

U.S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I

RO Inspection Report No: 50-289/74-34 Docket No: 50-289
Licensee: Metropolitan Edison Company License No: DPR-50
P. O. Box 541 Priority: _____
Reading, Pennsylvania 19603 Category: C
Location: Three Mile Island Nuclear Plant - Unit 2
Middletown, Pennsylvania
Type of Licensee: PWR, 819 MWe (B&W)
Type of Inspection: Special, Unannounced (Environmental Monitoring)
Dates of Inspection: November 20 and 21, 1974
Dates of Previous Inspection: October 24 and 25, 1974
Reporting Inspector: *D. Charles O. Galline* 12-10-74
for R. J. Bores, Radiation Specialist Date
Accompanying Inspectors: None _____ Date

Other Accompanying Personnel: None _____ Date
Reviewed By: *D. Charles O. Galline* 1449 160
for J. F. Stonr, Senior Environmental Specialist 12-10-74
Date

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SUMMARY OF FINDINGS

Enforcement Action (Environmental Monitoring)

1. I-131 activity in milk samples was not, in all instances, determined within the specified time or within the specified sensitivity required by Section 4.4.C of Appendix B, Technical Specifications. (Details, Paragraph 4.b.)
2. Fish impinged on the traveling screens were not weighed in accordance with the requirements specified by Section 4.1.1.A of Appendix B, Technical Specifications. (Details, Paragraph 6)
3. Negative temperature differential between the river water and plant water discharge in excess of 3°F on July 11, 15, 17 and 19, 1974 in violation of Section 2.1a(1) of Appendix B, Technical Specifications. (See Item 1, Unusual Occurrences Section)
4. Excessive free chlorine concentration at the plant river discharge on September 26, 1974 in violation of Section 2.2.1a of Appendix B, Technical Specifications. (See Item 2, Unusual Occurrences Section)
5. pH of Waste Neutralizing Tank discharges were in excess of limits 6.0 to 9.0 on August 31, September 15, 20 and 23, 1974 in violation of Section 2.2.3 of Appendix B, Technical Specifications. (See Item 3, Unusual Occurrences Section)

Licensee Action on Previously Identified Enforcement Action (Environmental Monitoring)

1. The licensee's corrective actions were submitted by letter to the Director, RO:I dated April 11, 1974 in response to violations identified in the RO:I letter dated March 29, 1974 and RO Inspection Report Nos. 50-289/74-07 and 50-320/74-02. The licensee's response was clarified in the telephone conversation on April 16, 1974 and these understandings were verified in the RO:I letter dated April 23, 1974. The licensee's corrective actions relative to Items 2 through 6 of the referenced correspondence were reviewed during this inspection. (Items 1.a and 1.b referenced in the correspondence were closed in previous inspection reports.) These items are closed.

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2. The inspector also reviewed the corrective actions relative to Environmental Incident Nos. 74-1 through 74-7, referenced in the licensee's letter to RO:I dated July 18, 1974. These items are closed.

Design Changes

None

Unusual Occurrences

1. Negative temperature differential between the river water and plant river discharge in excess of 3°F. This occurrence, Environmental Incident No. 74-8, was reported in accordance with the Technical Specifications in the licensee's letter to the Director, RO:I dated July 24, 1974. The circumstances and licensee's corrective actions were reviewed during this inspection and found to be consistent with those described in the licensee's report. This item is considered closed. (Details, Paragraph 8)
2. Excessive free chlorine concentrations at the plant river water discharge. This occurrence was reported as Environmental Incident No. 74-9 in the licensee's letter to the Director, RO:I, dated October 3, 1974. The circumstances and licensee's corrective actions were reviewed during this inspection and found to be consistent with those described in the licensee's report. This item is considered closed. (Details, Paragraph 9)
3. pH of Waste Neutralizing Tank discharges in excess of the limits 6.0 to 9.0. This occurrence was reported as Environmental Incident No. 74-10 in the licensee's letter to the Director, RO:I dated October 4, 1974. The circumstances and licensee's corrective actions were reviewed during this inspection and found to be consistent with those described in the licensee's report. This item is considered closed. (Details, Paragraph 10)
4. Measured air particulate filter activity in excess of four times the control station value. This occurrence was reported as Non-routine 30-Day Environmental Report 74-01 in the licensee's letter to the Director, RO:I, dated October 4, 1974. The circumstances and the licensee's evaluation of the atypical activity level were reviewed during this inspection. This item is considered closed. (Details, Paragraph 4.a)

