U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/85047

Docket No. 50-461 Construction Permit No. CPPR-137

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

Facility Name: Clinton Nuclear Power Station, Unit 1

Inspection At: Clinton Site, Clinton, Illinois

Inspection Conducted: September 9 through October 19, 1985

Inspector: W. G. Guldemond for Joseph M. Ulie — Date: 10-22-85

Approved By: William G. Guldemond, Chief
Operational Programs Section — Date: 10-22-85

Inspection Summary

Inspection on September 9 through October 19, 1985 (Report No. 50-461/85047(DRS))
Areas Inspected: Routine, announced inspection by a Region III based inspector to determine the licensee's progress in implementing the fire protection program including the fire protection pre-operational test program, and a review of allegations received by the NRC relative to fire barrier penetration seals. NRR also conducted their fire protection audit concurrently during the week of September 9-13, 1985. The inspection involved a total of 66 inspector-hours onsite and in-office by one NRC Regional inspector including 7 inspector-hours onsite during off-shifts.
Results: Of the seven areas inspected, no violations were identified in six areas; one apparent violation was identified in the remaining one area (failure to calibrate properly the fire hose standpipe pressure restricting valves and failure to inspect portable fire extinguishers in accordance with established monthly procedure - Paragraph 6).

DETAILS

1. Persons Contacted

Illinois Power Company

*K. A. Baker, Licensing
*R. P. Bhat, Supervisor, HVAC and Fire Protection
*E. J. Corrigan, Director, Quality Engineering and Verification
*H. E. Daniels, Project Manager
*J. H. Greene, Startup Manager
*R. W. Greer, Manager
*D. P. Hall, Vice President
*R. T. Kerestes, Project Manager, Fire Protection
*H. R. Lane, Director, Design Engineering
*J. E. Loomis, Construction Manager
B. MacDonald, Station Fire Marshal
*J. R. Patten, Director, Nuclear Training
*J. S. Perry, Manager, Nuclear Program Coordinator
J. Siper, Supervisor, Plant Fire Protection
*H. R. Victor, Manager, Nuclear Station Engineering Department
*D. W. Wilson, Supervisor, Licensing Administration
*J. W. Wilson, Plant Manager

Baldwin and Associates

*E. P. Rosol, Project Manager
*J. L. Thompson, Quality Engineering Manager

General Electric

J. Cochran, Principal Engineer
F. Smith, Mechanical Engineering Manager

Sargent and Lundy

L. Langenberg, Group Supervisor, Nuclear Licensing
*R. A. Parson, Mechanical Project Engineer
*D. K. Schaefer, Site Manager

USNRC Personnel

*P. Gwynn, Chief, Clinton Project
*S. West, NRR, Fire Protection Reviewer

The inspector also contacted other plant personnel including construction, training, maintenance, and operations personnel.

*Denotes persons attending the exit meeting on September 13, 1985.

2. Fire Brigade Program

The inspector examined the licensee's fire brigade program including fire brigade training, and fire brigade firefighting equipment.

The licensee did not conduct any hands-on or classroom training for the fire brigade during the inspector's inspection visit, although training for fire watch personnel was performed and observed by the inspector. This is discussed in Paragraph 4 of the report.

a. Plant Coordination With the Offsite Fire Department

Paragraph B.5(b) of Appendix A to Branch Technical Position (BTP) 9.5-1 indicates that the plant fire brigade should drill at least annually with the local fire department. The licensee's response stated that, "Fire drills involving local fire department participation will be conducted at least annually, if possible."

The licensee provided an "Agreement for Secondary Fire Protection With the City of Clinton, IL," dated April 26, 1985. The section entitled, "Agreement to Furnish Fire Protection," does not specifically indicate that annual training between the plant fire brigade and offsite fire department is to take place barring any unforeseen emergency (i.e., onsite or offsite actual incident or emergency). This is considered an open item (461/85047-01) pending inspector followup to verify that a clear and written understanding exists between the offsite fire department and the plant on conducting fire drill training on an annual basis.

Paragraph B.5(c) of Appendix A to BTP 9.5-1 indicates that training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance.

A review of the "Agreement for Secondary Fire Protection With the City of Clinton, IL" does not clearly delineate the responsibilities and duties of the local fire department coordinating efforts with the onsite fire brigade including the understanding of lead responsibilities during the emergency incident. This is considered an open item (461/85047-02) pending inspector followup.

b. Fire Brigade Firefighting Equipment

Appendix B of Clinton Power Station (CPS) Fire Brigade Procedure No. 1001.06 identifies three locations containing firefighting equipment for use by the Fire Brigade. The inspector toured two of the three locations and observed that not all equipment listed in Appendix B was in place, including a smoke ejector fan at the 800' Control Sleeping Room, and a self-contained breathing apparatus unit at the 737' Radwaste Building, Column R200. According to the licensee, all equipment required by commitment or procedure will be in place and verified ready for use prior to fuel load. The inspector acknowledged this fact and indicated a followup tour will take place at the next fire protection inspection prior to fuel load. This is an open item (461/85047-03).

