

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/82-10

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, Unit 1

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

Inspection Conducted: March 1-4, 1982

Inspectors: *M. J. Oestmann*  
M. J. Oestmann

3/19/82

*M. Schumacher*  
S. Rozak *ea*

3/23/82

Approved By: *M. Schumacher*  
M. Schumacher, Chief  
Independent Measurements and  
Environmental Protection Section  
*M. Schumacher for*  
C. J. Paperiello, Chief  
Emergency Preparedness and  
Program Support Branch

3/23/82

3/23/82

Inspection Summary:

Inspection on March 1-4, 1982 (Report No. 50-346/82-10(DEPOS))

Areas Inspected: Routine announced inspection of Confirmatory Measurements including collection of samples, analysis onsite with the Region III Measurements Van and discussion of results, quality assurance and quality control of analytical measurements. The inspection involved 46 inspector-hours on site by two NRC inspectors.

Results: No items of noncompliance or deviations were identified in the areas inspected.

## DETAILS

### 1. Persons Contacted

- \*D. Briden, Head, Chemistry and Health Physics Department
- \*R. Scott, Supervisor, Chemistry and Radiochemistry Group
- J. Armstrong, Radiation - Chemistry Technician

The inspectors also interviewed several other employees during the course of this inspection, including chemistry and health physics personnel, members of the security force, and general office personnel.

\*Denotes those present at the exit interview on March 4, 1982.

### 2. Action on Previous Inspection Findings

- a. (Closed) Noncompliance (50-346/80-24-01): Liquid effluents exceeded lake temperatures by more than 20°F on five occasions in January - February 1980 and also on two occasions in December 20-21, 1980. The licensee also reported in Reportable Occurrence Reports NP-09-81-01 (June 25, 1981), NP-09-81-02 (October 30, 1981) and NP-09-82-01 (February 3, 1982) that the temperature differential of thermal discharges across the condensers exceeded the 20°F  $\Delta T$  limit of Specification 2.1.1 of the Environmental Technical Specifications. The licensee has requested relief from the nonradiological Environmental Technical Specifications by letter on August 22, 1980. The Atomic Safety and Licensing Appeal Board in the Yellow Creek Decision has reported that only the States through the U.S. Environmental Protection Agency have authority over thermal discharges in accordance with the licensee's National Pollutant Discharge Elimination System (NPDES) permit. Thus, because of the Yellow Creek Decision, thermal discharge limits will not be enforced by NRC at Davis-Besse. This item is considered closed.
- b. (Closed) Noncompliance (50-346/80-24-02): Failure to report exceeding the 20°F limit on December 20 and 21, 1980. This problem was corrected when the licensee issued a Reportable Occurrence Report NP-09-81-01 on June 25, 1981 to include this item. For the same reasons discussed in item 2a above, this item is considered closed.

### 3. Confirmatory Measurements

- a. Licensee Program for Quality Assurance/Quality Control of Analytical Measurements

- (1) Nonradiological Analysis of Reactor Coolant

Selected chemistry procedures relating to the calibration and operation of laboratory analytical instruments used for

nonradiological analysis of reactor and secondary coolant samples were reviewed. The procedures reviewed included measurements of conductivity, pH, optical density, atomic absorption and gas chromatography for analysis of acidity and alkalinity, and concentrations of various metals and gases. These procedures were current, most having been reviewed by licensee management and revised in 1980 and 1981 and were technically adequate.

The instruments in the cold chemistry laboratory appeared to be functional; and calibration stickers were current. The licensee also dates the chemical solutions made up in the laboratory. No problems were identified.

(2) Radiological Analysis of Reactor Coolant and Effluents

The inspector reviewed licensee procedures and records relating to quality control of radiological measurements of reactor coolant and effluents. Procedures reviewed covered beta and gamma counting involving multichannel analyzers, tritium determination by liquid scintillation counting, sample collection and preparation, and radiochemical analytical measurements. Procedures were current and no significant problems were identified.

Quality control and functional checks of the licensee's counting practices were documented. Checksheets, control charts, and other records reflected adherence to procedural controls. The licensee performs daily energy checks and does an annual efficiency check but in only one geometry. The comparative results discussed in Paragraph 3.b indicated this to be insufficient. The licensee agreed to recalibrate his multichannel analyzers with GeLi detectors as soon as appropriate calibration standards would be obtained.

