

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/86026(DRSS)

Docket No. 50-346

License No. NPF-3

Licensee: Toledo Edison Company
300 Madison Avenue
Toledo, OH 43652

Facility Name: Davis-Besse Nuclear Power Plant, Unit 1

Inspection At: Davis-Besse Site, Oak Harbor, OH

Inspection Conducted: August 25-29, 1986 (Onsite)
September 3 and 4, 1986 (By Telephone)

Inspectors: *M. Schumacher*
M. J. Gestmann

9-26-86
Date

M. Schumacher
A. G. Januska

9-26-86
Date

Approved By: *M. Schumacher*
M. C. Schumacher, Chief
Radiological Effluents and
Chemistry Section

9-26-86
Date

Inspection Summary

Inspection on August 25-29 and September 3 and 4, 1986 (Report No. 50-346/86026(DRSS))

Areas Inspected: Routine, unannounced inspection of: (1) chemistry and radiochemistry, including water chemistry control; quality assurance/quality control of sampling and analysis in the laboratory; observation of technician performance in laboratories, counting room, sampling facilities; and plant systems affecting water quality; (2) training and qualification of chemistry and environmental staff; (3) radiological environmental monitoring, including review of annual and monthly reports and observation of environs stations; (4) licensee internal audits; and (5) activities taken regarding a violation from a previous inspection.

Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

- ¹D. R. Amnerine, Assistant Vice President - Nuclear
- ¹J. Johnson, Operations Engineering Supervisor
- ¹S. Smith, Assistant Plant Manager
- W. T. O'Conner, Acting Plant Manager
- ¹R. W. Bass, Contractor, Basic Energy Technology Associates, Inc. (Beta)
- ^{1,3}J. C. Sturdavant, Licensing Specialist
- ¹J. Scott-Wasilk, Environment and Emergency Preparedness Manager
- ¹L. England, Auditor, Quality Assurance
- ¹R. Scott, Chemistry, Superintendent
- ^{1,2}J. L. Ferguson, Chemistry Specialist
- ¹R. Dielman, Senior Nuclear Technologist, Environmental Monitoring
 - J. Whitney, Assistant Chemistry and Radiation Tester
 - L. Klett, Training Department Instructor
 - D. Hennen, Acting General Foreman
 - D. Jazwiecki, Acting General Foreman
 - R. Finneran, Acting Foreman
 - J. Kalmbach, Acting Foreman

¹Denotes those present at the exit interview on August 29, 1986.

²Present during telephone conversation on September 3, 1986.

³Present during telephone conversation on September 4, 1986.

2. Licensee Action on Previous Inspection Findings

(Closed) Violation (50-346/85024-02): Failure to implement a written procedure in accordance with Technical Specification 6.8.1.A. The inspector examined documentation and implementation of the daily Quality Control (QC) program for radiation detectors. The generation and use of control charts for radiation detectors is addressed in RC 4529.00, "Control Charts for Radiation Detectors," Revision 1, dated January 20, 1986 and tests and audits of tests in CRI-016, "Quality Control," Revision 6, dated August 25, 1986. RC 4529.00 describes the construction of control charts and actions to be taken if a "stop measurement" or " $\pm 3\sigma$ " has been exceeded and CRI-16 describes testing, documenting results on Form ED6719 and auditing of results. Results of daily audits of counting room as well as health physics detector QC tests were examined and found to be complete. Only daily QC tests on the beta counter involved in this violation were examined. Both the test results and control charts were complete and up-to-date.

3. Management Controls and Organization; Training and Qualifications

The inspectors reviewed the licensee's organization and management controls for chemistry/radiochemistry including organizational structure and staffing. The Chemistry and Health Physics (C&HP) General Superintendent reports directly to the Plant Manager. Under him are the Chemistry Superintendent,

Health Physics Superintendent and Assessment Manager. The two General Foremen, Training Foreman (presently vacant), assistant technologist and two chemistry specialists report to the Chemistry Superintendent. Each member of this professional staff has either a bachelor's degree in chemistry or chemical engineering or experience in the Nuclear Navy and meet T/S 6.3.1 and ANSI N18.1-1971 requirements.

Under the General Foremen are four foremen positions which are presently being filled, one Group Leader, two Senior testers, 11 testers and 16 assistant testers. The licensee plans to hire an additional 10 assistant testers so that each shift will be manned by at least a foreman, tester and assistant tester. At present one tester and assistant tester are on back shifts. Staffing appears adequate to perform the necessary chemistry support for the plant.

