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FACIL:50-263 Monticello Nuclear Generating Plant, Northern States 05000263
AUTH.NAME AUTHOR AFFILIATION
ENGELKE,S. Northern States Power Co.
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-019-00:on 910825,interruption in offsite power resulted in reactor scram & actuated several ESF sys.Caused by failed insulator on 115-KV line supplying station reserve transformer.Insulators replaced.W/910924 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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NSP

Northern States Power Company

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Minneapolis, Minnesota 55401-1927
Telephone (612) 330-5500

September 24, 1991

Report Required by
10 CFR Part 50, Section 50.73

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

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Failed Insulator on 115KV Line Causes Loss of Normal
Electrical Power Resulting in Reactor Scram and ESF Actuations

The Licensee Event Report for this occurrence is attached.

This event was reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72 on August 25, 1991.

for Monica Vick
Thomas M Parker
Manager
Nuclear Support Services

c: Regional Administrator - III NRC
Sr Resident Inspector, NRC
NRR Project Manager, NRC
MPCA
Attn: Dr J W Ferman

Attachment

A04

IE22
1/1

NRC FORM 366 (6-89) | U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

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-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)	DOCKET NUMBER (2)	PAGE (3)
MONTICELLO NUCLEAR GENERATING PLANT	0 5 0 0 0 2 6 3	1 OF 0 5

TITLE (4): Failed Insulator on 115KV Line Causes Loss of Normal Electrical Power Resulting in Reactor Scram and ESF Actuations

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 5 0 0 0
0 8	2 5	9 1	9 1	— 0 1 9	— 0 0	0 9	2 4	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
N		20.402(b)	20.405(c)	XX 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1 0 0		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	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
Steve Engelke, Superintendent, Electrial & Instrumentation Eng	AREA CODE 6 1 2 — 2 9 5 - 1 3 2 9

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
C	F K	I N S		NO					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	XX NO				

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

At 0609 hours on August 25, 1991 while operating at 100% power, an interruption in off-site power resulted in a reactor scram and actuated several Engineered Safety Feature systems. The cause of the event was a failed insulator on the 115KV line supplying the Station Reserve Transformer. The event occurred during a lightning storm and it is suspected that the insulator failure was caused by a lightning strike. The failed insulator caused a lock-out of the Station Reserve Transformer, resulting in an interruption of normal electrical power to all plant 4KV busses and a reactor scram. The essential busses were automatically reenergized from the Auxiliary Reserve Transformer in about 5 seconds as designed. All Engineered Safety Features operated as designed. Procedures were used to place the plant in a stable condition. The plant was restarted after all insulators on the affected 115KV tower were replaced, insulators on remaining 115KV towers were inspected, and protective relaying was functionally checked.

DESCRIPTION:

At 0609 hours, on August 25, 1991 while operating at 100% power a failed insulator (EIIS Component:INS) on the 115KV line (EIIS System: FK) caused a Lock Out on the Station Reserve (1R) Transformer (EIIS Component: XFMR) and an interruption of normal power. The interruption of power resulted in a reactor scram and actuated several additional Engineered Safety Feature systems.

At the time of the event, the plant was operating with three available sources of off-site power: the 1R Transformer was supplying all plant loads, the 2R Transformer was available as a manual back-up and the 1AR Transformer was available to automatically transfer to the essential busses. In addition, the Emergency Diesel Generators (EIIS Component: DG) were available as a backup on-site source of power to the essential busses. During a lightning storm, an insulator on the 115KV line supplying the station Reserve Transformer (1R) failed, allowing the "B" phase 115KV line to drop to within about 8 feet of the ground and causing Over Current Protection Relays (EIIS Component: 51) to initiate the Reserve Transformer Lock Out relay (186ST) (EIIS Component: 86). The lock out relay tripped all 4160 Volt supply breakers (EIIS Component: BKR) from the Reserve Transformer to Plant 4160 Volt busses (EIIS System: EA). The system and protective relaying operated as designed.

The interruption of normal off-site power resulted in an immediate start of the Emergency Diesel Generators and initiated an essential bus transfer to station back-up power as designed. The essential busses were automatically stripped of all non-essential loads and were automatically reenergized by the station 1AR Reserve Transformer in approximately 5 seconds. The Emergency Diesel Generators did not load onto the essential busses because the busses were reenergized from the 1AR Transformer as designed.

The interruption of normal off-site power to plant busses resulted in the immediate loss of the following:

-Normal feedwater to the reactor vessel (EIIS System: SJ)
-Both Reactor Recirculation Pumps (EIIS System: AD)
-The running Control Rod Drive Hydraulic pump (EIIS System: AA)
-Logic power to Plant Protection Systems, including Primary Containment Isolation systems (EIIS System: JM)
-Various non-essential loads

Both Reactor Protection System motor generators became deenergized during this event. #11 Reactor Protection System motor generator, which is powered from a non-essential bus, lost power when normal power was interrupted. #12 Reactor Protection System motor generator is powered from an essential bus but, as a non-essential load, was load-shed during the event. These actions occurred as designed and the resultant loss of all Reactor Protection System power resulted in a full reactor scram.

All isolation valves functioned properly. Secondary containment isolation and the Standby Gas Treatment System (EIIS System: BH) initiated as designed. All systems involved in the event were considered operable. This event is reportable because of the Engineered Safety Feature actuations, including the Reactor Protection System.

As directed by procedures, High Pressure Coolant Injection (EIIS System: BJ) and Reactor Core Isolation Cooling (EIIS System: BN) systems were manually started to recover reactor water level. Pressure control was supplemented by use of Safety Relief valves (EIIS Component: RV). The Station 2R Transformer was placed in service on all plant 4160 volt busses 9 minutes after loss of normal power. A Reactor Feedwater pump was started at 0656 hours. All group isolations were reset and the main condenser was restored as a heat sink. A reactor cooldown was commenced at 0743 hours and reactor temperature was less than 212 degrees by 2345 hours. Normal post scram and shutdown procedures were followed.

CAUSE:

The proximate cause of the event was a failed insulator on the 115KV line supplying the station 1R Transformer. The investigation as to why the insulator failed was inconclusive. Engineering judgment suggests that a lightning strike could have been a contributor to the failure, although degradation of the insulator prior to the lightning storm cannot be ruled out. Past experience with insulators of similar model and date of manufacture has not shown an excessive failure rate.

ANALYSIS:

At the time of the event there were three sources of offsite power available and both Emergency Diesel Generators were available as a back-up power supply for essential busses. Protective relaying operated properly to insure that all equipment needed to protect the health and safety of the public was available if needed during the event and subsequent cooldown of the reactor vessel.

For this event, the availability of the 2R transformer and the ability to quickly restore normal off-site power to non-essential busses allowed use of the Reactor Feed Pumps and the Main Condenser to facilitate shutdown. If the event had occurred with the 2R transformer unavailable, as allowed by Technical Specifications, reactor cooldown could still have been performed safely using emergency systems. Therefore, this event would not have resulted in more severe consequences given different initial conditions.

CORRECTIVE ACTIONS:

The following corrective actions have been taken:

1. The failed insulator and other similar insulators on the same 115KV tower have been replaced.

2. A visual inspection of similar insulators on 115KV towers between the plant and the substation was performed with no degradation found.

3. A functional check of the substation protective relays was conducted.

The following corrective actions will be taken:

1. Insulators installed on the 115KV line between the plant and the substation from the same manufacturer that are of a similar date as the failed insulator will be replaced during the next outage of sufficient duration.

ADDITIONAL INFORMATION:

Failed component Identification

Component: Insulator
Manufacturer: Knox
Date: 1968

Previous Similar events

None