

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report Nos: 50-315/97014(DRS); 50-316/97014(DRS)

Licensee: American Electric Power Company

Facility: Donald C. Cook Nuclear Generating Plant

Location: 500 Circle Drive
Buchanan, MI 49107-1395

Dates: August 4-8, 1997

Inspectors: R. Paul, Senior Radiation Specialist
D. Hart, Radiation Specialist

Approved by: Gary L. Shear, Chief, Plant Support Branch 2
Division of Reactor Safety

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EXECUTIVE SUMMARY

D. C. Cook Units 1 and 2
NRC Inspection Report 50-315/97014; 50-316/97014

This inspection included a review of the chemistry program and the Radiological Environmental Monitoring Program (REMP). The following specific observations were made:

Plant Support

- The primary and secondary systems water chemistry was well maintained and monitored. The licensee took appropriate actions to investigate and correct any adverse trends identified (Section R1.1).
- The laboratory and in-line instrument quality control program was well implemented and ensured the accuracy of chemistry instrumentation. Interlaboratory program results were generally good; however, a weakness was identified by the inspectors in that there was no tracking or trending of comparison results to determine overall performance, no documentation of the acceptance criteria used, and no instructions for when to re-analyze samples (Section R1.2).
- The inspectors reviewed the post accident sampling system (PASS) program to ensure operability. In addition, the inspectors reviewed maintenance records and discussed system operability with cognizant chemistry staff. No problems with the PASS were identified (Section R1.3).
- Implementation of the REMP was effective and no discernable impact on the environment from plant operations was identified. Tritium from the absorption pond continued to be tracked with no evidence that tritium had reached drinking water in either St. Joseph or Lake Township (Section R1.4).
- The inspectors observed a chemistry technician (CT) sample primary coolant. The CT demonstrated good contamination control practices as well as good analytical techniques and knowledge of procedure requirements (Section R4.1).
- The inspectors observed training provided to the radiation protection technicians (RPT's) regarding recent industry events. Good interaction between the instructor and the RPT's was observed and questions asked were appropriate (Section R5.1).
- Audits of the chemistry and radiological environmental monitoring programs identified several areas with minor deficiencies. Corrective actions had been implemented for the identified deficiencies (Section R7.1).



Report Details

IV. Plant Support

R1 Radiological Protection & Chemistry (RP & C) Controls

R1.1 Plant Water Chemistry Control

a. Inspection Scope (84750)

The inspectors reviewed the management of primary and secondary water chemistry including the program to mitigate impurities in the systems. The trending and evaluation of chemistry parameters by chemistry supervision was also reviewed.

b. Observations and Findings

The water chemistry program was consistent with the Electric Power Research Institute (EPRI) pressurized water reactor guidelines. A review of selected trend records indicated that plant primary water quality was very good, and no significant problems were observed. Once trends with the chemistry parameters were identified the chemistry department took prompt action to identify and correct the cause. None of the station chemistry department's goals had been exceeded for primary water chemistry for 1997.

The secondary water chemistry had periodically exceeded the station limits for sodium (Na), and condensate oxygen. The increased levels of Na seen on both units were attributed to secondary equipment being placed back into service after maintenance. The chemistry department had tracked these instances and issued a condition report for an adverse trend. Chemistry staff recommended that maintenance evaluate the use of steam cleaned parts prior to installation into the system, evaluate the effectiveness of cleaning after maintenance, flushing of the systems involved, and that chemistry perform sampling prior to placing equipment back into service. Chemistry staff also recommended revision of several operations procedures to include filling and draining systems prior to returning them to service.

The increase in condensate oxygen had exceeded the EPRI action level 1 limits for both units. This increase was attributed to the station performing condenser leak checks and high lake temperatures have also caused the levels to increase on Unit 1. The station plans to put a polymer coating on the condenser tube sheets from the water box up to the tube sheet gasket area during the next Unit 2 outage to help reduce inleakage thus decreasing oxygen concentrations.

Ethanolamine (ETA) is utilized for pH control and to reduce iron transport. Chemistry had noted high "after" cation conductivity values caused by the ETA, and through discussions with other stations chemistry personnel decided to test the viability of shutting off ETA addition after the initial treatment. At operating



temperature, pH and iron transport were being closely monitored to ensure they remained within the appropriate parameters.

NRC Report No. 96004 noted that the reverse osmosis makeup water purification system did not have an output capacity to meet the demands of both units. Since that observation a new permanent system had been installed with two trains, each capable of processing 800 gallons per minute, which is sufficient to meet station needs.

c. Conclusions

The primary and secondary water quality was well maintained and monitored. The chemistry staff took appropriate actions to investigate and correct any adverse trends.