The testers and assistant testers currently rotate assignments between the Chemistry Group and the Health Physics Group. The licensee is aware of this weakness in which a tester could lose his laboratory proficiency when absent from the laboratory for eight to ten weeks because of this rotation. The licensee plans to split the Chemistry and Health Physics Groups within the next six months and permanently assign the testers to either one of the two Groups. The inspectors confirmed that the current testers meet ANSI N18.1-1971 criteria for technicians.

The inspectors reviewed the training program provided the testers and assistant testers as outlined in Procedure AD 1828.12, "Chemistry and Health Physics Training," Revision 6, dated March 5, 1986 and the qualification manual, and identified no problems. The assistant testers must complete the manual to certify for a tester position. The manual requires signatures of the professional staff or senior testers on practical laboratory factors for completion of qualification cards. Review of selected qualification cards of the senior testers and testers indicated no problems.

The inspectors also found that the Training Department has adequate laboratory facilities for training purposes. The licensee's Training Department is seeking INPO accreditation by the end of 1986.

No violations or deviations were identified.

4. Water Chemistry Control Program

The licensee's water chemistry control program is defined in Plant Procedure PP 1101.04, "Operational Chemical Control Limits," Revision 27, dated February 28, 1986. This procedure includes administrative limits on key chemical parameters for various plant systems and a schedule of required chemical analyses and requirements for reanalysis when initial results are off-normal. The inspectors confirmed that this procedure is being implemented and key parameters are plotted to observe trends. The data indicates that the plant has been successful in operating within the administrative limits and that off-normal levels were recognized and corrected in a timely manner. Technical specification limits for conductivity, chloride, fluoride and pH were apparently never exceeded.

The majority of the administrative limits in PP 1101.04 are consistent with the SGOG guidelines but the licensee plans to revise this procedure to incorporate all the guidelines such as the dissolved oxygen limit of 10 ppb for the condensate polishers outlet and action levels when administrative levels are exceeded. A separate policy statement will also be prepared which will include organizational responsibilities and guidance on monitoring, data management and trending, and training. This revision of PP 1101.04 and preparation of policy statement are expected to be completed by 1987 and will be reviewed during a subsequent inspection (Open Item 50-346/86026-02).

No violations or deviations were identified.

5. Water Sampling and Monitoring

The inspectors reviewed the water treatment, sampling and monitoring programs and inspected related equipment during tours of the plant. The licensee has adequate sampling capability for various plant systems including water coolant and cleanup, primary and borated water storage tanks, condensate storage tank, condensate hotwell, condensate polishers inlet and outlet, steam generator feedwater and other systems. Since the plant has been shut down since June 1985, the licensee placed the secondary side of the plant in wet-layup. Samples were taken from the steam generators on a weekly schedule until chemical conditions stabilized. During this inspection no samples from the secondary side were taken with no flow available due to wet-layup or due to drained components. Samples from the primary side are routinely being taken.

In-line monitoring for conductivity on the secondary side was not operable because of no flow going through the flow-cell during wet-layup. There is no readout of secondary system conductivity in the control room as is typical of other PWRs to monitor for condenser tube leaks. The licensee relies on the in-line monitors at the secondary sample panel which annunciate but do not read out in the control room. The licensee plans to upgrade it's in-line monitoring capability to bring the plant up to the state-of-the-art in this area. This includes adding new monitors, such as the orbisphere for dissolved oxygen to the system. The licensee plans to start making improvements within six months after plant startup scheduled in November 1986. This item will be examined in a subsequent inspection. (Open Item 50-346/86026-03).

No violations or deviations were identified.

6. Chemistry/Radiochemistry Program

The inspectors reviewed the chemistry and radiochemistry program including physical facilities, laboratory operations, chemistry procedures and practices followed in the laboratories and counting room. Laboratory space was tight. Plans are underway to expand the present facilities by converting the laundry facilities to laboratory space within the next six months. Ventilation in the hoods and laboratories is adequate. Housekeeping, particularly in the hoods, needed minor improvement.

