



BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Roy A. Anderson
Senior Vice President - Nuclear

May 4, 1992
BECo Ltr. 92-55

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

Docket No. 50-293
License No. DPR-35

The enclosed Licensee Event Report (LER) 92-005-00, "Unplanned Actuation of a Portion of Core Cooling Systems Logic Circuitry During Testing While Shutdown", is submitted in accordance with CFR Part 50.73.

Please do not hesitate to contact me if there are any questions regarding this report.

ET Boulette
R. A. Anderson

DWE/bal

Enclosure: LER 92-005-00

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Mr. R. B. Eaton
Div. of Reactor Projects I/II
Office of NRR - USNRC
One White Flint North - Mail Stop 14D1
11555 Rockville Pike
Rockville, MD 20852

Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

9205130241 920504
PDR ADDCK 05000293
S PDR

IE 22

1/1

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 RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1): Pilgrim Nuclear Power Station		DOCKET NUMBER (2): 0 5 0 0 0 2 9 3 1	PAGE (3): 1 OF 017
---	--	---	-----------------------

TITLE (4): Unplanned Actuation of a Portion of Core Cooling Systems Logic Circuitry During Testing While Shut Down

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)	
04	03	92	29	2	005	00	05	04	92	N/A	0 5 0 0 0
										N/A	0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.506(a)(1)(ii)	<input type="checkbox"/> 50.38(a)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.38(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
<input type="checkbox"/> 20.405(a)(1)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii) B	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.405(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(1)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(vii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: Douglas W. Ellis - Senior Compliance Engineer	TELEPHONE NUMBER: AREA CODE: 5 0 8 7 4 7 - 8 1 6 0
--	--

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 you complete EXPECTED SUBMISSION DATE; NO

ABSTRACT (Limit to 400 words, i.e., approximately fifteen single spaced typewritten lines) (16)

On April 3, 1992 at 0327 hours, an unplanned actuation of a portion of the core cooling systems logic circuitry occurred during testing while shutdown. The actuation resulted in designed responses including an automatic start of the emergency diesel generators (EDGs), automatic start of the Residual Heat Removal (RHR) System Loop 'A' pumps, and automatic positioning of the RHR Loop 'B' valves for low pressure coolant injection. The EDGs did not load because the buses remained energized. The performance of the test was terminated and the affected circuitry and systems were restored to conditions existing prior to the test. The cause of the actuation was a procedure deficiency due to utility non-licensed personnel error in that the procedure development and review did not identify the actuation would occur as a result of performing the test. The procedure was retired and replaced by another procedure. The replacement procedure included additional steps to preclude an actuation. The responsible individuals were counselled. Corrective action planned includes review of the procedure governing technical review and validation with applicable technical personnel. Unrelated to the cause of the event, the procedure was issued without plant manager approval signature. The cause was utility non-licensed personnel error. The responsible individuals were counselled. The event occurred while shut down with the reactor mode selector switch in the SHUTDOWN position. The control rods were in the inserted position. The RHR System Loop 'B' was in the shutdown cooling mode. The Reactor Vessel (RV) pressure was zero psig and the RV water temperature was 137 degrees Fahrenheit. This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) and (a)(2)(i). This event posed no threat to the public health and safety.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 3	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	0 0 5	0 0	0 2	OF 0 7

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

BACKGROUND

The Reactor Vessel (RV) instrumentation includes RV water level, RV coolant flow rates and differential pressure, and RV internal pressure. The Drywell instrumentation includes Drywell pressure. By design, this safety-related instrumentation is arranged into separate, redundant Channels 'A' and 'B'. Each instrument channel is connected to piping extending into primary containment. The Analog Trip System (ATS) is part of the instrumentation monitoring RV and Drywell parameters. The ATS consists of transmitters, master trip units, slave trip units, and trip relays. The transmitters are housed on instrument racks located outside primary containment. The transmitters convert the parameter being monitored into signals. The signals are converted into indications and/or trip functions to related systems. The systems include the Reactor Protection System (RPS), Anticipated Transient Without Scram (ATWS) System, Primary Containment Isolation Control System (PCIS)/Reactor Building Isolation Control System (RBIS), Core Standby Cooling Systems (CSCS), and Reactor Core Isolation Cooling (RCIC) System.

