SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

R. W. Krieger
Vice President
Nuclear Generation

October 23, 1996

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

Subject: Docket No. 50-362
30-Day Report
Licensee Event Report No. 96-004
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving reactor coolant system pressure boundary leakage. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

Enclosure: LER No. 96-004

cc: L. J. Callan, Regional Administrator, NRC Region IV
J. E. Dyer, Director, Division of Reactor Projects, NRC Region IV
K. E. Perkins, Jr., Director, Walnut Creek Field Office, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 & 3
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
Institute of Nuclear Power Operations (INPO)

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LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3	0 5 0 0 0 3 6 2	1 of 0 8

Title (4)
RCS Pressure Boundary Leakage Due to Failed RTD Thermowell

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)
0 9	1 9	9 6	9 6	---	0 0 4	0 0	1 0	2 3	9 6	NONE	0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

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)	___ Other (Specify in Abstract below and in text)
___ 20.405(a)(1)(iii)	X 50.73(a)(2)(i)	___ 50.73(a)(2)(viii)(A)	
___ 20.405(a)(1)(iv)	___ 50.73(a)(2)(ii)	___ 50.73(a)(2)(viii)(B)	
___ 20.405(a)(1)(v)	___ 50.73(a)(2)(iii)	___ 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
R. W. Krieger, Vice President, Nuclear Generation	AREA CODE 7 1 4 3 6 8 - 6 2 5 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	A B	T W	R 3 6 9	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

___ Yes (If yes, complete EXPECTED SUBMISSION DATE)

X NO

Expected Submission Date (15): Month ___ Day ___ Year ___

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

On 9/19/96, Edison observed radiation monitoring and sump level instruments inside containment indicating symptoms of a small unidentified reactor coolant system (RCS) leak (somewhat less than 0.05 gpm). To facilitate inspection inside the bioshield, on 9/24/96 Edison conservatively shut down Unit 3.

At 0530 on 9/24/96, Edison discovered steam issuing from a spare resistance temperature detector thermowell in RCS Loop 2A cold leg (a portion of the RCS pressure boundary inside the bioshield). Technical Specifications allow no RCS pressure boundary leakage while in Modes 1 through 4, and, when pressure boundary leakage does exist, require that the Unit be in Mode 3 within 6 hours and in Mode 5 within an additional 36 hours. Unit 3 entered Mode 5 at 1432 on 9/25/96.

Upon removal of the thermowell nozzle, Edison discovered that the thermowell itself had broken off inside the RCS pipe. The broken piece (about 9 inches long if intact) was not present and is presumed to have been swept into the bottom of the reactor vessel. Edison preliminarily concluded the thermowell failure was caused by fatigue. There was no evidence of stress corrosion cracking.

Edison restored the broken thermowell to its design configuration. Edison performed an analysis confirming that plant operation can safely continue with the broken piece(s) of thermowell in the RCS.

Plant: San Onofre Nuclear Generating Station, Unit 3
Reactor Vendor: Combustion Engineering
Event Date: September 20, 1996
Mode: Mode 1, Power Operation
Power Level: 100%

DESCRIPTION OF THE EVENT:

On 9/19/96, with Unit 3 in Mode 1 at approximately 100% power, Edison observed radiation monitoring and sump level instruments inside containment indicating symptoms of small (somewhat less than 0.05 gpm) unidentified reactor coolant system (RCS) [AB] leakage. Technical Specifications (TS) permit plant operation to continue with unidentified non-pressure boundary leakage of up to 1 gpm.

On 9/23/96, the calculated leak rate increased to about 0.2 gpm. Edison attempted unsuccessfully to locate the leak by inspecting the RCS (inside containment but outside the bioshield) on 9/20/96 and again on 9/23/96. To facilitate an RCS inspection inside the bioshield, on 9/24/96 Edison conservatively shut down Unit 3 to Mode 3.

At 0530 on 9/24/96, Edison engineers (utility, non-licensed) discovered steam issuing from the circumference of a threaded metal plug in spare resistance temperature detector (RTD) thermowell [TW] 3TE9179-3 in RCS Loop 2A cold leg (a portion of the RCS pressure boundary inside the bioshield). The engineers confirmed that only 3TE9179-3 was leaking by inspecting the remainder of the RCS thermowells.