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Other Significant Findings

A. Current Findings

None

B. Status of Previously Reported Unresolved Items (Environmental Monitoring)

None identified

Management Interview

On November 21, 1974, following the inspection, a meeting was held in the conference room at Three Mile Island Nuclear Power Station. The following individuals were in attendance:

Mr. R. J. Bores, Radiation Specialist, USAEC, RO:I
Mr. J. G. Herbein, Station Superintendent, Met-Ed (TMI)
Mr. J. E. Romanski, Engineer-Nuclear, Met-Ed (TMI)
Mr. J. P. O'Hanlon, Nuclear Engineer, Met-Ed (TMI)
Mr. M. R. Buring, Radiation Safety & Environmental Engineer, Met-Ed (Reading)
Ms. A. D. Taylor, Engineering Assistant, Met-Ed (Reading)

During this meeting and in the subsequent telephone conversation between Mr. Bores and Mr. Herbein on November 25, 1974, the following items were discussed:

A. General

The inspector stated that this was a special environmental inspection aimed at reviewing the previously identified violations and the reported Environmental Incidents since the last environmental inspection. The inspector stated that the licensee's corrective actions as described in letters from Met-Ed to the Director of RO:I, dated April 11, 1974 and July 18, 1974 were verified and these matters are now considered closed.

B. Unusual Occurrences

The inspector stated that the circumstances and the licensee's corrective actions relative to the violations of the Appendix B, Technical Specifications, described as Environmental Incident Nos. 74-8, 74-9 and 74-10 relating to water temperature differential,

free chlorine concentrations and pH of discharges, respectively, were also reviewed. (Details, Paragraphs 8, 9 and 10)

Similarly, the circumstances pertaining to the Non-Routine 30-Day Environmental Report 74-01, relating to the "hot particle" on a particulate filter was reviewed. The inspector stated that he had no further questions in the matter. (Details, Paragraph 4.a)

C. I-131 in Milk

The inspector stated that the Appendix B, Technical Specifications required that milk be analyzed monthly for I 131 and quarterly for Sr-89 and 90 from the cows pastured on the four pastures within a 5-mile radius of the plant with the highest anticipated radioactivity concentrations. The requirement also specifies that the I-131 be analyzed within eight days of sampling and that sensitivity of analysis be such that 0.5 picocuries of I-131/liter of milk at the time of sampling can be detected within an overall error of analyses of $\pm 25\%$. The inspector stated that on several occasions the analyses had not met the above specifications in violation of the requirements. On these occasions the milk was not analyzed within eight days of sampling, the 0.5 picocurie/liter sensitivity was not met, or the overall error of analysis exceeded $\pm 25\%$. The inspector noted that in most instances the requirements had been met. The inspector discussed with the licensee several methods of preventing recurrences of this type. (Details, Paragraph 4.b)

D. Fish Impingement

The inspector stated that Section 4.1.1.A of the Appendix B, Technical Specifications require that fish impinged during the sampling periods be counted, identified, weighted, and examined for condition and reproductive status. The inspector stated the Technical Specifications require individual fish weights be obtained whereas, the total weight of all fish of each species or grouping was obtained in violation of this requirement. (Details, Paragraph 6)

E. Sampling, Analytical Techniques and Quality Control

The inspector discussed a number of items relating to environmental sampling, analytical techniques and quality control, including:

1. The use of HCl in water samples to prevent selective ions from plating out on the container walls.

2. The need for the licensee to be familiar with the analytical procedures, capabilities and limitations of the contractors to assure that representative samples are analyzed and the results are valid.
3. The use of low level radioactive "spiked" samples and split or duplicate samples to evaluate the contractor's performance of radiological analyses of environmental samples.

