

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/90018(DRS)

Docket No. 50-461

License No. NPF-62

Licensee: Illinois Power Company
500 South 27th Street
Decatur, IL 62525

Facility Name: Clinton Power Station

Inspection At: Clinton, IL 61727

Inspection Conducted: August 24, 1990. through January 30, 1991

Inspector:

Peggy R. Rescheske
Peggy R. Rescheske

02/21/91
Date

Approved By:

Monte P. Phillips
Monte P. Phillips, Chief
Operations Branch

2/22/91
Date

Inspection Summary

Inspection on August 24, 1990, through January 30, 1991
(Report No. 50-461/90018(DRS))

Areas Inspected: Routine announced inspection to assess activities related to reactor disassembly and fuel movement during the second refuel outage (IP 60705, 60710, 86700).

Results: No violations or significant concerns were identified during the course of the inspection. The reactor disassembly and fuel movement activities were well organized and successful operations. Management involvement and control in the planning and preparation, and performance of most refueling activities was evident.

REPORT DETAILS

1. Persons Contacted

J. S. Perry, Vice President
S. R. Bell, Supervisor, ISI
J. G. Cook, Plant Manager
C. E. Elsasser, Director, Outage Maintenance Support
D. B. Gill, Manager, Nuclear Training
K. R. Graf, Director, QA
S. A. Huntington, Supervisor, Maintenance Services
R. T. Kerestes, Director, NSED
D. W. Miller, Director, Plant Radiation Protection
J. A. Miller, Manager, NSED
K. S. Moore, Director, Plant Technical
R. W. Morgenstern, Manager, Scheduling and Outage Management
J. A. Neuschwanger, Supervisor, Plant Operations
H. J. Nodine, Supervisor, Procedures
V. F. Palchak, Manager, NP&S
J. D. Peregoy, Staff Engineer, L&S
R. Phares, Director, Licensing
S. E. Rasor, Director, Plant Maintenance
J. V. Sipek, Supervisor, Regional Regulatory Interface
F. A. Spangenberg, Manager, Licensing and Safety
R. E. Wyatt, Manager, Quality Assurance

All of the above individuals attended the exit meeting held onsite on January 10, 1991. Subsequent to the onsite portion of the inspection further discussions were held with Mr. J. Sipek.

Others contacted during the course of the inspection included members of the licensee's operations, technical, and engineering staffs; and General Electric (GE) and Stone and Webster (SWEC) representatives.

2. Inspection Overview

The inspection focused on licensee activities related to reactor disassembly and fuel movement, including preparations for the second refuel outage at the Clinton Power Station (CPS). The inspection was conducted as a result of the deficiencies identified in performance of the initial refuel outage in early 1989. The objective of the inspection was to assess management control and involvement in the planning, preparation, and performance of refueling activities, including contractor interface functions; administrative control over the refueling activities; and quality assurance effectiveness. As a general conclusion of the inspection, the reactor disassembly and fuel movement activities were considered to be well organized and successful operations. No violations or significant concerns were identified during the course of the inspection. A summary of the conclusions from the inspection is in Paragraph 6 of this report.

Prior to the refuel outage, the licensee was planning and preparing for the activities. IP/NRC management meetings were held to discuss outage planning and execution. Training seminars were held for IP and contract staff regarding the refuel outage in general, and specific topics, such as major work to be performed. Training also included lessons learned from the initial refuel outage. The inspector reviewed outage planning, scheduling, and work documents; and attended the following meetings and training.

- August 24, 1990 Onsite management meeting (IP/NRC) to discuss refuel outage.
- October 3, 1990 Onsite management meeting (IP/NRC) to discuss topics of interest, including refuel outage.
- October 1-5, 1990 Training seminars for outage execution (scheduling and organization), reactor disassembly, fuel movement, and steam dryer repair.

The licensee contracted General Electric Company (GE) to perform the refueling, with support from Stone and Webster (SWEC) craft persons. The GE representative was present on site several months prior to the outage to assist in preparations for the refueling. As part of the preparation, modifications, preventive maintenance, and operational testing was completed on the fuel handling equipment. Procedures were revised, work plans were written, maintenance work requests (MWRs) were initiated (for each major evolution such as reactor head lift), and contingency plans were developed (addressing potential problems which could be encountered or expected, such as those from the initial refuel outage). The licensee had recently initiated an Outage Control Center (OCC), which was utilized with success during a previous planned maintenance outage. The OCC was manned for the refuel outage to function as the center for daily meetings for work planning and coordination, communicating progress and deficiencies, and resolving minor concerns and problems.

