U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/90004(DRSS)

Docket No. 50-346 License No. NPF-3

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

Facility Name: Davis-Besse Nuclear Power Station

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

Inspection Conducted: February 20-23, 1990

Inspectors: D. E. Miller — Date: 3/19/90

R. A. Paul — Date: 3/17/90

Approved By: M. C. Schumacher, Chief
Radiological Controls and
Chemistry Section — Date: 3/15/90

Inspection Summary

Inspection on February 20-23, 1990 (Report No. 50-346/90004(DRSS))
Areas Inspected: Routine, unannounced inspection of the licensee's radiation protection program during an extended outage, including organization and management controls, contract technician qualifications and training, external and internal exposure controls, outage radiological controls, and contamination controls and ALARA (IP 83750; 83729). Also reviewed was allegations (IP 99024) and actions taken in response to previous inspection findings (IP 92701; 92702).
Results: The licensee's radiation protection program during outage conditions appears to function well. One violation for failure to follow technical specification requirements for a high radiation entry, and one for failure to follow a radiological posting procedure, satisfied the criteria listed in 10 CFR Part 2, Appendix C, Section V.4; therefore, Notices of Violation are not being issued.

## DETAILS

1. Persons Contacted

T. Anderson, Manager, Maintenance Planning
R. Brandt, Manager, Plant Operations, Sentco
R. Coad, Supervisor, Radiological Protection
J. Doiron, Radiological Assessor
R. Gaston, Licensing Technologist
B. Geddes, Supervisor, Radiological Environmental
C. Hawley, Manager, Facility Modifications
G. Honma, Compliance Supervisor, Nuclear Licensing
W. Johnson, Manager, Plant Maintenance
J. Lash, Manager, ISE
D. Lightfoot Manager, Integrated Planning
J. Polyak, Manager, Radiological Control
A. Reynolds, Site Manager, EWNS
R. Risner, Supervisor, Quality Verification
E. Salowitz, Director, Planning and Support
R. Schrauder, Manager, Nuclear Licensing
J. Scott, Associate Health Physicist
M. Stewart, Manager, Nuclear Training
P. Strahm, Supervisor, Radiological Operations

P. Byron, NRC Senior Resident Inspector
D. Kosloff, NRC Resident Inspector

The above individuals attended the exit meeting on February 23, 1990.

The inspectors also contacted other licensee and contractor personnel.

2. General

This inspection was conducted to review the licensee's radiation protection program during a major refueling and maintenance outage. Also reviewed were licensee corrective measures for previously identified violations, and validity and consequences of allegations about implementation of the licensee's radiation protection program. The inspectors conducted independent radiation and contamination surveys during the inspection; one problem concerning an unposted contaminated valve was identified. Posting, labeling, and access and contamination controls appear generally adequate.

3. Licensee Action on Previous Inspection Findings (IP 92701; 92702)

(Closed) Open Item (346/89023-01): Use of N/A in semiannual reports. The licensee now presents lower limit of detection information for isotopes not seen but which have a high probability of being present, instead of listing them as N/A.

(Closed) Violation (346/89023-02): Failure to sample and analyze a liquid effluent before its release. The inspectors reviewed the licensee's response dated December 14, 1989. The corrective actions appear adequate and appropriate.

(Closed) Violation (346/89023-03): Failure to write an LER for a technical specification violation. The inspectors reviewed the licensee's response dated December 14, 1989. The corrective actions appear adequate and appropriate.

4. Radiation Protection, Organization, and Management Controls (IP 83750; 83729)

The licensee's Radiological Control organization (HP and Radwaste Groups) include: the Radiation Control Manager (RPM), four General Supervisors responsible for Radiological Controls and Radwaste, Radiation Protection, Environmental Compliance, and Radiological Health. The RPM reports directly to the Plant Manager. Currently the licensee's permanent onsite radiological staff comprises 6 HP supervisors, a training coordinator, two master rad control testers, 6 senior testers, 9 testers, and 6 assistant testers. Recently, HP technician staff turnover has been low; average plant experience is about 3 years. About 50 HP contract technicians were hired to support HP activities for the current outage. The licensee is considering hiring about 16 more technicians to support radiological controls for turbine building work. Both house and contract technicians are performing job coverage and oversight for outage activities. Adequate technician coverage was observed by the inspectors during several tours of the containment and auxiliary buildings.