The licensee stated that these areas would be evaluated and appropriate action would be taken. (Details, Paragraph 5)

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DETAILS

1. Persons Contacted

Mr. J. G. Herbein, Station Superintendent, Met-Ed (TMI)
Mr. J. E. Romanski, Engineer-Nuclear, Met-Ed (TMI)
Mr. J. P. O'Hanlon, Nuclear Engineer, Met-Ed (TMI)
Mr. M. R. Buring, Radiation Safety & Environmental Engineers, Met-Ed
(Reading)
Ms. A. D. Taylor, Engineering Assistant, Met-Ed (Reading)
Mr. K. E. Beale, Radiation Protection Supervisor, Met-Ed (TMI)
Mr. G. Kunder, Engineer-Operations, Met-Ed (TMI)
Mr. J. Hayes, Engineer-Jr., Surveillance, Met-Ed (TMI)
Mr. R. Laughin, Environmental Sample Collector, Radiation Management Corp. (RMC)
Dr. S. Gertz, Porter-Gertz Consultants, Inc.

2. General

This was a special inspection to determine the status of previously identified enforcement items of environmental nature and to review the circumstances and corrective actions concerning Environmental Incident Nos. 74-8, 74-9 and 74-10

The inspection consisted of a selective examination of environmental sampling stations, representative procedures, records and reports, interviews with personnel and observations by the inspector. Specifically included in this inspection were the chemical and thermal discharge monitoring programs, the fish impingement program and the radiological sampling program.

3. Organization and Administration

Several significant changes have been made in the administration of the environmental program since the last inspection of this area (RO Inspection Report 50-289/74-07, 50-320/74-02). All of the radiological sampling is now performed by contractor personnel with the exception of several inplant samples taken by licensee personnel. The bulk of the environmental samples are collected by Mr. Laughin or his designee and sent to Radiation Management Corp. (RMC), Philadelphia, Pa. for radiological analyses. In addition, a number of samples are split and sent to Teledyne Isotopes, Inc., Westwood, N.J., for quality control purposes. Ichthyological Associates, Inc., who perform the aquatic studies for Met-Ed, collects the required fish, aquatic vegetation and sediment samples for radiological analyses.

The licensee stated that the responsibility for overseeing the environmental monitoring program has been shifted to the Radiation Protection and Environmental Engineering Section of Met-Ed at their Reading, Pa. office under the supervision of Mr. T. Jenckes. The sampler maintenance and repair responsibilities are funnelled through the Radiation Protection Supervisor, as does the surveillance requirement to assure that all samples were taken and analyzed as required.

4. Radiological Environmental Monitoring

a. Air Monitoring

The inspector examined several of the air sampling stations and noted that all were functioning properly at the time of inspection. The review of the maintenance and service records indicated few problems until recently when several failed because of broken belts. The licensee stated that routine belt replacement would be added to the periodic maintenance list to prevent future failures. The inspector noted that the particulate filters were subjected to precipitation and were wet on the day of inspection. The licensee stated that the effects of reorienting the filter assembly from its present horizontal position to the vertical and drawing the air upward through the filters, would be evaluated in preventing precipitation from hitting the filter.

The inspector reviewed representative air sampling data and noted that the required analyses were performed. No I-131 activity was seen above the Minimum Detectable Concentrations (MDC), which were typically 0.6 to 1.6×10^{-14} microcuries/ml at the end of the sampling period.