The ATS cabinets contain the master trip units, slave trip units, trip relays, and power supplies. Typically, each transmitter provides signals to a master trip unit. The signal is proportional to the parameter being monitored. The master trip unit converts the signals into an indication and/or trip function. Slave trip units provide functions similar to the master trip units. Slave trip units receive signals from the transmitter via the related master trip unit. The setpoints of the master trip units and slave trip units are individually calibrated. If the signal reaches the setpoint, the trip unit energizes a normally de-energized trip relay connected to the related system. If a master trip unit is removed while the slave trip units are installed, the related slave trip units having a low level or low pressure function will cause the associated trip relay to become energized; moreover, the related slave trip units having a high level or high pressure function will not allow the associated trip relay to become energized.

Just prior to the event, the status of plant systems were:

- The Emergency Diesel Generators (EDGs) 'A' and 'B' were in standby service. The Auxiliary Power Distribution System was energized from the preferred offsite transmission system via the Startup Transformer. The switchyard air circuit breakers ACBs 102, 103, 104, and 105 were closed. The 23 KV distribution system was energized. The shutdown transformer was in standby service.
- The Recirculation System was not in service. The Loop 'A' and 'B' suction and discharge valves were closed.
- The Feedwater System pumps were not in service.
- The RPS manual scram channels A3 and B3 were in the tripped condition.
- The Reactor Vessel (RV) water level was steady at approximately +30 inches.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 0 6 0 0 0 2 9 3 9 2	LER NUMBER (6)			PAGE (3) 0 3 OF 0 7
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	

TEXT (if more space is required, use additional NRC Form 366A's) (3)

- The Residual Heat Removal (RHR) System Loop 'B' was in the shutdown cooling (SDC) mode. The Loop 'B' pumps P-203B/D were in service with valve MO-1001-28B in a throttled position and with valve MO-1001-29B in the open position. The Loop 'B' heat exchanger bypass valve MO-1001-16B was open. The Loop 'A' pumps were in standby service with valve MO-1001-28A in a throttled position and MO-1001-29A in the closed position. The Loop 'A' heat exchanger bypass valve MO-1001-16A was closed.

EVENT DESCRIPTION

On April 3, 1992 at 0327 hours, an unplanned actuation of a portion of the Core Standby Cooling System (CSCS) logic circuitry occurred while shut down. The actuation resulted in the following observed responses:

- Automatic start of EDGs 'A' and 'B'. The EDGs did not load onto the respective 4160 VAC bus because the buses remained energized.
- Automatic start of the RHR System Loop 'A' pumps P-203A/C and automatic repositioning of the RHR Loop 'B' valve MO-1001-28B from a throttled position to the full open position. The RHR Loop 'B' valve MO-1001-29B remained in the fully open position. The RHR Loop 'A' valve MO-1001-28A closed and the heat exchanger bypass valve MO-1001-16A opened.
- Automatic opening of the High Pressure Core Injection (HPCI) System turbine steam supply valve MO-2301-3 and automatic opening of the HPCI injection valve MO-2301-8. The HPCI System did not start because the steam supply pressure was less than the low pressure isolation setpoint.

The event occurred during the performance of temporary procedure TP 92-020 (Rev. 0), "Reactor Level Instrument Line Test & Investigation on Rack 2206 (Constant Level, Decreasing Pressure) at step 10.2[2](c). For this step, the ATS master trip unit LIS-263-72D was removed from its installed location in the analog trip cabinet C2233B. Master trip unit LIS-263-72B had been removed from its installed location at step 10.2[2](a). With the plant conditions existing at the time of the event, the concurrent low-low reactor water level trip signals from slave trip units LS-263-72B-1 and LS-263-72D-1 satisfied a portion of the Channel 'B' logic circuitry and resulted in the event.

The performance of TP 92-020 was terminated, the master trip units were reinstalled, the affected circuitry was reset, and the affected systems and components were restored to conditions existing prior to the event. Problem Report 92-9011 was written to document the event. The NRC Operations Center was notified in accordance with 10 CFR 50.72 on April 3, 1992 at 0423 hours.

