

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

USNRC REGION II  
ATLANTA, GEORGIA

400 Chestnut Street Tower II

July  
83 JUN 6 A8:45

June 30, 1983

U.S. Nuclear Regulatory Commission  
Region II  
ATTN: James P. O'Reilly, Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30303

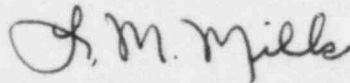
Dear Mr. O'Reilly:

Enclosed is our response to R. C. Lewis' May 24, 1983 letter to H. G. Parris transmitting Inspection Report Nos. 50-259/83-11, -260/83-11, -296/83-11 regarding activities at our Browns Ferry Nuclear Plant which appeared to have been in violation of NRC regulations. We have enclosed our response to Appendix A, Notice of Violation. We discussed the extension to July 1, 1983 in a telephone conversation between Bill Bradford of your staff and Mike Hellums of my staff on June 22, 1983. If you have any questions, please call Jim Domer at FTS 858-2725.

To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



L. M. Mills, Manager  
Nuclear Licensing

Enclosure

RESPONSE - NRC INSPECTION REPORT NOS.  
50-259/83-11, 50-260/83-11, AND 50-296/83-11  
R. C. LEWIS' LETTER TO H. G. PARRIS  
DATED MAY 24, 1983

Appendix A

(259, 260, and 296/83-11-02)

10 CFR 20.201b requires the licensee to perform surveys as necessary to demonstrate compliance with 10 CFR 20.106 which limits the release of radioactivity in unrestricted areas to the concentrations in Appendix B, Table II.

Technical Specification 6.9.3.A requires written procedures for radiation control activities.

Contrary to the above, during the period from September 1982 to March 1983, failure to establish and implement calibration procedures resulted in the use of improperly calibrated gamma spectroscopy system for the measurement of radioactive effluents released to unrestricted areas.

This is a Severity Level IV violation.

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred as stated.

2. Reasons for the Violation if Admitted

Several factors contributed to the violation. The Germanium detectors (Ge(Li)) used in the radiochemical laboratory countroom, during the time period cited by the inspector, had exceeded their useful service life. This resulted in a relatively high frequency of detector changeouts. Management and administrative controls over the changeout process were insufficient to ensure adequate calibration documentation was maintained during the period of repeated detector changeouts. The necessity for frequent detector changeout was aggravated by the replacement of existing detectors with ones of moderate age that had been used extensively elsewhere in TVA.

Additionally, an office move was undertaken during this period of repeated detector changeouts. During the move, some of the calibration documentation was inadvertently misplaced and cannot now be located. A change in precision of the efficiency factors from the older calibrations to the calibration which determined the efficiency at the time of the inspection provides strong indirect evidence that the calibrations had been, in fact, accomplished.

### 3. Corrective Steps Which Have Been Taken and the Results Achieved

The detector used in select code 3 was immediately taken out of service and shipped to the TVA Power Operations Training Center (POTC) for calibration. The detector for select code 2 had previously been calibrated by the POTC and recalibration was not required.

The efficiency factors<sup>1</sup> for select codes 2 and 3 were compared with efficiency determinations for existing programs performed at the POTC. For select code 2, of the 19 geometries in use, the efficiency factors for two were correct and 17 were high by factors ranging from 1.1 to 1.4. These are the ratios of the Browns Ferry efficiency factor to the factors determined at the POTC. Ratios greater than one will produce proportional overestimates of activity and ratios less than one will produce proportional underestimates of activity. Erroneous efficiency factors for select code 2 were replaced by efficiency factors determined at the POTC.

For select code 3, of the 11 geometries used, the Browns Ferry efficiency factors for two liquid (liter bottle) geometries were high compared to POTC efficiency factors by factors ranging from 1.0 to 2.1, and nine were low (charcoal and particulate filters and offgas vial) by factors ranging from 0.47 to 0.96. An evaluation of any underestimates of effluents and personnel exposure, which resulted from using "low" efficiency factors for select code 3, was undertaken and is continuing. Correct or high efficiency factors were in place for all liquid effluent analyses as current documentation shows. Therefore, the liquid effluent analyses were conservative; and even in the uncorrected form, they still produce a monthly release total that is less than 18 percent of applicable technical specification limit. The reported airborne releases are relatively unaffected by these calibration discrepancies since the airborne releases are quantified from radiation monitor response and isotopic ratios are only used to determine the distribution of nuclides in the effluents.

An evaluation of approximately 15,000 gamma analyses associated with 1,500 airborne surveys utilizing particulate and charcoal filters was performed. One hundred and six (106) gamma analyses of charcoal or particulate filters associated with 69 airborne surveys showed iodine or particulate activity levels of concern relative to plant

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1. The efficiency factor (F) used by BFN<sup>4</sup> is equal to the inverse of the product of the constant  $3.7 \times 10^4$  dps/uCi, the branching factor (f) for the particular nuclide and energy, and the efficiency of the detector (E) in units of counts per gammas emitted.

$$F = 1 / (f) (E) (3.7 \times 10^4)$$

administrative limits after accounting for the inaccuracies of the efficiency factors on select code 3. We are reviewing special work permits associated with these surveys to determine if any of the administrative limits were exceeded.

After select code 3 was taken out of service for calibration, a detector calibrated at the POTC was placed in select code 1 (select code 1 had been out of service for most of the time period reviewed during the inspection). All efficiency factors in use for select code 1 and 2 operation have been inputted, independently verified, and documented. Calibration records consisting of the original efficiency calibration, the determination of the efficiency factors for each nuclide, and a listing of the efficiency factors as placed in the appropriate computer are being maintained. The verification process for efficiency factors is also documented.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

Procedures for detector changeout and transferring and verifying detector calibration information are being developed. These procedures will be placed in the radiochemical laboratory control manual for each system in use to ensure proper documentation and efficiency factor verification. Procedures for operation of the gamma spectroscopy systems are also being developed. Procedures that affect the operation and calibration of gamma spectroscopy systems will be reviewed by the Plant Operations Review Committee and approved by the plant superintendent.

Calibration program factors used to provide "conservatism" will be reevaluated and dispositioned such that activity measurements are reported as accurately as possible.

Better storage facilities for calibration and quality control documentation will be provided.

5. Date When Full Compliance Will Be Achieved

Full compliance for the above items will be achieved by September 1, 1983.