Progress Energy

July 11, 2005

SERIAL: BSEP 05-0075 10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325 and 50-324/License Nos. DPR-71and DPR-72
Licensee Event Report 1-2005-004

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.73, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., submits the enclosed Licensee Event Report. This report fulfills the requirement for a written report within sixty (60) days of a reportable occurrence.

Please refer any questions regarding this submittal to Mr. Edward T. O'Neil, Manager – Support Services, at (910) 457-3512.

Sincerely,

David H. Hinds
Plant General Manager
Brunswick Steam Electric Plant

CRE/cre

Enclosure: Licensee Event Report

IE22

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Brunswick Nuclear Plant
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cc (with enclosure):

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2007

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	1 OF 10

4. TITLE

Loss of Electrical Power to Emergency Bus E1

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	12	2005	2005	-- 004 --	00	07	11	2005	BSEP, Unit 2	05000324
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

097

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	OTHER Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Charles R. Elberfeld, Lead Engineering Technical Support Specialist	(910) 457-2136

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MO	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

On May 12, 2005, at 0411 hours, with Emergency Diesel Generator (EDG) 1 inoperable for planned maintenance, electrical power was lost to the 4160 VAC Emergency Bus E1. As a result of this power loss, Unit 1 Reactor Coolant System Leakage Detection Instrumentation became inoperable, and Unit 1 received Division 1 Primary Containment Isolation system actuations for Groups 2, 3, and 6 isolation valves. Additionally, the redundant control building air compressor did not start, which resulted in inoperable Control Room Air Conditioning (AC) and the Control Room Emergency Ventilation (CREV) systems for Units 1 and 2.

The cause of the loss of electrical power to bus E1 is attributed to a design feature, associated with the EDG control logic, that can result in the reduced reliability of the offsite power source to the Emergency Buses in the event of a particular electrical alignment. The redundant control building air compressor did not start due to a wire lug that had broken and interrupted the control power circuit.

The wire lug was replaced and the Control Room AC and CREV systems were returned to service. Electrical power was restored to bus E1 and additional controls were implemented for the electrical alignment that resulted in the loss of power to bus E1. The safety significance of this event is considered minimal.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

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

INTRODUCTION

On May 12, 2005, at 0411 hours, with Emergency Diesel Generator (EDG) [EK] 1 inoperable for planned maintenance, electrical power was lost to the 4160 VAC Emergency Bus E1 [EB]. As a result of this event, Unit 1 operated in a condition prohibited by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.5, Reactor Coolant System (RCS) Leakage Detection Instrumentation [IJ, IK], and received Division 1 Primary Containment Isolation System (PCIS) [JM] actuations for Groups 2, 3, and 6 Primary Containment Isolation valves (PCIVs) [ISV]. Additionally, the redundant Control Building (CB) air compressor [CMP] did not start, which resulted in Units 1 and 2 being in a condition that could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident when both the Control Room Air Conditioning (AC) and the Control Room Emergency Ventilation (CREV) systems [VI] became inoperable.

At 1122 hours, the NRC was notified (i.e., Event Number 41692) in accordance with 10 CFR 50.72(b)(2)(i) (i.e., for the initiation of a plant shutdown for Unit 1), 10 CFR 50.73(a)(1) (i.e., for the invalid actuations of PCIVs for Unit 1), and 10 CFR 50.72(b)(3)(v)(D) (i.e., a condition that could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident for Units 1 and 2).

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) (i.e., operation prohibited by TS 3.4.5, for Unit 1), and 10 CFR 50.73(a)(2)(v)(D) (i.e., a condition that could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident for Units 1 and 2). The NRC issued Notice of Enforcement Discretion (NOED) No. 05-2-001 with respect to operation prohibited by TS 3.4.5.

EVENT DESCRIPTION

On May 12, 2005, at 0411 hours, electrical power was lost to the 4160 VAC Emergency Bus E1. EDG 1 had been removed from service for maintenance two days earlier, and was not available to power the bus. At the time of the electrical power loss, Unit 1 was at 97 percent and Unit 2 was at 100 percent of rated thermal power (RTP). The power loss to bus E1 affected both Units 1 and 2.

The following sequence of events occurred on Unit 1 on May 12, 2005.