Chemical instrumentation is generally of good quality. Instrumentation includes pH and specific ion probes, conductivity meters, colorimeter and spectrophotometers. These instruments were operable, well maintained, and calibrated with current calibration stickers on each instrument. Balances are vendor-calibrated every six months. Reagent bottles were properly labelled, and solution and chemicals were within posted expiration dates. The laboratory has recently obtained a Dionex 2020i ion chromatograph for chloride, fluoride, and other routine analyses. At the present time, a laboratory specialist is working to develop this instrument for routine use and providing training to the testers and assistant testers. The present method the licensee uses for the chloride-the mercuric thiocyanate method-is not very sensitive. Its lower limit of detection (LLD) is 50 ppb (the administrative limit) while the ion chromatograph LLD is 1-2 ppb. The licensee plans to replace this method with the ion chromatograph. The licensee also plans to replace its Perkin-Elmer atomic absorption spectrometer with a new computerized model with a graphite furnace for corrosion metal measurements. The licensee also uses a gas chromatograph for hydrogen and oxygen analyses. All testers and senior testers are trained on each instrument. A log book is maintained on each instrument with information as to status of analysis of standard samples run on each instrument during every analysis performed.

Counting room instruments were generally of high quality. They include two Canberra Series 40 analyzers and associated computer equipment, two Ge(Li) detectors, an NMC gas-flow proportional counter for gross alpha/beta counting, a SAC-4 alpha scintillation counter, and a Packard Tri-Carb Liquid Scintillation counter with an automatic sample changer. All instruments were operable and calibrated. Daily performance checks are made and results plotted on control charts.

The following procedures were reviewed for technical adequacy:

<u>Procedure</u>	<u>Revision</u>	<u>Title</u>
AD 1828.12	6	Chemistry and Health Physics Training
AD 1836.00	2	Hazardous and Non-hazardous Waste and Chemical Management
AD 1842.00	0	Chemistry and Health Physics
AD 1849.01	1	Measuring and Testing Equipment Control Calibration for Chemistry and Health Physics
ST 5043.01	7	Primary and Secondary Radiochemistry
ST 5043.02	8	Primary Chemistry

SP 1104.10	11	Sampling System Nuclear Area
SP 1104.59	4	Sampling System Non-Nuclear Area
CH 4046.00	5	Boron by pH or Phenolphthalein Endpoint
CH 4048.00	2	Calcium Hardness
CH 4051.00	2	Chloride, Mercury Nitrate Method
CH 4060.00	1	Cation Conductivity
CH 4061.00	2	Conductivity
CH 4071.00	2	Iron (Bathophenanthroline Method)
CH 4076.02	2	Nitrite Determination
CH 4079.00	4	Silica
CH 4082.00	3	Water Stability Test
CH 4086.00	3	Total Suspended Solid
CH 4090.00	6	Turbidity Test
CH 4091.00	7	Chloride Ion (Mercury Thiocyanate)
CH 4091.01	3	Determination of Chloride Using Ce-Selective Ion Electrode
CH 4094.00	4	Condenser Leakage Rates from Magnesium by Atomic Absorption
CH 4096.00	10	Fluoride Ion by Select Ion Electrode

All procedures were current, having been reviewed and approved by plant management in 1985 and 1986. No problems were noted.

Review of trend reports for 1985 to date indicated that the licensee has been analyzing for pH, conductivity, chloride, silica, dissolved oxygen, and corrosion metals in reactor coolant, feedwater, demineralized water, and water in condensate storage and other plant systems. No problems were identified.

The inspectors observed testers and assistant testers collect reactor coolant samples and perform various analyses for chloride, fluoride, boron, gross gamma and gross beta activities. The testers generally appeared to be competent and well versed in procedures and laboratory practices. The testers followed appropriate procedures, handled radioactive samples properly and performed the appropriate analysis, and recorded the information in log books.

No violations or deviations were identified.

7. Quality Assurance/Quality Control in the Chemistry/Radiochemistry Laboratory

The licensee has made moderate progress in developing and implementing programs to improve laboratory performance. These efforts and recent licensee management participation in offsite training on laboratory QA/QC indicate an increased appreciation of the importance of QA/QC programs in achieving valid analytical results.

A weakness, however, was identified in that the licensee does not have a formalized plant procedure that describes the QA/QC program being performed in the laboratory. The licensee has an informal instruction, CRI-016, "Quality Control," Revision 6, approved by the C&HP General Superintendent on August 25, 1986, which contains the major elements of the QC program being implemented in the laboratory. However, no mention is made in CRI-016 or any procedures, of the licensee's proficiency tests being performed through an interlaboratory cross check program involving analysis of blind samples by the testers for the past two years. Three sets of blind samples are sent quarterly from Analytics, Inc. for the testers to analyze. Results are discussed below. The lack of a formalized plant procedure for QC practices was discussed at the exit interview. The licensee agreed that such a procedure will be prepared within the two months after plant startup. This item will be examined in a future inspection (Open Item 50-346/86026-04).

