

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/87029(DRP); 50-316/87029(DRP)

Docket Nos. 50-315; 50-316

Licenses No. DPR-58; DPR-74

Licensee: Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43216

Facility Name: Donald C. Cook Nuclear Power Plant, Units 1 and 2

Inspection At: Donald C. Cook Site, Bridgman, Michigan

Inspection Conducted: September 29 through November 10, 1987

Inspectors: Bruce L. Jorgensen

James K. Heller

Approved By: 
B. L. Burgess, Chief
Reactor Projects Section 2A

11/23/87
Date

Inspection Summary

Inspection on September 29 through November 10, 1987 (Reports
No. 50-315/87029(DRP); No 50-316/87029(DRP))

Areas Inspected: Routine unannounced inspection by the resident inspectors of: actions on previously identified items; plant operations; reactor trips; radiological controls; maintenance; surveillance; fire protection and cleanliness; security; Steam Generator Repair Project; and Information Notices and Generic Letters.

Results: Of the 11 areas inspected, no violations or deviations were identified in ten areas. One violation was identified (Level IV - failure to perform required reviews and approvals for substitute repair material - Paragraph 6.h) in the remaining area.



DETAILS

1. Persons Contacted

- W. Smith, Jr., Plant Manager
- *A. Blind, Assistant Plant Manager - Administration
- *J. Rutkowski, Assistant Plant Manager - Production
- *L. Gibson, Assistant Plant Manager - Technical Support
- *B. Svensson, Licensing Activity Coordinator
 - T. Kriesel, Technical Superintendent - Physical Sciences
 - K. Baker, Operations Superintendent
- *J. Sampson, Safety and Assessment Supervisor
 - E. Morse, Quality Control Superintendent
 - T. Beilman, I&C/Planning Superintendent
- *J. Droste, Maintenance Superintendent
 - T. Postlewait, Technical Superintendent - Engineering
 - L. Matthias, Administrative Superintendent
- *M. Horvath, Quality Assurance Supervisor
 - A. Tetzlaff, Performance Engineer
 - D. Loope, Radiation Protection Supervisor
- *J. Kauffman, Construction Manager

The inspector also contacted a number of other licensee and contract employees and informally interviewed operations, maintenance, and technical personnel.

*Denotes some of the personnel attending Management Interview on November 10, 1987.

2. Actions on Previously Identified Items

- a. (Closed) Unresolved Item (315/86005-06): the containment airlock door seal material needed to be changed, as the original seals were beyond the manufacturer's stated service life. With seals of the original material no longer available, a design change (RFC-DC-2768) was processed to install an acceptable substitute. Action was completed on the last (Unit 1) airlock doors as of September 4, 1987.
- b. (Closed) Open Item (315/86035-02; 316/86035-02): electrical shorting appeared coincident with hydro-lasing activities to decontaminate area surfaces. Further review showed no circuits designed to be unaffected by water/steam had failed. Improved controls of the activity were apparently effective in that no subsequent problems occurred despite widespread decontamination activities using both hydro-lasing and steam-cleaning techniques.
- c. (Closed) Open Item (315/86041-03; 316/86041-02): the safety evaluation review sheet for lifted pressurizer heater leads determined remaining capacity was adequate by deducting lost capacity from total installed rather than from capacity accessible

to emergency power. The emergency powered capacity establishes safety. The licensee revised its evaluation, showing adequate capacity remains after deducting the disabled heaters from the emergency powered total.

- d. (Closed) Open Item (315/87003-01; 316/87003-01): the Component Cooling Water (CCW) system operating procedure contained a precaution against operation below 70 degrees F., but the low temperature alarm setpoint was reduced to 60 degrees F. because alarms were common/continuous at the higher setpoint. The licensee addressed this inconsistency by revising the operating procedure precaution to 60 degrees F, based on the facts that 70 degrees is not achievable during winter conditions and that no detriment to plant equipment had occurred in a number of years' experience with colder operating periods.

No violations, deviations, unresolved or open items were identified.

3. Operational Safety Verification

Routine facility operating activities were observed as conducted in the plant and from the main control rooms. Plant startup, steady power operation, plant shutdown, and systems) lineup and operation were observed as applicable.

The performance of licensed Reactor Operators and Senior Reactor Operators, of Shift Technical Advisors, and of auxiliary equipment operators was observed and evaluated including procedure use and adherence, records and logs, communications, shift/duty turnover, and the degree of professionalism of control room activities.

Evaluation, corrective action, and response for off normal conditions or events, if any, were examined. This included compliance to any reporting requirements.

Observations of the control room monitors, indicators, and recorders were made to verify the operability of emergency systems, radiation monitoring systems and nuclear reactor protection systems, as applicable. Reviews of surveillance, equipment condition, and tagout logs were conducted. Proper return to service of selected components was verified.

- a. Unit 1 was taken critical at 6:42 p.m. on October 4, 1987, ending a scheduled refueling, maintenance, modification and testing outage which began on June 26. Low power physics testing was completed on October 6 and power escalation for return to normal power operation commenced. NRC review of low power physics testing is documented in I.E. Inspection Reports No. 315/87028(DRS); No. 316/87028(DRS).