Time	May 12, 2005, Unit 1 Sequence of Events
0411 hours	Operators entered Abnormal Operating Procedure, 0AOP-36.1, "Loss of Any 4160V Buses or 480V E-Buses," due to loss of electrical power to Emergency Bus E1. The loss of power to bus E1 resulted in Division 1 PCIV actuations. The actuations included the Primary Containment Isolation System Group 2 (i.e., Drywell Equipment and Floor Drain, Traversing In-core Probe, Residual Heat Removal (RHR) Discharge to Radwaste, and RHR Process Sample), Group 3 (i.e., Reactor Water Cleanup), and Group 6 (i.e., Containment Atmosphere Control/Dilution, Containment Atmosphere Monitoring, and Post Accident Sampling Systems) valves, as well as the Reactor Building Ventilation System isolation

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

EVENT DESCRIPTION (continued)

Time	May 12, 2005, Unit 1 Sequence of Events (continued)
0411 hours (continued)	(i.e., Secondary Containment isolation) and the automatic start of Standby Gas Treatment (SGT) System train B. The actuations of PCIVs and Reactor Building Ventilation System isolation were complete and the affected equipment responded as designed to the invalid signal (i.e., the valves and dampers that were open, at the time of the event, closed if they had power or capability to close on loss of power). Additionally, the 1B Reactor Recirculation pump ran back from 88 to 79 percent; after which, both the 1A and 1B Reactor Recirculation pump speed controls locked up. Unit 1 entered TS LCO 3.8.7 Condition B (i.e., one or more AC electrical power distribution subsystems inoperable, Required Action: Restore subsystem to operable status in eight hours) due to loss of bus E1. Unit 1 also entered LCO 3.4.5 Condition D (i.e., all required leakage detection systems inoperable, Required Action: Enter TS LCO 3.0.3 immediately) due to the loss of electrical power to associated PCIVs resulting in loss of leakage detection flow paths. LCO 3.0.3 requires actions to be initiated to place the unit in Mode 2 (i.e., Startup) within seven hours, Mode 3 (i.e., Hot Shutdown) within 13 hours, and Mode 4 (i.e., Cold Shutdown) within 37 hours.
0421 hours	Operators noted under voltage relays [27], including the 27PK and the 27/59E under voltage relays, were actuated for E1. No relays were actuated on the 1D Balance of Plant (BOP) Bus that fed bus E1.
0440 hours	All three Control Room AC Subsystems for Units 1 and 2 were declared inoperable due to no CB instrument air compressors running. Both units entered TS LCO 3.7.4 Condition E (i.e., three control room AC subsystems inoperable, Required Action: Enter LCO 3.0.3 immediately).
0515 hours	Both CREV subsystems for Units 1 and 2 were declared inoperable when the dampers drifted shut due to no CB instrument air compressors running. Both units entered TS LCO 3.7.3 Condition B (i.e., two CREV subsystems inoperable, Required Action: Be in Mode 3 within 12 hours and in Mode 4 within 36 hours).
0546 hours	The 2A CB instrument air compressor was started and LCOs 3.7.4, for the Control Room AC, and 3.7.3, for the CREV systems, were exited after replacement of a broken control power wire lug.
0719 hours	During control room panel walkdown, operators noted that the electrical feed from bus E2 to the Motor-Driven Fire Pump (MDFP) was open.
0804 hours	Operators authorized the performance of a channel calibration test of the under voltage relay associated with bus E1/EDG 1 (i.e., the 27/59E under voltage relay).
0853 hours	Operators reset the 1B Reactor Recirculation pump speed control circuitry.

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EVENT DESCRIPTION (continued)

