

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-341/99012(DRS)

Licensee: Detroit Edison Company (DEC)

Facility: Enrico Fermi, Unit 2

Location: 6400 N. Dixie Hwy.
Newport, MI 48166

Dates: July 12-16, 1999

Inspector: M. Mitchell, Radiation Specialist

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

EXECUTIVE SUMMARY

Enrico Fermi, Unit 2
NRC Inspection Report 50-341/99012(DRS)

This inspection included a review of various aspects of the licensee's chemistry and radiation protection programs, specifically in the following areas:

- The Radiological Environmental Monitoring Program (REMP)
- Plant Water Quality
- The Post Accident Sampling System (PASS)
- Chemistry Quality Control (QC) and Material Condition
- Meteorology Monitoring
- General Radiation Protection (RP) Practices

The following conclusions were reached in these areas:

- Implementation of the REMP was effective and no discernable radiological impact on the environment from plant operations was identified. (Section R1.1)
- Plant water quality and fuel integrity remained excellent. Chemistry staff effectively monitored various chemistry parameters throughout the facility and promptly responded to trending changes. (Section R1.2)
- The RP staff properly implemented radiological controls and assessed radiological conditions within the plant to adequately limit dose to plant personnel. (Section R1.3)
- The PASS was maintained in an operable condition. Recent hardware changes improved system reliability and provided a highly functional system. Qualified staff experienced no difficulty in collecting and analyzing samples. (Section R2.1)
- The in-line instrumentation system was maintained in an operable condition and was used effectively to monitor operational chemistry parameters. (Section R2.2)
- Operability of the meteorological tower instrumentation was effectively maintained and monitored by the staff, and calibrations and surveillances for the meteorological tower were properly performed. (Section R2.3)
- Chemistry personnel were knowledgeable of their various responsibilities, demonstrated good laboratory practice, and displayed ownership of chemistry department activities. The analytical performance of the chemistry technicians was excellent as evidenced by blind QC data for both chemistry and radiochemistry analyses. (Section R4.1)
- Performance in the intercomparison programs for chemistry and radiochemistry was excellent. The instrumentation generally remained within statistical control parameters. Chemistry staff effectively reviewed biases related to instrument constancy and took appropriate action. (Section R7.1)

Report Details

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Implementation of the Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope (84750)

The inspector observed the collection of air and sediment samples in the vicinity of the plant, examined air sampling equipment, and interviewed REMP staff regarding collection, packaging and transportation of samples. The inspector also reviewed the 1998 land use census, the 1998 Annual Radiological Environmental Monitoring Report and several sampling procedures in addition to selected REMP data for 1998.

b. Observations and Findings

The inspector observed a REMP staff member collect air particulate and iodine samples at five air sampling stations located around the plant's controlled area and sediment samples at a lake location within the controlled area. The sampling was conducted according to applicable procedures and the Offsite Dose Calculation Manual (ODCM). In addition, the inspector noted that the environmental sampling stations were adequately maintained and that during the last two years sampling equipment continued to perform at a very high level of availability.

However, the inspector noted that the sediment sampling procedure authorized the use of a shovel for sample collection, a tool that limited retention of surface sediment silts and thus possibly limiting the efficiency of the sampling method. This method had been a long-standing practice of the licensee. The REMP staff agreed to review this methodology for sampling sediments and make any necessary changes to improve surface silt collection efficiency.

The 1998 Annual REMP Report concluded that plant operations had no measurable radiological impact on the surrounding environment. The REMP staff conducted sampling and analysis according to the ODCM methodology and all deviations were appropriately noted in the REMP Report. The inspector reviewed the 1998 land use census and found no changes to the land use or to the closest receptor in location or type. In addition, no changes were made to the ODCM since the last inspection.

c. Conclusions

Implementation of the REMP was effective and no discernable radiological impact on the environment from plant operations was identified.

R1.2 Control of Plant Water Quality

a. Inspection Scope (84750)

The inspector reviewed the reactor coolant and feedwater quality data for January 1998 to the present, interviewed plant personnel regarding the overall water quality, and reviewed the licensee's administrative controls for water quality. Additionally, the inspector reviewed the chemical addition program to the general service water, which was implemented in an effort to control biological contamination, specifically zebra mussels.

b. Observations and Findings

The licensee's administrative controls for plant water chemistry parameters were consistent with the Electric Power Research Institute (EPRI) Action Level guidelines. Plant water quality during power operation was well managed and remained excellent along with fuel integrity. The inspector determined that the chloride, sulfate, and conductivity levels in the reactor water did not exceed the licensee's administrative chemistry limits and were consistent with industry performance. The feedwater iron and copper values were also maintained below the licensee's administrative limits.