R1.2 Quality Control of Laboratory and In-line Chemistry Instruments

a. Inspection Scope (84750)

The inspectors reviewed the licensee's quality control (QC) program for laboratory and in-line instruments, radiochemistry instrumentation, and the interlaboratory comparison program. The inspectors reviewed the licensee's implementation of procedure 12 THP 6020 ADM.001, "Quality Control," Revision 1, dated June 17, 1996, and the maintenance of instrument control charts and performance of instrument calibrations.

b. Observations and Findings

The inspectors reviewed the labeling and storage of reagents and calibration standards. The inspectors did not identify any chemicals which were improperly labeled or which had been used beyond their expiration date. Laboratory chemicals were appropriately stored (i.e., incompatible chemicals were not stored in common locations).

The inspectors observed that performance tests for the laboratory, radiochemistry, and in-line instruments were accomplished. The laboratory control charts were well maintained and indicated proper instrument response, and statistical distribution of performance test data. The in-line instruments were tested as required with corrective actions taken for instruments not meeting the stated acceptance criteria. The inspectors also reviewed the efficiency determination for different geometries and compared them to the calibration curves for the high purity germanium detectors. The generation of lower limits of detection for the germanium detectors was also reviewed, and no problems were identified.

The inspectors noted that the station participated in the NWT Corporation interlaboratory comparison program and had generally performed well. However, the inspector identified that there was no tracking or trending of the results to determine if any analyte may have been consistently missed, or if any other



problems may exist. Also, the acceptance criteria for the testing was not documented in any station procedure. NWT Corporation identified the acceptance criteria used by the Institute for Nuclear Power Operations (INPO) as the standard they used to determine if a plant was within tolerance or not. When the chemistry department had failed to meet the INPO acceptance criteria the chemistry staff attempted to identify reasons and performed re-analysis using the duplicate samples which had been provided by NWT. These results were reported in the chemistry monthly report; however there was nothing in station procedures to direct personnel to re-analyze or report the results. Although this had been done as a good laboratory practice, the lack of any procedural guidance contributed to the weakness in the interlaboratory program.

c. Conclusions

The laboratory and in-line instrument quality control program was well implemented and ensured the accuracy of chemistry instrumentation. Interlaboratory program results were generally good; however, a weakness was identified by the inspectors in that there was no tracking or trending of results to determine overall performance, no documentation of the acceptance criteria used, and no procedural guidance for re-analyzing a sample.

R1.3 Post Accident Sampling System Maintenance and Surveillance Program

The inspectors reviewed the post accident sampling system (PASS) to ensure operability, reviewed maintenance records, and discussed system operability with cognizant chemistry staff.

The inspectors noted that chemistry personnel had a thorough understanding of the PASS system including the process with which a sample is obtained, system connections, and the maintenance history. The material condition of the PASS stations was good and the licensee was capable of obtaining required samples.

The inspectors noted that the licensee had effectively maintained the material condition of the PASS system to ensure the capability of sampling during accident conditions.

R1.4 Radiological Environmental Monitoring Program

a. Inspection Scope (84750)

The inspectors reviewed the implementation of the Radiological Environmental Monitoring Program (REMP) based on requirements of the licensee's Off-site Dose Calculation Manual (ODCM). The inspectors also observed air and drinking water collection and examined air sampling equipment. The 1995 and 1996 Annual Environmental Operating Reports (AEORs) were reviewed to ensure that the reports were submitted as required and to evaluate the effect of the plant's operations on the environment.



b. Observations and Findings

The REMP data indicated that plant operation had no radiological impact on the environment. In addition, the REMP staff conducted sampling and analyses according to technical specifications and all deviations were appropriately noted. The material condition of the air sampling equipment was very good and was within calibration. All air samplers were operational and sampling activities were performed in accordance with station procedures.

Plant personnel continued to track and trend the movement of groundwater tritium. The tritium in the groundwater at the plant has been periodically reviewed by NRC inspectors. The source of the tritium is from primary to secondary leakage primarily in Unit 1, which flows from the turbine room sump into the absorption pond. Seepage from the pond was evaluated by the licensee in a 1991 Hydrogeologic Evaluation, the results of which determined that natural barriers in the environment would prevent the tritium from reaching a source of drinking water. The groundwater well located adjacent to the absorption pond (w-14) recently showed tritium levels up to 19,000 pCi/l. The plant has a reporting level of 20,000 pCi/l, and plant staff stated that any values in excess of the reporting level would be mentioned in the AEOR. No tritium above background levels had been found in drinking water analyzed for St. Joseph and Lake Township. Unit 1 is scheduled for a steam generator replacement in 2000, which should greatly reduce the primary to secondary leakage, and subsequently the tritium in the absorption pond.

c. Conclusions

Implementation of the REMP was effective and no discernable impact on the environment from plant operations was identified. Tritium from the absorption pond continued to be tracked with no evidence that tritium had reached drinking water in either St. Joseph or Lake Township.

R4 Staff Knowledge and Performance in RP&C

R4.1 Sampling and Analysis of Primary Coolant

The inspectors observed a chemistry technician (CT) sample primary coolant. The technician appropriately contacted the control room prior to obtaining the sample and at the end of sampling. The CT demonstrated good contamination control practices, as well as good analytical techniques and knowledge of procedure requirements. The inspectors noted that during analysis, when the CT could not find a graph that he was directed to go to in the procedure, he stopped and notified management as appropriate. The graph was found, it had not been attached to the current revision; to correct this oversight, chemistry supervision immediately revised the procedure to include the graph.



