



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

AUG 26 2005

10 CFR 20.2002

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

In the Matter of the
Tennessee Valley Authority

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)

Docket No. 50-390

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 – RADIOACTIVE LIQUID EFFLUENT
LINE ABANDONMENT UNTIL STATION DECOMMISSIONING

References:

1. TVA Letter to NRC dated April 22, 2005, "Watts Bar Nuclear Plant (WBN) – Offsite Dose Calculation Manual (ODCM) Special Report"
2. TVA Letter to NRC dated July 21, 2005, "Watts Bar Nuclear Plant (WBN) – Offsite Dose Calculation Manual (ODCM) Special Report"

The purpose of this letter is to provide additional information related to the replacement of the WBN liquid effluent line and to obtain NRC approval to abandon the line until the decommissioning of WBN Unit 1. This line was found to be leaking in 2003 and was isolated and replaced with a temporary hose until a new liquid effluent line could be placed in service. TVA informed NRC in Reference 1 about an increase in groundwater tritium levels at Radiological Environmental Monitoring Program (REMP) monitoring well D. Reference 2 documented the same condition for REMP monitoring well B. The source of the tritium, as discussed in both letters, was believed to be the movement of the groundwater plume transporting the radiological activity from leaks in the original liquid effluent line.

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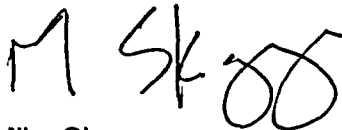
A replacement liquid effluent line has been placed in service. TVA has conducted a radiological assessment of the original liquid effluent line and a summary is provided in the enclosure. The assessment demonstrated that the dose impact of abandoning the original liquid effluent line *in situ* will not approach the regulatory dose limits in either 10 CFR 20.1201 or 10 CFR 20.1301. The assessment further indicated that the abandonment of the original liquid effluent line until plant decommissioning is consistent with the As Low As Reasonably Achievable (ALARA) principals as provided in 10 CFR 20.1101.

Consistent with 10 CFR 20.2002, TVA requests permission to abandon the original liquid effluent line until the decommissioning of WBN Unit 1. Details regarding this request are provided in Enclosure 1 of this letter. Provided in Enclosure 2 are the results of an analysis of the four samples of the old effluent line. Enclosure 3 list a commitment made in Enclosure 1.

Since this issue addresses materials that must be dealt with when WBN is decommissioned, the requirements of 10 CFR 50.75, "Reporting and Recordkeeping for Decommissioning Planning," are applicable and documentation required to satisfy 10 CFR 50.75(g) will be maintained as decommissioning records.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'M Skaggs'.

Mike Skaggs
Site Vice President

Enclosures:

1. Request to Abandon Piping until Unit Decommissioning
2. Analysis Results for Individual Samples
3. Commitment List

cc: see page 3

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Enclosure

cc (Enclosure):