Following the October 1998 outage the silicon levels increased slightly and the licensee monitored the condition and changed resin beds to curtail the increases. Additionally, on two occasions in the spring of 1999, the soluble and insoluble iron levels individually increased to nearly 5.0 parts per billion (ppb); however, the weekly integrated averages remained within limits.

Reactor water dissolved oxygen was also maintained well below the plant Action Level 1 value and Technical Specifications limits. The dissolved oxygen levels indicated that the hydrogen water chemistry program continued to function as planned. The licensee established an operating hydrogen injection level based on extensive system testing and plant dose rate studies, and successfully used the hydrogen addition program to maintain very low oxygen levels (i.e. 2 ppb) in the reactor coolant.

The licensee aggressively pursued a program of general service water biological control to limit zebra mussel infiltration. The chemical practices have been effective in eliminating both the developing and adult life cycle stages. However, during the periods of demand for increased service water, the adult mussel remains (shells) resuspended in the cooling water and fouled plant equipment. This problem has resulted in a major service-water-side heat exchanger maintenance commitment by the licensee. To combat this problem and maintain compliance with State chemical effluent restrictions, the licensee made plans to change the biocide program and decided to use a chlorination product much closer to the general service water intake in a manner that would not release the biocide to the surrounding environment. The inspector determined that the current chemical biocide program was implemented effectively and that the new program provided enhanced biological control.

c. Conclusions

Plant water quality and fuel integrity remained excellent, and chemistry staff effectively monitored various chemistry parameters throughout the facility and promptly responded to trending changes in chemistry parameters.

R1.3 Walkdowns Within the Radiologically Controlled Area (RCA)

a. Inspection Scope (83750)

The inspector conducted walkdowns of various areas within the RCA and interviewed Radiation Protection (RP) staff regarding radiological conditions and controls within the plant.

b. Observations and Findings

During the plant walkdowns, the inspector verified the adequacy of radiological postings and the placement of contamination boundaries. The plant was operating at full power and there was little work being done around the plant in or near contaminated areas. The inspector noted that portions of the turbine floor were appropriately posted as a high radiation area due to the hydrogen water chemistry program.

During the walkdowns, the inspector observed good worker awareness of radiological hazards. Workers properly reviewed the radiation work permit (RWP) and survey maps prior to conducting work in radiation areas, and were observed properly wearing dosimetry and using work locations and stay times to reduce dose.

The inspector noted that area survey maps in the reactor building and turbine building were available at entrance areas on each floor, usually near the elevator. Updated survey maps were located at the entry point of the reactor building.

c. Conclusions

The RP staff properly implemented radiological controls and assessed radiological conditions within the plant to adequately limit dose to plant personnel.

R2 Facilities and Equipment in RP&C

R2.1 Post Accident Sampling System (PASS)

a. Inspection Scope (84750)

The inspector reviewed the operation and maintenance of the PASS, interviewed cognizant plant personnel regarding the system, and walked down the PASS panels and sample points.

b. Observations and Findings

The PASS panel and sampling equipment was completely overhauled in March 1999. The system engineer with assistance from the chemistry and maintenance staff identified some deficiencies with "as built" conditions. To address these problems, the licensee dismantled and replaced all the PASS sampling station fittings and verified that all mechanical sampling systems were fully operational. After the alterations were completed, the plant staff verified reactor coolant, coolant gas and reactor building atmosphere collection capability. The chemistry staff then instituted an on-the-job (OJT) training program and proficiency measurement for all the chemistry technicians, which upgraded the training level for the entire staff that could be assigned to conduct the sampling. These improvements also provided confidence within the staff that they could conduct proper sampling at any time using a reliable PASS system. The inspector reviewed the last functional tests of the PASS and noted that the system delivered representative samples of reactor coolant, as evidenced by comparative analysis.

c. Conclusions

The PASS system was maintained in an operable condition. Recent hardware changes improved system reliability and provided a highly functional system. Qualified station staff experienced no difficulty in collecting and analyzing samples.