The Unit tripped (see Paragraph 4) on October 13, 1987 upon loss of one of two main feed pumps. A restart followed later the same day and the Unit remained in normal power operation through the remainder of the inspection period.



- b. Unit 2 was taken critical at 1:52 a.m. on October 10, 1987, ending an approximate six week maintenance and testing outage. At 12:13 p.m. the same day, the Unit tripped (see Paragraph 4) from about eight percent power. A restart followed on October 11, and the Unit remained in normal power operation the remainder of the inspection period with a single substantial power reduction, as described below.

Following startup, the Unit experienced excessive leakage through the pressurizer spray system. Pressure control required essentially all the pressurizer heaters be continuously energized. Valve NRV-164 was suspected as the leak source, though the other valve (NRV-163) could not be excluded. When attempts to rectify the situation from outside the containment failed, the licensee developed a preliminary plan to enter containment, inspect the situation, and (if no other course suggested itself) apply limited external mechanical force on the suspect valve with a jacking device. The entry necessitated a power reduction to about 20 percent for radiation protection considerations, which was performed on October 28. Upon entry, the inspection team found NRV-163 to be cycling erratically through a repetitive partial stroke cycle, while NRV-164 was found fully closed with operating (opening) air isolated by a local manual valve. NRV-163 was secured and air valved in to NRV-164, restoring essentially normal pressure control with small controlled spray system leakage. A return to normal power operation then followed. The condition of the isolated air supply to NRV-164 was unexpected and the licensee is continuing to investigate the causal factors.

- c. Items identified on plant tours for which some corrective action appeared appropriate were referred to plant management. On some occasions, such items were noted during tours conducted with management representatives. Examples noted during this inspection period included:

- i) an unsecured ladder left in an auxiliary feedwater pump room;
- ii) vent lines/hoses attached to each Unit 2 RHR heat exchanger; plus, general clutter in the heat exchanger rooms.

Each of the above was noted prior to Unit startup and was expeditiously corrected.

- iii) the inspector noted a lack of insulation on a line to a Unit 2 pressure instrument isolation valve, 2-MPI-10-V1. The line to the identical Unit 1 valve is insulated. The Maintenance Superintendent initiated a review to determine which configuration is correct.



d. A number of operating procedures were reviewed with results as described below:

- i) 01-OHP 4021.003.001 "Operation of Letdown, Charging and Seal Water Systems", Revision 9 dated 7/25/86 through Change Sheet 2 dated 8/28/87.

This procedure requires certain valve lineup checks, verification of oil level, flow and pressure, and verification of cooling water supply to auxiliaries. These checks are made in the pump room and partially duplicate prior checks documented on an attached lineup sheet. For those which exceed the scope of the lineup sheet, no provision exists to document they were done. In fact, the procedure is not an "in hand" procedure, which is inconsistent with the concept of specifying local checks at the pump.

The procedure implies it is not necessary to run the associated auxiliary oil pump while a centrifugal charging pump (CCP) is in service. The auxiliary oil pump is to be run at least a minute before starting an idle CCP and for at least five minutes after a CCP is secured. A caution tag was serving in lieu of specific procedure instructions for one of the pumps; e.g. "operate the oil pump on the 1E CCP continuously while the CCP is in service". This use of a caution tag in lieu of procedure instructions is inconsistent with the intent of the licensee's own administrative controls for caution tags.

The procedure is also either silent or provides ambiguous information concerning the single reciprocating charging pump in the Unit. This is discussed further at iii) below.

- ii) 01-OHP 4021.003.006 "Changing from a Reciprocating to a Centrifugal Charging Pump", Revision 5 dated 10/9/54 through Change Sheet 1 dated 9/11/85.
- iii) 01-OHP 4021.003.007 "Changing from a Centrifugal to a Reciprocating Charging Pump", Revision 5 dated 8/14/84 through Change Sheet 1 dated 9/11/85.

This procedure establishes an initial condition that the reciprocating charging pump (RCP) be filled, vented and available for standby operation per 1-OHP 4021.003.001. This referenced procedure (003.001) however, does not provide specific instructions for achieving standby readiness. The text is silent with respect to the RCP. The associated (003.001) "Valve Lineup Sheet" does not specify valve positions as "open" or "closed", but says "as required". This does not achieve the objective presumed in (003.007) of preparing the RCP for operation.

- iv) 12-OHP 4021.005.001, "Boron Makeup System Operation", Revision 9 dated 10/22/87.
- v) 01-OHP 4024.109, "Annunciator No. 9 Response: Boric Acid", Revision 3 dated 5/8/86 through Change Sheet 1 dated 8/28/87.

This alarm response procedure contained three apparent typographical errors in identification of relay numbers associated with the West Centrifugal Charging Pump motor instantaneous (drop 16) and overload (drop 17) trips.

Three alarms (drop 31, 32 and 33) involve abnormal conditions associated with the "middle" Boric Acid Storage Tank ("M" BAST). Though the tank can be aligned to either Unit, its conditions are monitored and alarmed only in the Unit 1 control room. The alarm procedure lacks instructions to check with or notify the Unit 2 control room concerning abnormal conditions for this tank.

- vi) 02-OHP 4024.209 "Annunciator Response No. 9: Boric Acid", Revision 2 dated 8/7/86 through Change Sheet 1 dated 8/28/87.