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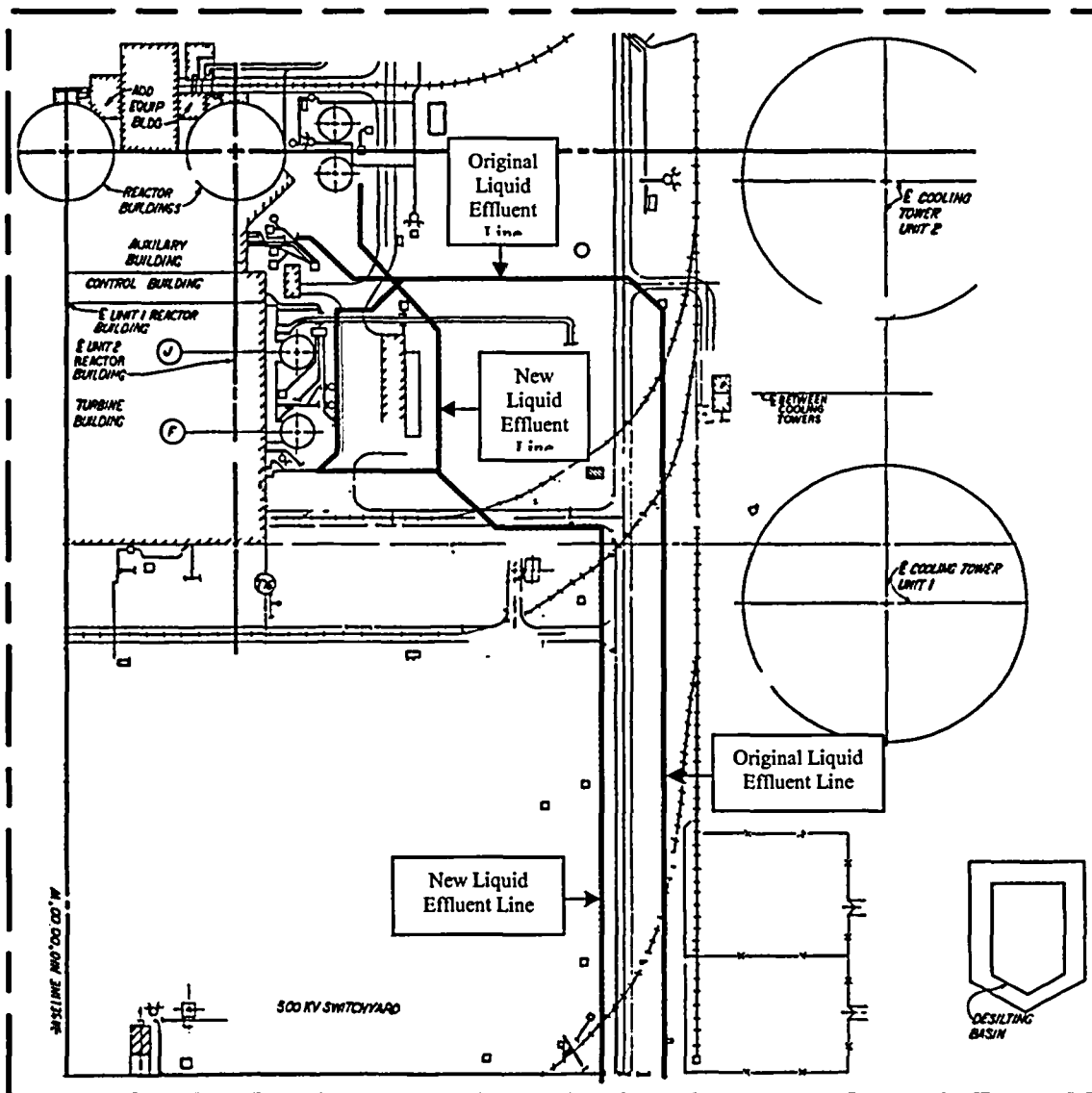
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ENCLOSURE 1
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
RADIOACTIVE LIQUID EFFLUENT LINE
REQUEST TO ABANDON PIPING UNTIL UNIT DECOMMISSIONING

Background:

The liquid waste system for WBN is described in Section 11.2, "liquid Waste System," of the Updated Final Safety Analysis Report (UFSAR). One element of this system is the liquid effluent line that ties into the Cooling Tower Blowdown (CTB) line which is used to release liquid effluents to the Tennessee River. The portion of the liquid effluent line that is routed outside the plant buildings is located in the yard area of the plant near the 500 kV switchyard. The original liquid effluent line is approximately 2600 feet long was placed into service when Unit 1 was licensed in 1995. The original line experienced some leakage problems and was recently replaced. TVA desires to abandon the original liquid effluent line in place until WBN is decommissioned. Figure 1 (below) depicts the routing of the original and the new liquid effluent lines:

Figure 1 – Original & New Liquid Effluent Lines



The referenced TVA letters^{1,2} documented that the limit for tritium in the groundwater has been exceeded in two onsite Radiological Environmental Monitoring Program (REMP) monitoring wells. In these letters, TVA explained its belief that the plume of radioactivity resulted from leaks in the original liquid effluent line. Initially, efforts were made to identify and seal the leaks in the liquid effluent line and as a result some of the soil surrounding the line was removed in several locations. The removed soil was stored so that it could be disposed of as low level radiological waste.

On May 9, 2005, the new liquid effluent line was placed in service. This line is constructed of approximately 1800 feet of Schedule 80 carbon steel pipe which is coated with Scotchkote 6233 Fusion Bonded Epoxy to limit corrosion. The routing of the replacement liquid effluent line is depicted in Figure 1 above.

Description of Materials to be Abandoned:

The original liquid effluent line consisted of approximately 2,600 feet of 4-inch pipe. The 4 inch line was constructed of Schedule 80 carbon steel pipe that was externally coated with coal tar to limit corrosion. All ends of the piping to be abandoned have been covered with 3/8 inch (minimum thickness) A36 carbon steel plate and welded. The plate has been covered with Tapecoat M50 RC gray tape.