R2.2 In-Line Plant Water Quality Instrumentation

a. Inspection Scope (84750)

The inspector walked down the chemistry sampling panels with a chemistry technician (CT) on routine rounds. The inspector also observed surveillance activities, interviewed staff, and reviewed functional tests.

b. Observations and Findings

The chemistry sampling panels contained the in-line instrumentation which measured conductivity, pH, and dissolved oxygen, and provided plant staff with current plant operation parameters. No material condition concerns were identified by the inspector with the panels or the in-line instruments. Although one chart recorder (dissolved oxygen) was out of service for repair or replacement, the chemistry staff collected and recorded the information each shift and met the requirements for data collection. Chemistry personnel indicated that this equipment routinely operated with few problems, which was supported by functional tests and surveillance data reviewed by the inspector. In addition, the periodic tests indicated that these instruments remained functional.

c. Conclusions

The in-line instrumentation system was maintained in an operable condition and the licensee experienced no problems collecting data and analyzing samples.

R2.3 Maintenance and Quality Control of Meteorological Monitoring Instrumentation

a. Inspection Scope (84750)

The inspector reviewed the operability of the meteorological instrumentation located at the meteorology tower. Specifically, the inspector reviewed trends of instrument performance, instrument calibration records, and preventive maintenance surveillances; discussed instrument performance with members of the staff; and performed a walk-down of the meteorological tower and related instrumentation.

b. Observations and Findings

The licensee maintained a meteorological tower to provide weather information for the purpose of offsite dose projections and emergency response actions. The meteorological tower consisted of instrumentation to measure the wind speed, wind direction, temperature, dew point, and precipitation. Dual instrumentation was available at each level (10 meters (m) and 60 m) on the tower.

The inspector observed the condition of the meteorological tower and did not identify any material condition issues. Although replacement parts for the electronic and computer equipment were difficult to obtain (as a result of the age of the components), the staff maintained an excellent level of equipment availability. On a monthly basis, a member of the meteorology department performed validation tests to determine the operability of the meteorological instrumentation and generated a summary report. Based on the results of these monthly tests, the availability (i.e., recoverable data hours) for meteorological tower instrumentation (i.e., for wind speed, wind direction, and temperature indication) was generally greater than 95 percent. The inspector noted that in 1997, the tower experienced a lightning strike that disabled the 60 meter instruments. The instrument booms were found welded to the boom holders. The meteorology staff took immediate corrective action and the tower contractor replaced the instruments and repaired the booms.

System engineering representatives indicated that a design modification was in progress to upgrade the housing for the data collection systems and the computer interface for the data recorders and tower instruments. This upgrade was part of the central computer changes for the facility. In addition, the current system was not compatible for the year 2000, but did not require date functions because it worked as a data logger and forwarded the data for a date stamp by the central computer. The system engineering staff anticipated the complete upgrade to be completed in April 2000. The building upgrade was scheduled to start July 19, 1999.

The licensee properly calibrated and tested the meteorological tower instrumentation, as required. At a six-month frequency, the licensee returned the instruments to the manufacturer for calibration. The inspector reviewed selected surveillance data and did not identify any problems.

c. Conclusions

The meteorology staff effectively monitored system operability for the meteorological tower instrumentation. The calibrations and surveillances for the meteorological tower were properly performed, and the licensee properly maintained the monitoring instrumentation.

R4 Staff Knowledge and Performance in RP&C

R4.1 Performance of Chemistry Sample Collection and Analysis

a. Inspection Scope (84750)

The inspector interviewed CTs and observed chemistry sampling and analysis activities. The inspector also interviewed chemistry supervisory staff and reviewed CT proficiency data for laboratory analyses.

b. Observations and Findings

The inspector observed three CTs, on three separate shifts, operating process instrumentation and conducting reactor water sampling and analysis. The inspector observed that plant chemistry samples were collected appropriately. The staff used good technique in collecting the samples which reduced the potential for self and area contamination. The CTs were experienced and knowledgeable regarding proper sample collection, analysis, and general laboratory practices.

The CTs also effectively used the chemistry laboratory database system to log QC and analytical results. The inspector observed that the material condition of the sampling panels was excellent and that CT ownership was evident for the chemistry work.

The CTs conducted the daily QC checks for a variety of analytes on the different laboratory instruments with standards having chemical concentrations which were calibrated. Also, the licensee used "blind" QC daily check standards which were changed regularly. For the past year, trended intracomparison and QC data indicated that the CT's analytical performance was excellent.

c. Conclusions

Chemistry personnel were knowledgeable of their various responsibilities, demonstrated good laboratory practice, and displayed ownership of chemistry department activities. The analytical performance of the CTs was excellent as evidenced by blind QC data for both chemistry and radiochemistry analyses.

