					LICENS	EE EVENT	REPOR	T (LER)			
Facili	ty Name	or Tri	Byron D On Hi	n. Unit 1 Igh Negative Flux Pa	e				Docket	Numbe: (2)	Page (3)	
Even	t Date	(5)	1	LER Number (6)		l Pana	rt Dat	. / 75	1			
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			COMPL	ETE ONE LINE FOR FAL	U CONDON				81	1 5 2	3 4 - 5 4 41	
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On July 13, 1985, a lightning strike at Byron Station resulted in a reactor trip and damage to plant instrumentation. It is believed that lightning struck in the vicinity of the Unit One containment and induced a voltage transient on the station ground, which caused two Rod Drive power supplies to fail. To prevent similar equipment damage due to lightning strikes, Byron has modified the Unit One containment lightning protection system.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NU	LER NUMBER (6)					Page (3)		
		Year	11/1	Sequential Number	14/1	Revision Number		1		
Byron, Unit 1	0151010101415	4 8 1 5		01610						

With the reactor in mode 1 at 11% power on July 13. 1975 at 0439 CDT, a lightning strike in the vicinity of Byron Station resulted in a reactor trip and damage to plant instrumentation. A listing of affected plant equipment is provided in Table I.

It is believed that lightning induced a voltage transient on the station ground, causing Rod Drive power supplies IBD PS-1 and IBD PS-2 to fail. These power supplies feed control and alarm circuitry associated with control rod banks B and D and shutdown bank B. Thus, failure of the power supplies resulted in insertion of these rod banks, and a negative flux rate trip.

Investigation into the instrument failure indicates that most likely a lightning strike to the reactor containment building occurred. The lightning was conducted to ground through the containment building steel. As the lightning strike passed by containment penetrations, voltage was induced into cables passing through the penetrations. The induced voltage potential was enough to damage plant instrumentation. As a result, portions of Train B safeguards instrumentation were unavailable.

The reactor tripped due to a negative flux rate in a normal and controlled manner. Although, portions of Train B safeguards instrumentation were damaged. Train A safeguards were unaffected. This was confirmed by performing safeguards operability surveillances. Therefore public and/or plant safety were not compromised at any time.

Byron station has not experienced a lightning-induced reactor trip previously.

All damaged equipment has been repaired and tested. Testing consisted of functional checks, channel checks, operability tests and performance of appropriate surveillances. In addition to testing damaged equipment, all devices which could have been affected were tested. This included any equipment with cables passing through a containment penetration associated with damaged equipment. Also, seven affected containment penetrations were leak tested to ensure containment integrity. Prior to Unit One criticality, various operability surveillances were performed on plant equipment. The purpose of performing these surveillances was to sample plant equipment and identify other failures not detected earlier. No failures were detected. Refer to Table II for a listing of

To prevent equipment damage due to similar lightning strikes, the containment lightning protection system was modified. This modification was installed prior to start-up after the lightning strike. The primary objective of the modification was to minimize the effect of lightning strikes on plant equipment. This objective was satisfied by isolating the containment lightning protection grid from structural steel and routing new conductors from the grid to the station ground mat. This approach will ensure that lightning strikes are carried to ground external to the containment structure.

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Byron, Unit 1				0 5 0	- 0 6 8								
	-		COMPL	ETE ONE LINE FOR	EACH COMPON	ENT FAILU	RE DESCRI	BED IN THIS RI	EPORT (13)	-			
CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NPROS		CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	TO NPROS	E		
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NRC FORM 3668

TABLE 1 EQUIPMENT AFFECTED BY LIGHTNING STRIKE

- A. PROTECTION CHANNEL II INSTRUMENTS
 - *1. Steam Pressure Transmitter 1FT-545
 - *2. Steam Generator 1A Level Transmitter 1LT-519
 - *3. Steam Flow Transmitter 1FT-513
 - *4. Steam Flow Transmitter 1FT-523
 - *5. Steam Flow Transmitter 1FT-533
 - *6. Steam Flow Transmitter 1FT-543
 - *7. Pressurizer Pressure Transmitter 1PT-456
 - *8. Steam Generator Wide Range Level Transmitter 1LT-502
 - *9. Tave 422 NRA Card 1TY-0421B
 - *10. Wide Range Cold Leg Temp NRA Card 1TY-413B
 - *11. Wide Range Cold Leg Temp NRA Card 1TY-423B
 - *12. Wide Range Cold Leg Temp NRA Card 1TY-433B
 - *13. Wide Range Cold Leg Temp NRA Card 1TY-443B
- B. TRAIN B EQUIPMENT
 - 1. Train B SSPS Universal Logic Cards