The inspector also reviewed the licensee's analysis of the Non-routine 30-Day Environmental Report 74-01 dated October 4, 1974 and submitted to the Director, RO:I in regard to a reported air particulate gross beta activity 9.6 times that of the control station. Based on the licensee's analysis and that of RMC, including an autoradiograph indicating a single hot-particle was involved, the inspector concurred with the licensee's evaluation that the source of the activity was not related to the TMI Nuclear Station. This item is considered closed.

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b. Milk

Section 4.4.C and Table 3 of Appendix B, Technical Specifications require that milk be sampled monthly (when cows are on pasture) from those cows on the four pastures with the highest anticipated radioiodine concentrations within a five mile radius of the plant. The milk is to be analyzed for I-131 within eight days of sampling and with sufficient sensitivity such that an I-131 concentration of 0.5 picocuries/liter of milk (pCi/l) can be determined at the time of sampling within an overall error of $\pm 25\%$ at the one sigma confidence level.

The review of the licensee's data revealed that the MDC for I-131 in milk ranged to a low of 0.037 pCi/l and in most instances the sensitivity and overall error of analysis were within that specified, i.e., 0.5 pCi/l $\pm 25\%$. However, in several instances, the above requirements were not met in that a) the samples were not analyzed within eight days of sampling, b) the MDC was greater than 0.5 pCi/l, or c) the overall error of analysis was greater than $\pm 25\%$ at or above the 0.5pCi/l level. The inspector stated that in the above instances, the requirements of the Technical Specifications were not met.

The inspector discussed with the licensee several methods of preventing the recurrence of this type of violation, including a resampling program within the same time frame, to obtain additional milk samples for analyses to replace samples presenting analytical difficulties.

c. Other Media

The inspector noted that the thermoluminescent dosimeters (TLD's) now used in the environmental monitoring program were furnished by RMC and were $\text{CaSO}_4:\text{Tm}$. In addition, the licensee was using the Eberline service with LiF TLD's for continuity of that program while evaluating the RMC system. Selective review of the records revealed no atypical data.

Examination of the precipitation collectors showed considerable improvement over those used at the previous inspection. Funnel collectors were used to reduce evaporation so that adequate samples were collected for each analysis.

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The licensee stated that aquatic vegetation was not found in the vicinity of the plant discharge nor downstream of that point. In the past water willow had been sampled as aquatic vegetation, but these samples were no longer taken since water willow is a terrestrial plant that grows along the banks of the river.

The licensee's records indicated that soil had been sampled and analyzed to establish some background data even though soil sampling is not required by the current Technical Specifications. The licensee stated that approximately 16 2-inch x 4-inch core samples were taken at each sampling station in 0-to 2-inch and 2-to 6-inch depths to determine some depth profile of radioisotopic distribution.

Other media sampled and analyzed, as required, included terrestrial (green) vegetation, river water, sediment and fish.

5. Analytical Procedures and Quality Control

The licensee stated that periodic samples were sent to Teledyne Isotopes, Inc., Westwood, N.J. to assure that the analysis performed by the primary contractor are reliable. The review of the records and discussions with the licensee indicated that these samples included: air particulates (collected weekly with a duplicate sampling system at a regular sampling station and analyzed for gross beta activity weekly and quarterly by gamma spectral analysis), air iodine (collected and analyzed one week each quarter), river water, drinking water, rainwater, milk (analyzed for I-131 and Sr-90), and sediment. In addition, the Eberline TLD system was used as a check on the RMC system.

The inspector discussed with the licensee the requirement that each contractor have comparable analytical sensitivities if the results of the analysis are of value to assure quality of the work. In particular, the MDC for I-131 in milk was approximately 5 to 7 pCi/l for the quality control samples, whereas, that of RMC was generally < 0.5 pCi/l, at approximately the same level as found in the milk samples. The inspector discussed the use of "spiked" samples, particularly low-level "spikes", as an alternative method of quality control for these samples. The licensee stated that this would be evaluated and appropriate action would be taken.