No violations or deviations were identified.

5. Contract Radiological Control (RC) Technician Qualifications and Training (IP 83729; 83750)

Prior to being selected to work at the station, the resumes of available contract RC technicians are reviewed to determine if they meet experience qualifications. The licensee performs past experience verifications for randomly selected incoming contract RC technicians.

Prior to providing site specific training to the incoming technicians, the technicians must pass a theory test with an 80 percent passing grade; some who fail are permitted self-study and retest. Those who pass the theory test are tested in their competency in the tasks they will be assigned at the station. Conduct of the testing, site specific training, and normal NGET training normally is completed in two weeks. No problems were noted.

No violations or deviations were identified.

6. External Exposure Control (IP 83750; 83729)

The inspectors reviewed the licensee's external exposure control and personal dosimetry programs, including: changes in program to meet

outage needs; use of dosimetry to determine whether requirements are met; and required records, reports, and notifications.

The licensee's external exposure controls program is described in Inspection Report No. 346/88008(DRSS). No significant programmatic changes have since been made. Personnel whole body dose for 1989 was about 37 person-rem.

The inspectors observed and discussed with licensee representatives radiological controls and access to radiation and high radiation areas. The inspectors also reviewed selected RWPs and associated radiation surveys and observed the instructions given by health physics personnel to workers entering into and working in controlled areas. Overall, the licensee's practices appeared to provide adequate radiological controls over outage activities including controls for entry into the reactor containment after shutdown and on entry to the reactor cavity and steam generator manways.

The inspectors reviewed a February 13, 1990 event where a contractor employee entered a high radiation area (HRA) in a mechanical penetration room without meeting the requirements for HRA entry listed in Technical Specification 6.1.2; these requirements are either specified radiation monitoring devices or positive controls over activities by an individual qualified in radiation protection procedures. A licensee radiological control supervisor saw the individual within the HRA, advised him to leave the HRA, and then questioned him about why he was in the HRA. The individual stated that he knowingly abrogated the required controls (rather than take time to follow the procedure) to "get the job done." The individual was immediately denied further access to the RCA, and was terminated from employment soon thereafter. This matter satisfies the five criteria in 10 CFR Part 2, Appendix C, and therefore no Notice of Violation issued.

No violations or deviations were identified.

7. Internal Exposure Control (IP 83750; 83729)

The inspectors reviewed the licensee's internal exposure control and assessment programs, including: changes to procedures affecting internal exposure control and personal assessment; determination whether engineering controls, respiratory equipment, and assessment of individual intakes meet regulatory requirements; and required records, reports, and notifications.

The program to control internal exposures includes engineering controls, airborne sampling and contamination surveillance, and use of approved respiratory devices and protective clothing. Whole body counting is used to supplement the monitoring program to ensure its effectiveness. The engineering controls include use of portable ventilation units in selected areas. No problems were noted.

Air sample data were selectively reviewed. Air samples appear to be taken, counted, and evaluated in accordance with procedural requirements. The procedures appear adequate for use in determining air sample results, placement, and type. Special air samples are collected to establish RWP requirements and job conditions, and it appears the licensee adequately uses air sample results to establish requirements for use of respirators and protective clothing.

The licensee uses a commercial standup (Canberra) whole body counter as the primary instrument to measure radioactive intakes, and two chair type counters (Canberra) for backup. The inspectors selectively reviewed relevant whole body count (WBC) procedures, the WBC facility and equipment, and discussed the WBC program with the health physicist responsible for the program and technicians performing the counts. The inspector also reviewed the results of calibrations recently performed on the standup counter. No problems were noted with these aspects of the WBC program reviewed by the inspectors.

The inspectors also reviewed WBC Procedure DB-HP-01340 "Internal Dose Assessment" and its method of relating whole body counting data to regulatory limits (MPC-hours). Use of the procedure was discussed with members of the HP staff. The inspectors requested the staff to use the procedure to convert WBC data to MPC-hours from an example given by the inspectors; the results of the staff's conversion were correct.

