

POWER REACTOR

EVENT NUMBER: 29853

FACILITY: BYRON
UNIT: [1] [2] []
RX TYPE: [1] W-4-LP, [2] W-4-LP

REGION: 3
STATE: IL

NOTIFICATION DATE: 01/18/96
NOTIFICATION TIME: 14:04 [ET]
EVENT DATE: 01/18/96
EVENT TIME: 14:00 [CST]
LAST UPDATE DATE: 01/18/96

NRC NOTIFIED BY: D PETERSON
HQ OPS OFFICER: JOHN MacKINNON

NOTIFICATIONS

EMERGENCY CLASS: NOT APPLICABLE
10 CFR SECTION:
CDEF 21.21(b)(2) DEFECTS/NONCOMPLIANCE

UNIT	SCRAM CODE	RX CRIT	INIT PWR	INIT RX MODE	CURR PWR	CURR RX MODE
1	N	N	0		0	
2	N	N	0		0	

EVENT TEXT

FAILURE OF A MOTOR PINION GEAR AT BYRON STATION.

MOTOR PINION GEARS USED IN MOTOR OPERATED VALVES PROCURED FROM WESTINGHOUSE ELECTRIC CORPORATION AND SUPPLIED TO WESTINGHOUSE BY LIMITORQUE CORPORATION. ACTUATOR SIZE:SB-O, MOTOR: 25 Ft-lb. 3600RPM, MOTOR PINION: 34 TOOTH PART #60-415-0100-1.

THE DEFECT IS RELATED TO THE FAILURE OF A MOTOR PINION GEAR AT BYRON STATION. ON 10/25/95, THE 1CV8105 MOTOR OPERATED VALVE AT BYRON STATION FAILED MID-STROKE WHEN IT WAS BEING CLOSED DURING NORMAL PLANT OPERATIONS. SUBSEQUENT TROUBLESHOOTING INDICATED THAT THE FAILURE WAS DUE TO SHEARED MOTOR PINION GEAR. MATERIAL ANALYSIS IF THE FAILED MOTOR PINION GEAR DETERMINED THAT THE GEAR WAS MADE OF AN IMPROPER MATERIAL. THE MATERIAL USED WAS 11B44 VERSUS 4140, 4320, OR 86L20 MATERIAL THAT SHOULD HAVE BEEN USED FOR THIS SIZE OPERATOR. AISI 11B44 MATERIAL IS A FREE-MACHINING, RE-SULFERIZED, BORON-BEARING CARBIDE STEEL. BASED ON THE RESULTS OF THE MATERIAL ANALYSIS, IT APPEARS AS IF THE FAILED MOTOR PINION GEAR WAS MACHINED FROM CAST STOCK. THE MOTOR PINION GEAR FAILURE WAS ATTRIBUTED TO THE POOR MECHANICAL PROPERTIES OF THE PART AND THE INABILITY OF THE GEAR TO SUSTAIN SERVICE LOADS. THE USE OF THE IMPROPER MATERIAL IN THE MOTOR PINION GEAR DIRECTLY LED TO THE FAILURE OF THE 1CV8105 VALVE TO OPERATE. BRAIDWOOD STATION ALSO PURCHASED 6 OF THESE MOTOR PINION GEARS (IDENTIFIED IN THE 1CV8105 VALVE).

PART 21 WAS FACSIMILED TO VERN HODGE NRR/PCEB.

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Commonwealth Edison Company
 Byron Generating Station
 7450 North German Church Road
 Byron, IL 61010-9794
 Tel 815-234-5441

January 18, 1996



LTR: BYRON 96-0016
 FILE: 2.01.0703

U. S. Nuclear Regulatory Commission
 Washington, DC 20555

Attention: Document Control Desk

Subject: Byron Station Units 1 and 2
 Braidwood Station Units 1 and 2

10 CFR Part 21 Notification
 Improper Material in Motor Operated Valve Motor Pinion Gear
NCR Dockets 50-454 and 50-455
NCR Dockets 50-456 and 50-457

Applicability

This notification is submitted in accordance with the requirements of 10 CFR Part 21, Section 21.21(b), 21.3a(3), and 21.3d(4).

Identification of Facilities and Components

Byron Nuclear Generating Station Units 1 and 2
 Braidwood Nuclear Generating Station Units 1 and 2

Motor Pinion Gears used in Motor Operated Valves (MOV's) procured from Westinghouse Electric Corporation and supplied to Westinghouse by Limitorque Corporation.