TS 3.4.13.a allows no RCS pressure boundary leakage while in Modes 1 through 4, and, when pressure boundary leakage does exist, requires that the Unit be in Mode 3 within 6 hours and in Mode 5 within 36 hours. Unit 3 entered Mode 5 at 1432 on 9/25/96. Edison made a courtesy telephone notification to the NRC Operations Center at 2116 PDT on 9/24/96 and is submitting this written report in accordance with 10CFR50.73(a)(2)(i).

CAUSE OF THE EVENT:

Upon removal of the thermowell nozzle, Edison discovered that the thermowell itself (Rosemount model 89-287) had broken off inside the RCS pipe (Figures 1 - 3). The broken piece (about 9 inches long if intact) was not present and is presumed to have been swept into the bottom of the reactor vessel [RPV]. Although Edison has not completed the formal root cause evaluation, Edison preliminarily concluded the thermowell failure was caused by fatigue fracture which extended through about 95% of its circumference. While there was no evidence of stress corrosion cracking, the fracture surface had indications of oxidized surface rubbing and heavy oxidation.

CORRECTIVE ACTIONS:

Edison restored the broken thermowell for 3TE9179-3 to its design configuration. Edison performed an analysis confirming that plant operation can safely continue with the broken piece(s) of thermowell in the RCS (see safety significance section below).

SAFETY SIGNIFICANCE OF THE EVENT:

Edison reported in LER 3-95-001 that the consequences of a circumferential failure of a RCS instrument penetration are bounded by the small break loss of coolant accident (LOCA) analyzed in the UFSAR. The leakage area introduced by the complete failure of an instrument thermowell is substantially less than the smallest area evaluated in the UFSAR for small break LOCAs.

As noted above, Edison also evaluated the consequences the loose thermowell piece(s) may have on plant operation. Because thermowell location 3TE9179-3 is in RCS Loop 2A cold leg, the thermowell fragment(s) was/were probably swept into the reactor vessel. Based

on the potential size(s) of the thermowell fragment(s), it/they would likely become lodged in one of the following vessel locations (Figures 4 and 5): (1) Reactor vessel flow skirt, (2) the lower support structure, (3) the core support plate, (4) fuel assembly lower support plate or (5) fuel assembly lower grid. Edison's evaluation concluded that potential coolant flow blockage resulting from these five potential end locations would still be bounded by departure from nucleate boiling ratio (DNBR) calculational uncertainties. Consequently, the thermowell fragment(s) could not prevent proper cooling of fuel.

Additionally, potential thermowell fragment(s) which succeeded in reaching vessel location (5) would not jeopardize fuel pin integrity because the bottom portions of the fuel pins are solid metal end caps (plugs). Consequently, potential fretting between thermowell fragment(s) and fuel pins would not degrade the fission product barrier (fuel clad). Moreover, the fuel assemblies are debris resistant, having long end caps or guardian grids designed to preclude RCS debris from interacting with the active portion of the fuel (fuel clad).

Consequently, this occurrence had minimal safety significance.

ADDITIONAL INFORMATION:

The plant cooldown from Mode 3 to Mode 5 was delayed when excore nuclear instrument startup channel 1 malfunctioned. A faulty circuit card was diagnosed and replaced, and the channel returned to service.

In the past three years, Edison reported two similar RCS leakage events as follows:

LER 2-92-004 reported small pressure boundary leaks on both the Unit 2 and Unit 3 pressurizer vapor space nozzles due to primary water stress corrosion cracking (PWSCC);

LER 3-95-001 reported RCS nozzle leaks due to PWSCC of alloy 600 type materials.