3. Fire Protection Administrative Controls

The inspector examined a sample of fire protection administrative controls including procedures, instructor lesson plans, and student hand-out material.

In the review of CPS Procedure No. 1893.03, Revision 2, dated February 1985, regarding the control of flammable and combustible liquids and combustible materials the following inspector comments were made:

a. Step 6.0 indicates that the storage of combustible and flammable materials and liquids is prohibited in or adjacent to safety-related areas, except in designated storage areas. The inspector comment relates to the exception in the procedure. Attachment No. 3 of NRC supplemental guidance document titled "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance", committed to by the licensee in their letter of November 19, 1981, prohibits the storage of combustible and flammable materials in safety related areas. The inspector indicated that only those combustible/flammable materials needed for the operation of equipment in a particular safety-related area should be allowed with appropriate administrative controls.

b. Step 8.0, regarding the allowable transient fire loading acceptable in an area, identified specific criteria which the licensee's staff needed to review to provide a basis for the amount of transient fire loading designated. Subsequent to the inspection the inspector reviewed the licensee's basis for allowable transient fire loading. This basis is predicated on the availability of portable fire extinguishers being installed in all safety-related areas of the plant. This basis for the amount of transient fire loading allowed in an area was determined to be acceptable.

Comment No. a is considered an open item (461/85047-04) pending procedural revision.

The inspector reviewed the following fire protection procedures and determined these procedures to be adequate: (1) CPS Procedure No. 1893.02, regarding the control of ignition sources, Revision 1, dated June 1985; (2) CPS Procedure No. 9601.03, regarding the establishing of fire watch personnel, Revision 0, dated July 1985; and (3) Nuclear Training Department (NTD) Procedure No. 29, regarding fire watch training, Revision 0, dated August 1985. One comment the inspector indicated to the licensee's staff regarding NTD Procedure No. 29 was that this training is provided only once a year and it may be helpful for the individuals performing fire watch duties to have issued to them an information card describing actions to take as applicable.

The inspector witnessed the classroom portion of the fire watch training program including review of the Instructor's Lesson Plan No. 12012, Revision 0, dated June 1985, and review of the Firewatch Training Student Handbook, Revision 0, also dated June 1985. It was noted that the above documents did not describe in sufficient detail the operation of each type

of portable extinguisher used onsite, including advantages, disadvantages, and hazards associated with the individual type portable extinguisher. According to the licensee's staff these documents will be revised. This is considered an open item (461/85047-05).

Due to several of the inspection findings, the licensee is reminded to review all of their fire protection commitments to the NRC including their letter dated November 19, 1981 and FSAR Amendment No. 14 regarding implementation of their fire protection program as delineated in the NRC supplemental guidance document entitled, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

4. Standpipe Fire Hose Stations

Paragraph E.3.d of Appendix A to BTP 9.5-1 indicates that standpipes having attached fire hose and suitable nozzles should be provided in all buildings, including containment, on all floors and should be spaced at not more than 100 foot intervals.

The licensee's response stated that, "Hose stations have a maximum of 100 feet of 1-1/2 inch hose with an adjustable spray nozzle."

During the inspector's participation in the practical portion of the fire watch hose handling training which included the flow of water, the inspector observed that the adjustable spray nozzle being used, (according to licensee's training staff, the nozzle was identical to those being used in the plant currently and planned for during plant operation) when initially opened, provides a solid stream of water. In an area containing vital energized electrical equipment, a solid stream of water can carry sufficient electrical current back to a nozzle to kill or injure plant personnel in addition to causing malfunction of vital equipment affecting a safe plant shutdown. To resolve this concern, the licensee proposed to install approved Class C type nozzles (fog nozzles) on standpipe fire hose located in areas containing considerable energized electrical equipment. In addition, the licensee proposed to make a special emphasis in discussing this concern during fire hose handling training. The inspector concurred with these proposed actions. Until verification that these proposed actions have been implemented, this is considered an open item (461/85047-06).

5. Fire Dampers

The inspector wished to examine the licensee's fire damper preoperational test results; however, according to the licensee this testing had not been initiated at the time of the inspection visit. Followup review of the fire damper test program will be conducted during upcoming inspections, including a review of the licensee's reported 10 CFR 50.55(e) Deficiency Report 55-84-23 regarding Ruskin Interlocking Blade Fire Dampers.