The reactor was shutdown on October 14, 1990, and the refuel outage commenced. The reactor was placed in Mode 5 (Refueling) on October 21, 1990, when the reactor pressure vessel (RPV) head was detensioned. The inspector observed reactor disassembly activities (Paragraph 3 of this report). Fuel movement (including core alterations) was observed on November 26-30, 1990 (Paragraph 4). Other inspection activities included review of problems experienced by the licensee during the refuel mast/grapple modification, and the installation of the steam dryer (Paragraph 5).

3. Reactor Disassembly

The inspector observed portions of the RPV disassembly and reviewed associated work documents. The disassembly was performed in accordance with MWRs, which referenced applicable plant procedures. During the course of the inspection, the inspector routinely attended daily outage meetings and shift briefings, and observed communications and coordination, housekeeping, radiation protection (RP) practices, and Quality Assurance (QA) coverage. Discussions were routinely held with IP outage management representatives, IP operations persons, and GE and SWEC supervisors and staff. The following summarizes the scope of the inspection activities.

- a. On October 17, 1990, the plant was in Mode 4, the inclined fuel transfer system (IFTS) had been lined up, with the blank flange removed, and the reactor cavity pool was being drained. (The licensee experienced problems with the IFTS bottom valve leaking by, and this event was discussed in NRC Resident Inspection Report No. 461/90021(DRP).) The drywell head bolts were detensioned, and on October 19, 1990, the drywell head was removed and the seal flange protector was installed in accordance with CPS Procedure No. 8117.01. This work was performed under MWR No. D07183. The inspector observed portions of the above activities, including the drywell head lift to the refuel floor.
- b. The RPV head piping and insulation was removed, and the standpipe was connected and calibrated to establish a temporary vessel water level reference. This work was performed per CPS 8117.02, under MWR No. D07184. The RPV head was then vented and vessel level was raised. RPV head detensioning and removal was performed under MWR No. D07185, in accordance with CPS 8117.03. On October 21, 1990, the RPV head was detensioned and the plant entered Mode 5. At this point, CPS 1019.04 went into effect for tool and material control on the refuel floor. On October 22, 1990, the RPV head was lifted to the refuel floor. The inspector observed portions of the above activities, including the RPV head lift.
- c. The remainder of the reactor disassembly was performed per CPS 8117.05, under MWR No. D07186. On October 23, 1990, the steam dryer was removed and placed into its storage pool. The main steam line plugs were then installed. On October 24, 1990, the steam separator assembly was moved from the RPV, to its storage pool. The preparations and coordination for this operation were extensive. Briefings were held with all persons involved (including RP). Prior to the actual lift over the wall, a shift turnover occurred and additional briefings were held. Since high radiation levels (including airborne) were expected, all non-essential persons were cleared from the refuel floor. The NRC and IP QA inspectors remained on the floor to observe the operation.

4. Fuel Movement

Fuel movement, conducted by the licensee during the last two weeks of November 1990, was controlled and documented by CPS No. 1898.00C001, "SNM Transfer Checklist." New fuel bundles were transferred from the spent fuel pool (SFP) to the upper containment pool via the IFTS; the spent fuel was discharged from the core and transferred to the SFP, and the new fuel was loaded into the core; and the remaining fuel in the core was shuffled one quadrant at a time. The inspector observed portions of the refueling on the refuel floor in containment, on the SFP floor in the fuel handling building, and in the control room. The types of activities monitored included: fuel movement and documentation, updating the fuel status boards, communications between the refueling stations, periodic surveillance testing, housekeeping, and material accountability. The inspector selectively reviewed station procedures which controlled the fuel handling operations and surveillances required by Technical Specification Section 3/4.9, "Refueling Operations."

5. Other Inspection Activities

- a. The licensee experienced problems during the installation/test phase of Field Alteration FH-F020, which modified the refuel mast and grapple on the refueling bridge. The modification included a new cylindrical mast, provided for a modified grapple (with an internally mounted camera system), and included modified/additional equipment to support the modification. The equipment and parts were procured from GE. On October 11, 1990, the licensee determined that the newly installed grapple did not fit the bail handle of the test weights. Subsequently, the licensee determined that the new grapple would not fit the BWR-6 fuel bundle bail handle. In addition, problems were identified with the camera system cable and the leak-tightness of the camera.