Time	May 12, 2005, Unit 1 Sequence of Events (continued)
0948 hours	Operators commenced power reduction in accordance with General Plant Operating Procedure 0GP-05, "Unit Shutdown," to comply with LCO 3.0.3.
0957 hours	Performance of the channel calibration test of under voltage relay associated with bus E1/EDG 1 indicated that the relay was in calibration.
1035 hours	Operators reduced power to 65 percent of RTP.
1058 hours	The plant received a verbal NOED from the NRC concerning LCO 3.0.3 for LCO 3.4.5. This allowed the shutdown activities to continue within the time frame of LCO 3.8.7.
1211 hours	Unit 1 entered LCO 3.8.7 Condition E (i.e., required action and associated completion time of Condition B not met, Required Action: Be in Mode 3 in 12 hours and in Mode 4 in 36 hours).
1336 hours	Reactor power was at approximately 50 percent of RTP and activities were in progress to implement local manual control of 1A Reactor Recirculation pump speed to further reduce reactor power.
1710 hours	Operators energized bus E1 in accordance with plant procedures after testing for bus faults was completed.
1740 hours	Operators energized Emergency Bus E5 (i.e., the 480 VAC bus normally fed from bus E1) restoring RCS Leakage Detection Instrumentation to operable status. Unit 1 exited LCO 3.4.5.
2015 hours	Operators declared bus E1 operable and exited TS 3.8.7.
2319 hours	Operators completed restoration of electrical/system alignments and exited 0AOP-36.1

The following sequence of events occurred on Unit 2 on May 12, 2005.

Time	May 12, 2005, Unit 2 Sequence of Events
0411 hours	Operators entered 0AOP-36.1 due to loss of electrical power to bus E1. The 2C Conventional Service Water (CSW) [KG] pump tripped as a result of a loss of E1, and the 2B CSW pump automatically started. The 2C Circulating Water [KE] Intake Pump (CWIP) tripped due to low lube water flow. Unit 2 entered LCO 3.8.7 Condition B (i.e., one or more AC electrical power distribution subsystems inoperable, Required Action: Restore subsystem to operable status in eight hours) due to loss of bus E1.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

EVENT DESCRIPTION (continued)

Time	May 12, 2005, Unit 2 Sequence of Events (continued)
0430 hours	Operators received an annunciator indicating that CB instrument air pressure was low. The 2A CB instrument air compressor did not start as expected after the loss of power to bus E1. Operators sent Instrument & Controls (I&C) technicians to investigate.
0440 hours	All three Control Room AC Subsystems for Units 1 and 2 were declared inoperable due to no CB instrument air compressors running. Both units entered LCO 3.7.4 Condition E (i.e., three control room AC subsystems inoperable, Required Action: Enter LCO 3.0.3 immediately).
0515 hours	Both CREV subsystems for Units 1 and 2 were declared inoperable when the dampers drifted shut due to no CB instrument air compressors running. Both units entered LCO 3.7.3 Condition B (i.e., two CREV subsystems inoperable, Required Action: Be in Mode 3 within 12 hours and in Mode 4 within 36 hours).
0517 hours	I&C technicians identified a broken lug on 2A CB instrument air compressor breaker control wiring.
0540 hours	The broken lug was replaced by I&C technicians and the 2A CB instrument air compressor was returned to service.
0546 hours	After the air compressor was started, LCOs 3.7.4, for the Control Room AC, and 3.7.3, for the CREV systems, were exited.
0804 hours	Operators authorized the performance of a channel calibration test of the undervoltage relay associated with bus E1/EDG 1 (i.e., the 27/59E undervoltage relay).
0910 hours	Operators entered 0AOP-23.0, "Condensate/Feedwater System Failure," due to perturbations on the Condensate/Feedwater system [SD/SJ] resulting from the re-start of the 2C CWIP. During the re-start, momentary steam flashing occurred in the condenser causing automatic starting of the standby Condensate and Condensate Booster pumps. Reactor water level lowered approximately two inches.
0954 hours	Reactor power was reduced to 95 percent of RTP in preparation for realignment of the Condensate system.
0957 hours	Performance of the channel calibration test of undervoltage relay associated with E1/EDG 1 indicated that the relay was in calibration.
1020 hours	Operators secured the 2C Condensate Booster pump.
1035 hours	Operators secured the 2C Condensate pump.