During a tour of the Diesel Generator Division II Room, the inspector observed a fire damper believed to be identified as IVD09YB which had the S-hook installed backwards (open end of the S-hook facing upward toward blade). Installation of the S-hook in the backward position could cause

the damper blade to catch on the open end of the S-hook, possibly preventing blade closure as previously identified at another Region III plant. Upon the inspector's request, the licensee provided Ruskin Quality Assurance Procedure No. P-148, Revision 0, dated August 25, 1980, which, in Step 2.3, indicates that "S-hooks may be crimped or uncrimped per drawing No. 4875 (attached)." The drawing showed the S-hook's open end facing down away from the blade. The manufacturer's procedure which allows the S-hook open end to be uncrimped further substantiates the possibility of the damper blade getting hung-up on the open end of the S-hook if installed backwards. The concerns regarding the fire dampers, the review of the damper preoperational test program, and the followup of deficiency report 55-84-23 is considered an open item (461/85047-07).

6. Tour of the Fuel Storage Building

The inspector examined the licensee's fire protection equipment installed as determined by Appendix A to the BTP 9.5-1, the Clinton Materials License, plant surveillance procedures, and other related documentation.

According to Paragraph A.6 of Appendix A of the B.T.P 9.5-1, the fire protection program (plans, personnel, and equipment) for buildings storing new reactor fuel should be fully operational before fuel is received at the site. The licensee's response indicated that fire protection is provided by several charged fire hose stations and portable Halon extinguishers in the vicinity of each storage and handling area.

A review of Section IX of the Safety Evaluation Report (SER) related to Materials License No. SNM-1886, dated August 7, 1985, states that fire protection provided for the Fuel Building consists of charged fire hose stations and portable Halon extinguishers.

On September 8, 1985, the inspector performed a tour of the Fuel Building to examine the installed fire protection equipment and to verify that fire protection administrative controls were in place. During this tour the inspector observed that the individual fire hose standpipe pressure restricting valves (installed at hose outlets of standpipe systems to reduce existing excessive standpipe water pressure) appeared not to be calibrated (positioned so as not to reduce any water pressure flow). Subsequent to the tour, the licensee's staff determined that in fact the fire hose standpipe pressure restricting valves were not calibrated to the proper positions. Two of these fire hose standpipes were located on elevation 781' and the remaining five on elevation 755' of the Fuel Building. In addition, the inspector observed that several of the portable fire extinguishers located in the Fuel Building on elevations 755' and 781' were either missing their inspection tags or had surveillance inspection tags that had not been marked (inspection tags punched) to show that the Halon extinguishers had been inspected during the month of August 1985.

Subsequent to the tour the licensee, upon inspector request, provided copies of the procedures covering the monthly fire hose standpipe stations and portable fire extinguisher surveillance inspections. Fire hose

standpipe inspection procedure No. CPS 9071.17, not dated, did not include a check to verify the proper position of the pressure restricting valve nor was the procedure an approved procedure. Section 9.0 of the portable fire extinguisher inspection procedure, No. CPS 1150.01, Revision 0, dated July 1985, requires the fire extinguisher tag to be properly marked to correctly indicate the month of the visual inspection.

The failure to follow one procedure (portable fire extinguisher procedure No. CPS 1150.01), and the lack of an adequate and approved second procedure (fire hose standpipe procedure No. CPS 9071.17) is considered to be a violation (461/85047-08).

At the exit meeting of September 13, 1985, the inspector emphasized that the specific deficiencies identified above were of concern; however, also of importance to the NRC is the licensee's control in installing and maintaining the fire protection features of the plant.

Following the exit meeting of September 13, 1985, the inspector met with the Director of Quality Engineering and Verification to discuss the IP Quality Assurance Department's activities in the area of fire protection. Subsequently, the licensee provided the inspector with twelve fire protection audits and surveillances performed by the Quality Assurance Department since May 1985. The inspector reviewed this documentation and found the number of inspections within the areas inspected to be adequate, although, based on the NRC's inspection findings, it is recommended that Quality Assurance broaden their scope of inspection to all areas of the fire protection program (i.e., fire damper S-hooks installed backwards, fire hose standpipe pressure restricting valves not calibrated, etc.). The inspector did note that the concern relative to fire extinguisher inspection tags was found by the licensee's QA staff during an audit conducted September 3-7, 1985.

