Consumers Power

POWERING MICHIGAN'S PROGRESS

Big Rock Point Nuclear Plant, 10269 US-31 North, Charlevoix, MI 49720

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Plant Manager

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Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - VOLUNTARY LICENSEE EVENT REPORT 94-006; TURBINE OIL FIRE - REVISION 1

On July 29, 1994, at 0647 hours, the NRC was notified by Big Rock Point via the Emergency Notification System that a small oil fire in the pipe tunnel had been experienced. The fire was short-lived and did not require an entry into the Site Emergency Plan. At that time the event was reported as a "Nonemergency Event - One Hour Reportable; Informational".

After further review, the event should have been reported in accordance with 10 CFR 50.72(b)(2)(vi); "Any event or situation, related to the health and safety of the public or on-site personnel, or protection of the environment, for which a news release is planned or notification to other governmental agencies has been or will be made..." (A Voluntary Licensee Event Report was submitted by letter dated August 26, 1994, as the event may have been of generic interest to the industry and the Commission).

In addition, this revision updates the corrective action that has been and will need to be taken to correct the source of the turbine oil leak. The revisions are italicized and highlighted.

Patrick M Donnelly
Plant Manager

CC: Administrator, Region III, USNRC
NRC Resident Inspector - Big Rock Point

ATTACHMENT

IE22

NRC Form 366
(5-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Big Rock Point Plant	0 5 0 0 0 1 5 5	1 OF 0 5

TITLE (4) TURBINE OIL FIRE

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	
									N/A	0 5 0 0 0
0 7	2 9	9 4	9 4	- 0 0 6	- 0 1	0 1	1 2	9 5	N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 8 7	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X 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)	VOLUNTARY

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Michael D Bourassa, Licensing Supervisor	6 1 6 5 4 7 - 6 5 3 7

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	
				N							

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

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

On July 29, 1994, a Control Room Operator (CO) was performing a routine turbine inspection required during power operation. The reactor was operating at approximately 87%. While at the front standard, he noticed an odd smell. He then walked around the east side of the turbine and opened an inspection door. The CO observed an orange, flickering light reflecting from somewhere beneath the turbine. The Shift Supervisor (SS) was immediately informed, and proceeded to a recently installed closed circuit television monitor to remotely scan the room underneath the turbine. The SS identified the source of the flickering light as a baseball sized flame on top of the High Pressure Feedwater Heater insulation, and notified the Control Room at 0553. The fire alarm was then sounded. The fire brigade assembled, entered the pipe tunnel, and extinguished the fire at 0602 using dry chemicals.

The source of the fire was confirmed to be turbine lube oil that overflowed a collection basin placed under the # 2 turbine bearing onto the hot High Pressure Feedwater heater; which was the likely source for ignition. After a more thorough investigation, management decided to place the plant in the shutdown condition to clean up the oil spill and replace the oil soaked feedwater heater insulation.

IDENTIFICATION OF EVENT

At 0647, a voluntary one-hour report was made to the NRC Emergency Operations Center concerning the fire. *After further review, this event should be reported in accordance with 10 CFR 50.72(b)(2)(vi); "Any event or situation, related to the health and safety of the public or on-site personnel, or protection of the environment, for which a news release is planned or notification to other governmental agencies has been or will be made..."*

At 1220, a Notice of an Unusual Event was declared because after an investigation of the area involved, the potential for a recurring fire could not be eliminated; and the oil soaked insulation continued to smolder. A plant shutdown had commenced at 1143.

At 2110, the Notice of an Unusual Event was terminated due to the fact that the high pressure heater was less than 100 degrees F, and smoke was no longer visible. This condition was confirmed by a crew entering the pipe tunnel.

References

NUREG-1022

CONDITIONS PRIOR TO THE EVENT

The reactor [RCT] was operating at approximately 87%. The control rods [AA] were all out and the facility was in the process of "coasting" (relative to reactor power) towards a fall refueling outage. There were no limiting conditions of operation present at the time of the event.

DESCRIPTION OF THE EVENT

On July 29, 1994, a Control Room Operator (CO) was performing a routine turbine [TRB] inspection required during power operation. While at the front standard, he noticed an odd smell. He then walked around the east side of the turbine and opened an inspection door. The CO observed an orange, flickering light reflecting from somewhere beneath the turbine. The Shift Supervisor (SS) was immediately informed, and proceeded to a recently installed closed circuit television monitor [TELE:MON] to remotely scan the room underneath the turbine. The SS identified the source of the flickering light as a baseball sized flame on top of the High Pressure (HP) Feedwater Heater [HX] insulation [ISL], and notified the control room [NA] at 0553. The fire alarm [FRA] was then sounded, and the Charlevoix Township Fire Department was contacted and asked to remain on an open phone line. The fire brigade assembled, entered the pipe tunnel, and extinguished the fire in less than 10 minutes by 0602 using dry chemicals. The fire department was subsequently released from further action.

