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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
URANIUM RECOVERY FIELD OFFICE  
BOX 25325  
DENVER, COLORADO 80225

JAN 02 1990

URFO:GRK  
Docket No. 40-1341  
SUA-816, Amendment No. 33  
04001341750E

MEMORANDUM FOR: Docket File No. 40-1341  
FROM: Gary R. Konwinski  
Project Manager  
SUBJECT: PROCESS AREA TERMINATION AMENDMENT

Introduction

The decommissioning and decontamination of the TVA, Edgemont site, involved removal of the tailings from their respective tailings impoundments and relocation of these materials to a disposal cell. Similarly, the mill building and ancillary facilities were dismantled, crushed, and mixed with the tailings in the disposal cell. Prior to initiation of decommissioning and decontamination, an environmental statement was prepared that discussed the issues associated with the proposed action. This document was published in June of 1982, as NUREG-0846.

Within the body of the "Final Environmental Statement Related to the Decommissioning of the Edgemont Uranium Mill," a considerable amount of text discussed options for disposal and disposal selection criteria. Since the publication of the environmental statement, numerous regulations concerning long-term disposal of the tailings, ground-water remediation, and acceptable radon exhalation rates have been modified. Regulatory requirements concerning each of these areas are discussed in subsequent paragraphs.

Long-Term Disposal

The primary objective for the Edgemont Project was to relocate the tailings and other contaminated materials from the processing site to a disposal site and isolate them from the environment. An extensive design was undertaken at the disposal site, which utilized the Belle Fouché shale as a foundation material as well as a source of cover. The Belle Fouché shale consists of silt and clay particles of which 100 percent consistently passes the No. 200 sieve. The soils classify as CL and CH materials by the Unified Soil Classification system. Their field and laboratory hydraulic conductivities have consistently been 1.0E-8 cm/sec or less.

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In addition to the construction commitments discussed in NUREG-0846, several license conditions concentrating on long-term disposal were incorporated into Source Material License SUA-816. These construction requirements are stated in License Condition Nos. 19 and 22. Various inspections of the site have verified that TVA and their contractors have fulfilled these license requirements by constructing the cell as required, and therefore, these license conditions should be deleted from Source Material License SUA-816. However, the requirement to submit as-built drawings of the disposal cell and a final report should be maintained.

#### Ground-Water Remediation

Tailings disposal at the Edgemont mill utilized a slurry that was discharged into numerous tailings impoundments. These impoundments were unlined and constructed of native alluvial materials in the drainage areas of Cottonwood Creek and the Cheyenne River. Due to the construction materials as well as the lack of tailings impoundment liners, the tailings impoundments lost much of the tailings solution to the alluvium. However, the alluvial materials are rather thin and underlain by the Belle Fouche shale. Due to the highly impermeable nature of this shale, leachate moving through the alluvium contacted the shale, traveled on its surface, and was discharged to Cottonwood Creek and the Cheyenne River.

Although leachate was produced, the alluvial units contained sufficient buffering capacity to retard the movement of the majority of hazardous constituents. Gradually, hazardous constituents in concentrations above background were noticed in monitoring wells established in the process area. However, this data was considered unreliable due to the utilization of steel casings, the questionable construction of the wells, and sampling methods that were being utilized. In response to this, TVA was required by licensing action to complete several new wells on the site, as well as update their sampling protocol.

These actions indicated that the ground water in the alluvial materials had slightly better quality than previously observed. It was apparent that the original monitoring wells had connections to the land surface and were not truly indicative of the ground water quality. As these wells were being constructed and baselined, tailings dewatering and relocation efforts were having dramatic effects on the water levels in the alluvial wells. The recharge to the alluvial units was primarily from the tailings discharge and associative ponded waters. Currently, the saturated thickness over the eastern half of the process area is approximately 5 feet. The western half of the process area is essentially devoid of alluvial ground water. This contrasts sharply with a 1982 saturated thickness of 20 and 5 feet in these two areas, respectively.

Dependable water quality data for the processing site was collected from 1988 to the present. These data indicate that, relative to background, the hazardous constituents of selenium, barium, and gross alpha are elevated as shown in Table 1.