7. Penetration Fire Seals

The inspector examined the licensee's penetration seal program relative to allegations concerning Bisco penetration fire and pressure seals, and a withdrawal by American Nuclear Insurers (ANI) of four previously accepted penetration fire stop system designs.

a. Review of Allegations Concerning Bisco Penetration Seals

The NRC received three generic (not specifically mentioning the Clinton Power Plant) allegations regarding Bisco penetration seals indicating that: (1) test data to support the penetration seals fire resistance capability did not exist including test data to show that the six inch silicone foam fire barrier penetration seals are rated for three hours, (2) penetration seals were installed with a 2" overlap on the seal boot instead of the required 3", and (3) Bisco procedures SP504, SP505, SP505-1, SP505-2, and SP505-3 were deficient.

Resolution of these allegations was pursued through inspector review of Bisco fire and pressure test reports, Bisco flexible boot fabrication and installation procedures, visual inspection and penetration seal walkdown of the installed flexible boot seals, observed Bisco personnel in the preparation of a flexible boot seal, and discussions between the licensee's staff, Bisco site personnel, the NRC resident, and the inspector to determine whether the allegations could be substantiated. As a result of these activities, the following findings and conclusions were made:

(1) Allegation No. RIII-83-A-0029-01: Test data to support the penetration seals' fire resistance capability did not exist including test data to show that the six inch silicone fire barrier penetration seals are rated for three hours.

The inspector reviewed five Bisco fire test reports (No. 748-63-A dated March 11, 1982; No. 748-81 dated May 12, 1982; 748-42 dated July 29, 1981; No. 748-100 dated November 15, 1982; and No. 748-105 dated June 10, 1983). In reviewing these test reports the inspector noted particular attention to test assembly configuration including seal design configurations and any penetrating items, standards being used and acceptance criteria in evaluating test results, observations during the test, and the findings of the fire test. None of the five fire test reports indicated having a design configuration utilizing a six inch depth silicone foam fire seal. In addition, according to the licensee's staff, no six inch depth penetration fire seal design configuration is being used at the site. Discussions between the inspector and resident inspector indicated that the resident was not aware of any such fire seal design configuration.

Review of Test Report No. 748-42 showed a penetration fill depth of twelve inches utilizing Bisco SF-150NH material; Test Report No. 748-81, a penetration fill depth of five inches of Bisco SF-60 material was used; for Test Report No. 748-63-A, varying design configurations having nine inches and twelve inches of Bisco SF-20 and five inches of Bisco SF-60 was used; for Test Report No. 748-100 a penetration fill depth of seven and one half inches of Bisco SF-60 material was used; and for Test Report No. 748-105, a penetration fill depth of five inches of Bisco SF-60 material was used.

These five fire tests met NRC acceptance criteria with the following exception: Bisco Test Report No. 748-81 and 748-100 did not clearly identify the thermocouple(s) positioned on the unexposed seal surface and its applicable temperature measurements. This is considered an open item (461/85047-09) pending inspector followup.

Regarding the specific allegation, the inspector concluded that, based on a review of a sample number of penetration fire seal test reports and discussions with the licensee's staff including

Bisco personnel and the resident inspector, this allegation is not applicable to the site. This portion of the allegation is considered closed.

(2) Allegations No. RIII-83-A-0029-02 and 03: Penetration seals were installed with a 2" overlap on the seal boot instead of the required 3". Bisco Company procedures SP504, SP505, SP505-1, SP505-2, and SP505-3 were deficient. The inspector determined that these two allegations were interrelated, and as such are discussed together. These two allegations are in regard to flexible boot seals which are designed for use as pressure barriers.

The inspector reviewed Bisco Installation Procedure No. SP-505, Revision 8, dated July 29, 1985; Bisco Fabrication Procedure No. SP-504, Revision 1, dated September 14, 1983, and a second Bisco Installation Procedure No. SP-505-1, Revision 0, dated September 27, 1979. According to the licensee, Bisco Procedures No. SP-505-2 and No. SP 505-3 were not being used at the Clinton site.

Step 7.2.2 of Procedure No. SP-505 indicates the overlap seam should be calculated from Production (Fabrication) Procedure No. SP-504. Step 5.2 of Procedure No. SP-504 refers to Bisco Form FB-1, "Bisco Flexible Boot Work Sheet," for determining the overlap seam. The inspector inspected three flexible boot seams and determined that they were installed according to the procedure although only about six boot seals had been installed in the plant. However, in the review of the documentation provided by the licensee, the inspector was unable to determine the basis for Bisco's overlap seam criteria. This is considered an open item (461/85047-10) pending inspector review of Bisco's bases for the overlap seam criteria and further inspection of additional flexible boot seals.

