



May 6, 1975

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Rusche:

ABNORMAL OCCURRENCE NO. 251-75-7

May 6, 1975

OCCURRENCE DATE: APRIL 26, 1975

TURKEY POINT UNIT NO. 4

FUEL ASSEMBLY DAMAGED DURING
REFUELING OPERATIONS

A. CONDITIONS PRIOR TO OCCURRENCE

The reactor was in refueling shutdown condition, reactor coolant temperature was approximately 105 F and the reactor vessel head was removed. The refueling cavity, refueling canal and the spent fuel pit (SFP) were filled with borated water with a boron concentration of approximately 2180 ppm.

All requirements for refueling operations were satisfied. Fuel assembly number P41 had been removed from the SFP storage racks and was positioned over the SFP side lifting frame assembly waiting for the return of the conveyor car.

B. DESCRIPTION OF OCCURRENCE

As fuel assembly number P41 was being lowered into the reactor core at about 11:15 a.m. April 26, 1975, an observer on the west side of the refueling cavity noticed an anomalous condition on the west face of this fuel assembly. Since the containment air particulate and gaseous radioactivity detectors and the area radiation detectors continued to show background radiation levels, additional examinations of the fuel assembly were made. Based on the results of visual examination, it was concluded at 11:51 a.m. April 26, 1975, that fuel assembly number P41 was damaged.

Immediate operator action was to order evacuation of the containment building and take the actions specified in Procedure No. 16,008.2.

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Special radiation surveys and containment air samples were analyzed and evaluated. It was concluded that containment radiation levels and airborne radioactivity had remained at background levels.

Fuel assembly number P41 was moved away from the reactor vessel for examination using an underwater television system. This inspection showed that the first grid (No. 1 grid) above the bottom nozzle was damaged and the seventh and eighth fuel rods from the southwest corner of the fuel assembly, were distorted. The two fuel rods were pushed back and out of alignment with the other fuel rods in the outside row. There was no evidence of a breach of fuel cladding integrity. However, it was concluded that the damage to No. 1 grid and the deformation of fuel rods number 7 and 8 made this fuel assembly unacceptable for further use in the reactor core.

Fuel assembly number P41 was transferred from the containment refueling canal to the SFP racks for storage.

C. DESIGNATION OF APPARENT CAUSE OF OCCURRENCE

After review, analysis, and evaluation of the physical damage to fuel assembly number P41, we concluded that procedure deficiencies were the cause of this occurrence. Procedures did not specify that the fuel assembly must be lifted to the "full-up" position by the SFP bridge crane before the SFP bridge is moved away from the SFP rack position. Procedures did not specify that fuel assemblies must not be moved over the SFP side lifting frame area until the lifting frame has been upended and ready to receive a fuel assembly.

D. ANALYSIS OF OCCURRENCE

When the SFP side lifting frame was upended, the lifting frame struck the fuel assembly and pushed it into the lifting frame pulley mounted on the west wall of the SFP transfer canal. This pulley is an eight-inch diameter pulley. The location of the pulley is consistent with the physical damage observed on the fuel assembly.

There was no release of radioactive materials as a result of this occurrence.

There were no injuries to personnel and no exposure of personnel to radiation or concentrations of radioactive materials as a result of this occurrence.

If the fuel cladding integrity had been breached during this occurrence, increased radiation levels would have been detected by the radiation detector installed immediately above the SFP refueling canal on the west wall. This detector has local indication, remote indication and recorder in the central control room. If radiation levels increase above setpoint values, this detector sounds an audible alarm and a visible alarm locally and remotely in the central control room. During this incident, no alarms occurred and no increase in radiation levels were recorded.

Fuel handling incidents are analyzed and presented in the Turkey Point Unit Nos. 3 and 4 Final Safety Analysis Report (FSAR) using conservative assumptions. In these analyses, the reactor is assumed to be subcritical for 50 hours and that 15 fuel rods are breached at the time of the fuel handling incident.

We have calculated the potential consequences of this incident as though a breach of fuel rod cladding had occurred and compared the results of our calculations with the fuel handling incidents analyzed and presented in the FSAR.

At the time of this occurrence the reactor had been subcritical for about 610 hours and two fuel rods were damaged. If the fuel rod cladding integrity had been breached on these two rods, the inventory of noble gas radionuclides and halogen radionuclides available for release would be less than the quantity calculated and presented in the FSAR by a factor of about seven.

Radioactivity decay would have reduced the inventory of noble gas and halogen radionuclides available for release by a factor of about nine compared to the quantity calculated and presented in the FSAR.

Comparison of the exposures calculated and presented in FSAR with our calculated values show that exposure to radiation and radioactive materials would be less than the FSAR values by a factor of about 60.

From the review, analyses, and evaluation of conditions during this occurrence, we concluded that neither reactor safety nor the health and safety of the public were jeopardized by this occurrence.

E. CORRECTIVE ACTION

The "dummy" fuel assembly, with dimensions and weight identical to a fuel assembly, was transferred from the SFP racks to the

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manipulator crane in the containment refueling canal and returned to the SFP racks with the fuel transfer system. This demonstrated satisfactory performance of the fuel transfer system.

Seven fuel assemblies, selected at random, that had been transferred to the reactor vessel before fuel assembly number P41 was damaged, were inspected. No evidence of damage was found. It was concluded that fuel assembly number P41 was the only fuel assembly damaged during fuel handling operations.

Procedures have been revised to specify (1) when a fuel assembly is lifted from the SFP rack, the fuel assembly will be verified to be "full-up" by visual observation of the SFP bridge hoist hook and cable upper limit position before the SFP bridge crane or hoist are moved horizontally and (2) fuel assemblies will not be moved into lifting frame area of the SFP refueling canal until the lifting frame has been upended and verified to be in the "full-up" position by visual observation and the indicating lamp illuminated.

F. FAILURE DATA

This is the first abnormal occurrence involving the SFP side lifting frame.

Abnormal Occurrence Report No. 4-73-1, April 20, 1973, reported inadequate clearance between the containment side refueling canal transfer flange and the lifting frame.

Abnormal Occurrence Report No. 4-73-2, April 20, 1973, reported the failure of a component on the containment side lifting frame assembly.

Very truly yours,

J.R. Brusen
for A.D. Schmidt
Vice President
Power Resources

VTC/dd

cc: Mr. Norman C. Moseley
Jack R. Newman, Esquire