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WMUR:GGE
Docket No. 40-1341

MEMORANDUM FOR: Frank S. Anastasi
Operating Facilities Section I
Uranium Recovery Licensing Branch

THRU: Harry J. Pettengill, Section Leader
Operating Facilities Section II
Uranium Recovery Licensing Branch

FROM: Gregory G. Eadie
Operating Facilities Section II
Uranium Recovery Licensing Branch

SUBJECT: REVIEW OF TVA'S EMP REPORT DATED FEBRUARY 27, 1981;
(EDGEMONT, SOUTH DAKOTA INACTIVE MILL)

I have reviewed the report, "Edgemont, South Dakota, Uranium Mill Semiannual Effluent Release Report No. 11 (July 1, 1980, to December 31, 1980)," submitted by the TVA on February 27, 1981 in accordance with the semiannual reporting requirement of 10 CFR 40.65, and have the following comments:

Table 1 - Atmospheric Particulates

Four sampling locations were reported; one location was apparently "upwind" at one-half mile distance from the mill site, the other three samplers were located "downwind" at the SE site boundary and at three-fourth and one-half miles distance in the SE direction. The air samples were apparently "grab" samples collected on September 9, 1980, and on December 9, 1980; but no information was provided which specifies the exact sample collection period. Only uranium (natural) was reported. The uranium values reported for September 9, 1980, were all the same value of 0.011 pCi/m³, and the December 9, 1980, samples were also the same values of 0.010 pCi/m³.

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These uranium airborne concentrations are at least an order of magnitude greater than typical background levels measured in other uranium milling areas. The similarity of results for both sampling dates and all sampling locations regardless of being upwind or downwind seems to indicate that the mill site is probably not the source of these airborne uranium concentrations, otherwise concentrations should be lower at greater distances from the site. However, until more data is collected on a continuous basis and such results are correlated with wind speed and direction, no positive determination of the true source (i.e., mill site or natural background in area surrounding Edgemont) can be made.

Table 2 - Off-site Surface and Ground Waters

The complete evaluation of the ground and surface water monitoring program (i.e., sampling locations, well depths, and chemical analyses) will be discussed in a separate memorandum.

Surface water samples were collected at two locations on the Cheyenne River (one upstream at one-half mile W and one downstream at one mile E of the mill site). Grab samples were collected on September 9, 1980, and on December 30, 1980. Results were reported for uranium and dissolved radium-226 only. The highest radium-226 result was 0.6 pCi/l which is typical of background concentrations and is also less than the current EPA drinking water standard of 5.0 pCi/l. The highest uranium result was 9.5 pCi/l which is well below the acceptable criteria of 3385 pCi/l (i.e., 5 mg/l) and the reported uranium levels are typical of background concentrations. Surface water samples were also collected from Cottonwood Creek--one location one-half mile S and the other location one mile E of the mill site. Results for the Cottonwood Creek sampling are slightly

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higher than those for the Cheyenne River. The highest radium-226 result for Cottonwood Creek was 0.7 pCi/l and the highest uranium result was 28.4 pCi/l--both results are within typical background concentrations.

Two ground water wells were grab sampled on September 2, 1980, and on December 30, 1980. The feed water well for Silver King Mines, Inc., had radium-226 values of 4.1 and 4.9 pCi/l and uranium values of 2.7 pCi/l for these sampling dates. The sample from the Edgemont Water Works had radium-226 values of 5.3 and 2.9 pCi/l and uranium values of 2.7 and 2.0 pCi/l for these sampling dates. The one sample from the Edgemont Water Works exceeds the EPA drinking water radium-226 standard, but all of the uranium concentrations are typical of natural background levels.

Table 3 - On-site Monitor Wells

Two on-site monitor wells were grab sampled one day each month (June through November 1980) and analyzed for uranium, thorium-230, and radium-226 contents. The highest reported results for this period were 1.23 pCi/l for radium-226, 2.28 pCi/l for thorium-230, and 1.1 pCi/l for uranium. All reported results are typical of background concentrations and are below applicable drinking water standards.