Regarding the inspector's review of Bisco Procedure No. SP-505-1, Steps 7.1 and 7.3 indicate that all intended sealing surfaces of the boot material including the overlap and application of the sealant material should be a minimum of three inches. This implies that the overlap axial seam should be a minimum of three inches, although the correct boot overlap axial seam calculations will be determined based on the supporting documentation the licensee provides to satisfy open item (461/85047-10). Regarding Allegation No. RIII-83-A-0029-03, adequacy of the three procedures will be determined subsequent to review of open item (461/85047-10). This portion of the allegation remains open.

No violations or deviations were identified at the time of this review.

b. Withdrawal By ANI of Previously Accepted Penetration Fire Stop Systems

The inspector examined the licensee's potential 10 CFR 50.55(e) report submitted approximately the week of the inspection visit regarding ANI withdrawal of approval for previously accepted penetration fire stop systems. These are penetration fire stop systems (according to an ANI letter to all of their properly insured utilities dated August 20, 1985) having four Bisco seal designs including a nine inch depth of Bisco SF-20 (1977) silicone foam or Dow Corning 3-6548 RTV silicone foam without damming board left in place type of configurations.

The inspector reviewed the ANI letter dated August 20, 1985 including the applicable design details; Bisco letter to Baldwin Associates dated August 26, 1985; Bisco letter to IP dated August 30, 1985; an internal IP letter from R. Bhat to F. Spangenberg dated September 5, 1985; Bisco Test Report No. 748-15 dated May 29, 1979; and Bisco Test Report No. 748-64 dated January 15, 1982.

The inspector's review determined that the two test reports had apparent temperature measurements taken during the test that exceeded NRC allowable limits. Bisco Test Report No. 748-15 showed Conduit 8, Thermocouple No. 2 having exceeded the NRC allowable temperature (325°F) at one hour and fifty minutes into the test (350°F) and rising to 470°F at three hours into the test (test duration was three hours); and Conduit 9, Thermocouple No. 2 having measured 335°F at two hours and twenty minutes into the test and rising to 390°F at three hours into the test. The inspector discussed these discrepancies with the licensee's technical and licensing staff on October 11, 1985. This is considered an open item (461/85047-11) pending inspection followup of the licensee's evaluation of the identified discrepancies.

8. NRR Fire Protection Site Audit

During the week of September 9-13, 1985, the NRR Fire Protection Reviewer also conducted a fire protection site audit. NRR requested Region III to followup on resolution of open items identified during the NRR fire protection site audit. The following is the list of open items Region III plans on pursuing during upcoming inspection visits prior to fuel load:

a. The licensee could not justify the two-hour fire resistance rating attributed to the eight-inch thick hollow concrete block walls serving as fire barriers. This is considered an open item (461/85047-13).

b. The Reactor Building air lock doors are not fire rated (Section D.1.(j) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-12).

c. Electrical bus duct penetrations through fire barriers are not sealed (Section D.1.(j) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-14).

d. Structural steel forming a part of a fire barrier in the diesel generator day tank room is not protected (Section D.1.(j) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-15).

e. Some ventilation ducts penetrating fire barriers are not equipped with fire rated dampers (Section D.1.(j) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-16).

f. The tracks and blades of fire damper assemblies are loaded with dirt and debris (Section C.8 of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-17).

g. Cable trays outside of the cable spreading room are not protected by automatic sprinkler systems (Section D.3.(c) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-18).

h. The location of the fire pump flow meter discharge outlet relative to the pump intake may adversely affect the fire flow test results (Section E.2.(c) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-19).

i. Fire hydrant spacing exceeds 250 feet within the power block (Section E.2.(g) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-20).

j. In many safety-related areas it may not be possible to reach all locations with 75 feet of fire hose due to congestion and changes in elevation (Section E.3.(d) of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-21).

k. The Control Room is not adequately separated from its peripheral rooms by fire rated construction and automatic sprinkler protection is not provided in the peripheral rooms (Section F.2 of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-22).

l. The Turbine Building contains conduits identified as being safety-related (various sections of Appendix A to BTP APCSB 9.5-1 and Appendix R to 10 CFR to apply to areas containing safety-related equipment). This is considered an open item (461/85047-23).

m. Fire protection means for the containment and drywell have not been provided in accordance with NRC guidelines (Section III.G of Appendix R to 10 CFR 50 and Section F.1 of Appendix A to BTP APCSB 9.5-1). This is considered an open item (461/85047-24).

9. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, or which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 2, 3, 4, 5, 7, and 8.

10. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on September 13, 1985, and summarized the scope and findings of the inspection. 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 reviewed by the inspector during the inspection. The licensee did not identify any of the documents as proprietary.