Table 1 - TVA Edgemont - Ground-Water Quality Data

	<u>Low background</u>	<u>High background</u>	<u>P.O.C. value</u>
Selenium	0.001	0.003	0.050
Nickel	0.008	0.670	0.190
Arsenic	0.001	0.002	0.001
Chromium	0.007	0.072	0.001
Cadmium	0.001	0.012	0.012
Barium	0.02	0.02	0.040
Beryllium	0.002	0.06	0.002
Molybdenum	0.004	0.004	0.004
Vanadium	0.002	0.002	0.002
Lead	0.001	0.002	0.002
Aluminum	0.001	0.001	0.001
Gross Alpha	7.7	13.6	89.8
Radium 226 & 228	1.8	2.7	2.25
Uranium	0.001	0.053	0.572

The data in Table 1 indicate that the current ground-water quality relative to background has not been significantly increased in the levels of hazardous constituents. Furthermore, the lack of water contained on the alluvial materials as well as the minimal saturated thickness, makes development of this geological unit as a drinking water resource a remote possibility.

The improved ground-water quality at the site is not the result of ground-water remediation by TVA. Historical records indicate that the ground-water quality has been much worse in past years. However, as the tailings, which are the source of the hazardous constituents, have been removed, precipitation has diluted the remaining hazardous constituents and allowed them to discharge into Cottonwood Creek and the Cheyenne River. This trend is continuing and the ground water is showing signs of further improvement. The flow in these two drainages has been sufficient that upstream and downstream monitoring have not shown detrimental effects.

Due to the ground-water situation that exists at the site, and the trend of further improvements in the hazardous constituents that are elevated, it is recommended that no further ground-water monitoring be performed at the site. Furthermore, the existing wells should be sealed and abandoned.

#### Radon Exhalation

The cover on the disposal cell was designed utilizing the RADON computer code. This code indicated that the disposal cell would need approximately 4.5 feet of soil cover to diminish radon exhalation rates to the regulatory standard of 20 picocuries per square meter per second. Although this has not been measured, the cover requirements specified in the reclamation plan have been constructed to the compaction requirements noted in the license. Furthermore, extensive gamma surveys conducted by the NRC during the last two inspections indicate that background gamma radiation readings exist over the entire disposal cell. Because the design objectives have been met, it is recommended

that the license conditions discussing construction techniques and cover designs be deleted from the license.

### Summary

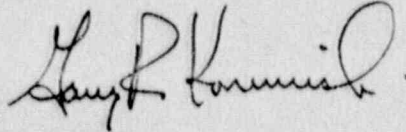
Based upon the three construction, decommissioning, and reclamation inspections that have been conducted during the past year, as well as the information discussed in the memorandum, it is recommended that Source Material License SUA-816 be modified to delete license conditions relating to disposal cell construction, environmental monitoring, and all references to the process area. It is also recommended that a Federal Register Notice be filed indicating that the process area is being released for unrestricted use. Furthermore, it is recommended that an existing license condition be modified to note that the vegetation success at the processing site and disposal cell after two growing seasons be documented per Environmental Statement agreements.

The staff would recommend that License Condition Nos. 11, 12, 15, 16, 19, 21, 24, 25, 27, and 28 be deleted and License Condition Nos. 3, 4, 7, 9, and 22 be modified to read as follows:

3. SUA-816, Amendment No. 33
4. Until NRC determines that adequate submittals have been made.
7. Residual contamination from previous licensed activities
9. Authorized Place of Use: Licensee's tailings disposal site located in Sections 8 and 17, T9S, R3E, near Edgemont, S.D.
11. DELETED by Amendment No. 33.
12. DELETED by Amendment No. 33.
15. DELETED by Amendment No. 33.
16. DELETED by Amendment No. 33.
19. DELETED by Amendment No. 33.
21. DELETED by Amendment No. 33.
22. The licensee shall, within 4 months of the end of the second consecutive growing season, submit data for all reclaimed land that verify that the vegetative cover and density after two consecutive growing seasons equals or exceeds perennial species at the control area.

Additionally, the licensee shall submit a final report which summarizes decontamination of the process area and construction of the disposal cell.

- 24. DELETED by Amendment No. 33.
- 25. DELETED by Amendment No. 33.
- 27. DELETED by Amendment No. 33.
- 28. DELETED by Amendment No. 33.



Gary R. Konwinski  
Project Manager

Approved by:



Ramon E. Hall  
Director

Case Closed: 04001341750E



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1341/GRK/89/12/11/TERM AMEND

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