This event occurred with the reactor mode selector switch in the SHUTDOWN position. The control rods were in the inserted position. The Reactor Vessel (RV) pressure was zero psig with the head vent valves open. The RV water temperature was approximately 137 degrees Fahrenheit. No activity was being performed having the potential to drain the RV. The test was being performed as part of investigating an event reported in Licensee Event Report 50-293/92-004-00.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (0150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 3	LER NUMBER (8)			PAGE (3)	
		YEAR 9 2	SEQUENTIAL NUMBER - 0 0 5	REVISION NUMBER - 0 0 0	4 OF 0 7	

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

CAUSE

The root cause of the event was a procedure deficiency due to utility non-licensed personnel error in that procedure TP 92-020 did not contain sufficient precautions or steps to preclude the actuation. The actuation was the designed response to the conditions existing at the time of the event and the removal of the master trip units while the slave trip units (e.g. LS-263-72B-1 and 72D-1) were installed.

The procedure was developed consistent with the guidance of procedure 1.3.4-1.9 (Rev. 2), "Temporary and Special Test Procedures Formatting Guide". Procedure TP 92-020 was written by an assigned individual having an Instrumentation and Control (I&C) background. Procedure TP 92-020 was generally consistent with the guidance of procedure 1.3.4-4 (Rev. 3), "Procedure Technical Review and Validation", for procedure writing, technical review, and validation. However, procedure TP 92-020 did not contain sufficient precautions or steps to preclude the actuation. During the development of TP 92-020, the procedure writer focused on possible adverse impact to plant safety and operation. The procedure writer understood the functions of the ATS master trip units, slave trip units, power supplies, and normally de-energized/energize-to-trip relays. Because of the focus on plant safety and operation, the procedure writer thought the removal of only the master trip units was sufficient for the test.

The technical review criteria of procedure 1.3.4-4 includes provision for appropriate cautions warning of conditions which can cause or increase the probability of an engineered safety feature actuation. The technical reviewer was qualified to perform the technical review and understood the purpose for procedure TP 92-020. The technical reviewer also understood the electrical isolations for TP 92-020 included the removal of the applicable master and slave trip units, with the removal of the applicable slave trip units first followed by the related master trip unit. Procedure TP 92-020, section 10.2, contained master trip units only. The technical reviewer thought the related slave trip units were included because of previous discussions with the other personnel responsible for the procedure. The ATS transmitters and functions provided by the related master and slave trip units were identified in the discussion section of TP 92-020.

The validation criteria of procedure 1.3.4-4 includes the identification of interactions with other systems and equipment. The procedure validator was qualified to perform the validation. The validator had reviewed a previous draft of TP 92-020 and was aware some jumpers were not specified in the procedure to preclude an actuation of the RPS, PCIS, RBIS, and CSCS logic circuitry. After the jumpers were specified in the procedure, the validator reviewed TP 92-020 and related drawings of the ATS, RPS, PCIS, RBIS, CSCS and RCIC circuitry. The validator review focused on the jumpers relative to the RPS, PCIS, and RBIS and on the master trip units. The validator could not recall why the slave trip units were not considered during the validation. After validating TP 92-020, the validator attended the Operations Review Committee meeting for TP 92-020 and answered questions including those regarding jumpers to preclude an unplanned actuation during the performance of TP 92-020.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F430), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 92-01012-913	LER NUMBER (6)			PAGE (8) OF 17
		YEAR 92	SEQUENTIAL NUMBER -01015	REVISION NUMBER -01015	

TEXT (if more space is required, use additional NRC Form 286A's) (17)

After the event, a review of TP 92-020 revealed the procedure was issued without approval signature by the Plant Manager contrary to procedure 1.3.4 (Rev. 14) section 5.3.16, "Procedure Approval and Distribution". Problem Report 92-1013 was written to document the discovery. Procedure TP 92-020 was reviewed by the Operations Review Committee on April 2, 1992 during a meeting held after normal working hours. The committee recommended approval of TP 92-020 by the Plant Manager.

Procedure 1.3.4, section 5.3.16, contains controls for issuing a procedure after normal working hours. The controls include obtaining department manager approval signature prior to procedure issuance. However, the individual who was given the procedure package after ORC review was told by the first individual to "hot issue" the procedure. The second individual was the relief for the first individual. The shift turnover also included other verbal communications. The second individual verified the procedure was in the package. The package contained the appropriate 10 CFR 50.59 checklists, safety evaluation, procedure forms, and TP 92-020. However, the procedure cover page signature block was obscured by the form used when a procedure is revised or issued as a new procedure. Moreover, the individual was not told the Plant Manager signature block was not signed and was not told he was responsible for obtaining the signature. Consequently, the procedure package was delivered to the Document Control Center (DCC) for issuance.