(3) Quality Control of Laboratory Personnel

The inspector discussed the QC of laboratory practices with licensee representatives. The licensee reported that spikes and blind samples are provided to the laboratory technicians for analysis in order to check the performance of laboratory work. This item is in response to a recommendation from a previous inspection.<sup>1</sup>

<sup>1</sup> Inspection Report No. 50-346/81-06

#### (4) Training of Chemistry Laboratory Personnel

Currently, the licensee trains chemistry personnel on-the-job. Such training includes supervisor observation of analytical measurements. The licensee stated that the Training Department has a formal program involving lectures and laboratory exercises under development but it has not yet been implemented. This item was discussed in a previous inspection<sup>2</sup> and will be examined in a future inspection (Open Item 50-346/82-10-01).

##### b. Results of Comparative Analyses

The NRC Region III Measurements Van was used onsite to analyze samples split with the licensee. Comparisons were made on analyses in four media. In addition, at the request of the NRC inspectors, the licensee counted spiked samples of a liquid, air particulate, and a charcoal cartridge. The spiked samples were counted on the detector system the licensee calls detector 1 and the split samples on the system called detector 2. The comparisons are shown in Table I and the comparison criteria in Attachment 1. A liquid waste sample was sent to the NRC Reference Laboratory for analysis of tritium, gross beta, Sr-89, and Sr-90. The results of these analyses will be included in an addendum to this report.

Of twenty-seven comparisons the licensee had eighteen agreements or possible agreements. In almost all cases the licensee values were conservative. The disagreements were on charcoal cartridges for both detector systems and on an air particulate for detector 2. The licensee failed to identify Na-24 in the air particulate sample. The primary gamma ray for this radionuclide (1369kev) was part of a doublet with a much stronger gamma ray from Cs-134 and the licensee's system did not have the energy range to see a confirming gamma ray at higher energy (2754kev).

The licensee does not recalibrate his detector systems on a regular basis. The systems were calibrated approximately five years ago. Detector 1 was recalibrated subsequently after having been redrifted. The systems are monitored daily for QC purposes and annually a point source is counted specifically to check the efficiencies for this one geometry. If this efficiency is judged to be adequate all the others are presumed not to have changed. There is no procedure that specifies what constitutes an adequate agreement and the licensee admitted that this comparison has indicated that at least one of the detector systems has been over quantifying activity. Since the results were conservative, no recalibration was done. This method of

<sup>2</sup> Ibid

checking efficiency will not identify problems in the initial determination of an efficiency curve for a particular geometry. Since the point source is counted relatively far from the detector, it will also not give an accurate indication that efficiencies for sources close to the detector have not changed with time. The need for keeping adequate records of efficiency calibrations to track trends with time was also discussed with the licensee.

The licensee acknowledged the inspectors' comments on this matter and agreed to recalibrate both detector systems within two months after receiving new calibration sources. The licensee had contacted a supplier of calibration sources before the inspectors left the site.

No items of noncompliance or deviations were identified.

#### 4. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of this inspection on March 4, 1982. The licensee representatives acknowledged the inspectors' comments on the efficiency calibration of the GeLi detector systems and agreed to perform the following actions:

- a. Recalibrate both detector systems within two months after receiving new calibration standards (Open item 50-346/82-10-02);
- b. Analyze the liquid waste sample split taken on March 2, 1982 for tritium, Sr-89 and Sr-90, and gross beta (gross beta to be counted 12:00 noon EST on March 29, 1981) and report the results to Region III (Open item 50-346/82-10-03).

#### Attachments:

1. Attachment 1, Criteria for Comparing Analytical Measurements
2. Table I, Confirmatory Measurements Program Results, 1st Quarter, 1982.

TABLE 1

U S NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
CONFIRMATORY MEASUREMENTS PROGRAM  
FACILITY: DAVIS BESSE  
FOR THE 1 QUARTER OF 1982