The inspector discussed observations from procedure reviews as described in i) through vi) above with the Operations procedure group. Procedure change requests were initiated for deficiencies where deemed appropriate.

- e. Prior to the Unit 2 Mode change from MODE 5 to MODE 4 the inspector verified that containment integrity was established as required by the Technical Specifications. The inspector verified the proper position of the valves associated with at least ten containment penetrations, observed that the Unit 2 upper airlock containment penetration was tested per plant procedure and that the ice condenser was maintained in accordance with plant procedures.

No violations, deviations, unresolved or open items were identified.

4. Reactor Trips or ESF Actuations

a. Unit 1

Unit 1 tripped from about 69 percent power at 8:18 a.m. on October 13, 1987, following loss of the 1E main feed pump. The feed pump had tripped unexpectedly when an associated oil pump was secured per normal practice. Operators immediately commenced pump recovery and reopening of the pump discharge valve, which closed as designed on the pump trip, but they were unable to maintain required steam generator levels and flow balances. The reactor subsequently tripped on steam generator (No. 11) low level with steam/feed flow mismatch. Control response of one feedwater regulating valve (FRV-210) was "ragged" and contributed to the event. A detective circuit card was replaced.

The inspector was onsite at the time of the trip and went to the control room to observe initial operator post-trip recovery actions and equipment performance. All post-trip system responses were normal, and operator response was orderly, professional and "by the book".

b. Unit 2

- i) Unit 2 received a Train A safety injection actuation on October 2, 1987, at 4:57 p.m. while the Unit was in MODE 5 (cold shutdown). Instrument and Control personnel had been performing surveillance testing of the Solid State Protection System (SSPS) when a test failure occurred. Investigation identified a faulted circuit board, which was replaced. During the evolution of performing maintenance in the middle of testing, an error was made in the sequence for repositioning SSPS switches such that the "block" was not in effect for the streamline isolation signal input to safety injection. In MODE 5, this signal is normal, so when the input error inhibit switch was returned to "normal" the Safety Injection signal actuated. No actual injection occurred because equipment was tagged out for low temperature overpressure protection as required. The Train A emergency diesel (2 CD) started and the containment isolated as designed. Upon assessment of the situation, operators terminated the signal and restored pre-event conditions. The remaining instrument testing was then completed without further incident. The resident inspectors will review adherence to applicable procedure controls during followup of the anticipated LER.
- ii) Unit 2 received a reactor trip/turbine trip signal at 11:28 p.m. on October 8, 1987 while the Unit was in MODE 3 (hot shutdown) with the reactor trip breakers closed but no control rods withdrawn. Instrument and Control personnel were performing testing on excore nuclear instrument channels when, due to an error, channel 43 was placed in "Test" instead of channel 44. The latter channel already had its bi-stables tripped in preparation for the testing, so two-of-four logic was satisfied and the trip signal resulted. Both reactor trip breakers opened as designed. Upon determination and discussion about what had happened, operators restored the breakers and the remaining test was completed.
- iii) Unit 2 tripped (turbine trip/reactor trip) from about eight percent nuclear power at 12:13 p.m. on October 10, 1987. Operators were in the process of rolling the main turbine up to speed through about 1550 rpm when it tripped from an unknown cause. Setpoint P-13 (establishing turbine/reactor trip off first stage pressure) had been set rather low and had been blinking in and out with nuclear power around eight percent.

It happened to be instated when the turbine tripped, so reactor trip followed instantly. Trip response was completely normal.

When the licensee was unable, despite extensive investigation and testing, (and consultation with a turbine vendor representative who witnessed the event) to determine the exact cause of the turbine trip, the start-up decision was referred, as required, to the Plant Nuclear Safety Review Committee (PNSRC) and the Plant Manager. They authorized restart conditioned on reverification and adjustment, if necessary, of setpoint P-13, and of the Brown-Boveri (turbine manufacturer) vacuum trip circuits. The trip circuits, which seemed the only remaining candidate/suspect, checked satisfactorily without adjustment. Setpoint P-13 was raised to 8.7 percent.

The inspector went to the site October 11 to review the original records concerning the trip event and system response, to review the licensee's investigative scope and results, and to observe the restart. No discrepancies prohibiting a Unit restart were noted. Subsequently, the restart was observed through turbine roll, synchronization, and initial power escalation to 20 percent power. It was completely uneventful.

This occurrence, within a week of two Instrument and Control personnel errors which caused inadvertent safety system actuations, is of some concern to NRC. The situation will be monitored carefully for a recurrence or for other related occurrences. This was discussed at the management interview.

No violations, deviations, unresolved or open items were identified.

5. Radiological Controls

During routine tours of radiologically controlled plant facilities or areas, the inspector observed occupational radiation safety practices by the radiation protection staff and other workers:

- a. proper wearing of personnel dosimetry;
- b. correct use of step-off pads for contamination control;
- c. adherence to assigned Radiation Work Permit;
- d. proper Auxiliary Building exit, i.e. entering self reading dosimeter data to the REM computer and correctly using the high-sensitivity personnel contamination monitors.

Effluent releases were routinely checked, including examination of on-line recorder traces and proper operation of automatic monitoring equipment.