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The inspector also discussed several other areas relating to sampling or analytical techniques, including:

- a. The use of HCl with NaHSO_3 in water samples to reduce the tendency of selective ions to plate-out onto the walls of the container prior to analysis of the sample.
- b. The assurance that representative samples of media (especially, soil, sediment and vegetation) are analyzed.
- c. The need to be familiar with techniques and procedures used by the contractors, instrument backgrounds and efficiencies, and capabilities or limitations of the methods of analysis used.

The licensee stated that these items would be evaluated and appropriate action would be taken.

6. Fish Impingement

Paragraph 4.1.1.A of the Appendix B, Technical Specifications requires that fish impinged on the traveling screens be sampled at semi-monthly intervals and analyzed by counting, weighing, determining the reproductive status and condition of the organism, and identifying to the lowest positive taxon. The inspector reviewed representative records of the impingement study performed for the licensee by Ichthyological Associates. The inspector noted that the fish were counted, identified, measured and the reproductive status and condition of the organism were noted. The records indicated that the total weight of the fish of each identified taxon was recorded rather than the individual weight of each fish, as required. The inspector stated that this was a violation of the requirements.

7. Other Studies

The inspector examined the results of the required studies performed to determine number of birds inspected by the natural draft cooling towers and found the requirements of this study were met. The towers appeared to have a very minor influence in causing bird lethality due to impaction.

The inspector also examined the selected results of the heavy metal analyses performed on river water. No atypical results were noted.

8. Thermal Discharges

The inspector reviewed the circumstances surrounding the reported Environmental Incident No. 74-08 relating to the negative temperature

differential between the river water discharge and plant discharge water in excess of 3°F on July 11, 15, 17 and 19, 1974 in violation of Section 2.(a)(1) of Appendix B, Technical Specifications. The licensee's investigation indicated that a failed transducer caused both the control room delta temperature recorder and the alternate delta temperature recorder in the pump house of the mechanical draft cooling tower to be inoperative. As a result the licensee was unaware of the excessive negative delta temperature. The licensee's corrective actions included additional procedures and training so as to obtain the required delta temperatures by alternate means. The inspector examined these procedures and discussed them with the licensee. The corrective actions were found to be consistent with those reported in the Met-Ed letter to the Director, RO:I dated July 24, 1974. The inspector stated that he considered this item closed.

9. Chlorine Releases

The inspector examined the circumstances and the licensee's corrective actions with respect to total chlorine and free chlorine concentrations released to the river in excess of the limits. In particular, he reviewed those concerning the reported Environmental Incident No. 74-09 relating to free chlorine in the river discharge equal to 0.1 ppm on September 26, 1974 in violation of Appendix B, Technical Specifications 2.2.1.a.

The licensee's corrective actions were found to be as stated in his letter to the Director, RO:I dated October 3, 1974. As part of these actions, the chlorine injection rate was reduced and consultants have been contracted to prevent recurrences. The inspector examined the progress reports of one of these consultants, Wapora, Inc. of Washington, D.C. In addition, the manufacturer of the installed amperometric titrator has sent representatives to aid in resolving instrumentation problems. The inspector asked whether the chlorine demand of the intake river water was routinely determined. The licensee stated that this had not been done but that this would be evaluated with the consultants. The inspector stated that the above matter was considered closed.

10. pH of Discharges

The inspector reviewed the circumstances and corrective actions relating to reported Environmental Incident No. 74-10, pH in excess of the limits 6.0 to 9.0 on August 31, September 15, 20 and 23, 1974 in violation of Appendix B, Technical Specifications, Section 2.2.3.

The inspector determined that the corrective actions were consistent with those reported in the Met-Ed letter to the Director, RO:I dated October 4, 1974 and included an updated calibration program for the installed pH instrumentation and a change in procedures such that prior to draining the Waste Neutralizing Tank, a sample must be drawn and analyzed to assure the pH is within the specified limits. The inspector stated that this item was considered closed.

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