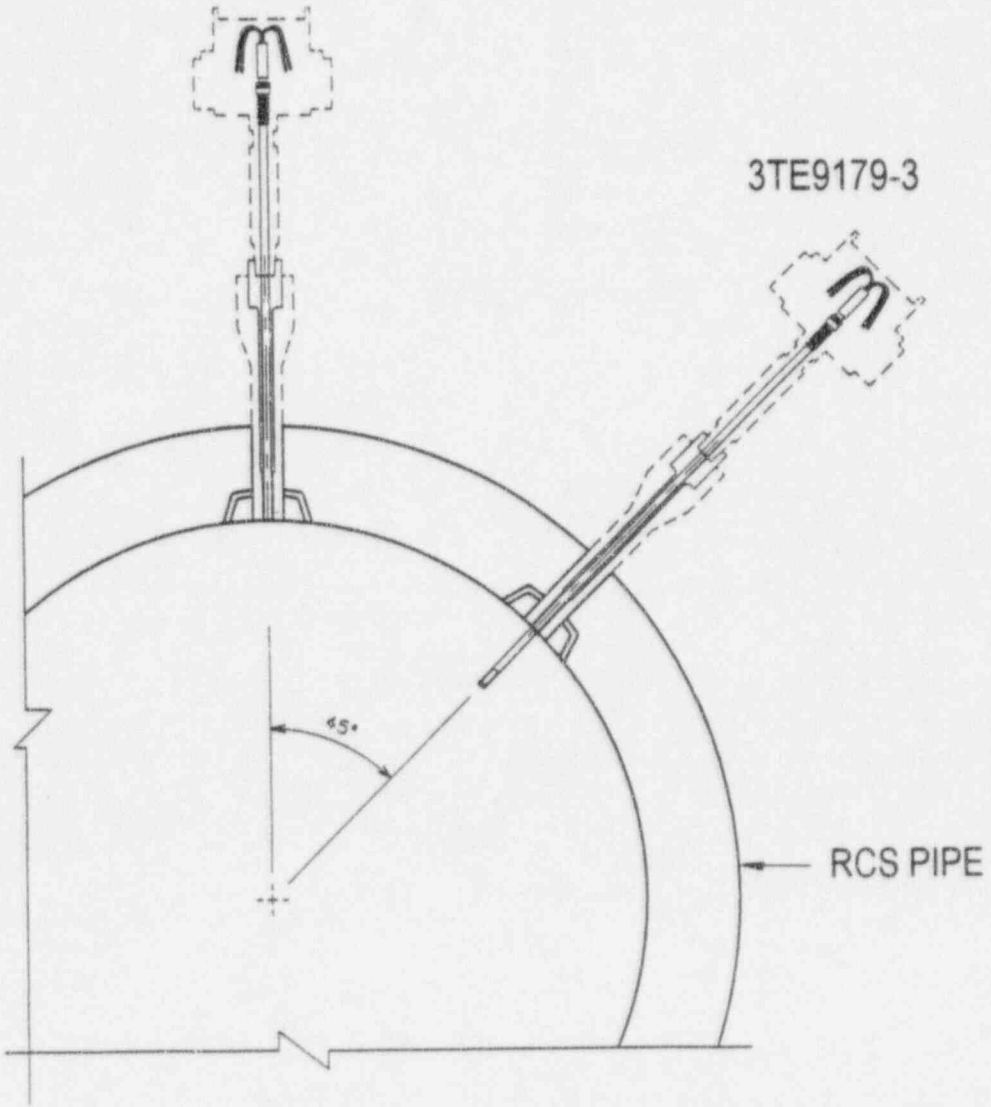


Figure 1

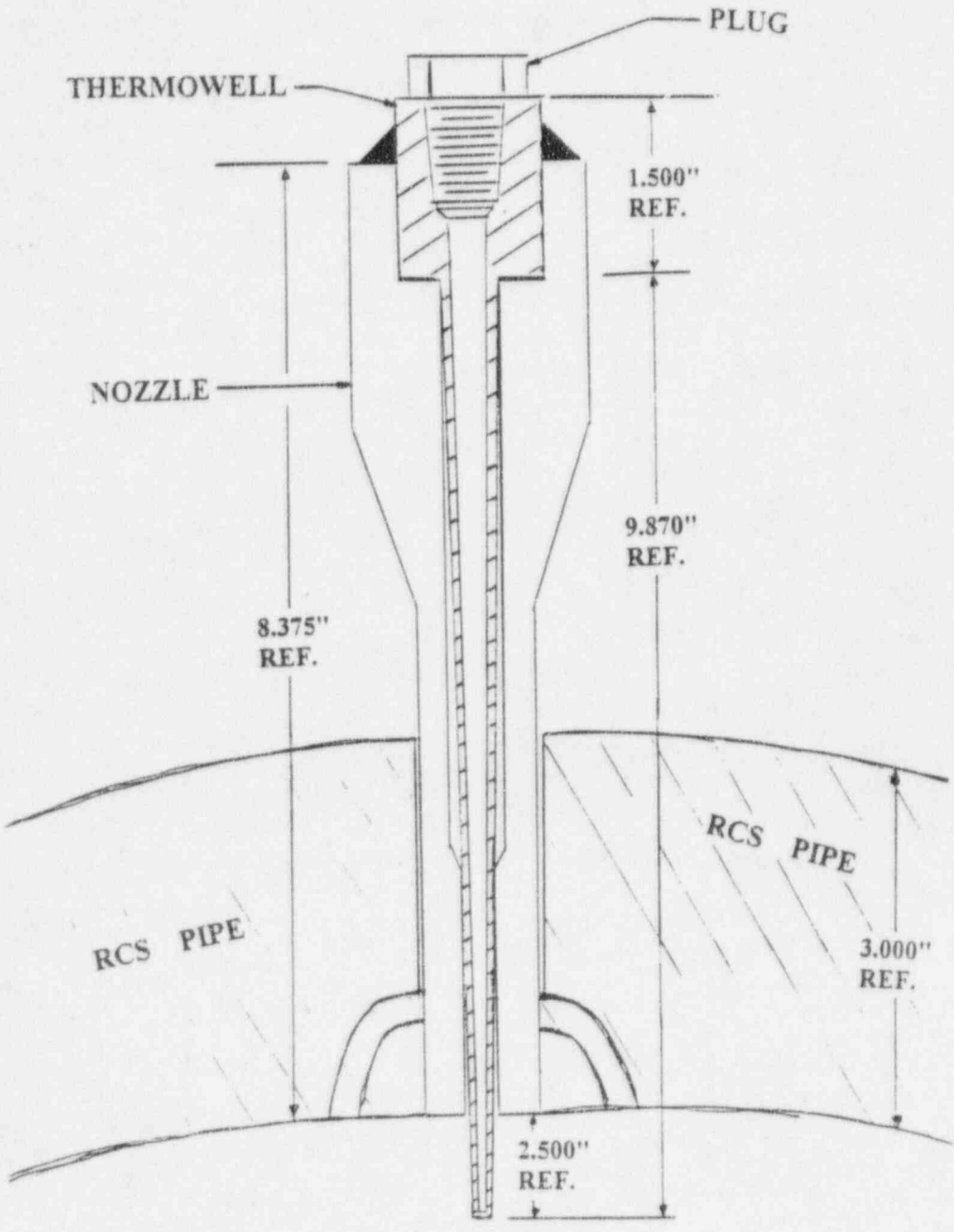

PLUG
THERMOWELL
1.500" REF.
NOZZLE
9.870" REF.
8.375" REF.
RCS PIPE
RCS PIPE
3.000" REF.
2.500" REF.