Independent surveys were performed in various radiologically controlled areas, using a licensee-issued E-130 G-M detector.

No violations, deviations, unresolved or open items were identified.

6. Maintenance

Maintenance activities in the plant were routinely inspected, including both corrective maintenance (repairs) and preventive maintenance. Mechanical, electrical, and instrument and control group maintenance activities were included as available.

The focus of the inspection was to assure the maintenance activities reviewed were conducted in accordance with approved procedures, regulatory guides and industry codes or standards and in conformance with Technical Specifications. The following items were considered during this review: the Limiting Conditions for Operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures; and post maintenance testing was performed as applicable.

The following activities were inspected:

- a. The licensee recently named Mr. J. B. Droste to the position of Maintenance Superintendent. This position is equivalent to the position of "Maintenance Manager" as described in ANSI N18.1-1971, to which the licensee is committed. Mr. Droste's training and experience were reviewed against the criteria of the ANSI standard with no deficiencies noted.
- b. As part of a review of testing activities associated with containment isolation valves (see Paragraph 7.a) the inspector reviewed procedure PMI-2290 "Job Orders" and held discussions with Maintenance Department representatives concerning "as found" testing of such valves before performance of work which could affect their performance as a leakage barrier. The procedure contains a generalized instruction to identify all required testing during the job order development process. This is taken to include "as found" testing for containment isolation valves. The personnel who prepare the job orders have been informed and, reportedly, trained to include this testing for work on any containment boundary valve. Specific written and/or computerized cross-check procedures to identify required testing as a function of the component being worked do not currently exist. The licensee has an ongoing project to develop such a tool using the computerized plant equipment database, which is anticipated will be ready sometime around the middle of next year.
- c. Procedure PMI-2160 "Control of Chemical Materials and Cleaning Agents" was reviewed and compliance to several of its attributes were verified during routine in-plant inspection activities. No particular problem areas were noted by the inspector, although the

licensee's Quality Assurance audit/surveillance program has identified some problems in this area which the licensee is addressing.

- d. RFC-DC-4033: preliminary work for relocating P-250 computer room exhaust vents.
- e. RFC-DC-2962: preparatory grinding/cleaning activities in support of the project to strengthen the auxiliary building crane and associated support structures; a subsidiary project of the Steam Generator Repair Project (SGRP) on Unit 2 - see Paragraph 10.
- f. Job Order JO 021122: rebuild/retest of snubber. A snubber located at the top of the pressurizer next to valve 2-NRV-152 was found leaking oil. The snubber was removed and a replacement installed. The removed snubber subsequently failed a functional bench test. During discussion of the matter with licensee representatives, the inspector verified the test failure was being properly factored into the scheduling process for the next visual inspection period.
- g. Job Order JO 726879: repair post-accident sample sink.
- h. Job Order JO 012282: weld repair of the Unit 2 Component Cooling Water (CCW) return pipe from the West RHR heat exchanger. This repair involved cutting out a rectangular piece atop the pipe to capture a through-wall crack which had developed in the heat-affected zone adjacent to a pipe weld. The intent was to obtain a specimen perhaps representative of several cracks which developed in the Unit 2 CCW system and to perform metallurgical analysis on the specimen in an effort to determine the cause of the cracking.

The CCW investigatory project and the technical safety considerations associated with this repair are discussed in I.E. Inspection Report No. 50-315/87023(DRS); 50-316/87023(DRS). Based on questions raised during the referenced inspection it was learned the licensee had replaced the cut out piece with a piece of ASTM A-36 structural steel in lieu of the ASTM A-106 Grade B material of which the pipe is made, because no A-106 material was available. Belated evaluation/documentation concerning the substitution concluded the repair was satisfactory from the standpoint of strength and weld compatibility.

This inspection focused on the administrative processes established to control substitutions or other changes to approved design conditions of plant safety systems. The inspector determined all such changes are governed either by procedure PMI-2140 "Temporary Modifications" or (for permanent changes) by procedure PMI-5040 "Design Change Control Program". The former procedure at Paragraph 3.4.1, requires prior evaluation and approval be performed and

documented before performing an activity which (temporarily) alters a plant system, component or structure from its existing approved condition. A like requirement is contained in the latter procedure (for permanent changes) at its Paragraph 4.4.3. Thus, appropriate controls exist to provide that alterations to plant safety systems receive advance review and approval. In the subject repair, neither of these controlling procedures were applied.

Relatively concurrent with NRC inspection of this matter, the licensee's onsite Quality Assurance (QA) Department performed an audit of the maintenance area which included the subject Job Order among many. The QA audit report (QA-87-26) was provided to and reviewed by the inspector. It contains the same finding that administrative procedures were violated when no documented prior evaluation and approval of the substitute repair were completed. Since Technical Specification 6.8.1.a requires implementation of such procedures via reference through Regulatory Guide 1.33 Appendix A, this matter is considered a violation of the referenced Technical Specification (Violation: 316/87029-01).

Prior to the conclusion of the inspection, both on the basis of the QA audit finding and considering an earlier Condition Report initiated on the same repair activity by the Quality Control Supervisor, corrective actions were implemented as follows:

- i) a documented safety analysis was performed;
- ii) applicable reviews and approvals were obtained;
- iii) the applicable documents were updated to show the current modified condition.

