TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
3S 61K Lookout Place

October 24, 1989

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Gentlemen:

REPLY TO NOTICE OF VIOLATION (NRC INSPECTION REPORT NO. 41-08165-13/89-01)
DOCKET NUMBER 030-19613, LICENSE NO. 41-08165-13

This is in response to the Notice of Violation Inspection Report No. 41-08165-13/89-01 that was sent to me by W. E. Cline, of NRC Region II, on September 8, 1989.

We admit the violation. The reason for the violation is as follows:

> Dose rates ranging from 0.8 to 4 mrem/hour were measured near nuclear gauges located on the scrubbers of units 7 and 8 of the Widows Creek Fossil Plant. These dose rate fields are of rather small physical size and are located in areas that are seldom visited by plant workers. The nuclear gauges held under this by-product license were originally purchased as generally licensed sources. It was assumed that the granting of a general license by the NRC for these gauges implied a high level of safety and therefore radiation levels in their vicinity were acceptable. Thus in our interpretations of the dose rate limits given in 10 CFR 20.105(b)(1) and (2), under which this violation is cited, TVA had assumed that the dose rates were to the whole body and that occupancy factors could be used. Under these assumptions, dose rates of 0.8 to 4 mrem/hour, covering small areas are acceptable.

Corrective Actions: We have constructed six barricades (rails with grill work) to limit access to nuclear gauges and have added lead shielding to six nuclear gauges and/or their detectors. In addition, we are applying for an amendment to this by-product license under 10 CFR 20.105(a) because the remaining dose rates will cause no individual at this facility to receive a dose to the whole body in excess of 0.5 rem in any calendar year. A discussion of each location where a violation was cited is enclosed. An application for amendment to this by-product license to implement 10 CFR 20.105(a) is also enclosed.

We believe that with the corrective actions already taken and with approval of the requested amendment we will be in full compliance with all NRC regulations. We appreciate the assistance of Mr. C. Hosey of the NRC Region II Office for his assistance in discussing these violations with our staff and for assisting in their resolution.

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If you have any questions or comments, please call Ron Maxwell, Radiation Protection Officer for Power, at (205) 386-2767 or Stanley W. Coffman, Radiation Safety Coordinator for Power Production, at (615) 751-3393.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

C. N. Dammann
Manager of Fossil Operations

Enclosure

ENCLOSURE I

CORRECTIVE ACTIONS AND GENERAL DISCUSSION

General Comments:

All of the nuclear gauges authorized by this by-product license are standard products of NRC approved design, installed by the manufacturer and are mounted on vertical pipes. The nuclear gauges on scrubbers 7 and 8 cited in this violation are located in an open frame structure and not enclosed by walls. The estimated cumulated time that all workers combined spend near the gauges is less than 40 hours per year. Any specific individual will spend much less time in the area. There are no offices, break areas, or occupied areas near any of the gauges.

I. Unit 8 Scrubber (Locations A, B, C, and D)

Lead sheets have been placed over the small gaps between the source housings and the pipes to reduce this source of scattered radiation. Barricades, covering a nominal floor area of 5 feet by 15 feet, have been constructed around each of these four nuclear gauges. Two of the nuclear gauges were relocated so that any beam that may penetrate through the detector will not enter a walkway. The other two gauges were already orientated in this manner. Radiation surveys along these barricades indicate a maximum dose rate of 0.5 mrem/hr, with unit 8 operating and slurry in the pipe.

II. Unit 7 Scrubber (Locations B Rod and C Rod)

These two nuclear gauges are located in a walkway at a height of four feet above the walkway. Three measures have been taken to reduce the dose rate near these nuclear gauges. First, two layers of 1/8-inch lead sheet has been added around the circular sides of these source housings to reduce leakage radiation through the housings. Second, lead shecting has been placed behind the detectors to provide additional attenuation of the primary beams. Third, collars of lead sheeting have been placed around the regions where the detectors are mounted to the pipes. The dose rate behind the detector is less than 1 mrem/hour (with slurry in the pipe, after these modifications).