Figure 2

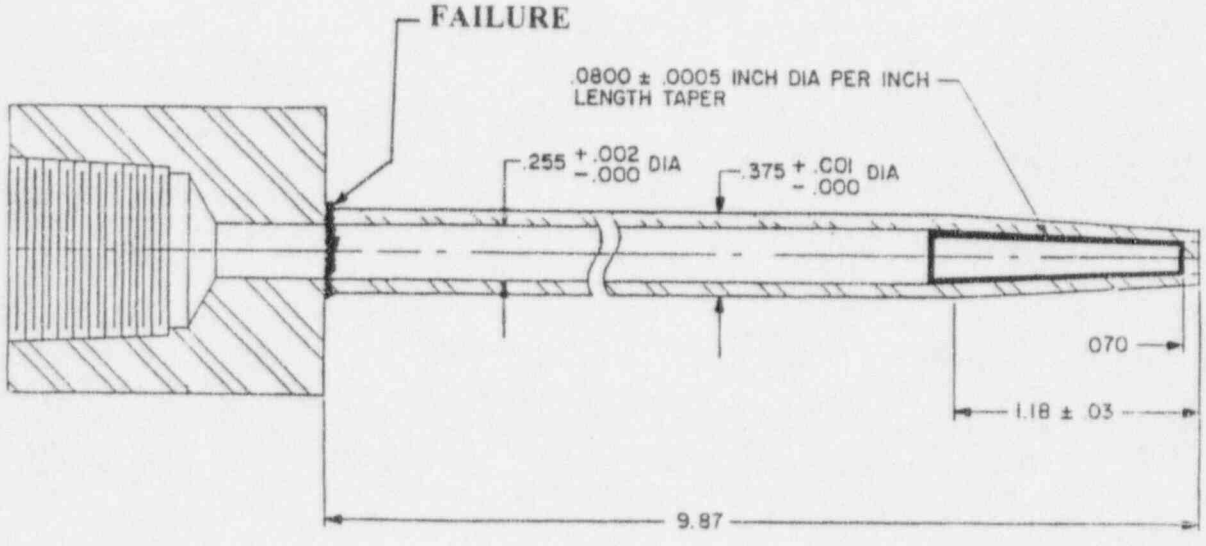

FAILURE
.0800 ± .0005 INCH DIA PER INCH LENGTH TAPER
.255 +.002 −.000 DIA
.375 +.001 −.000 DIA
070
1.18 ± 03
9.87

Figure 3

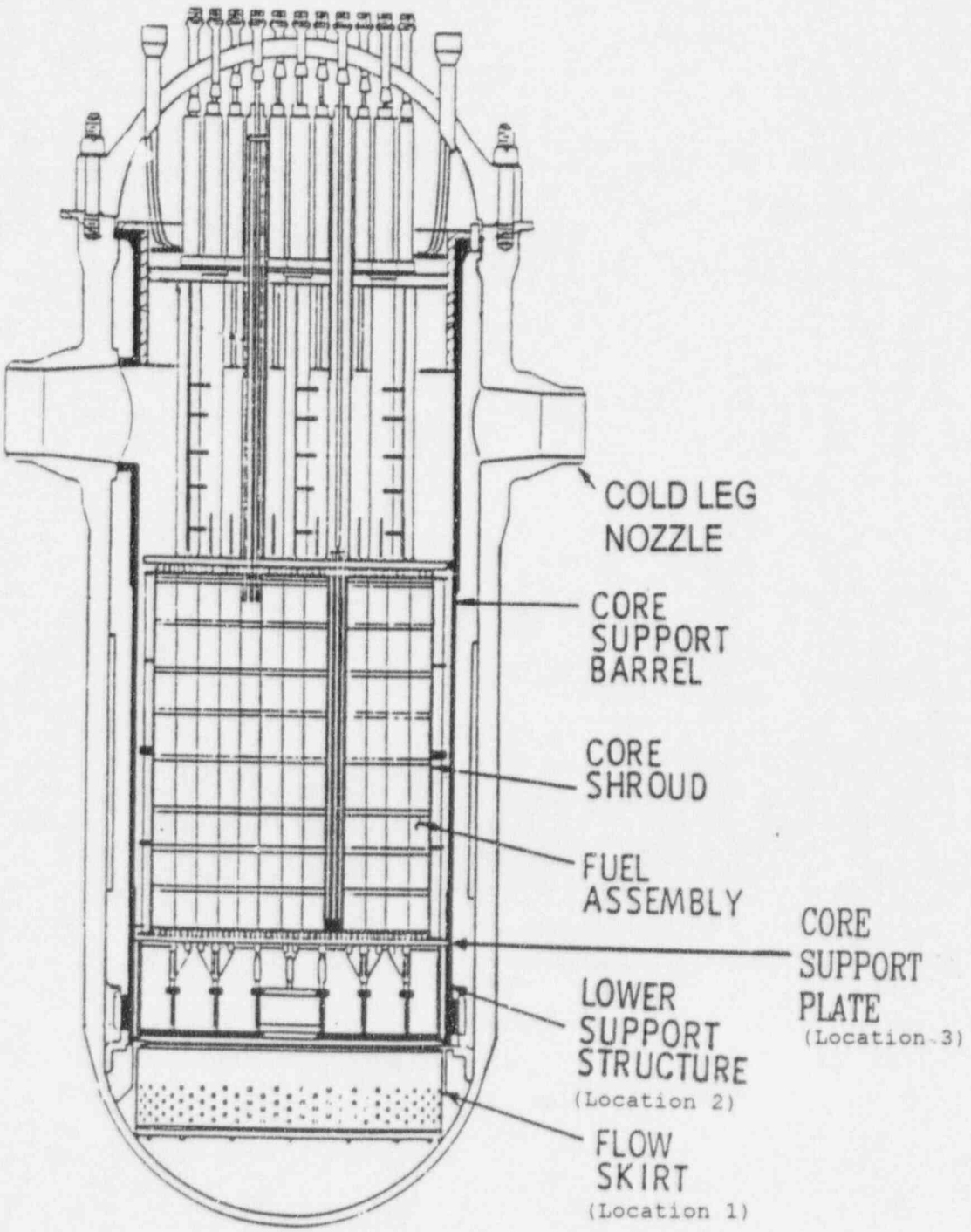
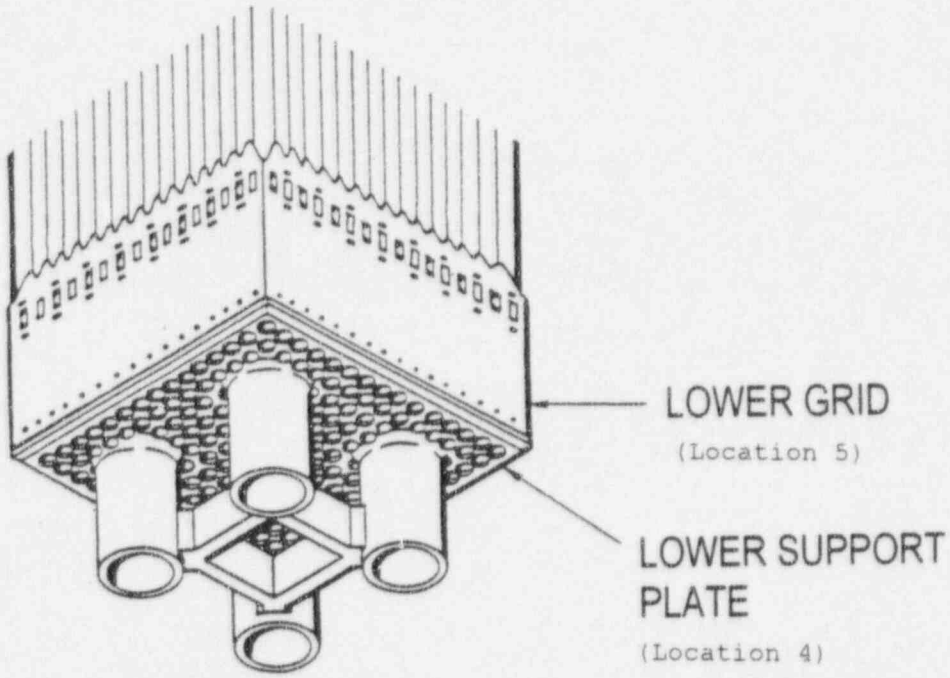