On October 19, 1990, the licensee held a critique meeting with GE representatives to discuss the design problem with the grapple. The inspector also attended this meeting. The critique discussion concluded that the receipt of the incorrect fuel grapple was primarily the result of errors committed during the GE design, verification, and testing of the grapple. The GE original design intent was to fabricate a universal design applicable to all GE BWRs (BWR 2-6). However, the appropriate dimensions were not used, the design was not adequately verified, and the post-modification testing performed at the GE facilities used bail handle dimensions of BWR 2-5 fuel. The result was that the modified grapple did not fit BWR-6 fuel. Further, the grapple design was such that acceptable loading criteria would not have been met for BWR 2-5 and BWR-6 fuel bundles.

The licensee did not identify the problems with the grapple during the design review process because the design documents reviewed did

not have the level of details to have identified these types of problems. (Additional design documents such as a detailed drawing should have been required on receipt). As a corrective action, the licensee requested that GE investigate the design control error and identify actions to prevent recurrence. The licensee planned to review other recent fuel handling modifications to ensure design adequacy, and to review/revise vendor control procedures.

The licensee decided that the new mast with the "old" grapple would be used for the refueling activities. The modified grapple (with camera) would be re-designed for future installation (after the refuel outage). The inspector had no further concerns with Field Alteration FH-F020, and considered the licensee's resolution of the problems and corrective actions to be acceptable.

- b. The licensee experienced problems while installing the steam dryer during RPV re-assembly. On January 9, 1991, while lowering the dryer onto the guide rods in the RPV, the dryer appeared to hang up on the north guide rod and tilt toward the south. The dryer was lifted clear of the guide rods and reset three (3) times without success. Attempts were made to center the dryer using tag lines and repositioning the trolley. On the third attempt, the dryer rocked east to west, and a loud noise was heard. (Later, it was determined that the vessel flange protector had been struck by the dryer.) The dryer was returned to its storage location.

The inspector attended the critique meeting held by the licensee on January 9, 1991. During the meeting, a video tape of the event was viewed. The licensee determined that the causes of the event were inadequate preparations (due to poor judgement in scheduling the operation), and failure to properly align dryer lugs to vessel guide rods (due to poor lighting and lack of markers). Corrective actions included revising procedures to incorporate guidance on vessel cavity lighting and optimum spotter locations, and painting match marks on the polar crane and trolley to identify vessel centerline. The dryer, vessel, and vessel flange were inspected by the licensee (visually and by underwater camera), and no significant damage was found.

The inspector considered this incident to be an isolated event, and not representative of the refueling operations. The event was not considered significant, in that no damage was identified, and the licensee recognized the issues and took effective corrective actions. Reactor assembly was subsequently completed without further incident.

6. Inspection Summary

No violations or significant concerns were identified during the course of the inspection.

Planning and preparation for the refuel outage was evident. Problems encountered by the licensee during the initial refuel outage were thoroughly evaluated, lessons learned were included in training for this outage, and contingency plans were developed. Equipment operability problems were minimal due in part to the preventive maintenance and modifications performed on the fuel handling equipment.

Management involvement in assuring the quality of the refueling activities was evident. The reactor disassembly and fuel movement activities were well organized and successful operations due, in part, to the conservative approach exhibited in routine activities, as well as in resolving concerns and problems. Another contributing factor to the success was the philosophy that the schedule did not control the work, but rather, the goal was to get the job done properly. Management control of the activities was enhanced by the operation of the Outage Control Center (OCC). Daily meetings in the OCC were effective in coordinating work activities, defining responsibilities, and communicating progress and deficiencies. Minor concerns and problems were efficiently resolved by management persons continuously manning the OCC.

The licensee contracted an experienced and dedicated refueling staff and supervision (GE, SWEC). The contracted staff was augmented with licensee operations and management persons. Good communications existed between IP and contracted staff and management persons. Procedures and policy were understood and implemented as evidenced by the absence of significant and/or recurring personnel error. Responsibilities and authority were clearly defined for both contract and IP persons. Contractor/IP interface and IP management oversight was effective in assuring that activities were performed properly.

The QA organization was involved in the refueling activities providing nearly continuous coverage. The IP QA persons were knowledgeable of administrative and refueling procedures/practices, and the QA surveillances were appropriately focused.

Radiation Protection (RP) coverage was provided by IP RP (rather than contracted). RP coverage was considered excellent. RP staff and supervision was aware of and maintained control over all radiological aspects of the refueling operations. RP involvement in preparations for major evolutions was evident.

7. Exit Meeting

The inspector met with the licensee representatives (denoted in Paragraph 1) on January 10, 1991. The inspector summarized the scope and findings of the inspection, and the licensee acknowledged the statements made by the inspector. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection and the licensee did not identify any such documents/processes as proprietary. Further discussion with licensee representatives (regarding the steam dryer event) were held via teleconference on January 30, 1991.