Preventive actions included:

- iv) requiring site Maintenance Engineers to have documented Engineering Evaluations vs. verbal instructions from the corporate engineering group for use in the development of work packages;
- v) briefings/training for all welders and supervisors concerning the need for documented vs. verbal instructions; and,
- vi) utilization of a "traveler" form in preparation of Code weld repair packages to provide for specific advance identification of the precise repair intended/required, the applicable Code, the necessary procedures and the required testing. The "Traveler" is to receive prior review by Quality Control and Inservice Inspection personnel.

The last item is presently being implemented pursuant to an instructional memorandum from the Maintenance Engineer in charge of this discipline. A decision to make the process permanent has not yet been made as the licensee is still considering if this system is the most efficient one or whether a better (and perhaps more generic) alternative may exist.

Also, subsequent to the improper repair, but before its discovery, the licensee revised his procedure PMI-5075, "ASME Section XI Repair/Replacement Program", which governs weld activities of this type. The new revision contains clearly stated requirements that all materials must conform to D. C. Cook plant specifications and that replacement of any part or section requires appropriate reference to PMI-5040.

One violation (no licensee response required) and no deviations, unresolved or open items were identified.

7. Surveillance

The inspector reviewed Technical Specifications required surveillance testing as described below and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that Limiting Conditions for Operation were met, that removal and restoration of the affected components were properly accomplished, that test results conformed with Technical Specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and that deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The following activities were inspected:

- a. **1 THP 4030 STP.203 "Surveillance Test Procedure Type B&C Leak Rate Test" Revision 10 dated 5/28/87 through Change Sheet 13 dated 8/7/87.

Particular attention was given to testing of valves in the Chemical and Volume Control system (CVCS) and the Component Cooling Water (CCW) system, to provide some focus to the review, since the procedure is an integrated one (several hundred pages, counting attachments) covering all containment isolation valves.

Concerning CVCS, the inspector verified:

- i) stipulated valve lineups appeared appropriate;
- ii) leakage action guides and limits were reasonable;
- iii) data and instructions were consistent among the various attachments and the procedure body concerning CVCS penetrations; and,



- iv) justification/authorization was provided for valves tested by "reverse direction" pressure, consistent with 10 CFR 50, Appendix J.

Concerning CCW, attributes i) through iii) above were checked. The inspector noted an apparent inconsistency between the body of the procedure (Paragraph 5.9.3.3.C.2) which excludes ten CCW valves from as-found vs. as-left "penalty" calculation, while Appendix I includes the valves. Further discussion with Performance Engineering established the CCW calculations, if performed, are not added into the total "penalty" applied to the subsequent integrated leak test. Evaluation against criteria of 10 CFR 50 Appendix J, considering function and design of the lines in question, determined the licensee's practice is acceptable.

Some review was conducted on a licensee Problem Report (No.87-0846) addressing a failure to perform an "as-found" Type C test on CVCS letdown valve QCR-300 prior to maintenance. The inspector verified Procedure STP.203 calls for an "as-found" leak rate test prior to any piping or valve modifications or repair. This is a Precaution/Limitation stated in Step 4.13 of the procedure. As noted in Paragraph 6.b above, however, the licensee currently relies on the knowledge and experience of the personnel preparing job order packages to recognize the need for such testing so the Performance Department is notified and can perform STP.203 before repairs begin.

