

September 29, 1997

5 pgs

Mr. Robert W. Sharkey, Manager  
Regulatory Compliance  
Hematite Nuclear Fuel Manufacturing  
Combustion Engineering, Inc.  
3300 State Road P  
Hematite, MO 63047

SUBJECT: LICENSE CONDITION S-2, SOURCE AND IDENTIFICATION OF  
CONTAMINANT IN BURIAL SITE WELL # 4 (TAC NO. L30758)

Dear Mr. Sharkey:

This is in reference to your submittals dated March 28, and May 15, 1997, which provide the results of your investigation into the source of technetium-99 (Tc-99) in burial site well # 4 in compliance with Safety Condition S-2 of your renewed license. The NRC staff has reviewed your submittals and agrees that the source of the Tc-99 appears to be the former ring storage area. Therefore, Safety Condition S-2 of your license will be removed at the time of your next license amendment. A discussion of our review is enclosed.

If you have any questions, please contact Susan Chotoo at (301) 415-8102 or Sean Soong at (301) 415-8155.

Sincerely,

Original signed by:

Michael F. Weber, Chief  
Licensing Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

Docket 70-36  
License SNM-33

Enclosure: As stated

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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Sincerely,

A handwritten signature in cursive script that reads "Michael F. Weber".

Michael F. Weber, Chief  
Licensing Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

Docket 70-36  
License SNM-33

Enclosure: As stated

## ASSESSMENT OF BURIAL SITE WELL # 4 (WS-17)

### BACKGROUND

Safety Condition S-2 of Combustion Engineering's (CE's) renewed license for the Hematite, Missouri, facility committed the licensee to investigate and determine the isotope and the source of gross beta activity found in monitoring well WS-17 (formerly known as burial site well # 4). WS-17 is located south of the manufacturing buildings between the Union Pacific Railroad tracks and the controlled area fence. The licensee stated in a letter dated January 27, 1995, that the contaminant is technetium-99 (Tc-99), and the source of the activity is the formerly used evaporation ponds. Although the NRC staff agreed with the licensee's determination of the isotope, the NRC staff review of groundwater data did not support the licensee's conclusion of the source of the contamination.

In a letter dated May 4, 1995, the licensee was requested to provide water level measurements, boring logs, and well construction information to support the determination of the groundwater flow direction from the evaporation ponds toward WS-17. The licensee replied in a letter dated July 14, 1995, that water levels had not been measured, and boring logs were not generated when the wells were installed. In response to a telephone conversation with NRC staff, the licensee measured the water level in each of the groundwater monitoring wells and submitted this information by letter dated October 30, 1995. The water levels were variable across the site and did not show a distinguishable hydraulic gradient. Water levels were subsequently measured by the licensee in November 1995 during an NRC visit to the site. This data also did not indicate a distinguishable hydraulic gradient.

Therefore, in a letter dated April 30, 1996, the NRC staff concluded that the information provided by the licensee in letters dated January 27, July 14, and October 30, 1995, indicated that the hydrology of the site had not been adequately characterized, and therefore, it was not clear that the licensee's groundwater monitoring program was adequate to assure compliance with 10 CFR Part 20. The licensee was asked to provide sufficient information to support the stated source of contamination and to revise the groundwater monitoring program to demonstrate compliance with 10 CFR 20.1302. By letter dated June 14, 1996, the licensee agreed to investigate further and to upgrade the monitoring wells. The results of this investigation were submitted to the NRC by letters dated March 28, and May 15, 1997.

### DISCUSSION

Safety Condition S-2 required the licensee to identify both the isotope and the source of contamination in WS-17. The analytical method used by the licensee to quantify the contamination level in groundwater wells is gross beta counting. By letter dated January 27, 1995, the licensee stated that in May 1994 samples were obtained for Tc-99 analysis using liquid-liquid extraction followed by scintillation counting. The relative percent difference between scintillation counting and gross beta analysis for WS-17 was six percent. These results confirm that the only significant beta contamination is due to Tc-99. By letter dated May 4, 1995, the NRC staff informed the licensee that it agreed with the determination of the isotope.

However, this letter and a subsequent letter on April 30, 1996, identified NRC concerns about the groundwater monitoring program.