Table 4 - TVA Sampling of Surface and Groundwater

Data reported in this table is more extensive (i.e., three sampling locations on both the Cheyenne River and Cottonwood Creek; and analysis for uranium, thorium-230, and radium-226) than data reported in Table 2. The highest reported results, irrespective of any particular sample were: 41 pCi/l for uranium, 2.32 pCi/l for thorium-230, 2.66 pCi/l for radium-226, and the only polonium-210 result was 3.2 pCi/l. However, all reported results are typical of natural background concentrations.

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Five additional locations were identified as ground water sampling locations. Only one sample, at the SE corner of pond No. 1 for the August 14, 1980 sampling, had a radium-226 content of 7.51 pCi/l, otherwise all other results were typical of background concentrations for all measured radionuclides.

Table 5 - Air Filter Composites

Air filters were collected at two locations on eight different days and analyzed for uranium, thorium-230, and radium-226 concentrations. The highest reported values, irrespective of any particular sample were: 0.0005 pCi/m³ for uranium. The highest reported results were from the station 1.1 km WNW of the mill (i.e., on the upwind direction). These reported uranium values are typical of background concentrations and are two orders of magnitude less than the uranium values reported in Table 1.

Conclusions

The results of the sample collection and analysis program for the inactive Edgemont mill site as contained in this report submitted in accordance with 10 CFR 40.65 provides only minimal information to permit a complete evaluation of the impact of the mill site on the local environs. The reported airborne particulate, ground and surface water monitoring results reflect typical background concentrations of uranium, thorium-230, and radium-226, except for the one water sample from the Edgemont Water Works (9/2/80) which had a radium-226 content of 5.3 pCi/l. The main deficiency in the airborne particulate monitoring was that it was only grab sampling for less than one day each calendar quarter at only four locations. Also, there is an apparent duplication of efforts since similar samples were collected and analyzed by TVA and a separate sample

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collected and analyzed by the mill personnel; however, the reported uranium airborne particulate results are conflicting (see Table 1 with values 0.010 and 0.011 pCi/m³ whereas Table 5 indicated the highest value of 0.0005 pCi/m³ for uranium). This discrepancy in the measured airborne uranium concentrations should be evaluated and explained.

Recommendations

The licensee should be required to develop a comprehensive environmental monitoring program (EMP), and to implement such a program as soon as possible, in order to evaluate the impact of planned site decontamination and decommissioning activities. As a minimum, the licensee's EMP should have:

- 1) Air Particulate Sampling -- at four locations; one sampler upwind but off-site as a background or control location, one sampler on-site near the existing mill complex, one sampler in the downwind direction at the site boundary, and one sampler at the nearest off-site residence (i.e., the location with the highest predicted airborne concentration). Sampling shall be conducted continuously with weekly filter changes or more frequently as required by dust loading. Analysis shall be on quarterly composites for uranium, thorium-230, radium-226, and lead-210.

- 2) Ground Water -- at least 2 wells; one well located hydrologically upgradient from the tailings disposal area to serve as a control location and one well located hydrologically downgradient from the tailings disposal area. Sampling shall be by grab sampling on a quarterly basis, with analysis for dissolved uranium, thorium-230, radium-226, lead-210, and polonium-210.

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- 3) Surface Water -- at least two locations on both the Cheyenne River and the Cottonwood Creek; one sampling location to be upstream of the mill site to serve as a control location, and the second sampling location to be downstream from the mill site. Sampling shall be by grab sampling on a monthly basis, with analysis for both the dissolved and suspended uranium, thorium-230, radium-226, lead-210, and polonium-210.
- 4) Sediment -- from the same locations as used for the surface water monitoring (i.e., a sample upstream and one downstream on both the Cheyenne River and Cottonwood Creek). Sampling shall be completed once before site cleanup activities begin and another sampling upon completion of site restoration activities. Analysis shall be for uranium, thorium-230, radium-226, and lead-210.
- 5) Gamma Exposure Rate -- at the same locations as used for the airborne particulate monitoring (i.e., at least four locations). Measurements shall be continuous using a passive integrating device such as the thermoluminescence dosimeter (TLD), with analysis on a quarterly basis for direct gamma exposure rate in $\mu\text{R/hr}$.

Original signed by

Gregory G. Eadie
 Operating Facilities Section II
 Uranium Recovery Licensing Branch
 Division of Waste Management

Approved by: Original signed by

H. J. Pettengill, Section Leader
 Uranium Recovery Licensing Branch

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