R5 Staff Training and Qualification in RP&C

R5.1 Industry Events Training for Radiation Protection Personnel

The inspectors attended training provided to the radiation protection technicians (RPT's) regarding recent industry events. Events reviewed included the Calvert Cliffs incident involving a diver in the spent fuel pool and the intake of alpha emitting nuclides by a worker at Haddem Neck. Good interaction between the instructor and the RPT's was observed. The training was performed in a workshop format, groups were formed to evaluate these events, and present their findings to the class.

R7 Quality Assurance in RP&C Activities

R7.1 Chemistry and REMP Audits

The inspectors reviewed the results of a quality assurance audit of chemistry, QA-96-16. Several condition reports were issued as a result of the auditor's findings. The inspectors noted that the audit was comprehensive and that corrective actions and recommendations were being implemented.

The inspectors also reviewed the last two REMP audits, QA-97-18 and QA-96-10. The most recent audit had no findings in the REMP area, however there were several good findings in the previous audit. A discrepancy between the ODCM and a procedure was identified during this audit and a condition report was issued. The procedure was revised to reflect the ODCM requirements.

R8 Miscellaneous RP&C Issues

R8.1 (Closed) Violation No. 50-315/96004-02; 50-316/96004-02: This violation had three examples, the first was a failure to perform monthly grab samples for the PASS comparisons. The chemistry staff was directed to count the samples the same day they were taken in order to address this issue. This was communicated to the staff through department meetings, no recurrence of the previous problems were identified by the inspectors. The second example was a failure to take corrective actions for the comparisons outside of the acceptance criteria. Procedure 12 THP 6020 PAS.016 was revised to include steps directing the worker to re-analyze a PASS sample if outside the acceptance criteria, and if the re-analysis was outside the limits, discussions with PASS supervision were conducted to record deviation in appropriate logbook or database. The lack of procedural adherence concerning the evaluation and documentation of quality control information was the third example and was addressed by revising the stations procedures to clarify steps for identifying, recording, and evaluating biases. The inspectors reviewed the corrective actions and concluded that the actions were appropriate.



V. Management Meetings

X1 Exit Meeting Summary

On August 8, 1997, the inspectors presented the inspection results to licensee management. The licensee acknowledged the findings presented.

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

PARTIAL LIST OF PERSONS CONTACTED

M. Ackerman, Nuclear Licensing
T. Andert, Chemist
R. Claes, Chemist
D. Foster, Health Physicist
R. Gillespe, Acting Plant Manager
M. Snyder, Health Physicist

INSPECTION PROCEDURES USED

IP 83750: Occupational Radiation Exposure
IP 84750: Radioactive Waste Treatment, and Effluent and Environmental Monitoring

LIST OF ITEMS OPENED AND CLOSED

Closed

50-315(316)/96004-02 VIO failure to follow procedures with regard to PASS monthly comparisons, corrective actions for the comparisons, and failure to document and evaluate QC information.

LIST OF ACRONYMS USED

AEOR	Annual Environmental Operating Report
CT	Chemistry Technician
EPRI	Electric Power Research Institute
ETA	Ethanolamine
INPO	Institute for Nuclear Power Research
ODCM	Off-site Dose Calculation Manual
NRC	Nuclear Regulatory Commission
PASS	Post-Accident Sampling System
PDR	Public Document Room
QC	Quality Control
REMP	Radiological Environmental Monitoring Program
RPT	Radiation Protection Technician
VIO	Violation



LIST OF DOCUMENTS REVIEWED

Annual Environmental Operating Report 1996

Annual Environmental Operating Report 1995

12 THP 6020 ADM.001 Rev 1 "Quality Control"

12 THP 6020 ADM.010 Rev 2 "Analytical Results"

12 PMP 6010 OSD.001 Revision (Rev) 11 "Offsite Dose Calculation Manual"

12 THP 6010 RPP.632 Rev 4 "Collection of Environmental Air Samples"

12 THP 6010 RPP.642 Rev 1 "Collection of Drinking Water Samples"

12 THP 6020 CHM.202 Rev 3 "Condensate and Feedwater"

12 THP 6020 PAS.016 Rev 4 "Post Accident Sampling Quality Control"

Performance Assurance Audit QA-97-18 "Radiological Environmental Monitoring Program (REMP) / Offsite Dose Calculation Manual (ODCM) (PMI-6010)"

Performance Assurance Audit QA-96-10 "REMP (PMI-6010)"

Performance Assurance Audit QA-96-16 "Chemical/Radiochemical Control Program (PMI-6020)"

NWT Result Nos. 47, 48, 49, and 50

Condition Report Nos. 96-0838, 97-1644, 97-1796, 97-0063, 97-0256, 97-0654, and 97-0655

Technical Specification Sections 6.8 and 3.4.7

Updated Final Safety Analysis Report Sections 2.7 and 9.6