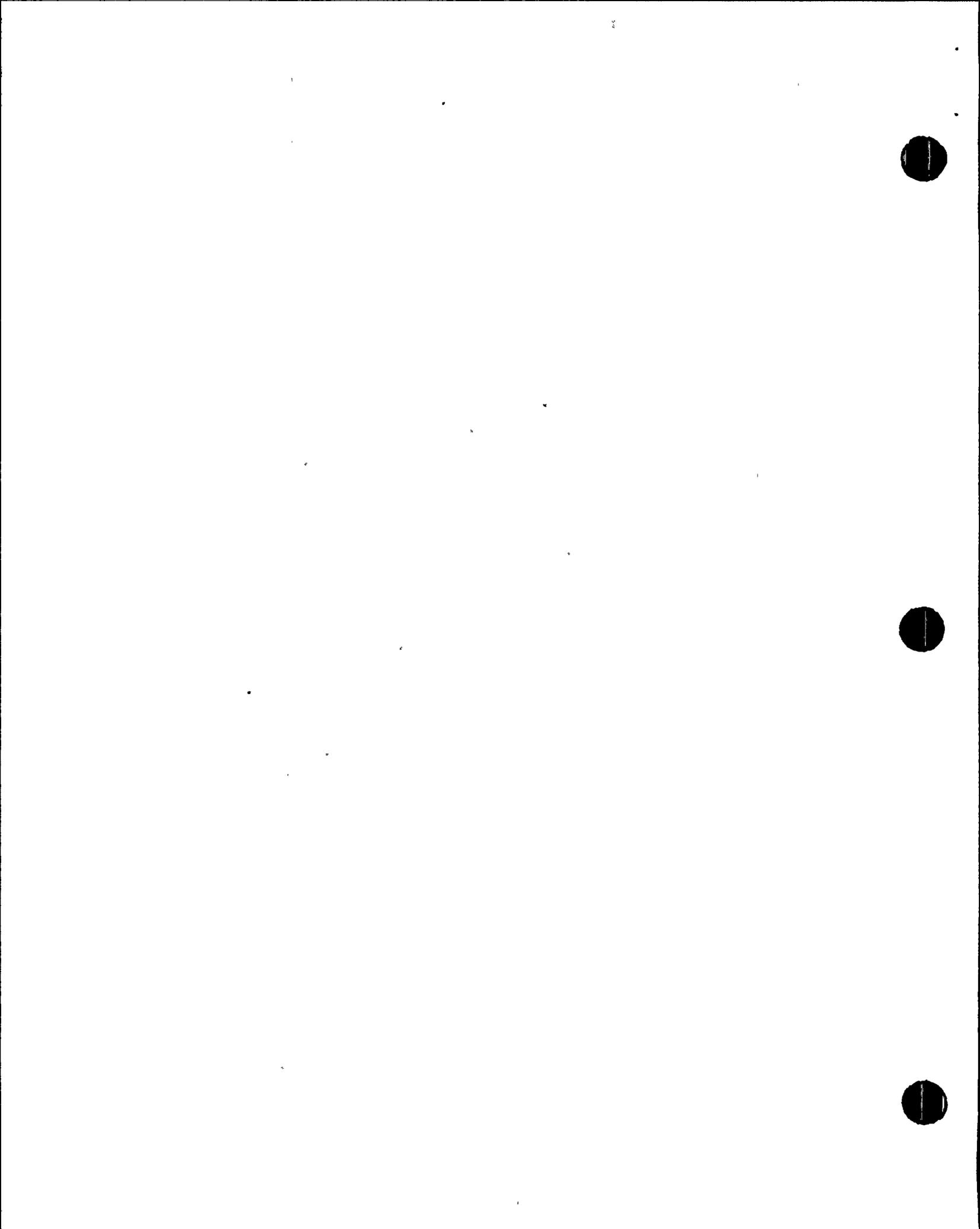
Since the licensee identified this apparent procedure violation, corrected it, and it was neither safety significant nor repetitive, only preventive actions remain to be verified to establish whether a NRC Notice of Violation should be issued. Pending this review, this is considered an Unresolved Item (315/87029-01).

- b. **12 MHP 5050 SPC.005 "Hydrostatic Test Procedure" Revision 4 through Change Sheet 1 dated 11/3/87.

Setup for this procedure to hydrostatically test essential service water to the containment spray heat exchanger was observed on November 3, 1987. The test procedure had just been revised to incorporate a Code interpretation involving low temperature (below 200 degrees F.) systems with installed safety/relief valves. It is a generic procedure for testing multiple systems, with the applicable system test pressure calculated at the time the test is done.

- c. **12 THP 4030 STP.246 "Inspection of Ice Condenser Floor Drain Valves".

Condition Report No. 2-10-87-1473 identified that two of twenty-four Unit 2 floor drain valve gates were not sealing properly during the performance of STP.246. The immediate corrective action documented



that the seating surface was sealed with grease and a Job Order written to make permanent repairs. The inspector questioned the use of grease as a sealing mechanism. During discussion with cognizant engineers the inspector was informed that the grease is routinely applied, by procedure, to decrease hot air inleakage, during plant operation, from the lower containment to the ice condenser. Thus, all the gates have greased seating surfaces. Air tightness is not a test criterion, however, so grease is not required to pass the test. The inspector also found that the licensee was aware of problems encountered by another utility when containment isolation valves were greased prior to leak rate testing. In addition, the inspector verified that the grease was compatible with the ice condenser environment.

STP.246 at Step 4.4 states, "Procedure test steps can be performed in any order". The inspector questions if this is appropriate, since a primary objective of the procedure is to verify each drain valve gate opens within a specified opening force. Since other steps involve exercising the valve gates, it appears inappropriate to perform these steps prior to determining the "as-found" opening force. This was discussed with the cognizant engineer who committed to review/revise (if needed) STP.246.

- d. **1 OHP 4030 STP.027AB "AB Diesel Operability Test". The Unit 1 AB diesel generator failed a start test under this procedure on July 19, 1987. The licensee had intended to use a successful test to declare the machine "operable". Investigation showed fuses for the generator field flashing circuits had been pulled by Instrument and Control personnel on about July 15. The purpose for pulling the fuses was to prevent damage during a planned series of slow-speed (non-synchronous) runs of the engine. The governing Maintenance Department procedural instructions were deficient in that they neither specifically recognized the actual pulling of the fuses would be by the Instrument and Control (I&C) group, nor were there instructions to assure re-installation on completion of the slow-speed runs. The I&C group was not called upon in the interim between July 15 and 19. The licensee issued a Problem Report (No. 87-0614) on this matter which noted the above procedural problems, as well as other contributing factors. The inspector considered the evolution to reflect poorly on communication/co-ordination among plant departments, but also to contain some valuable lessons learned.