The procedure package was checked by the shift DCC individual for the appropriate checklists, safety evaluation, and procedure forms with satisfactory results. The procedure was also checked for format and legibility with satisfactory results. These actions by the DCC individual were in accordance with Pilgrim DCC work instruction 2.24 (Rev. 11), "Control of PNPS Operations Manual Procedures and Instructions", section 7.0 (procedure hot issue).

CORRECTIVE ACTION

Procedure TP 92-020 (Rev. 0) was retired and replaced by procedure TP 92-022 (Rev. 0). Procedure TP 92-022 contained additional steps for removing and reinstalling the master trip units and slave trip units including the order the trip units were to be removed and reinstalled. Procedure TP 92-022 was approved in accordance with procedure 1.3.4 and issued on April 5, 1992. The performance of TP 92-022 began on April 5, 1992 at 400 hours and was completed on April 7, 1992 at 0342 hours.

Pilgrim Station DCC personnel were briefed on April 3, 1992 regarding the issuance of TP 92-020 without approval signature. The Pilgrim DCC work instruction 2.24 (Rev. 11), "Control of PNPS Operations Manual Procedures and Instructions", will be reviewed for possible improvement.

A review was conducted of other procedures 'hot issued' during the outage. The review revealed the procedures were approved in accordance with procedure 1.3.4.

The personnel responsible for TP92-020 and 'hot issue' of TP 92-020 were counselled.

Procedure 1.3.4-4 will be reviewed with applicable technical personnel.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUIREMENT HAS BEEN FORWARDED COMMENTS REGARDING BURDEN ESTIMATION TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-5-2) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 050010293	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		92	005	00	06	OF 07

TEXT IF more space is required, use additional NRC Form 305A (17)

SAFETY CONSEQUENCES

This event posed no threat to the public health and safety.

The actuation was the designed response to the conditions existing at the time master trip units LIS-263-72B and LIS-263-72D were removed from their installed locations.

There were no component or system failures associated with this event.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) because the issuance of procedure TP 92-020 without approval signature was contrary to the administrative controls specified by Technical Specification 6.3.B.

This report is also submitted in accordance with 10 CFR 50.73(a)(2)(iv) because the actuation, although a designed response, was not an expected or planned part of procedure TP 92-020.

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review focused on LERs involving an unplanned actuation due to a procedural deficiency. The review identified a similar cause reported in LER 50-293/88-019-00.

For LER 88-019-00, an unplanned RPS scram signal occurred while shut down on July 8, 1988 at 1454 hours. The scram signal occurred during ATWS System Division 2 testing per procedure TP 87-126 (Rev. 5). The test began by simulating a low-low RV water level condition. The response resulted in the expected trips for the recirculation pump trip (RPT) and alternate rod insertion (ARI) functions. The ARI function further resulted in the designed slow depressurization of the scram air header and subsequent draining of control rod drive water into the scram discharge volume (SDV). When the water level in the SDV reached the level corresponding to 39 gallons, the unplanned scram signal occurred. The root cause of the event was inadequate review of TP 87-126 in that the review did not identify that a scram signal would occur as a result of the test.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-70) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 0 15 0 0 0 2 9 3	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	— 0 0 5	— 0 0	0 7	OF 0 7

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

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS

CODES

Relay, tripping	94
Switch, indicating, level (LIS)	LIS
Valve (MO-202-5A/B)	V
Valve, control, temperature (MO-1001-16A/B)	TCV
Valve, injection (MO-1001-28A/B, -29A/B, MO-2301-8)	INV
Valve, shutoff (MO-2301-3)	SHV

SYSTEMS

Emergency Onsite Power Supply System (EDGs)	EK
Engineered Safety Features Actuation System	JE
High Pressure Coolant Injection (HPCI) System	BJ
Reactor Recirculation System	AD
Residual Heat Removal System (RHR/LPCI)	BP
Solid State Control System (ATS)	JG