As described in CRI-016, the licensee analyzes several standard samples whose concentrations bracket the concentration of the plant sample being analyzed at the time of analysis to verify that the analytical procedure and the instruments are working properly. Daily checks on each laboratory instrument are made for proper operation. Results are logged in a log book. However, no control charts of the results are maintained. This item was discussed with licensee representatives who agreed to prepare such control charts within the next six months to observe trends of instrument performance over a period of time (Open Item 50-346/86026-05).

The licensee's instructions in CRI-016 call for repetition of the analysis of the standards if the initial results do not fall within the acceptance criteria established for each instrument. Daily audits by senior testers are performed to verify the required standardization and verification tests of instrumental performance have been made. The inspector reviewed such records and found the results to be acceptable.

The inspector also reviewed the 1986 results of analysis of the Analytics blind samples performed by each tester assigned to the laboratory (discussed above) and on the whole they were acceptable (within $\pm 15\%$ of the known value). However, as the concentration of the various nonradiological chemical parameters becomes very diluted, such as in the ppb range for chloride, the testers had difficulty in obtaining results within the $\pm 15\%$ acceptance criteria because of the limitations of the analytical method being used. Once the ion chromatograph is used routinely, the sensitivity of analysis should improve and better results should be obtained. Different types of samples are received each month with all types being included during the calendar quarter. Parameters being analyzed include boron, chloride, silica, iron, copper, nickel, chromium, sodium, ammonium, and nitrate. The licensee has most of the testers analyze these samples and selects those results from one of the more experienced testers for the actual comparison with the Analytic results.

No violations or deviations were identified.

8. Laboratory Safety Practices

The inspectors reviewed laboratory safety practices and facilities during a tour of the laboratories and plant and observed that emergency showers, eye washers, fire extinguishers, and first-aid kits were appropriately placed in the laboratories. Properly labeled hazardous materials were stored in metal storage containers. The inspectors also observed that Procedure No. AD 1836.00 "Hazardous and Non-Hazardous Waste and Chemical Management," Revision 2, dated December 16, 1985 was appropriately being implemented. The inspectors noted that prudent safe practices were used by the testers during their different chemical operations.

No violations or deviations were identified.

9. Plant Systems Affecting Plant Water Chemistry

The inspectors reviewed the status of plant systems affecting water chemistry. During a tour of the plant, the inspectors observed the various components of the makeup water treatment system, including clarifiers, anthracite filters, activated carbon filters, water treatment chlorination and feed pumps, chlorine detention tanks, the clearwell and primary anion and cation exchangers. The system was operable. The licensee has been able to maintain high quality make-up water for plant use within administrative limits of PP 1101.04 discussed in Section 4.

The inspectors also observed that the four condensate polisher demineralizers were not operable as the secondary side of the plant was in wet-layup with the plant shutdown.

The licensee reported that they analyze for magnesium by atomic absorption to monitor condenser leakage (Procedure No. CH 4094.00) in the condenser hotwell. At the present time all leaking tubes have been plugged. The licensee also performs analysis for pH, cation conductivity, silica, and dissolved oxygen in the deaerator storage tank and pH, cation conductivity, and conductivity in the condensate storage tank to assure the water in these tanks are within administrative limits.

A licensee representative stated that extensive effort was being expended to maintain high quality water in various systems and tanks through maximizing the use of demineralizers and cleanup systems. Inspector's review of trend plots of key chemical parameters for 1985 to date show the licensee has experienced improvement in maintaining water quality in different plant systems. The licensee has never exceeded any T/S limits and has been able to keep within their administrative limits in PP 1101.04. Once the plant becomes operational again, the licensee will be able to demonstrate how well high purity water quality can be maintained over time.

No violations or deviations were identified.

10. Licensee Internal Audits and Surveillances

The inspector reviewed a chemistry audit (TED QA Audit 1442) performed on September 3-10, 1985 by onsite personnel in the licensee's QA Department. Responses to the three findings in chemistry from this audit were closed out January 29, 1986. The audit dealt primarily with administrative matters concerning classification of chemical materials but also included review and implementation of several chemistry surveillance procedures. The inspectors also determined that the auditors had previous technical training to qualify for the auditor position.