EVENT DESCRIPTION (continued)

Time	May 12, 2005, Unit 2 Sequence of Events (continued)
1141 hours	Operators returned reactor power to 100 percent of RTP.
1143 hours	Operators exited 0AOP-23.0.
1211 hours	Unit 2 entered LCO 3.8.7 Condition E (i.e., required action and associated completion time of Condition B not met, Required Action: Be in Mode 3 in 12 hours and in Mode 4 in 36 hours).
2015 hours	Operators declared bus E1 operable and exited LCO 3.8.7.
2319 hours	Operators completed restoration of electrical/system alignments and exited 0AOP-36.1

EVENT CAUSE

Loss of Electrical Power to Bus E1

The cause of the loss of electrical power to bus E1 is attributed to a design feature, associated with the EDG control logic, that can result in the reduced reliability of the offsite power source to the Emergency Buses in the event of a particular electrical alignment. Plant operators and engineers were not aware of the decreased reliability of the offsite power source when the plant was in this alignment. The PK relays associated with an EDG, which include the under voltage 27PK, under frequency 81PK, and directional power 32PK relays, were originally intended to protect the EDG while it was operated in manual and in parallel with the offsite source to supply peak power demand needs. The operating function of the EDG has been limited to an emergency source only and is only operated in parallel for required testing. This design feature is applicable to the four 4160 VAC Emergency Buses (i.e., E1 through E4) and the four EDGs (i.e., EDG 1 through EDG 4).

The normal protection scheme for the electrical distribution systems includes time delays to allow protective relays to clear faults from emergency bus loads before interrupting power to the emergency bus itself. Prior to the loss of electrical power to bus E1, EDG 1 was out of service for maintenance with the control switch in "Manual" and with the automatic start feature disabled. With the EDG 1 control switch in "Manual," the 27PK relay is placed in the protective circuit and this relay provides instantaneous under voltage protection that effectively bypasses the time delay protection scheme (i.e., makes the associated Loss of Power (LOP) Instrumentation required by TS LCO 3.3.8.1 inoperable).

On May 12, 2005, at 0411 hours, a fault on electrical cabling to the MDFP, fed by bus E2 from BOP bus 1C, resulted in a short duration voltage transient while the MDFP feeder breaker was opening. The voltage transient propagated throughout the entire distribution system supplied by the Unit Auxiliary Transformer (UAT). Since both bus E1 and bus E2 were being supplied by the UAT, through the BOP buses, the transient was also sensed on bus E1 by the 27PK relay. The 27PK relay actuated and separated bus E1 from BOP bus 1D. Since EDG 1 was out of service at the time, bus E1 lost electrical power.

EVENT CAUSE (continued)

RCS Leakage Detection Instrumentation Inoperability

The drywell floor drain sump flow monitoring system, the primary containment atmosphere particulate, and the primary containment gaseous RCS leakage detection instrumentation were rendered inoperable due to the loss of bus E1. The inoperability was primarily the result of closure of the PCIVs associated with the instrumentation and the inability to re-open the PCIVs due to the inoperable bus E1.

Control Room AC and CREV Loss of Safety Function

The 2B CB Air Compressor is powered from bus E1, so when electrical power was lost to bus E1, the compressor stopped. The 2A CB Air Compressor should have automatically started to provide air to support operability of the Control Room AC and CREV systems; however, the compressor did not start and, as air bled off the systems, the dampers closed and the systems became inoperable. The reason the 2A CB Air Compressor did not start was due to a wire lug that had broken and interrupted the control power circuit. The lug broke between the ring portion and the portion crimped to the control wire due to apparent strain hardening. Wire movement/manipulation during motor starter coil replacement and breaker preventive maintenance is inevitable in order to perform proper maintenance. Over time, manipulation of the wiring may have contributed to formulating a crack that propagated and weakened the lug due to repeated cycling of the breaker as the compressor cycled on and off to maintain system pressure. The last maintenance activities on the breaker were performed in April 2004.

CORRECTIVE ACTIONS

Loss of Electrical Power to Bus E1

Maintenance personnel inspected and tested bus E1 and when it was determined that the bus was in satisfactory condition, it was energized in accordance with plant procedures. Once the impact of the design feature on equipment reliability/operability was understood, standing instructions were issued to plant operators for equipment control in relation to the EDG control switches being placed in the "Manual" position. Training on the event was provided to operations personnel. The fault on the MDFP electrical cabling was corrected by pulling new cables. An expected alarm did not come in when the MDFP faulted. Activities are in progress to ensure that appropriate alarms are received in response to such faults and are scheduled to be completed by July 15, 2005. Activities are in progress to determine the desired design change with regard to PK relays. The determination is scheduled to be completed by October 17, 2005.

