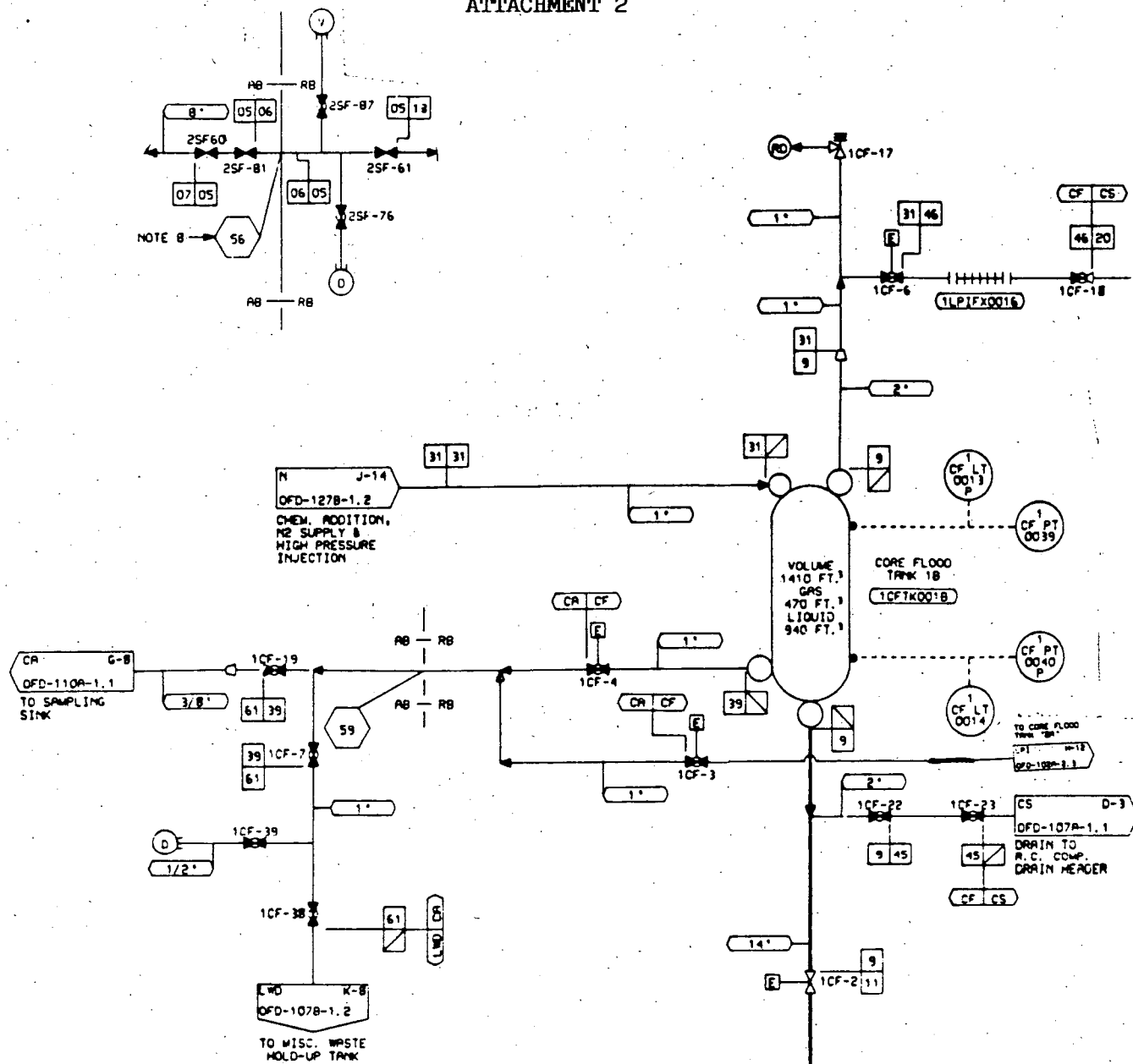
- 0 0

2 3 OF

2 4

TEXT in more space is required, use additional NRC Form 306A's (17)

ATTACHMENT 2



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMS NO. 3180-0104
EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Oconee Nuclear Station, Unit 1	05000269	89	-015-	00	24	OF 24

TEXT (If more space is required, use additional NRC Form 386A's (17))

ATTACHMENT 2