The licensee identified this apparent procedure deficiency and corrected it, and the problem was neither safety significant nor repetitive. Pending final inspector review of preventive actions, to determine whether or not a NRC Notice of Violation should be issue, this matter is considered an Unresolved Item (315/87029-02).

- e. 12 MHP 4030 STP.029 "Functional Test of Hydraulic Snubbers".
- f. **1 OHP 4030 STP.004 "Centrifugal Charging Pump Operability Test-MODE 5 or 6".

As previously noted, Unit 1 was in an outage throughout September, 1987. When this test was run on September 4, acceptance criteria in the form of updated differential pressure graphs were not present in the Tech Data Book. The pump could not be determined to meet surveillance criteria on the basis of this test. Its condition following an earlier maintenance activity to modify the discharge orifice remained indeterminate. When updated graphs were received by operators on September 6, they showed the pump failed with pressure differential too high. The pump was declared inoperable.

Subsequently, investigation showed the pressure gauge was reading slightly high, and a retest after calibration (with no work on the pump itself) succeeded in qualifying the pump for "operable" status as required prior to a MODE change. Retrospective reviews also showed the other centrifugal charging pump had remained operable while the subject pump was unknowingly in a failed status. A licensee Problem Report (No. 87-0812) documents these circumstances which, in the view of the inspector, resulted in inadvertant compliance to requirements. This was discussed at the Management Interview.

No violations, deviations, unresolved or open items were identified.

8. Fire Protection

Fire protection program activities, including fire prevention and other activities associated with maintaining capability for early detection and suppression of postulated fires, were examined. Plant cleanliness, with a focus on control of combustibles and on maintaining continuous ready access to fire fighting equipment and materials, was included in the items evaluated.

- a. The licensee reported on October 12, 1987, that a preplanned maintenance activity to replace a valve in the outside fire suppression water rising header necessitated isolation of a portion of the header. Provision of backup suppression capability and followup written notification were both accomplished in accordance with fire protection Technical Specifications.
- b. The inspector informed the licensee concerning discovery, during fire protection "safe shutdown" reviews at another plant, of a potential common mode postulated fire which could disable presumably independent emergency power sources. The licensee initiated a review of the matter to determine its applicability, if any, to the D. C. Cook Units.

No violations, deviations, unresolved or open items were identified.

9. Security

Routine facility security measures, including control of access for vehicles, packages and personnel, were observed. Performance of dedicated physical security equipment was verified during inspections in various plant areas. The activities of the professional security force in maintaining facility security protection were occasionally examined or reviewed, and interviews were occasionally conducted with security force members.

No violations, deviations, unresolved or open items were identified.

10. Steam Generator Repair Project (SGRP)

a. Briefing Meeting

The licensee visited NRC Region III on October 23, 1987 to make a presentation covering several areas of interest in the upcoming (probable Spring 1988) project to replace the Unit 2 steam generators. Specific topical areas included a schedule overview, which addressed outage activities and milestones. A presentation was given on the radiological protection aspects of the project, as were presentations addressing quality assurance both from the licensee and from the primary contractor (M-K Ferguson) perspectives. A scale model was used to demonstrate major aspects of the physical disassembly, component movement, and reassembly. The licensee also addressed a variety of questions from the NRC representatives. A followup meeting is tentatively being considered for March 1988.

b. Organization and Staff

The inspector visited and toured the onsite offices for the SGRP, which occupy somewhat expanded facilities at the South end of the site formerly used as the site training center. Brief general introductory meetings were held with contractor, licensee corporate and licensee site representatives.

c. Plant Segregation and Layup Plans

It will be necessary while the SGRP is ongoing to maintain clear and positive segregation of construction activities associated with the project from affecting the operating Unit 1 and those portions of Unit 2 not involved with the project. Licensee planning to precisely identify the desired boundaries and to develop controls to assure compliance with the boundaries were reviewed. The licensee has detailed some experienced plant personnel to the SGRP primarily to focus on segregation and (as discussed below) return to service. The segregation requirements identified to date appeared logical and consistent. Division of responsibilities has been established,

primary turnover preparation milestones identified, and individual systems reviewed. A preliminary but quite detailed clearance setup and valve position list has been prepared.

During the layup portion of the SGRP outage, some current Technical Specification testing will be impossible or illogical. The licensee intends, however, to maintain many Unit 2 systems under appropriate administrative controls to provide continuing "operability" by performing applicable testing and required maintenance. A listing of proposed Technical Specifications exemptions, to omit impossible or illogical testing, has been prepared and submitted for NRC review and approval.

d. Return to Service Plans

Preliminary Start-up Program development, for the return of Unit 2 to normal service after the SGRP, is underway. Organizational responsibility and milestone assignments have been made. The licensee has committed to complete Start-up Program development, including identification of applicable existing system performance tests, by the end of March, 1988, which is prior to commencement of the SGRP outage. This subject is likely to be addressed in more detail in future licensee/NRC meetings.

e. New Facilities

The inspector toured the newly constructed temporary storage facility which was completed during this inspection period. Tours were also conducted in a new radiation area access control facility and a new security site access control facility. Each of these facilities remained under construction at the conclusion of the inspection. Both will be dedicated solely to SGRP functions through the completion of that project. Details of their potential utilization thereafter have not yet been decided.