Selected aspects of the licensee's respiratory program were reviewed. Workers' authorization information included respirator qualifications, proof of required training, and expiration date. Provisions are made during the issuance and return cycle for MPC-hours accountability. No unreturned respirators were observed in the plant during inspector tours, although there is no specific mechanism which ensures workers return respirators before reissuance of a respirator the following shift/day. Observation of the licensee's processing facility, and respirators ready for issuance, indicated sufficient attention is given to respirator inspection, storage, and maintenance. The general scope of the respiratory protection program was discussed with the cognizant health physics supervisor. The licensee appears to have a satisfactory program.

No violations or deviations were identified.

8. Outage Radiological Controls (IP 83729)

During this outage auxiliary and containment building access and exit control points were well maintained by RPTs. The flow of persons, materials, and equipment in and out of these control points is monitored by the RPTs, as is personal frisking performed using portable friskers or a whole body frisker. Sufficient radiation protection coverage was provided and it appeared outage activities were accomplished in accordance with special instructions and requirements. The supply of portable survey instruments, portable ventilation equipment, protective clothing and respiratory equipment for this outage appeared adequate.

No violations or deviations were identified.

9. Contamination Controls (IP 83750; 93729)

Although it is the licensee's practice not to release any material to an unrestricted area with measured levels of contamination above background, their procedure specifies a numerical release limit (100 cpm/100cm$^2$ above background), thereby implying permission to release measured levels of radioactive contamination to an unrestricted area. The licensee was informed that NRC regulations do not permit disposal of licensed material except as specified in 10 CFR 20.301. The inspectors also referred to Information Notice No. 85-12 which provides guidance in this matter. The licensee stated the procedures will be revised to indicate their current practice. (Open Item 346/90004-01)

Over several days, the inspectors noted there was an inordinately high number of false positive PCM-1B alarms during worker exit at the auxiliary building control point. This matter was brought to the licensee's attention who found that the problem was caused by inadequate cleaning of the foot pad. The pad was cleaned and the number of false positive alarms decreased; the licensee intends to clean the pad more frequently.

As discussed in Section 11, associated with expressed concerns about radiological contamination controls in the turbine building, the inspector found a valve on an auxiliary steam pipe to have loose surface contamination of greater than 1,000 dpm/100cm$^2$ without being posted and controlled as a contamination area as required by licensee procedure HP 1601.04.14 "Radiation, Contamination, and Airborne Radiation Areas." Using the discretionary enforcement policy authorized by Section V. G. of 10 CFR Part 2, no violation is being issued for failure to follow the radiological procedure because: the valve was immediately properly posted by the licensee when informed; prior to the end of the inspection a licensee manager discussed this event, and the need to assure procedural compliance, with all station RC supervisors and station and contract RC technicians; and a followup memorandum reinforcing the oral discussion was given to all supervisor and technicians. The radiological hazards surrounding this event, which appears to be an isolated event was minor.

Fifty-two personal contamination events (PCEs) occurred at the station during 1989; about 80 percent of which were personal clothing. There was no refueling and maintenance outage during 1989. The licensee has experienced 43 PCEs during 1990 as of February 16; the increase, according to licensee representatives, is associated with increased activity in the primary coolant; increased coolant activity is discussed further in Section 10. The licensee's review and followup of individual PCEs appears good. Enhanced scrutiny appears needed to identify and correct radiological situations that result in PCEs; this matter was discussed with licensee representatives during the inspection.

No violations or deviations were identified.

10. ALARA and Outage Planning

The licensee does not have a "formal" ALARA group. The ALARA program is coordinated by the Supervisor-Radiological Protection and his staff. For this outage, additional contract ALARA personnel were hired to provide assistance to this staff. The staff reviews exposure trends, radiation reduction practices requiring reviews that involve almost all dose producing jobs, and is involved in conceptual design change and modifications and major work early in the planning stages. Information gained from coverage of work performed during previous refueling outages was used to aid in the planning and preparation of similar jobs during this outage. Development and implementation of engineering controls was the responsibility of the Radiological Protection Staff.

The licensee's annual doses have been low since the plant has been in operation. One of the primary reasons has been reasonably low radiation fields during outage conditions. For 1990, the station set the annual goal at 180 person-rem based on historical data and projected work/outage activities for the year. The goal now appears unattainable because plant radiation levels during this outage are higher than had been anticipated, and the scope of the work is greater than originally anticipated.

