

U.S. NUCLEAR REGULATORY COMMISSION

Region I

License No.: DPR-59

Report No.: 97-03

Docket No.: 50-333

Licensee: New York Power Authority
Post Office Box 41
Scriba, New York 13093

Facility Name: James A. FitzPatrick Nuclear Power Plant

Dates: March 4, 1997 through March 13, 1997

Inspectors: G. Hunegs, Senior Resident Inspector
R. Fernandes, Resident Inspector
L. Briggs, Senior Reactor Engineer

Approved by: Curtis J. Cowgill, Chief
Projects Branch 2
Division of Reactor Projects

DETAILS

1. Incorrect Control Rod Operation

a. Inspection Scope

On March 3, a licensed reactor operator mistakenly withdrew one control rod from position 22 to 26. The resident staff and a Region I inspector with licensed examiner experience reviewed the circumstances surrounding the control rod withdrawal. The inspectors interviewed selected personnel including the reactor operator, control room supervisor and licensee management. Procedures and training related to conduct of operations and control rod operation were reviewed. The purpose of the special inspection was to provide a timely and systematic inspection of an event which involved concerns pertaining to licensed operator and management performance with regards to reactivity management.

b. Observations and Findings

Event Overview:

On March 3, a licensed reactor operator (RO) mistakenly withdrew control rod 26-11 from position 22 to position 26. Rod out movement was stopped by an automatic rod withdrawal block due to high neutron flux. The rod out movement resulted in reactor power increasing to 101.2 percent for approximately 1 minute. A rod block monitor (RBM) upscale alarm annunciated and alerted the RO to the error. The RO informed the senior reactor operator (SRO) and requested permission to insert the rod. The SRO directed that the rod be inserted and informed the shift manager (SM). Reactor coolant chemistry and off-gas samples were normal and the 3D Monicore showed that no core thermal limits were exceeded. The 3D Monicore is a system of computer programs designed to monitor and predict important core parameters. An analysis was performed to determine the consequences of withdrawing the control rod. The analysis showed that thermal limits were not exceeded, however, pre-conditioning limits may have been exceeded. Subsequent analysis determined that the preconditioning envelope had been exceeded at 4 nodes. Fuel pre-conditioning is the process involved in limiting the rate and magnitude of fuel power increases to limit cladding stresses to prevent pellet clad interaction (PCI) failures. The licensee also consulted with the fuel vendor, and, although the preconditioning envelope had been exceeded, the fuel vendor determined that fuel damage was unlikely.

Licensee Corrective Actions:

A post event critique was held after the crew was relieved. The operators involved were removed from watchstanding duties pending remediation training and licensee evaluation. Fitness for duty tests were performed for selected individuals. The Operations Manager conducted briefs on reactivity manipulations for all crews prior to standing watch. The emphasis was that control rods are only to be manipulated when directed by a scheduled surveillance test, rod pattern adjustment, or when required to respond to a plant transient and that any control rod manipulation must be treated as a reactivity manipulation. Additionally, manipulations in the plant

specifically for training and not part of a scheduled plant evolution are not authorized.

A root cause analysis is being conducted by a team to review expectations, personnel responsibilities, understanding of managements expectations and the station's safety culture.

NRC Assessment:

The RO was conducting impromptu training with an RO license candidate. The RO had been discussing the control rod drive hydraulic system, and, to demonstrate a point, requested permission from the control room supervisor (CRS) to perform a control rod coupling check. The CRS granted permission, however the evolution was not authorized by the SM nor was it part of a scheduled surveillance test. Had a procedure been used, the applicable procedure was ST-20C, Control Rod Operability Check. This procedure requires that the SM grant permission to conduct the evolution. The RO and CRS both stated that a coupling check was a routine evolution. Their stated reason for making this determination was that control rod coupling checks are conducted weekly and no rod motion was expected. The inspectors concluded, based on this information that the licensed operators were insensitive to possible control rod movement. For example, they failed to consider what actions they would have taken had the control rod been actually uncoupled from the control rod drive mechanism. An independent verifier was not stationed as required by ST-20C and AP 12.03 nor was procedure ST-20C used as required by station administrative procedures.

The RO selected control rod 26-11 because he thought the rod was full out. He had not made a determination to select a particular rod, he stated that his intent was to select a rod that was full out. Control rods are selected for movement by depressing an associated rod select pushbutton on the rod select matrix. When a control rod is selected for movement, the position of the selected rod and up to three adjacent control rods are displayed on the four rod display. The rod selected is identified by a lighted window on the full core display and a lighted select pushbutton on the rod select matrix. The RO selected control rod 26-11 and did not recognize that its position was 22 vice the desired position of 48. The rod selected and its position were not verified as required by ST 20C.

The inspectors noted that licensee management expectations concerning the conduct of evolutions for the purpose of training were not effectively communicated. At the time of the event, licensed operator candidates had been on shift for approximately 5 weeks. Operations management had not discussed with or briefed crews on expectations concerning conduct of training. Based on interviews, the site executive officer would not expect this control rod manipulation to be performed unscheduled. However, some subordinate managers including shift managers were not aware of this expectation.