11. Information Notices and Generic Letters

The inspector reviewed the NRC communications listed below and verified that: the licensee has received the correspondence; the correspondence was reviewed by appropriate management representatives; a written response was submitted if required; and, plant-specific actions were taken as described in the licensee's response.

a. (Closed) Information Notice (IN) 87-41, "Failures of Certain Brown-Boveri Electric (BBE) Circuit Breakers".

By memorandum dated October 27, 1987, the NRC Region III requested the inspector to review IN 87-41 to determine if the generic implications had been considered and (if necessary) resolved by the licensee. The IN identified two problems:

- i) The "close" latch in the breakers should be modified by addition of a light spring. The licensee's file on IN 87-41 states this item is applicable for breakers at D. C. Cook and springs are being added per design change RFC 12-2739, "Modifications to BBE Circuit Breakers to Prevent Inadvertent Opening". The RFC is complete for Unit 1 and is scheduled for the next refueling outage for Unit 2. The inspector reviewed the RFC file and verified a Brown-Boveri instruction (1B-8307, "Installation of a Close Latch Anti-shock Spring in the Mechanism") was incorporated.
- ii) A breaker failed to close because of insufficient torquing of the charging motor mounting bolts. Maintenance Procedure 12 MHP 5021.082.001, "Maintenance Inspection and Repair of 4 KV Power Circuit Breakers", was revised by Change Sheet 2, dated July 16, 1987, to require specific checks of the closing spring charging motor mounting bolts.

b. (Closed) Generic Letter 81-21, "Natural Circulation Cooldown"

By memorandum dated May 15, 1987 and Temporary Instruction 2515/86, Region III requested that the inspector review the licensee's actions taken to resolve Generic Letter (GL) 81-21. GL 81-21 describes a 1980 natural circulation cooldown event at the St. Lucie Unit 1 power plant which resulted in liquid flashing in the reactor vessel upper head region. The Generic Letter required a response, which was provided on July 2, 1983 (Licensee file number AEP:NRC:044A). The NRC Office of Nuclear Reactor Regulation evaluated the licensee's response and a Westinghouse Owners Group review of natural circulation and issued a site specific Safety Evaluation Report (SER) dated November 17, 1983. The SER discussed different cooldown rates and hold points as they applied to the availability of reactor vessel head forced air cooling. In addition, the SER concluded that implementation of the NRC-approved Westinghouse Owners Group Emergency Response Guidelines, with appropriate plant specific modifications, would be adequate to perform a safe natural circulation cooldown.

The inspector reviewed the emergency procedures listed below and verified that the cooldown limits discussed in the SER are addressed:

- i) 01 OHP 4023 ES-0.2 Natural Circulation Cooldown
- ii) 01 OHP 4023 ES-0.3 Natural Circulation Cooldown
With Steam Voids in the Vessel
(with RVLIS)
- iii) 01 OHP 4023 ES-0.4 Natural Circulation Cooldown
with Steam Voids in the Vessel
(without RVLIS)

The inspector interviewed the November 5, 1987 Unit 1 and Unit 2 day shift operations crew and determined that natural circulation cooldown training had been performed and that crew members were cognizant of the St. Lucie event. In addition, the inspector confirmed that training had been performed by review of natural circulation lesson plans RQ-C-EOP0; RQ-C-EOP2; RQ-R-1231; RQ-R-1289, and, RQ-C-1291.

- c. (Open) Generic Letter 87-06, "Periodic Verification of Leak Tight Integrity of Pressure Isolation Valves"

This Generic Letter, dated March 13, 1987, was one of two identified for inspector followup via memorandum from the Region III Director, Division of Reactor Projects. It identified information to be submitted within 90 days; i.e. by about June 11, 1987. During the current inspection, no record could be found that the requested information had been provided. The licensee is investigating and will develop and provide the requested information as soon as possible. Subsequent to the exit interview, the licensee confirmed that the response was not sent, would be sent by November 11, 1987 and that a Condition Report (internal corrective action document) would be issued.

No violations, deviations, unresolved or open items were identified.

20. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 7.a and 7.d.

21. Management Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) on November 10, 1987 to discuss the scope and findings of the inspection. In addition, the inspector asked those in attendance whether they considered any of the items discussed to contain information exempt from disclosure. No items were identified.

The following items were specifically discussed.

- a. The inspector questioned the review status concerning problems experienced with Unit 2 pressurizer spray valve leakage and indicated it had been unclear a safety evaluation would be performed to justify a plan to apply force to a valve with a jack. The licensee stated his investigation of the matter is continuing, that use of a jack in the circumstances discussed was considered analogous to any other use of a tool but that it was understood (and some review actions were initiated) that a safety evaluation would be required to justify leaving anything foreign in place on or at the valve (Paragraph 3.6).



- b. Some of the observations derived from operating procedures reviews were summarized (Paragraph 3.d)
- c. The inspector indicated close NRC attention is being and will continue to be paid to errors by Instrument and Control personnel (Paragraph 4.b)
- d. The apparent violation of administrative control requirements in the Maintenance area was reviewed (Paragraph 6.h)
- e. Poorly coordinated charging pump testing resulting in inadvertent, rather than intentional, compliance to MODE change requirements, was discussed (Paragraph 7.f).

