

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **CRYSTAL RIVER UNIT 3** DOCKET NUMBER (2) **05000302** PAGE (3) **1 OF 04**

TITLE (4) **LACK OF ADEQUATE ADMINISTRATIVE CONTROLS RESULTS IN OVER LOADING ES BUS ALTERNATE POWER SUPPLY AND DIESEL GENERATOR START**

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	09	89	89	013	00	05	09	89	N/A		05000
									N/A		05000

OPERATING MODE (9) **5**

POWER LEVEL (10) **000**

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"/> 20.406(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.38(a)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(a)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.38(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **LARRY W. MOFFATT, SUPERVISOR, NUCLEAR SAFETY** TELEPHONE NUMBER **904 795-6486**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) **06 30 89**

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

On April 9, 1989 Crystal River Unit 3 was in OPERATIONAL MODE 5 (COLD SHUTDOWN) for repair of Reactor Coolant Pumps. Maintenance was being performed on the Unit 3 Startup Transformer. The 4160V Engineered Safeguards (ES) Buses were being supplied through an underground connection by the Unit 1 and 2 (Coal Fired Plants) Start-Up Transformer. The voltage of the ES buses degraded to the setpoint for actuation of the Second Level Undervoltage Relays and these time delay relays actuated. When the time delay was satisfied and the voltage had not recovered, an Emergency Diesel Generator (EGDG) start signal was initiated. This is an actuation of an Engineered Safety feature and is therefore reportable. The voltage remained degraded long enough for the EGDG to come up to full speed. However, the voltage did not stay degraded long enough to require the diesel to pick up the ES Buses. Appropriate Operator action was accomplished to verify automatic start of both EGDGs and to verify recovery of the ES Bus voltage to the required value. The EGDGs were returned to standby status. The cause of the EGDG start was a degraded voltage condition on the ES Buses. The cause of the degraded voltage was an overloading of the Unit 1 & 2 Start-Up Transformer. The cause of the overloading is under investigation. Corrective action will be taken when the cause is fully understood.

B9051B0401 B90509
PDR ADOCK 05000302
S PNU

IE22
/1

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		89	013	00	02	OF 04

TEXT (1) more space is required, use additional NRC Form 266a (17)

EVENT DESCRIPTION:

On April 9, 1989 Crystal River Unit 3 was in OPERATIONAL MODE 5 (COLD SHUTDOWN) for repair of Reactor Coolant Pumps [AB,P]. Maintenance was being performed on the Unit 3 Startup Transformer [EA, XFMR]. The 4160V Engineered Safeguards (ES) Buses [EB, BU] were being supplied through an underground connection by the Unit 1 (Coal Fired Plant) 4160V buses. At 2349 the voltage of the ES buses degraded to the setpoint for actuation of the Second Level Undervoltage Relays [EB, 2] (SLURS) and the time delay relays actuated. When the time delay was satisfied (5 sec) and the voltage had not recovered above the 95% SLUR setpoint, an Emergency Diesel Generator [EK, DG] (EGDG) engine start signal was initiated. The voltage remained degraded for greater than 10 seconds which was long enough for both of the EGDGs to come up to full speed. However, the voltage did not stay degraded long enough, 18 seconds, to require the diesel to pick up the ES Buses. Appropriate Operator action was accomplished to verify automatic start of both EGDGs and to verify recovery of the ES Bus voltage to the required value. Both EGDGs were returned to standby condition.

CAUSE:

The cause of the automatic start of the EGDGs was a degraded voltage on the ES 4160v buses for a period of time sufficient for the Second Level Undervoltage Relays to initiate a diesel start signal. The cause of the degraded voltage was overloading of the primary alternate off-site power source by Units 1 & 2 due to the lack of adequate administrative controls to assure reliability of the power source.

EVENT ANALYSIS:

Crystal River Unit 3 uses power from the Unit 1 and 2 Start-Up Transformer (S/UX) as an alternate offsite source of power to the 4160v Engineered Safeguards Buses. Units 1 & 2 are adjacent to Unit 3 and the Unit 1 & 2 S/UX is supplied from the 230 Kv switchyard. The S/UX has two secondary windings referred to as "X" and "Y". The alternate offsite power source for Unit 3 4160v ES Buses is the "X" winding of the Unit 1 & 2 S/UX. The normal offsite power source to the ES Buses is the Unit 3 S/UX supplied directly from the 230kv switchyard. That power source was not available because maintenance was being performed on the Unit 3 S/UX. Unit 2 was on line at full power while Unit 1 was shutting down. The boiler feed pump at Unit 1 had been shutdown but was needed to help in the boiler cooldown. When the boiler feed pump, which is a 3500 Hp motor, was restarted, the Unit 1 and 2 S/UX was not able to supply all the required power without a significant voltage decrease. Voltage, as measured at the Unit 3 4160v ES buses, decreased from 4200v to 3680v instantaneously. With the approximately 500v decrease, the protective circuits on the ES buses were actuated and a time delay relay was started. It should be noted that the safeguards control centers starters have been specified to hold in down to 65% of rated voltage for a period of two (2) seconds. None of the safeguards equipment was lost in this event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) CRYSTAL RIVER UNIT 3	DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)																
	0	5	0	0	0	3	0	2	8	9	-	0	1	3	-	0	0	0	3	OF	0	4
									YEAR	SEQUENTIAL NUMBER	REVISION NUMBER											