R7 Quality Assurance in RP&C Activities

R7.1 Chemistry Laboratory Quality Control (QC)

a. Inspection Scope (84750)

The inspector reviewed QC records and interviewed laboratory staff regarding laboratory QC practices. In addition, the inspector reviewed 1998 and 1999 intercomparison data for chemistry and radiochemistry.

b. Observations and Findings

The inspector observed that the material condition of the laboratory analytical and counting instrumentation was very good. The instrument QC data showed that instrument operability was excellent. During the inspection a technician correctly identified an operability issue with one of the anion analyzers using the daily quality control checks. The instrument was declared out-of-service and another available instrument was QC checked and put into service.

Instrument control charts indicated that the instrumentation generally remained within acceptable parameters. The licensee properly identified biases in the QC charts in accordance with plant procedure. The chemistry staff had not identified the need to take corrective action for instrumentation bias.

The inspector noted that the laboratory performance in the vendor radiochemistry and chemistry intercomparison programs was excellent. There were no expired standards observed during laboratory walkdowns.

c. Conclusions

Performance in the intercomparison programs for chemistry and radiochemistry was excellent. The instrumentation generally remained within statistical control parameters. Chemistry staff effectively reviewed biases related to instrument constancy and took appropriate action.

VI Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management during an exit meeting on July 16, 1999. The licensee did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Craine, Radiation Protection
L. Craine, Radiation Protection
L. Crissman, Radiation Protection
P. Fessler, Operations
R. Gillmore, Radiation Protection
R. Hassler, Meteorology
K. Hlavaty, Operations
T. Holmberg, Training
L. Kantola, Outage Management
E. Kokosky, Radiation Protection
T. Lashley, REMP, Radiation Protection
J. May, Chemistry
G. Mulleavy, Chemistry
B. Nearhoof, Chemistry
J. Pendergast, Licensing Compliance
N. Peterson, Licensing Compliance
J. Plona, Engineering
R. Pospiech, Chemistry
R. Sheehy, Chemistry
R. Smerigan, Radiation Protection
B. Thompson, Meteorology
B. Weber, Radioactive Waste
D. Williams, Radiation Protection
J. Yokem, Chemistry

NRC

S. Campbell, Senior Resident Inspector, Monticello

INSPECTION PROCEDURES USED

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

ITEMS OPENED, CLOSED, AND DISCUSSED

None

LIST OF ACRONYMS USED

CT	Chemistry Technician
DRS	Division of Reactor Safety
DECo	Detroit Edison Company
EPRI	Electric Power Research Institute
IP	Inspection Procedure
ODCM	Offsite Dose Calculation Manual
OJT	On-the-job Training
PASS	Post Accident Sampling System
PDR	Public Document Room
ppb	Parts per Billion
QC	Quality Control
RCA	Radiologically Controlled Area
REMP	Radiological Environmental Monitoring Program
RP	Radiation Protection
RP&C	Radiation Protection and Chemistry
RWP	Radiation Work Permit

PARTIAL LIST OF DOCUMENTS REVIEWED

1998 Annual Radiation Environmental Monitoring Report

System Health Fermi 2, P3400 PASS, Maintenance Rule Summary
CARD 98-11001, "P3400 PASS Get Well Plan Rev 1"

Nuclear Quality Assurance Audit Report 97-0108, "Radiological Effluents and Radioactive Material, Transfer and Disposal, dated February 10-28, 1997

Nuclear Quality Assurance Audit Report 99-0104, "Radiological Effluents and Radioactive Material, Transfer and Disposal", dated February 26, 1999

Plant Maintenance Procedure 45.000.001 (Rev 24), "Climatronics Horizontal Wind Speed Sensor"

Plant Maintenance Procedure 45.000.002 (Rev 25), "Climatronics Wind Direction Sensor"

Plant Maintenance Procedure 45.000.003 (Rev 25), "Climatronics Temperature and Delta Temperature Sensors"

Plant Maintenance Procedure 45.000.006 (Rev 24), "Climatronics Vertical Wind Speed Sensor Model WC-14"

Plant Technical Procedure 62.000.210 (Rev 2), "Aquatic Monitoring Sample Collection**"

Plant Technical Procedure 62.000.210 (Rev 3), "Airborne Particulate and Iodine Sampling Using Model DL-1 Digital Low Volume Air Sampler**"

Plant Technical Procedure 75.000.45 (Rev 12) Operation of Dionex 2020i Ion Chromatograph*

Meteorology Computer Performance Scheduling and Tracking (January 1996 to May 1999)

* Indicates that performance of the procedures was observed by the inspector