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JUN 10 1996

U.S. Nuclear Regulatory Commission
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Gentlemen:

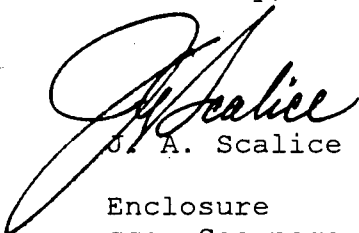
In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 - NRC INSPECTION REPORT NO.
50-390, 391/96-02 - ADDITIONAL INFORMATION

The purpose of this letter is to provide a reply to NRC's letter dated May 17, 1996. NRC requested that TVA define the basis for not using a Krypton 85 source supplied by the vendor during future calibrations of the Condenser Vacuum Vent Post Accident Radiation Monitor. Also requested was a clarification of detector channel identification for this monitor. The enclosure to this letter contains TVA's response to these requests.

If you should have any questions, please contact P. L. Pace at (423) 365-1824.

Sincerely,


J. A. Scalice

Enclosure
cc: See page 2

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Page 2

JUN 10 1996

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ENCLOSURE
WATTS BAR NUCLEAR PLANT UNIT 1
INSPECTION REPORT 50-390/96-02
REQUEST FOR ADDITIONAL INFORMATION

Background:

The detectors in the Eberline AXM-1 monitor assembly have the following channel designations based on Eberline documentation. The designation of the channels will be further explained in the response below:

Monitor Channel	Eberline Designation - Generic Documentation	Eberline Designation - Firmware	TVA Unique Identifier
Mid-range	Channel 4	Channel 1	RE-90-404A
High-range	Channel 3	Channel 3	RE-90-404B
Background	Channel 2	Channel 2	No identifier

NRC Question:

Provide a technical basis for not using a Krypton (KR) 85 source supplied by the vendor during future calibrations of the Condenser Vacuum Vent Post Accident Radiation Monitor.

TVA Response:

This issue involves the calibration methodology used by TVA for the condenser vacuum pump exhaust high range gaseous radiation monitoring channel, TVA identifier 1-RE-90-404B. The detector for this channel is designated by Eberline in generic documentation as accident range monitor high range noble gas Channel 3 (SA-15) and is an energy compensated Geiger-Mueller (GM) tube detector. For this detector, Eberline states in its documentation entitled, "Technical Manual for Accident Range Monitor, Model AXM-1," that the detector has a known sensitivity (in air) to a Cesium (Cs) 137 gamma field. Eberline procedure, "AXM-1 Calibration Checkout Procedure, 10429-A318," along with Section III, "Calibration," of the Eberline technical manual referenced above, indicate that a known concentration of gas (or comparison to laboratory samples) is to be used in conjunction with the Cs-137 source to calibrate the channel.

TVA has determined that the use of the Cs-137 source alone is adequate to verify proper alignment of 1-RE-90-404B. This position was initially documented as Design Change Notice (DCN) F-38345. The following information is provided to support the decision documented in DCN F-38345:

1. The mid-range noble gas channel on the AXM-1, Channel 4 (SA-14), also utilizes an energy compensated GM tube for the detector. Eberline's document, "Technical Manual for Accident Range Monitor, Model AXM-1," identifies the calibration methodology for Channel 4 to be the same as the methodology used for Channel 3, since both detectors are GM tubes. However, Eberline's procedure, "AXM-1 Calibration Checkout Procedure, 10429-A318," applies only a Cs-137 field to verify calibration of Channel 4.
2. In a letter to TVA dated February 29, 1996, Eberline endorsed using the Cs-137 source for the field calibration of Channel 3 by providing methodology for relating the results of the calibration to the Kr-85 response from the original calibration data.
3. For GM tubes, no adjustments to the response such as with photo-multiplier tubes are possible. There is no potential to set a lower level discriminator incorrectly such that some energy levels are undetected, producing a non-conservative response. If the Cs-137 field produces the expected response, the response to gases is predictable based on the relationships established in Eberline's documents, "Primary Calibration SA-15 and SA-9 High Range Gas Detector, 12000-01," and "Ping/Sping Primary Gas Calibration and Detector Response to Beta and Photon Sources," 11000-A211.
4. Energy compensated GM tubes are sensitive to gamma radiation. The reason the GM tube is sensitive to the gas calibration source Kr-85, which is largely a beta source, is because it has a gamma energy level of 513.99 kiloelectron volt (keV). In the case of the Cs-137 calibration source, approximately 95 percent of Cs-137 decays to Barium (Ba) 137, which is a gamma source with an energy level of 661.65 keV. These gamma energies are relatively close in the energy spectrum, further supporting the use of the Cs-137 solid source to calibrate the SA-15 high range Eberline channel.
5. To calculate the sensitivity of the detector, an accurate measurement of the volume and total activity of the source is required. In March 1996, Eberline updated drawing 11143-C10, "Calibration Source (85Kr Noble Gas) SA-9," to specify the volume and activity of the Kr-85 source. The volume and total activity indicated on Eberline documentation for the Kr-85 source were only approximate values and therefore, were not considered useful for calculation purposes. The assay documentation accompanying the Watts Bar Kr-85 source included only the total activity, not the volume.
6. Eberline's factory checkout procedure, "AXM-1 Calibration Checkout Procedure, 10429-A318," indicates a much better accuracy for the Cs-137 readings than for the Kr-85 readings. As stated in paragraph 3.4 of this procedure, the uncertainty of calibration with the Cs-137 source is approximately 22 percent. The uncertainty of calibration with the Kr-85 source is documented in paragraph 3.10 to be approximately 36 percent. The TVA Nuclear Engineering (NE) Scaling and Setpoint document (SSD), 1-RE-90-404,