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L WASTE	XE-133	5.4E-06	1.3E-07	5.8E-06	5.5E-07	1.1E 00	4.3E 01	A
	XE-135	1.9E-07	3.4E-08	4.1E-07	1.2E-07	2.2E 00	5.6E 00	P
P FILTER	I-131	2.1E-02	8.9E-05	2.7E-02	2.9E-04	1.3E 00	2.3E 02	D
	CS-136	3.7E-04	3.7E-05	5.9E-04	9.5E-05	1.6E 00	9.9E 00	A
	CS-134	4.2E-02	1.5E-04	6.0E-02	4.2E-04	1.4E 00	2.7E 02	D
	I-133	2.0E-03	5.7E-05	3.0E-03	2.7E-04	1.5E 00	3.5E 01	P
	CS-137	1.1E-01	2.2E-04	1.4E-01	5.9E-04	1.3E 00	4.9E 02	D
	CD-60	1.3E-04	1.6E-05	3.1E-04	8.5E-05	2.3E 00	8.4E 00	D
	NA-24	4.8E-04	2.4E-05	0.0E-01	0.0E-01	0.0E-01	2.0E 01	D
C FILTER	I-131	1.4E 00	7.9E-04	2.3E 00	3.9E-03	1.6E 00	1.8E 03	D
	I-133	2.3E-02	1.7E-04	3.5E-02	8.3E-04	1.5E 00	1.3E 02	D
	XE-133	7.7E-01	6.5E-04	1.0E 00	5.0E-03	1.3E 00	1.2E 03	P
OFF GAS	XE-133	2.0E-03	7.2E-06	2.1E-03	0.0E-01	1.0E 00	2.8E 02	A
	XE-131M	4.1E-04	1.4E-05	4.1E-04	0.0E-01	9.9E-01	3.1E 01	A
	KR-85	2.1E-03	8.0E-05	3.0E-03	0.0E-01	1.5E 00	2.6E 01	P
C SPIKED	CD-57	1.1E 04	2.0E 02	1.6E 04	0.0E-01	1.4E 00	5.5E 01	P
	CS-137	6.2E 04	7.0E 02	9.7E 04	0.0E-01	1.6E 00	8.9E 01	D
	CD-60	9.8E 04	1.0E 03	1.3E 05	0.0E-01	1.4E 00	9.8E 01	D
	Y-88	1.6E 05	2.0E 03	1.6E 05	0.0E-01	1.0E 00	7.8E 01	A
F SPIKED	CD-57	4.4E 03	5.0E 01	5.0E 03	0.0E-01	1.1E 00	8.9E 01	A
	CS-137	2.5E 04	3.0E 02	2.8E 04	0.0E-01	1.1E 00	8.3E 01	A
	CD-60	3.9E 04	4.0E 02	4.5E 04	0.0E-01	1.1E 00	9.9E 01	A
	Y-88	6.6E 04	7.0E 02	8.0E 04	0.0E-01	1.2E 00	9.5E 01	A
L SPIKED	CD-57	3.7E 04	1.0E 02	4.1E 04	0.0E-01	1.1E 00	3.7E 02	A
	CS-137	1.6E 05	1.0E 03	1.8E 05	0.0E-01	1.2E 00	1.6E 02	A
	CD-60	2.2E 05	1.0E 03	2.5E 05	0.0E-01	1.1E 00	2.2E 02	A
	Y-88	3.9E 05	2.0E 03	5.2E 05	0.0E-01	1.3E 00	2.0E 02	P

## T TEST RESULTS:

A=AGREEMENT

D=DISAGREEMENT

P=POSSIBLE AGREEMENT

N=NO COMPARISON

# ATTACHMENT 1

## CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgment limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated one sigma uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement should be considered acceptable as the resolution decreases. The values in the ratio criteria may be rounded to fewer significant figures to maintain statistical consistency with the number of significant figures reported by the NRC Reference Laboratory, unless such rounding will result in a narrowed category of acceptance. The acceptance category reported will be the narrowest into which the ratio fits for the resolution being used.

<u>RESOLUTION</u>	<u>RATIO = LICENSEE VALUE/NRC REFERENCE VALUE</u>		
	<u>Agreement</u>	<u>Possible Agreement "A"</u>	<u>Possible Agreeable "B"</u>
<3	No Comparison	No Comparison	No Comparison
>3 and <4	0.4 - 2.5	0.3 - 3.0	No Comparison
>4 and <8	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
>8 and <16	0.6 - 1.67	0.5 - 2.0	0.4 - 2.5
>16 and <51	0.75 - 1.33	0.6 - 1.67	0.5 - 2.0
>51 and <200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.67
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma spectrometry, where principal gamma energy used for identification is greater than 250 keV.

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

Gamma spectrometry, where principal gamma energy used for identification is less than 250 keV.

Sr-89 and Sr-90 determinations.

Gross beta, where samples are counted on the same date using the same reference nuclide.