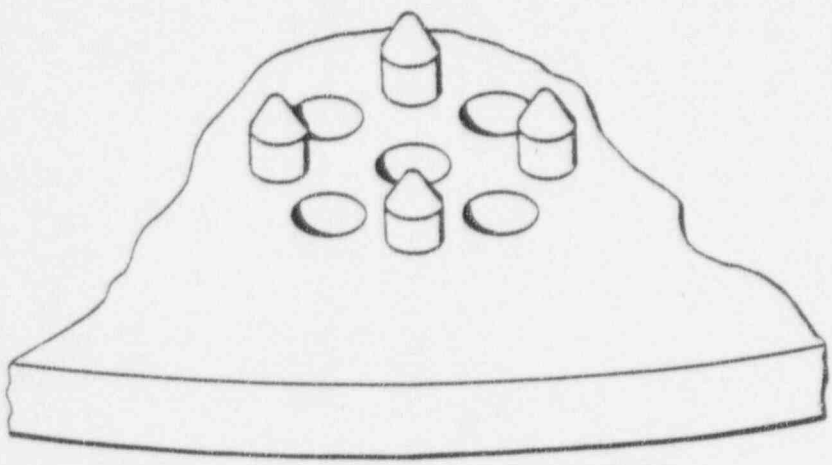

COLD LEG NOZZLE
CORE SUPPORT BARREL
CORE SHROUD
FUEL ASSEMBLY
CORE SUPPORT PLATE
(Location 3)
LOWER SUPPORT STRUCTURE
(Location 2)
FLOW SKIRT
(Location 1)

Figure 4



FUEL ASSEMBLY



CORE SUPPORT PLATE

Figure 5