In response to these concerns, the licensee provided additional information by letter dated July 14, 1995, and committed to upgrade the groundwater monitoring program by letter dated June 14, 1996. The licensee committed to (1) install a surface apron, protective casing, lock, and plug for each well; (2) properly abandon wells/boreholes that are no longer used; (3) revise the well sampling procedures to require purging of wells prior to sampling and monthly sampling of the water level in each well; and (4) replace burial site well # 4 (WS-17) with a new well (WS-17B), approximately 10 feet north of existing well # 4.

The licensee decided to replace WS-17 due to a concern that surface water accumulations of Tc-99 around the vicinity of WS-17 may have resulted in well contamination. Therefore, in June 1996, WS-17 was replaced by a well 10 feet north of WS-17 designated as WS-17B. However, WS-17B also contained concentrations of Tc-99, indicating that the occurrence was not confined to WS-17.

To investigate the source of the contamination, the licensee contracted with Gateway Environmental Associates, Inc. Gateway's documentation of its investigation was submitted to the NRC by the licensee by letters dated March 28, and May 15, 1997. Gateway reviewed historical records and conducted groundwater and soil sampling from twelve probeholes and from the existing monitoring wells. Gateway developed groundwater contour maps, which show that the direction of the groundwater is southeasterly in the vicinity of WS-17. This is consistent with the data submitted by the licensee in October 1995. Based on this and other information provided by the licensee, the existing monitoring wells appear adequately placed and appropriately screened to detect migration of radionuclides from the evaporation ponds and manufacturing areas.

Through this investigation, Gateway identified the highest concentrations of Tc-99 in the groundwater beneath a former ring storage area. This area is east of the south vault, south of Building 256, and north of WS-17 and was used to store enriched uranium scrap and wastes. This material was contaminated with Tc-99. Currently spent limestone is stored south of this area. Gateway concluded that the limestone is not the source of the contamination because it was placed after the Tc-99 was discovered in the groundwater and due to the relatively low Tc-99 leach quantities determined by the licensee. Contamination of WS-17 from Tc-99 introduced into the groundwater in the ring storage area is consistent with the information provided by the licensee on the hydrology of the site.

The highest activity measured in groundwater beneath the ring storage area during the Gateway investigation in August 1996 was 15.6 pCi/ml (gross beta). This is above the Environmental Protection Agency's Maximum Contaminant Level for Tc-99 in drinking water of 4 mrem/yr specified in 40 CFR 141.16, which corresponds to a concentration of 0.9 pCi/ml. However, the groundwater in the area between the manufacturing buildings and Joachim Creek, which is located to the southeast of WS-17B, is not used as a drinking water source. There are two private groundwater wells located onsite. However, these wells are

northeast of the manufacturing areas and will not be affected by the Tc-99 groundwater plume. The plant water supply well, which is located northwest of the ring storage area, is monitored monthly and has shown no beta radioactivity.

The measurements of Tc-99 in the groundwater are below the effluent limit specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 of 60 pCi/ml. In addition, further dilution of the contaminant is expected before the groundwater discharges to Joachim Creek. The creek acts as a shallow groundwater drain, thus protecting surrounding properties from the migrating groundwater plume. The licensee monitors this creek upstream and downstream of the site for gross beta activity. Gross beta measurements for the last 10 years have remained consistently at background levels.

### CONCLUSION

The licensee has committed to further hydrogeological characterization in conjunction with an investigation of potential contaminant migration from material buried under former 10 CFR 20.304 east of the manufacturing area. The staff will review the results from this investigation, as well as any subsequent investigations, to further understand Tc-99 migration and to assess the adequacy of the groundwater monitoring program.

From the information currently available, the locations of the wells appear adequate to monitor plumes from the evaporation ponds and manufacturing areas of the facility. With the upgrades described in the licensee's June 14, 1996, letter, the groundwater monitoring program appears sufficient to meet the requirements of 10 CFR Part 20.

The staff also concludes that there is sufficient supporting information to indicate that the contaminant of well # 4 (WS-17) is Tc-99, and the source of the contamination is the former ring storage area. Therefore, the staff recommends that Safety Condition S-2 be removed from License SNM-33 during the next licensing action.

Nevertheless, at the time of plant decommissioning the licensee will be required to fully characterize the extent of the Tc-99 contamination in soils and groundwater and to remediate if the levels are above established release criteria.

### Principal Contributors

Susan Chotoo  
Sean Soong

*Michael F. Weller*  
*Sept 29, 1997*