Actuator Size: SB-0
 Motor: 25 Ft.-lb. 3600 RPM
 Motor Pinion: 34 tooth part #60-415-0100-1

Identification of Component Manufacturer/Supplier

Limitorque Corporation
 5114 Woodall Road
 P.O. Box 11318
 Lynchburg, Virginia 24506-1318

BYRON NUCLEAR POWER STATION		# of pages ▶ 4
To: NRC OPERATIONS CENTER	From: D. PETERSON	
Co.	Co: COM ED - BYRON	
Dept.	Phone #: 815-234-5441	
Fax #	Fax #	

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Nature of Defect

The defect is related to the failure of a motor pinion gear at Byron Station. On 10/25/95, the 1CV8105 motor operated valve (MOV) at Byron Station failed mid-stroke when it was being closed during normal plant operations. Subsequent troubleshooting indicated that the failure was due to a sheared motor pinion gear. Material analysis of the failed motor pinion gear determined that the gear was made of an improper material. The material used was 11B44 versus the 4140, 4320, or 86L20 material that should have been used for this size operator. AISI 11B44 material is a free-machining, re-sulferized, boron-bearing carbide steel. Based on the results of the material analysis, it appears as if the failed motor pinion gear was machined from cast stock. The motor pinion gear failure was attributed to the poor mechanical properties of the part and the inability of the gear to sustain service loads. The use of the improper material in the motor pinion gear directly led to the failure of the 1CV8105 valve to operate.

Time of Discovery

The failure of the 1CV8105 valve occurred on 10/25/95. ComEd determined that the failure was a potential defect subject to the provisions of 10CFR21 on 11/21/95. Final determination that the defect was reportable per 10CFR21 was made on 1/12/96.

Number and Location of All Defective Components:

The only known defective motor pinion gear was identified in the 1CV8105 valve at Byron Station. The 1CV8105 valve at Byron Station was one (1) of 12 MOVs that were purchased as a group from Westinghouse Electric Corporation for ComEd's Byron and Braidwood Stations (6 MOVs for each station). The actuators/motors for these twelve (12) valves were purchased from Limitorque Corporation by Westinghouse and supplied to ComEd.

Corrective Actions:

ComEd initiated replacement and inspection activities for the potentially impacted population of MOVs at Byron and Braidwood Stations including testing of 14 spare replacement motor pinion gears in ComEd Stores of that particular gear size. To date, 20 of 21 gears tested have been determined to be of the correct material. The only identified use of the improper material was in the motor pinion gear that was removed from the 1CV8105 valve at Byron Station. Two (2) MOVs at Braidwood Station from the suspect purchase order were subsequently determined to have different gear ratios and not be impacted by this defect. From the original lot of MOVs purchased together, two (2) MOVs at Byron Station and one (1) MOV at Braidwood Station remain to have their motor pinion gears replaced and inspected. These MOVs are on operating units at the respective stations.

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The inspection and replacement activities will take place prior to or during the next outage on each unit. These actions are being tracked by the station's respective corrective action programs.

At this time, based on conversations with the vendor, Limitorque Corporation, and the positive inspection results of other potentially impacted components, ComEd believes that the presence of the defective material in the 1CV8105 valve at Byron Station was an isolated incident. Beyond the inspection of the three (3) remaining motor pinion gears at Byron and Braidwood Stations, no further actions are anticipated. However, it is ComEd's understanding that the vendor is currently evaluating this defect for any generic applicability and will notify licensees, as appropriate.

10 CFR 21 Evaluation

The 1CV8105 valve at Byron Station is a safety related valve in the Chemical and Volume Control System (CVCS) that is used as an isolation valve during normal charging activities. The specific failure of the 1CV8105 valve on 10/25/95 did not lead to an incident of significant magnitude. However, there was a potential for a more significant event. There is a redundant valve (1CV8106) in series with the 1CV8105 valve that is capable of performing the same design function. However, the presence of the improper material in the 1CV8105 did represent a reduction in the inherent design margin of the system.

Therefore, ComEd has determined that the procurement of the motor pinion gear with the improper material does constitute a defect per the requirements of 10CFR21 and is providing this notification to the NRC.

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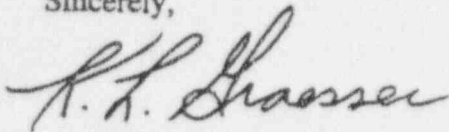
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Contact

Questions pertaining to this notification should be addressed to:

Bradley J. Adams
Site Engineering
ComEd Byron Station
4450 N. German Church Road
Byron, Illinois 61010
(815) 234-5441 x2979

Sincerely,



K. L. Graesser
Site Vice President
Byron Nuclear Station

KLG/BA/rp

cc: H. Miller, Regional Administrator-RIII
H. Peterson, Senior Resident Inspector (Byron)
C. Phillips, Senior Resident Inspector (Braidwood)
G. Dick - NRR
R. Assa - NRR
Office of Nuclear Facility Safety - IDNS