Licensee representatives speculate the primary reasons for the elevated plant dose rates were the plant's longest run without a reactor trip (270 days), a reactor trip at the end of the run which caused a crud burst and fission product spiking, and the unavailability of a demineralizer on the letdown for clean up during post-trip and the entire cool down period due to the failure of valve MU 2B. In addition to the elevated dose rates, there are many one-time jobs which are projected to total about 300 person-rem. These include core barrel bolt replacement, ten year reactor vessel and RCS component ISI, S/G nozzle dam installation, reactor head vent line modification/repair, pressurizer heater bundle replacement, and feed and bleed modifications. Other major dose producing jobs include S/G tube plugging, CRDM repair, nozzle and RCP motor/bearing inspection.

ALARA initiatives for the outage include: use of additional shielding for jobs involving CRDM and core bolt work, increase personnel awareness to increased radiation fields, reduced early pulling of the incore detectors to reduce exposures for canal work, and hiring additional ALARA specialists. In addition, the licensee is gathering detailed baseline survey data to use to evaluate the effect of programs in use or being considered for personnel exposures. These programs include increasing lithium concentrates in the reactor coolant system, adding hydrogen peroxide at shutdown, and reduction of cobalt based alloys for hard-faced surfaces.

Outage dose was also discussed with the plant manager by telephone on March 12 and again in a licensee requested management meeting held in Region III on March 15, 1990. The plant manager indicated that the 180 man-rem projection made in November 1989 was based on unrealistically low shutdown radiation assumptions. In addition, it did not reflect the full scope of the outage as it evolved in planning or the emergent work that developed during the outage itself. The plant manager indicated that a more realistic prediction would be in the 500 to 600 person-rem range. He also stated that while an early estimate of 700+ person-rem was made by some of his staff, that number was never an official estimate, and that a new 1990 projected dose would be forthcoming near the end of March. He indicated that at present, exposure was tracking well below the 700 person-rem line, which he believed reflected the additional attention being given to ALARA. He stated that consideration was given to repairing the broken letdown valve and then performing normal system cleanup before final shutdown for the outage, but this was not done because such action would have extended the outage by a week or more.

He also stated that neither area radiation process monitors nor reactor coolant samples gave forewarning of the higher than normal radiation levels seen after shutdown.

Because of the unexpected elevated dose rates during this outage and a staff which is unaccustomed to such rates, additional efforts to limit exposures were instituted by the licensee. The inspectors found that while the HP staff was vigorous in its attempt to control worker entry and work activities, better efforts to achieve ALARA were desirable by other groups, particularly in planning, scheduling, and communicating by first line supervisors and containment coordinators. This matter was discussed at the exit meeting.

No violations or deviations were identified.

11. Allegation Followup (IP 99024) (AMS No. RIII-90-A-0019)

On February 16, 1990, an individual contacted the NRC Resident Inspector at Davis-Besse Station and expressed concerns about the radiation protection program at Davis-Besse Station.

During this inspection, the inspector contacted the individual by telephone and discussed the allegations further to obtain more specific information.

The inspector performed surveys, reviewed licensee procedures and standards, interviewed licensee and contractor personnel, and reviewed selected records to determine the validity and consequences of the concerns expressed by the alleger. The allegations are presented and discussed below.

Allegation: I surveyed an auxiliary steam valve that had vented and contaminated the nearby area. I swiped the area and found contamination but was told not to post the area.

- Discussion: When asked by the inspector for more specific information concerning the allegation, the alleger described the location of the valve and named the individual who allegedly said not to post (tags and barricades) the area. The alleger stated that he believed that a survey sheet had been generated recording the survey results.

  The inspector went to the location described. The valve was a sample tap external to a nominal 18-inch auxiliary steam line located about ten feet above the floor on the 603' level of the turbine building. Temporary scaffolding was erected under the steam line (apparently to reach the valve) and the valve was tagged with a maintenance information tag indicating that the valve was leaking and needed repair. There was no indication that repair work had begun.

  The inspector swiped the valve, insulation on the steam line near the valve, and portions of surrounding equipment and scaffolding. Minor transferable contamination was found on several swipes; one swipe, on the valve itself, indicated Beta-Gamma activity of 1430 dpm/100cm$^2$ which was greater than the licensee's procedural designation for a contaminated area of 1000 dmp/100cm$^2$ or greater. The valve was not posted as being contaminated. When informed of the contamination on the valve, the licensee immediately posted the area as a contaminated area.