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

When the Unit 3 Final Safety Analysis Report (FSAR) was prepared prior to receipt of a license, certain conditions were assumed which allowed us to specify that the Unit 1 & 2 S/UX was capable of supplying the necessary power (6.59 MVA) for Unit 3 ES loads. This assumption was stated in Chapter 8 "ELECTRICAL SYSTEMS" Section 8.2.3 "SOURCES OF AUXILIARY POWER" pages 8-17 thru 8-27. This assumption was apparently based on the steady state condition of Unit 2 operating, Unit 1 starting up, and Unit 3 in an emergency condition with its ES loads already loaded on the Unit 1 & 2 Start-up Transformer. Included in the assumption was a stipulation that the Unit 1 and 2 S/UX was to be carrying one fully loaded (6.65 MVA) bus, Bus 2B, from Unit 2 and one 70% loaded (3.54 MVA) bus (Bus 1B) from Unit 1.

In 1985 analyses were performed which showed that it was undesirable to allow voltage to drop to significantly less than 95% of nominal voltage at the ES 4160v Buses. For that reason, Second Level Undervoltage Relaying (SLURs) was installed on the Unit 3 4160v ES Buses. The SLURs are time delayed relays. The installation of SLURs put a limit of acceptability of 95% of nominal voltage on the ES Buses which had not been there before. The time delay relay's function is to allow some slight and temporary voltage fluctuations without immediately starting the EGDGs. Many unnecessary EGDG starts are avoided by allowing a few seconds time for the voltage to recover before initiating a start of an EGDG. Evidently, the expected voltage drop under the conditions assumed in the FSAR was not considered in the design process for the SLURs.

On the date of this event, the loads on the ES Buses totaled approximately 1670 Kw (1.8 MVA) which, because there was no emergency condition, is far below the FSAR assumed ES loads of 5930 Kw (6.59 MVA). Unit 2 was operating and Unit 1 was performing a rapid cooldown of its boiler. This cooldown situation is very similar to the startup conditions stated in the FSAR in that the cooldown of Unit 1 required the start of a boiler feed pump motor (3500 Hp) just as would be required in a startup situation. However, four (4) buses, 1A, 1B, Start-up Buses A, and B, instead of two, were being carried on the Unit 1 & 2 S/UX. The "Y" winding was carrying buses 1B and Start-up Bus B and any loads on those buses contributed to the load on the transformer. Because buses 1A and Start-Up Bus A were connected to the "X" winding of the S/UX in parallel with Unit 3 ES Buses, they also contributed to causing the S/UX to overload. This overloading resulted in a significant voltage drop at the 4160v ES buses at Unit 3 even without full ES loads being on the Unit 3 ES Buses. Consequently, when Unit 3 was dependent on the power supply from Units 1 & 2 Start-Up Transformer, it was found to be inadequate.

Power to the ES buses was always available. There was no decrease in the margin of safety for the public caused by this event. None of the safety functions of plant equipment were compromised. All in plant equipment functioned as designed and all plant procedures were adequate for the situation. All actions by the operators were proper and timely. If this event had occurred subsequent to an ES actuation there could have been some impact on the amount of time required to supply High Pressure Injection (HPI) water to the reactor core.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) CRYSTAL RIVER UNIT 3	DOCKET NUMBER (2) 0 5 0 0 0 3 0 2 8 9 - 0 1 3 - 0 0 0 4 OF 0 4	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

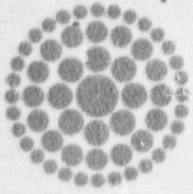
TEXT (If more space is required, use additional NRC Form 366A's) (17)

CORRECTIVE ACTION:

The systems functioned as they were supposed to when a degraded voltage situation occurs. The Emergency Diesel Generators were returned to standby status after verifying the ES buses were being properly supplied. No corrective action is required for responding systems/components. Based on the result of the investigation into the cause of the overloading of the Unit 1 and 2 Start-Up Transformer, appropriate action will be taken prior to ascending into Operational Mode 4 following the current outage. The actions will include appropriate administrative controls to assure that this offsite power source is not relied upon as a Technical Specification offsite power supply when its configuration will not provide sufficient capacity. An analysis of the impact of sequential occurrence of an ES actuation followed by a degraded voltage condition on the ES buses will be performed. A supplement to this report will be submitted.

PREVIOUS EVENTS:

An unplanned start of an EGDG has previously occurred seven times in the 12 year operating history of the plant. The last event was reported in LER 87-007. This event is the first time the diesel has started due to actual degraded voltage conditions. All other events were either start circuitry problems or total loss of voltage situations. There have not been any observed occurrences of overloading the Start-Up Transformer.



**Florida
Power**
CORPORATION

May 9, 1989
3F0589-10

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

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
Licensee Event Report No. 89-013

Dear Sir:

Enclosed is Licensee Event Report (LER) 89-013 which is submitted in accordance with 10 CFR 50.73.

Should there be any questions, please contact this office.

Yours very truly,

Rolf C. Widell
Director, Nuclear Operations Site Support

WLR/sjm

Enclosure

xc: Regional Administrator, Region II
Senior Resident Inspector

IER2
1/1