*A404 Turbing Throttle Valve Rx Trip Logic (2/2)

- *2. Train B SSPS "OPERATE" Lamp
- *3. Train B SSPS Power Supply #2

TABLE 1 (Continued)

- 4. 1PA06J Power Supply (26 VDC)
- *5. 1PA19J Power Supply #1 fuse
- *6. 1PA32J

C. METRO TOWER

- *1. Temperature at 30' (Loop II)
- *2. Wind Direction at 34' (Loop I)
- *3. Wind Speed at 34' (Loop I)
- *4. Wind Speed at 250' (Loop I)

D. ROD DRIVE

-

- *1. Rod Drive Power Supply 2AC PS-2
- *2. Rod Drive Power Supply 2BD PS-3
- *3. Rod Drive Power Supply 1BD PS-1, PS-2

E. LOOSE PARTS MONITORING

- *1. IVE-LM001 Loose Parts Monitor Channel 1
- *2. IVE-LM002 Loose Parts Monitor Channel 2
- *3. IVE-LM003 Loose Parts Monitor Channel 3

F.

1.

EQUIPMENT AFFECTED: Multiplexor 2 Autoterm 4, 5, 6, 7 Gatehouse Turnstyle Cardreaders ROOT CAUSE: Watch Tour Cardreader and Associated Autoterm

Due to a problem intiated by a cardreader, autoterm number 6 within multiplexor number 2 blew a modem board. The loss of this one autoterm caused a subsequent loss of communication with all autoterms within this single multiplexor. The cardreader which initiated all failures required complete replacement. A modem board within the autoterm also required replacement.

 EQUIPMENT AFFECTED: Multiplexor 6 Autoterm 3 Door 0552 Door 0351 ROOT CAUSE: Damage to Door 0551

After the lightning strike it was determined that damage to door 0551 caused autoterm 3 within multiplexor 6 to fail. Initial problem detection was diagnosed as being related to the card reader at door 551. The cardreader at door 551 was replaced initially. Further diagnostics later revealed that the modem board within autoterm 3, multiplexor 6 required replacement. It was also determined at this time that the door for the autoterm needed replacement also. The reasoning behind replacing the door is not known at this time.

3. EQUIPMENT AFFECTED: Survillance Cameras #4, 11, 12, 14, 15, 20 ROOT CAUSE: Surge to Cameras

After the lightning strike a total of six surveillance cameras failed to provide indication in the security centers. It was determined that five of the six cameras suffered from a failed primary video unit. The auxiliary input to each camera was used which restored camera isolation. The remaining camera failed due to a shorted isolation amplifier. The amplifier was replaced and the camera opeation was restored.

4. EQUIPMENT AFFECTED: Multiplexor 2 5015 Autoterm 2 ROOT CAUSE: Transformer Failure

Following the lightning strike overhead door 15 in the receiving building failed due to a blown 12 volt transformer. The 12 volt transformer was replaced and door operation was restored.

5. EOUIPMENT AFFECTED: Security Lighting K13, K5, L10 ROOT CAUSE: Unknown

The failure of security lighting, as reported, has not been investigated fully at this time.

TABLE 1 (Continued)

G.			
SECURITY EQUIPMENT FAILURE (ITEM FROM PREVIOUS LIST)	NWR #	COMPLETED	TEST REQUIRED (ALL PERFORMED BY SECURITY)
1	899802 Release #58 899514 Release #286	x	Functional Check of all devices in Channel 5: multiplexor 2 autoterm's 4, 5, 6, 7
2	B99802 Release #60 B99514 Release #288, 283	x	Functional Check of all related to multiplexor 6 autoterm 6 (Doors D551, D552, D351)
3	B99610 Release #98, 99, 100, 97, 96	x	Verify that picture from camera is restored
4	B99611 Release #291	x	Function Check
5NO I	NFORMATION AVAILABLE		