INSPECTOR'S REPORT
Office of Inspection and Enforcement

Reynolds, Peggy
Philip, Michael P

INSPECTORS

LICENSEE/VENDOR	TRANSACTION TYPE	DOCKET NO. (8 digit) OR LICENSE NO. (BY PRODUCE TYPE 8 digit)	REPORT				NEXT INSP. DATE	
			NO.	SEQ.	MO.	YR.	MO.	YR.
Francis Power Co	1 - INSERT	03000461	70018	A				
	M - MODIFY			B				
	D - DELETE			C				
	R - REPLACE			D				

PERIOD OF INVESTIGATION/INSPECTION						INSPECTION PERFORMED BY						ORGANIZATION (OFFICE OF REGION/HQ CONDUCTING ACTIVITY (See NRC 5530 "Manpower Report" - Weekly Manpower Reporting - 10/1983))		
FROM			TO			1 - REGIONAL OFFICE STAFF			OTHER			REGION		
MO.	DAY	YR.	MO.	DAY	YR.	2 - RESIDENT INSPECTOR						3	3	1
08	24	70	09	13	91	3 - PERFORMANCE APPRAISAL TEAM								

REGIONAL ACTION (Check one box only)		TYPE OF ACTIVITY CONDUCTED (Check one box only)				
1 - NRC FORM 501		02 - SAFETY		06 - MGMT. VISIT		10 - PLANT SEC.
2 - REGIONAL OFFICE LETTER		03 - INCIDENT		07 - SPECIAL		11 - INVENT. VER.
		04 - ENFORCEMENT		08 - VENDOR		12 - SHIPMENT/EXPORT
		05 - MGT. AUDIT		09 - MAT. ACCT.		13 - IMPORT
						14 - INQUIRY
						15 - INVESTIGATION

INSPECTION/INVESTIGATION FINDINGS (Check one box only)				TOTAL NUMBER OF VIOLATIONS AND DEVIATIONS				ENFORCEMENT CONFERENCE HELD				REPORT CONTAIN 2 700 INFORMATION				LETTER OF REPORT TRANSMITTAL DATE					
1 - CLEAR				A				A				A				MO.		DAY		YR.	
2 - VIOLATION				B				B				B				02		22		91	
3 - DEVIATION				C				C				C									
4 - VIOLATION & DEVIATION				D				D				D									

MODULE INFORMATION										MODULE INFORMATION											
REC. ORD.	MODULE NUMBER/INSP.			PRIORITY	DIRECT INSPEC. TIME REPORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REG. FOLLOWUP			REC. ORD.	MODULE NUMBER/INSP.			PRIORITY	DIRECT INSPEC. TIME REPORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REG. FOLLOWUP		
TYPE	NUMBR	PHASE	MANU/CH					PHASE	MANU/CH	PROCEDURE NUMBER	LEVEL	TYPE	NUMBR	PHASE					MANU/CH	PROCEDURE NUMBER	LEVEL
B	1530703			A						B	5537700			A							
	extra rec exit mtgs			B							mods fuel handling equipment			B							
B	1541400			A						B	560705			A							
	non-lie xatg training			B							Prep for Refueling			B							
B	1541701			A						B	560710			A							
	Licensed staff training			B							Refueling			B							
B	1530702			A						B	586700			A							
	mgmt meetings			B							JFP			B							

* CIRCLE SEQUENCE IF VIOLATION OR DEVIATION

end date 1991
Jan 30

INSPECTION PLAN

Facility: Clinical Inspection Report No: 50-461/90018 (DRS)
 Inspection Date(s): May 24, 25, 26, 1990 Resident Notified: Yes
 Inspection Type: Core Regional Init. Team Reactive
 Other (specify) _____
 Announced Unannounced
 SALP Weaknesses addressed Outages / Operations

Inspection Focus (SALP Weakness, Core Program, Regional Initiative, Event Followup) <i>Refueling and related activities</i>	Module/TI No.	SALP Area/Rating	Priority No.	Open Item No. (OIL)
Entrance & Exit Meetings	3070.3 (CO)	3	2	
Nonlic. staff training	41400 (AD)			
Licensed staff training	41701 (AD)			
Management/Exec meetings	30702 (AD)			
Fuel Handling Equip. Mods	37700 (R)			
Preparations for Refueling	60705 (R)			
Refueling Activities	60710 (R)			
SFP Activities	86700 (R)			

Plan Prepared By: [Signature] Date: 08/16/90
 Lead Inspector
 Plan Approved By: [Signature] Date: 8/16/90
 Section Chief
 Plan Reviewed By: [Signature] Date: 8/16/90
 Project Section Chief
 (or DRS/S Branch Chief)