The inspector noted that licensed operator training and procedures emphasized sound operating practices. Periodically, through the use of crew briefs and required

reading, operations management has attempted to reinforce standards. In spite of the procedures and training which emphasize sound operating practices, and licensee management's emphasis on safe operating practices, a licensed reactor operator and senior reactor operator were involved with an inadvertent control rod manipulation.

The NRC noted that previous personnel errors have resulted in or contributed to several plant transients or adverse conditions. A summary of these concerns follows:

In January 1997, a large influx of fish blocked the traveling screens, causing a reduction in intake water level and leading to a manual reactor scram. The automatic start function was disabled for maintenance at the time of the event. The licensee's work planning and control process did not identify the risk significance of this evolution and thus allowed this to occur. Failure to recognize the importance of the travelling screens automatic start function resulted in a poor decision to remove two of the three travelling screens from service at the same time.

During the 1996 refueling outage, several personnel errors indicated that a poor questioning attitude existed at the station. For example, a personnel error during surveillance on the reactor water level instrumentation resulted in a reactor protection system actuation, assumptions made during high pressure coolant injection system maintenance resulted in the improper installation of hydraulic control system lines and incorrect control rod drives were removed. The last event was compounded because, when faced with unexpected conditions, there were several opportunities for plant and contractor personnel to stop work and investigate anomalies, but this was not initially done.

In September 1996, an automatic reactor scram was caused because of a personnel error when a technician improperly performed a calibration on a generator relay. In this case, a fundamental principle of good work practices was not adhered to in that a technician proceeded to continue a task when faced with a condition that was acknowledged to be risk significant. In addition, during this event, operator errors and performance weaknesses were evident as reflected in operators transferring the Reactor Protection System (RPS) buses to alternate power supplies that were de-energized, in spite of clear indications that the RPS was energized and the alternate power supply was not powered.

In each of these examples, workers failed to exercise sound decision making and a questioning attitude. The inadvertent control rod withdrawal event is similar to past events in that personnel involved failed to think before acting and consider the consequences of their actions. These types of errors indicate an operating environment where a questioning attitude is not always a part of station practices.

c. Conclusions

The safety consequence of the error was minimal in this event. The nuclear instrumentation and rod control system responded properly and prevented local fuel damage. However, the potential existed for a more significant problem if the rod position or power level had been different. Additionally, fuel preconditioning values were exceeded. Also, the RO and SRO actions are of concern because of their improper watchstanding practices.

The inspectors concluded that the licensed operators were insensitive to a possible control rod manipulation. This mindset led to a non-conservative decision to conduct an unscheduled plant evolution. Both the SRO and RO, because they thought that no rod movement would occur, did not implement the requirements of AP 12.03 paragraph 8.17.9 for independent verification and paragraph 7.2 for self checking. Paragraph 8.17.9 requires that a second individual with no concurrent duties to be stationed to verify correct control rod selection and paragraph 7.2 states that personnel who operate plant equipment shall practice self-checking while performing a task. The RO was not paying attention and did not consider the consequences of his action. The operators' failure to follow procedures resulted in a reactor power excursion which was not monitored and is an apparent violation (EEI 50-333/9703-01).

Summary of Findings:

A licensed RO moved a control rod without the use of a procedure, without verifying that the proper rod was selected and without monitoring appropriate reactor parameters.

A licensed SRO inappropriately granted permission to conduct an unscheduled evolution and failed to provide proper supervision. Additionally, he failed to get permission from the SM to conduct the evolution.

Management expectations with respect to the conduct of evolutions for the purpose of training were not effectively communicated.

Operators failure to follow procedures resulted in a reactor power excursion which was not monitored and is an apparent violation.

The communication between the SRO and SM was weak. The SM was not informed until after the rod was mispositioned. The SRO demonstrated inadequate oversight in that he failed to provide supervisory oversight and failed to communicate the evolution to the shift manager.

Licensee management expectations were insufficiently established and reinforced. Licensee management had not clearly communicated their expectations to the operating crews concerning training evolutions as a clear understanding of when a training evolution can be conducted was not established.

In several recent plant events, workers failed to exercise sound decision making and a questioning attitude. The inadvertent control rod withdrawal event is similar to past events in that personnel involved failed to think and consider the consequences of their actions. These types of errors indicate an operating environment where a questioning attitude is not consistently a part of station practices.

Exit Meeting Summary

The inspectors presented the inspection results to members of the licensee management at the conclusion of the inspection on March 14, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Colomb, Site Executive Officer
J. Maurer, General Manager - Support Services
D. Vandermark, Quality Assurance Manager
D. Topley, General Manager - Maintenance
D. Lindsey, General Manager - Operations

NRC

L. Briggs, Senior Reactor Engineer
R. Fernandes, Resident Inspector - FitzPatrick

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-333/9703-01 EEI Operators' failure to follow procedures resulted in a reactor power excursion which was not monitored.

Closed

None