requires achievement of results within ± 25 percent. The Cs-137 source meets this requirement, the Kr-85 source does not.

7. During a retest conducted in early 1996 to demonstrate the adequacy of previous Cs-137 calibrations performed in 1995, measurements using the Kr-85 source were taken for additional information. It was discovered that the manufacturer's specification for positioning the Kr-85 source with respect to the detector resulted in an off-centered position and lower than required response. A maximum response was achieved after establishing a centered position for the source with the detector. The average response of three readings obtained with the source in the centered position was still low but within expected tolerance. Variability of the readings obtained with the Kr-85 source in this position significantly exceeded the required acceptance band of this monitor. The response to the Cs-137 source agreed with the previous calibration.

NRC Question:

Discuss the reasons Eberline's documentation identifies the detector channels different from how TVA has identified them.

TVA Response:

Eberline's "Technical Manual for Accident Range Monitor, Model AXM-1," describes the monitor assembly which consists of four units: a Noble Gas Pallet (NGP-1), a Grab Sample Pallet (GSP-1), a Bulk Filter Assembly (BFA), and a Data Acquisition Module (DAM-4-6). The technical manual assigns Channel 1 to a background detectors on the GSP-1, and the remaining Channels 2 through 4 to the detectors on the NGP-1. Channel 2 is background subtraction, Channel 3 is high range noble gas, and Channel 4 is mid-range noble gas. Eberline procedure, "AXM-1 Calibration Checkout Procedure, 10429-A318," uses Eberline's vendor manual identifiers and contains calibration instructions for all four detectors.

TVA currently has installed on the condenser vacuum pump exhaust only the NGP-1 and the DAM-4-6. Therefore, TVA does not have a Channel 1 that corresponds to the Channel 1 defined in the Eberline documents identified in the previous paragraph. When Eberline made firmware assignments in the DAM-4-6 for the TVA equipment, they assigned three channel numbers, one to each of the detectors on the NGP-1. It would have been convenient and less confusing had they used the same channel numbers as were defined in Eberline's "Technical Manual for Accident Range Monitor, Model AXM-1." However, they assigned firmware Channel 1 to the mid-range noble gas detector, Channel 2 to the background detector, and Channel 3 to the high range detector. The firmware channel assignments in the DAM-4-6 are reflected in appropriate TVA documents which include, the SSD's and Instrument Maintenance

Instruction (IMI) 90-092, "18 Mounth Channel Calibration of the Condenser Vacuum Vent Post Radiation Monitoring Loop 1-LPR-90-404." It is understood that there may be differences in generic vendor manuals and specific equipment supplied to Watts Bar. It is not the normal practice of the vendors to revise generic manuals for specific applications nor is it necessary or customary for TVA to request this action.

TVA unique component identifiers are assigned in accordance with Site Standard Practice (SSP) 2.54, "Component Identification and Implementation - Watts Bar Nuclear Plant." The format for component identifiers is standardized to maintain configuration control and consistency. The TVA component identifiers can be related to the vendor component identifiers through the Equipment Management System (EMS), and TVA and vendor drawings. In the specific case of Eberline AXM-1 Channel 3 (SA-15), the vendor description is high range noble gas detector. The Watts Bar EMS provides the ranges of 1-RE-90-404A (Firmware Channel 1) and 1-RE-90-404B (Firmware Channel 3), from which it can be verified that 1-RE-90-404B is the high range channel.

In addition to the difference between the vendor manual and calibration procedure, and the vendor firmware assignments of channel numbers, it was noted by NRC that channel numbers had been marked either by the vendor or by TVA with a "magic marker" on the NGP-1 in the field. This marking is not an authorized identifier and as such cannot be used in installing, calibrating, or maintaining the equipment. The "magic marker" notations do however, match the firmware channel assignments. It should be noted that the markings on the monitor assembly are in roman numerals rather than arabic numbers. In order to clearly identify the channels, a labeling request was submitted to Operations for the channels that have unique identifiers in EMS.

NRC Question:

Provide clarification of the words "survey meter" versus "detector" as applied to TVA's response to Violation 50-390/96-02-03.

TVA Response:

The words "survey meter" in TVA's response to Violation 390/96-02-03 dated April 22, 1996, were used to identify the hand held measuring and test equipment (M&TE) external to and differentiated from the equipment being tested. The word "detector" is the detector internal to the radiation monitor being tested and uniquely identified within the SSD.