Compensatory actions that were then taken include:

a. Checking the turbine lube oil reservoir. Level was found at normal levels.

b. Continuous monitoring of the pipe tunnel using the remote closed circuit camera was initiated.

c. Prestaging additional fire fighting turnout gear and fire extinguishers at the entry to the pipe tunnel.

d. Planning an immediate pipe tunnel entry to identify the source of the leakage.

e. Installing a temporary oil collection trough.

Subsequent events

The Operations Supervisor and Chemistry/Radiation Protection Supervisor made an entry into the pipe tunnel at 1030 while the plant continued to operate at 87% power. The source of oil was verified as overflow from the collection basin that was temporarily installed to collect leakage from the #2 turbine bearing. Oil overflowed and traveled down the drain line to the Intermediate Pressure (IP) Feedwater Heater [HX]. From there it dripped/flowed down piping and ultimately onto the HP heater. The Operations Supervisor observed a significant amount of oil on the top of the IP Heater, but was unable to determine the degree of saturation.

Upon exiting the pipe tunnel at approximately 1100, the Operations Supervisor requested a power reduction to 15 - 20 MWe to decrease radiation and temperature levels to allow further investigations in the pipe tunnel. Power reduction commenced at approximately 1130.

A management/PRC meeting was held from approximately 1130 - 1200. The current situation, including known and potential hazards and consequences, was discussed in detail. The PRC elected to shut the plant down.

The Operating crew was notified at approximately 1205 to take the plant to the shutdown condition. At 1220, the SS was directed by the Acting Plant manager to declare an unusual event (discretionary) due to the HP Heater insulation continuing to smolder and because of increased fire loading (oil soaked insulation) in the pipe tunnel.

The plant was shutdown with all rods all in (ARAI) at 1641. The shutdown cooling system was placed in service at 2114.

The NUE was exited at 2110. NOTE: During the plant shutdown several pipe tunnel entries were made to wet down the smoldering insulation and continuous surveillance was maintained via the remote camera. The NUE was exited only after it was confirmed that the insulation had stopped smoldering and contact temperatures were approximately the same as system temperature (approximately 100 degrees F).

On 7/31/94, maintenance personnel did not find any obstructions in the oil drain line. Approximately 17 feet of insulation was removed from the IP Heater and approximately 12 feet from the HP Heater. The IP Heater insulation was saturated all the way through, while the HP Heater was not.

CAUSE(s) OF THE EVENT

The source of the fire was re-affirmed to be turbine lube oil (Flash Point, 405 Degrees F; Ignition Point, 455 degrees F) contacting a hot feedwater heater [HX] surface and igniting. A catch basin/collection facility had been placed beneath the #2 turbine bearing during the recent operating cycle to contain the oil leak. The oil leakage apparently exceeded the capacity of the drain line and began dripping down the outside edge of the drain line onto the IP Feedwater heater, then down onto the HP Feedwater heater. The oil soaked through the HP heater insulation in a narrow circumferential pattern from top to bottom, and the metal heater surface ignited the oil at the top of the insulation near a "crack" where oxygen was present. Entries into the pipe tunnel are made on a weekly basis, and oil that had accumulated in the basin was being removed. This mode of operation was and is expected to continue until appropriate repairs can be planned and made during the refueling outage scheduled for the fall.

CORRECTIVE ACTION TO PREVENT RECURRENCE

Prior to Startup

1. The existing collection basin was modified and tested to ensure that the system does not overflow. A second closed circuit television camera and monitor have been installed to observe for oil overflowing the collection basin.

Long term

1. Repair the oil leak on the #2 turbine bearing during the 1994 refueling outage scheduled for October 1, 1994.

   The repair during the refueling outage was not entirely successful, and the additional long term actions have been recommended by the turbine engineer. Implementation of these additional actions will be completed by the end of the 1996 Refueling outage.

In the interim, a procedurализed oil leakage monitoring and collection program has been established and is performed weekly. This action compares the amount of oil leaked to the oil collected, ensuring that the collection system is collecting all of the oil. Any incongruities will be evaluated by the Big Rock Point staff.

SAFETY SIGNIFICANCE

The fire occurred on the secondary side of the plant and did not involve any safety-related equipment. Therefore there was minimal safety significance associated with this event.

Had the fire gone unnoticed by the operating crew, heat sensitive sprinkler heads near the feedwater heaters in the pipe tunnel would have been activated by the fire. The "sprinklers pipe tunnel and turbine" alarm [ALM] window in the control room would have then annunciated due to low fire system [KP] pressure, coincidental with an electric fire pump [KP;P] auto start; alerting the operators to the off-normal condition. After confirming the alarm, the operators are directed by station procedures to manually scram the reactor because the fire was in an area (Main Condenser) [SG] that requires such action to ensure the safe shutdown of the plant.