  The inspector reviewed records of contamination surveys performed in the 603' level of the turbine building during the time period indicated by the alleger; no survey sheet containing swipe results on the valve/valve area was found.

  The inspector discussed this matter with the individual who had allegedly told the alleger not to post the valve/valve area. The individual stated that he had no recollection of any discussion concerning this valve.

  Methods of control of contamination and monitoring for contamination in the turbine building is discussed in follow paragraphs of this section.

- Finding: The inspector was unable to confirm that the named individual had instructed the alleger not to post the auxiliary steam valve, and was unable to locate any record of survey of the valve by the alleger or anyone else during the specified time period. Although the specific allegation could not be substantiated, the inspector's smear survey of the valve did find low level contamination nominally above the licensee's conservative level for a contaminated area, so the alleger's statement was plausible. The radiological hazard surrounding this event, which appears to be an isolated occurrence, was minor and the licensee took appropriate corrective actions when it was brought to their attention.

Allegation: A potentially contaminated system had tubing that drained to an uncontrolled floor drain. I found no contamination at the location but felt uneasy about the situation.

- Discussion: During a telecon, the alleger provided information concerning the location of system, tubing, and drain. The inspector located the area in question and determined that two valves in a secondary coolant line were leaking into temporary catch containments which drained through tubing to a floor drain; the floor drain lead to a turbine building sump. The inspector learned that when identifiable primary to secondary leakage began during late 1989 (less than 0.1 gpm), the licensee realigned the sump discharge to the north settling basin within the licensee's controlled area. The north settling basin overflows to the south settling basin which overflows to a collection box and then to the lake; releases via this pathway are quantified by analysis of samples collected at the collection box. The quantity of radioisotope releases via this pathway is small.

- Finding: The allegation that the tubing drained to an uncontrolled floor drain was not substantiated. The floor drain is controlled in that radioactive releases via this pathway are known and monitored.

Allegation: Parts of the turbine building (TB) were contaminated but were not being surveyed; this was in violation of the licensee's procedures.

- Discussion: According to the licensee and licensee records, after primary to secondary leakage began in late 1989, the licensee routinely performed extensive radiation and contamination surveys in the TB. Valves, equipment, and surfaces found contaminated, because of leaks, were posted and controlled as Radiologically Controlled Areas (RCAs). After shutdown, the licensee performed further surveys to identify contaminated equipment/areas. Recognizing that some contaminated components could have been missed during the survey program, and much work was planned, the licensee posted all entrances to the TB with signs stating "Notify Rad Con Prior to Work in Any RCA or Breaking Any System Boundary in the Turbine Building."

  During a telecon, the alleger stated that he believed that the entire TB should have been controlled as an RCA instead of controlling individually identified contaminated equipment or areas as RCAs.

  During review of this allegation, the inspector identified no regulatory requirement, radiological condition, or licensee procedure which would require posting of the entire building as an RCA. A review of personal contamination incidents indicated one occurrence in the TB so far in 1990; this incident occurred within a posted RCA. Also, a review of routine radiological surveys indicated no identified spread of contamination from the TB to

adjacent walkways. Therefore, control of contamination in the TB appears adequate.

- Finding: The allegation that the methods of contamination control in the TB are in violation of licensee procedures was not substantiated.

12. Exit Meeting (IP 30703)

The inspectors met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on February 23, 1990, to discuss the scope of the inspection and the findings. The inspectors also discussed the likely informational content of the inspection report with regard to documents or process reviewed by the inspectors during the inspection. The licensee identified no such documents/processes as proprietary.

The following matters were discussed specifically by the inspectors:

a. The need to revise the station procedure which specifies an acceptable contamination release level. The licensee stated that the procedure would be revised. (Section 9)

b. The need for enhanced scrutiny of individual and collective personal contamination events (PCEs) to identify and correct radiological conditions leading to PCEs.

c. The allegations/concerns about radiological controls imposed in the turbine building. (Section 11)

d. The need for all personnel, especially radiation workers, planners, schedulers, and first line supervisors to be more responsible for ALARA. (Section 10)

Additional discussions concerning ALARA and dose for current outage was discussed during a management meeting held in Region III on March 15, 1990.