RCS Leakage Detection Instrumentation Inoperability

On May 13, 2005, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., (PEC) submitted a letter, SERIAL: BSEP 05-0059 to the NRC, Subject: Request for Notice of Enforcement Discretion, Technical Specification 3.4.5, "RCS Leakage Detection Instrumentation," for Unit 1. On May 17, 2005, the NRC issued a letter, Subject: Notice of Enforcement Discretion for Carolina Power & Light Regarding BSEP Unit No. 1 (TAC NO. MC6977, NOED NO. 05-2-001),

CORRECTIVE ACTIONS (continued)

RCS Leakage Detection Instrumentation Inoperability (continued)

granting the enforcement discretion. On May 17, 2005, PEC submitted a letter, SERIAL: BSEP 05-0060, Subject: Request for License Amendment, Technical Specification 3.4.5, "RCS Leakage Detection Instrumentation," for Units 1 and 2. On June 28, 2005, the NRC issued a letter, Subject: BSEP Units 1 and 2 – Issuance of Amendment on Technical Specification 3.4.5, Reactor Coolant System Leakage Detection Instrumentation (TAC NOS. MC7216 and MC7217), revising the TS to replace Required Action D.1 (i.e., immediately enter LCO 3.0.3) with the requirement to be in Mode 3 within 12 hours and Mode 4 within 36 hours if all required leakage detection systems are inoperable.

Control Room AC and CREV Systems Loss of Safety Function

The broken ring lug was replaced with a heavy duty ring lug, the 2A CB Air Compressor was started, and the Control Room AC and CREV systems were returned to service. The 2B CB Air Compressor control wiring was subsequently inspected satisfactorily with no similar conditions existing. Procedures for performing breaker maintenance were reviewed and determined to contain proper guidance regarding inspection and termination of control wiring. Operating experience is being developed to make maintenance personnel aware of this occurrence.

SAFETY ASSESSMENT

The safety significance of this event is considered to be minimal. Operation of the plants in response to the system/equipment inoperabilities was in accordance with TS LCO Required Action Completion Times, with the exception of Unit 1 operation with regard to LCO 3.4.5. An NRC NOED was requested and received to delay the Unit 1 shutdown required by LCO 3.4.5. Discussion of the major system/equipment impacts follows.

Loss of Electrical Power to Bus E1

Electrical power distribution subsystems are required to be operable in Modes 1, 2, and 3 to ensure that acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of anticipated operational occurrences or abnormal transients. The subsystems are also required to be operable to ensure that adequate core cooling is provided, and containment operability and other vital functions are maintained in the event of a postulated design basis accident (DBA). With one or more required AC buses in one division inoperable, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced; however, because a single failure in the remaining AC electrical power subsystems could result in the minimum required engineered safety feature functions not being supported. For this event, bus E1 and its supported buses were de-energized for 13 hours and 29 minutes, and were considered to be inoperable for approximately 16 hours and four minutes. During that time, the remaining AC electrical subsystems in the other division and their supported systems/subsystems remained operable to safely shut down the reactors and maintain them in a safe shut down condition, if needed. Maintenance and operational activities were restricted during the event to minimize challenges to the operators and equipment.

SAFETY ASSESSMENT (continued)

RCS Leakage Detection Instrumentation Inoperability

TS 3.4.5 establishes LCOs for three RCS leakage detection systems: (1) the drywell floor drain sump flow monitoring system, (2) the primary containment atmosphere particulate monitoring system, and (3) the primary containment atmosphere gaseous monitoring system. Each of the TS 3.4.5-required leakage detection systems is designed with the capability of detecting leakage less than the leakage rate limits established in TS 3.4.4, "RCS Operational Leakage," and providing alarm and/or indication of excess leakage to control room operators. Drywell pressure, drywell temperature, cooling water temperature to and from the primary containment atmosphere coolers, and reactor water level also provide a means for detecting RCS leaks within the primary containment.