No violations or deviations were identified.

11. Radiological Environmental Monitoring Program (REMP)

a. Administration

The Radiological Environmental Monitoring Program (REMP) has recently been consolidated and is now under the direction of the Environmental and Emergency Preparedness Manager. Program administrative controls are defined in AD 1843, "Radiological Environmental Monitoring" and program implementation in ST 5099.03, "Environmental Radiological Monitoring Program." AD 1843 has been revised to reflect the change in administration and responsibilities of the program and is under review. ST 5099.03, Revision 13 now under review, does not reflect the current assignment of responsibilities. It will be revised to address these changes, along with proposed changes in sample parameters corresponding to an environmental contract renewal January 1, 1987 with Teledyne Isotopes Midwest Laboratory (TIML), and expanded to include additional sections for tasks being performed under this program but not proceduralized. These changes will be reviewed in a future inspection. (Open Item 346/86026-06).

b. Program Implementation

The inspectors reviewed the new REMP described in T/S 3/4/12 and T/S 6.9.1.7 implemented on October 30, 1985, the licensee's Environmental Contractor's tabulated data for 1985 and January through June 1986, and the 1985 Annual Environmental Operating Report to assure compliance with the technical specifications. All samples were accounted for and no anomolous results except for the Chernobyl

Accident were identified. No station effect on the environment was reported in any of the sampling media collected and analyzed when concentrations measured at indicator locations were compared with levels measured at control locations.

The inspectors examined five environmental air sampling stations. Three stations were not operating at the time because of a power interruption onsite. Sample pumps in two of these stations did not have calibration stickers; however, a licensee representative stated that they had been calibrated according to the prescribed frequency. The inspectors reviewed the pump schedule and confirmed the air samplers had been calibrated. The inspectors noted that the licensee's quarterly and monthly thermoluminescent dosimeters (TLDs) are kept in closed plastic bottles within the environmental station housing. The inspectors expressed concern over whether the glass encapsulation of the TLD plus the attenuation produced by the closed plastic bottles and the housing material would nonconservatively bias the response to environmental radiation or station produced radiation in a plume. The licensee agreed to evaluate the response of the TLDs to the 81 keV energy line of Xe-133 and the attenuation effects of the bottle and housing materials (Open Item 346/86026-07).

In order to improve the program the licensee stated that air sampling station housings which have deteriorated will be replaced; a number of new air sampling pumps have been purchased for replacement use during routine calibrations; and new air particulate and charcoal sample heads are to be purchased.

Overall, the licensee has satisfactorily maintained the REMP.

c. Audits

The inspector examined TED QA Audit Reports 1543 and 1547. Audit 1543 conducted April 21 - May 2, 1986 examined, in part, the REMP as required by T/S 3.12.1 and audit 1547 conducted March 31 - April 1, 1986 examined TIML meeting the guidance in NRC Regulatory Guide 4.15, the Toledo Edison approved Quality Assurance program, and the applicable criteria of 10 CFR 50 Appendix B. No findings were identified in the audits.

No violations or deviations were identified.

12. Open Items

Open Items are matters which have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some actions on the part of the NRC or licensee or both. Open Items disclosed during the inspection are discussed in Sections 2, 4, 5, 7 and 11.

13. Exit Interview

The inspectors met with licensee representatives denoted in Section 1 at the conclusion of the inspection on August 29, 1986. The scope and findings were discussed. The licensee acknowledged the need to:

- Revise PP 1101.04 to be fully consistent with the SGOG guidelines including action levels of plant operation and adopt a plant policy statement regarding water chemistry control including organizational responsibilities.
- Upgrade the in-line monitors for chemical measurements
- Formalize a procedure governing laboratory QA/QC practices in chemistry.
- Prepare control charts for QC program in chemistry
- Improve the air sampling houses, evaluate the response of TLDs to low energy gamma radiation and place calibration stickers on all air samplers for the REMP.

Additional telephone discussions concerning the QA/QC program were held with licensee representatives on September 3 and 4, 1986.

During the inspection, the inspectors discussed the likely informational content of the inspection report with regard to documents or procedures reviewed by the inspectors during the inspection. Licensee representatives did not identify any such documents or procedures as proprietary.