III. Unit 7 Scrubber (Location A Rod)

This nuclear gauge is located approximately 19 inches below an open grate catwalk. The dose rate directly above the source housing on contact with the catwalk is 0.9 mrem/hour with slurry in the pipe. At one-foot above the catwalk, the dose rate is 0.5 mrem/hour. Because of the general inaccessibility of this gauge no shielding was added and no barricades were constructed for this gauge.

IV. Unit 7 Scrubber (Location D Rod)

This nuclear gauge is mounted on a vertical pipe next to a walkway. The source housing is 18 inches from the railing. The highest dose rate on the handrail closest to the nuclear gauge is 1.4 mrem/hour and the highest dose rate at a distance of 12 inches inside the catwalk is 0.6 mrem/hour. Because of the low occupancy of this area, no corrective action was taken.

V. Unit 7 Scrubber (Location B-1 and B-3)

These two nuclear gauges are mounted on two vertical pipes on the south end of the scrubber. They are approachable from a catwalk with only one entrance. This entrance has been barricaded with a locked gate. The highest dose rate near an accessible area is 1.0 mrem/hour at a height of six feet above the catwalk and 0.5 mrem/hour at a height of five feet.

VI. Unit 7 Scrubber (Location C-1 and C-3)

This is the same as unit 7 scrubber location B-1 and B-3 discussed above except on the north side of the scrubber. This entrance has also been barricaded.

VII. Unit 7 Scrubber (Locations B-2 and C-2)

These two nuclear gauges are mounted on vertical pipes in a catwalk and are 7-1/2 feet above the catwalk. With the scrubber operating and slurry in the pipes, the maximum dose rate at six feet above the catwalk is 1.1 mrem/hr. The maximum dose rate at five feet is 0.3 mrem/hour. Because of the low occupancy of this area and the low dose rates to the whole body, no corrective action on these two gauges has been taken.

VIII. Unit 7 Scrubber (Locations D-1, D-2, and D-3)

These three nuclear gauges are mounted on three pipes that are surrounded on two sides by stairs and on the other two sides by a walkway. The highest reading on the handrails of the stairs and walkways is 0.8 mrem/hour near location D-3, and 0.5 mrem/hour near D-2 and less than that near D-1, with the scrubber operating and the slurry in the pipes. There is an extreme fall danger if an individual crosses the handrails to get closer to the gauges. Because of the low occupancy of this area, no shielding or barricade construction was undertaken for these gauges.

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ENCLOSURE II

APPLICATION FOR AMENDMENT TO BY-PRODUCT LICENSE 41-08165-13

This application is for the purpose of setting up a dose rate limit in an unrestricted area near licensed nuclear gauges, as described in 10 CFR 20.105(a).

We propose a dose rate limit of 5 mrem/hour, averaged over a vertical area one foot wide and three feet high in an accessible area. No individual occupies an area near any of these gauges for more than 40 hours/year. The product of this dose rate (5 mrem/hour) by the maximum occupancy (40 hours/year) is 200 mrem/year, 40 percent of the allowable limit (0.5 mrem/year) in 10 CFR 20.105(a).

The nuclear gauges, authorized by this license are standard products sold by such corporations as Ohmart and Texas Nuclear, Inc. They are mounted on pipes in standard configurations. They are not located near any office, shop, workplace, or break area. They are approached only while walking by or for inspections, calibrations, maintenance on the gauge detector and during infrequent outages when work such as welding or valve and pipe maintenance may be conducted near by. There are three classes of gauges authorized under this license.

First, on the unit 8 scrubber, there are four nuclear gauges containing 4 Ci of Cs-137 (locations A, B, C, and D) that are mounted on vertical pipes with a diameter of about 2-1/2 feet. During infrequent periods when the scrubber is not operating, the pipe may be empty and a gamma field with a dose rate that exceeds the proposed limit may exist behind the detector.

Barricades approximately 5 feet by 16 feet have been constructed around these gauges to prevent access to this beam.

Second, nuclear gauges containing 2 Ci of Cs-137 are located on the unit 7 scrubber at locations C1 and C3 and also at locations B1 and B3. During periods when the unit is not operating and the pipes are empty, beams exceeding the proposed limit may be found. The catwalk leading to this area has been barricaded.

Third, health physics surveys indicate that the accessible areas near all other sources authorized by this license are within the proposed limit.

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