With all required leakage detection systems inoperable, Unit 1 entered LCO 3.4.5 Condition D (i.e., enter LCO 3.0.3 immediately) on May 12, 2005, at 0411 hours. Compliance with LCO 3.0.3 required Unit 1 to be in Mode 2 by 1111 hours. A Unit 1 power reduction in accordance with LCO 3.0.3 was initiated; however, the loss of electrical power to bus E1 affected the ability to reduce power using the 1A Reactor Recirculation pump due to the speed control being locked as a result of the loss of control power. In order to be in Mode 2 by 1111 hours, reactor power needed to be reduced via the 1B Reactor Recirculation pump until limited by pump mismatch requirements at which time power reduction via control rod insertion continued. The time required to pre-brief and safely perform local manual operation of the 1A Reactor Recirculation pump speed control, or continue to reduce power by control rod insertion alone, did not support entry into Mode 2 by 1111 hours. Therefore, operators intended to insert a manual scram at 1100 hours to comply with LCO 3.4.5/LCO 3.0.3. Unit 1 would have been at approximately 60 percent of RTP at the time the manual scram was required.

If compliance with LCO 3.4.5/LCO 3.0.3 was enforced, a relatively high powered manual scram, complicated by the inoperable bus E1, would have been required. The granted NOED allowed for necessary planning and precautions to be implemented, as appropriate, to conduct an orderly shutdown, given the degraded condition of the electrical distribution system. As a compensatory measure, operators performed increased monitoring of the narrow range primary containment pressure instrumentation and the primary containment temperature instrumentation. This monitoring provided the indirect ability to detect increased RCS leakage. The non-compliance with LCO 3.4.5/LCO 3.0.3 was not a potential detriment to the public health and safety because it provided additional time to plan and implement, if necessary, a more orderly shutdown of Unit 1. This additional time was consistent with existing shutdown requirements in LCO 3.4.4 for actual RCS leakage conditions in excess of TS requirements, and in LCO 3.8.7, for degraded electrical system conditions. There was no net increase in radiological risk to the public by avoiding the unnecessary transient imposed through compliance with LCO 3.4.5/LCO 3.0.3, and safety continued to be assured by the existing LCO 3.8.7 requirements which include more appropriate completion times when responding to a degraded electrical distribution system.

SAFETY ASSESSMENT (continued)

RCS Leakage Detection Instrumentation Inoperability (continued)

Unit 1 operated for approximately 13 hours and 29 minutes with all required RCS Leakage Detection Instrumentation inoperable. Prior to the event, Unit 1 unidentified RCS leakage was well below the LCO 3.4.4 operational leakage rate limit. Increased monitoring by operators during the event did not detect an RCS leakage increase, and when the RCS Leakage Detection Instrumentation was returned to service, RCS leakage was confirmed to be at pre-event rates.

Control Room AC and CREV Systems Loss of Safety Function

The Control Room AC system is designed to provide a controlled environment under both normal and accident conditions. Two of the three subsystems provide the required temperature control to maintain a habitable environment and ensure the operability of components in the control room. Each subsystem consists of a heating coil, a cooling coil, a supply fan, a compressor-condenser unit, ductwork, dampers, and instrumentation and controls to provide for control room temperature control. In Modes 1, 2, and 3, the Control Room AC system must be operable to ensure that control room temperature will not exceed equipment operability limits following control room isolation.

The CREV system provides a radiologically controlled environment from which the units can be operated following a DBA. The system is a standby system that is common to both Units 1 and 2, parts of which also operate during normal unit operations to maintain the control room environment. The safety function of the CREV system is the radiation protection portion of the radiation/smoke protection mode and includes two redundant high efficiency air filtration subsystems for emergency treatment of recirculated air or outside supply air. Each subsystem consists of a high efficiency particulate air filter, an activated charcoal adsorber bank, an emergency recirculation fan, and the associated ductwork and dampers. In Modes 1, 2, and 3, the CREV system must be operable to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

Both Units 1 and 2 operated without the CB Air Compressors providing support for the Control Room AC and CREV systems operation for approximately one hour and 16 minutes. Plant staff took immediate actions to investigate/correct the problem and return the systems to service. For the brief time the Control Room AC and CREV systems were inoperable, performance of plant personnel and equipment were not adversely affected.

PREVIOUS SIMILAR EVENTS

A review of LERs and corrective action program condition reports for the past three years has not identified any previous similar events.

COMMITMENTS

No regulatory commitments are contained in this report. Those actions discussed in this submittal will be implemented in accordance with corrective action program requirements.