TABLE II

MISCELLANEOUS OPERABILITY CHECKS AND SURVEILLANCES

BOS AP-1	Unit 1 System Aux Power Transformers Weekly Surv.
BOS AP-2	34KV Line to River Screen House Quarterly Surv.
BOS AP-3	Unit 2 System Aux Power Transformers Weekly Surv.
BOS SY-1	345KV Switchyard Weekly Surv.
1BOS 3.1.1-10	Rx Trip Brkr Shunt and Undervoltage Trip Independance Test
	Train A Staggered Test Basis Bimonthly
1805 3.1.1-11	Rx Trip Brkr Shunt and Undervoltage Trip Independance Test
	Train B Staggered Test Basis Bimonthly
1BOS 3.1.1-20	Train A Solid State Protection System Bimonthly Surv
1BOS 3.1.1-21	Train B Solid State Protection System Bimonthly Surv
1BOS 3.1.1-15	Analog Channel Oper. Test of Source Range Channel N32
1BOS 3.1.1-14	Analog Channel Oper. Test of Source Range Channels N35 and N36
1BOS 3.1.1-1	Analog Channel Oper. Test of Power Range Channels NAL NA2 NA2
	and N44
1BOS 3.2.1-802	ESFAS Inst. Slave Relay Surv (Train & Auto SI-K604)
1805 3.2.1-812	ESFAS Inst. Slave Relay Surv (Train B Auto SI-K604)
1BOS 3.2.1-842	ESFAS Inst. Slave Relay Surv (Train & Phase & Isol-K607)
1BOS 3.2.1-843	ESFAS Inst. Slave Relay Surv (Train & Phase & Isol-K612)
1BOS 3.2.1-870	ESFAS Inst. Slave Relay Surv (Train & Phase & Isol-Kol2)
1BOS 3.2.1-880	ESFAS Inst. Slave Relay Surv (Train & Phase & Isol-Kol8, Ko20)
1BOS 3.2.1-890	ESFAS Inst. Slave Belay Surv (Train & Cont Vent Isol-Kol5, Ko22)
1BOS 3.2.1-940	ESFAS Inst. Slave Belay Surv (Train & Cont Vent Isol-Kols, Ko22)
1BOS 3.2.1-941	ESFAS Inst. Slave Relay Surv (Train & Arw Pump Start-Ko32, Ko39)
1805 3.2.1-820	ESFAS inst Slave Relay Surv (Train & Arw Pump Start-Koss)
1805 3.2.1-851	FSFAS Inst. Slave Relay Surv (Train & Cont Spray-K643)
1805 3.2.1-981	FSFAS Inst. Slave Relay Surv (Train B Phase A Isol-K043)
1805 3.2.1-991	FSFRS Inst. Slave Relay Surv (Train & P-14 S/G H1-2-K621)
1805 3.2.1-951	ESFAS Inst. Slave Relay Surv (Train B P-14 S/G H1-2-K621)
1805 3.2.1-930	CSFAS INSt. Slave Relay Surv (Train B AFW Pump Start-K632 K639)
1005 3.2.1-990	ESFAS INST. Slave Relay Surv (Train B P-14 S/G H1-2-K637)
1005 3.3.10-2	Rad Gas Effluent Mon Instrumentation Surv.
1005 5.3.10-3	Rad Gas Effluent Mon Instrumentation Surv.
1803 0.1.7.1-1	Containment Vent. Isol. Valves Monthly Surv.

1805 8.1.1.2.a-1	1A Diesel Gen. Oper. Monthly Surv.
1BOS 8.1.1.2.a-2	18 Diesel Gen. Oper. Monthly Surv.
1BOS 8.1.2-1	Offsite AC Power Availability Weekly Surv
1BOS 8.1.3.b-1	2A Diesel Gen Oper Monthly Surv.
1BOS 8.3.1-1	ESF Onsite Power Dist During Operation Weekly Survey
BCS 11.2.1-1	Common Noble Rad Gas Effluents
	Check of Containment Penetration Integrity-Electrical
	Penetrations - E29 through E42
	Check of Fire Hazards Panel
	Check of Post Accident Monitoring Equipment
	Check of Remote Shutdown Panel Instrumentation
	Check of Fire Protection Panel
	Check of Proper DEHC Operation during Startup
18VS 3.3.1-2	Containment High Range Radiation Monitors
1BVS 3.3.1-3	RCS Leakage Radiation Monitor
'BVS 3.3.1-4	Main Control Room Air Intake Radiation Monitors



Commonwealth Edison Byron Nuclear Station 4450 North German Church Road Byron, Illinois 61010

August 12, 1985

LTR: BYRON 85-1120

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

Dear Sir:

The enclosed Licensee Event Report from Byron Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) which requires a 30 day written report.

This report is number 85-068-00; Docket No. 50-454.

Very truly yours,

R. E. Querio Station Superintendent Byron Nuclear Power Station

REQ/gt

Enclosure: Licensee Event Report No. 85-068-00

cc: J. G. Keppler, NRC Region III Administrator J. Hinds, NRC Resident Inspector INPO Record Center CECO Distribution List

#3/017