In order to estimate the total radioactivity in the abandoned pipe, four two-inch samples (Sample A, B, C, and D) were collected and submitted for direct gamma spectroscopy in November 2004. The analysis results are summarized below and the results of the analysis for each sample are provided in Enclosure 2:

Mean Sample Activity (uCi/Sample) - 2.04E-01

Estimated Total Activity in 2,680 ft of Pipe (uCi) November 2004 – 3.28E+03

Estimated Total Activity in 2,680 ft of Pipe (uCi) November 2034 – 1.96+01

Estimated Specific Activity in Pipe (pCi/gram) November 2004 – 1.68E+02

Estimated Specific Activity in Pipe (pCi/gram) November 2034 – 1.00E+00

1 TVA Letter to NRC dated April 22, 2005, "Watts Bar Nuclear Plant (WBN) – Offsite Dose Calculation Manual (ODCM) Special Report"

2 TVA Letter to NRC dated July 21, 2005, "Watts Bar Nuclear Plant (WBN) – Offsite Dose Calculation Manual (ODCM) Special Report"

Evaluation of Environmental Impacts:

Site Characteristics:

The original liquid effluent line is located outside of the plant buildings in the yard area of the plant near the 500 kV switchyard but within the site protected area (Refer to Figure 1). The pipe will be abandoned in place where it was originally installed. This area is not accessible to the general public. Specific information on the WBN site and the characteristics of the site can be found in Section 2.1.1, "Site Location and Description," of the UFSAR.

Radiological Impacts:

The original liquid effluent line contains some residual amounts of radioactive material that had been properly released from the site in effluents meeting 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits. Although not accessible to the public, the radiological assessment conservatively used ANSI/HPS N13.12-1999³ as a basis for evaluating the potential radiological impact on the health and safety of members of the public with regard to the total quantity of radioactive material present in the abandoned line. The evaluation considered the average potential exposure to members of the hypothetical critical group through a scenario that considered the following pathways:

- External exposure to penetrating radiation,
- Inhalation of airborne radioactive materials, and
- Ingestion of radioactive materials

The assumed activity was that as of November 2004 and November 2034. The primary exposure criterion of ANSI/HPS N13.12-1999 is that Total Effective Dose Equivalent (TEDE) of the average member of the critical group will not exceed 1.0 mrem in a year. The standard provides screening levels, which provide assurance that the TEDE criterion is satisfied. The screening levels divide radionuclides into four groups based on similarities in exposure scenario results.

Following the standard's calculation guidance, a summing of the radionuclide fractions methodology was used. When radiological calculations are performed for the purpose of demonstration with ANSI/HPS N13.12-1999 screening level criteria with a mixture of radionuclides that is known or potentially present, a determination of whether or not the radionuclide mixture meets the screening criteria can be made by the sum of the fractions method. The following sum of the fractions should be used:

3 American National Standards Institute/Health Physics Society 1999. *Surface and Volume Radioactivity Standards for Clearance* Standard N13.12. New York: ANSI

$$\sum_{i=1}^n \frac{C}{SL} \leq 1$$

Where C is the measured value of radionuclide i ; SL is the applicable group screening level value for radionuclide i ; and n is the number of radionuclides in the mixture.

If the sum of fractions is equal to or less than one, the item, and any residual radioactive material comply with the screening level requirements, and the TEDE to the average member of the critical group will be less than one mrem per year.

The sum of the fractions for the material contained in the line as of November 2004 is 5.61E+00, which equates to an annual TEDE exposure of 5.61 mrem. The average U.S. radiation background level received from natural, medical, and consumer sources is 357 mrem per year. The material contained in the original liquid effluent line will maximally contribute no more than 1.6% of the dose the same population will receive from background on an annual basis. For individuals occupationally exposed to licensed radioactive material this value equates to 0.11% of the 10 CFR 20.1201 regulatory limits. The sum of the fractions for the material contained in the line as of November 2034 is 3.35E-02, which equates to an annual TEDE exposure of 0.0335 mrem.

Proposed Administrative Controls:

Based on the preceding radiological evaluation, the potential TEDE exposure is very low and it will continue to decrease during the remainder of WBN's 40 year operating license. As a result, TVA is proposing that no periodic radiological monitoring be required. However, it is important that the pipe and the soil around the pipe not be disturbed. Therefore, TVA intends to revise the UFSAR to document that a revision will be made to the site instruction that controls excavation to ensure the abandoned liquid effluent line will not be affected by the implementation of future plant modifications.

Conclusion:

The abandoned original liquid effluent line contains residual amounts of radioactive material that had been properly released from the site in effluents meeting 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits. The line is completely contained within the WBN protected area and is not accessible to the public. Although not accessible to the public, the radiological assessment conservatively used ANSI/HPS N13.12-1999 as a basis for evaluating the potential radiological impact of the abandoned line. If a hypothetical member of the public

were permitted access to the area of the station containing the abandoned line, their maximum annual dose from the radioactive material within the line would not exceed 5.61 mrem. For members of the station staff this equates to 0.11% of the 20.1201 regulatory limits. Accordingly, TVA requests NRC's permission to abandon the original liquid effluent line until the decommissioning of WBN Unit 1. In lieu of periodic radiological monitoring, TVA will revise the UFSAR to require an annual walkdown of the original liquid effluent line to ensure it is still properly covered and that the abandoned pipe has not been affected by the implementation of plant modifications.

ENCLOSURE 2
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
RADIOACTIVE LIQUID EFFLUENT LINE
REQUEST TO ABANDON PIPING UNTIL UNIT DECOMMISSIONING
ANALYSIS RESULTS FOR INDIVIDUAL SAMPLES

Sample A - Units: microCi/Sample			
Nuclide	Concentration	One Sigma Error	Calculated MDC
Mn-54	2.20 E-04	0.12 E-04	1.64 E-05
Co-57	1.81 E-04	0.08 E-04	1.52 E-05
Co-58	1.77 E-03	0.06 E-03	1.56 E-05
Co-60	1.41 E-02	0.05 E-02	8.63 E-06
Ag-110m	5.12 E-05	0.82 E-05	1.29 E-05
Sb-124	1.67 E-04	0.11 E-04	1.13 E-05
Sb-125	8.50 E-02	0.28 E-02	6.10 E-05
Cs-134	3.02 E-05	0.74 E-05	1.85 E-05
Cs-137	4.12 E-04	0.25 E-04	1.43 E-05

Sample B - Units: microCi/Sample			
Nuclide	Concentration	One Sigma Error	Calculated MDC
Mn-54	3.26 E-04	0.18 E-04	2.26 E-05
Co-57	1.48 E-04	0.08 E-04	1.85 E-05
Co-58	1.35 E-03	0.06 E-03	2.08 E-05
Co-60	2.32 E-02	0.08 E-02	1.10 E-05
Ag-110m	6.82 E-05	0.98 E-05	3.11 E-05
Sb-124	1.90 E-04	0.12 E-04	1.46 E-05
Sb-125	1.19 E-01	0.04 E-01	7.48 E-05
Cs-134	1.04 E-04	0.11 E-04	2.39 E-05
Cs-137	1.42 E-03	0.08 E-03	1.85 E-05

Sample C - Units: microCi/Sample			
Nuclide	Concentration	One Sigma Error	Calculated MDC
Mn-54	7.11 E-04	0.30 E-04	3.40 E-05
Co-57	3.52 E-04	0.20 E-04	2.67 E-05
Co-58	3.22 E-03	0.12 E-03	3.99 E-05
Co-60	4.95 E-02	0.17 E-02	1.90 E-05
Ag-110m	1.14 E-04	0.16 E-04	5.12 E-05
Sb-124	3.48 E-04	0.24 E-04	3.27 E-05
Sb-125	2.38 E-01	0.08 E-01	9.93 E-05
Cs-134	1.29 E-04	0.13 E-04	3.50 E-05
Cs-137	1.89 E-03	0.12 E-03	2.87 E-05

Sample D - Units: microCi/Sample			
Nuclide	Concentration	One Sigma Error	Calculated MDC
Mn-54	6.87 E-04	0.31 E-04	3.30 E-05
Co-57	3.27 E-04	0.19 E-04	2.85 E-05
Co-58	3.54 E-03	0.13 E-03	3.89 E-05
Co-60	4.21 E-02	0.14 E-02	1.94 E-05
Zn-65	2.14 E-04	0.44 E-04	1.04 E-04
Ag-110m	1.87 E-04	0.28 E-04	5.63 E-05
Sb-124	4.16 E-04	0.22 E-04	3.10 E-05
Sb-125	2.25 E-01	0.08 E-01	1.16 E-04
Cs-134	1.03 E-04	0.09 E-04	3.18 E-05
Cs-137	1.68 E-03	0.08 E-03	2.82 E-05

**ENCLOSURE 3
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
RADIOACTIVE LIQUID EFFLUENT LINE
REQUEST TO ABANDON PIPING UNTIL UNIT DECOMMISSIONING**

COMMITMENT LIST

1. TVA intends to revise the UFSAR to document that a revision will be made to the site instruction that controls excavation to ensure the abandoned liquid effluent line will not be affected by the implementation of future plant modifications.