ENVIRONMENTAL ASSESSMENT FOR RENEWAL OF SOURCE MATERIAL LICENSE NO. SUA-1358

ENERGY FUELS NUCLEAR, INC.
WHITE MESA URANIUM MILL
SAN JUAN COUNTY, UTAH

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DOCKET NO. 40-8681

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety
and Safeguards
Division of Waste Management

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1.0 INTRODUCTION

By application dated August 23, 1991, and supplements and revisions transmitted by letters dated December 13 and 17, 1991, January 13 and April 7, 1992, Umetco Minerals Corporation (Umetco) requested renewal of Source Material License SUA-1358, for continued authorization of milling activities at the White Mesa Uranium Mill, which is located in San Juan County, Utah. By letter dated March 29, 1994, Umetco requested transfer of the license and a change in ownership of the mill to Energy Fuels Nuclear, Inc. (EFN). On May 25, 1994, the license was amended to change designation of the licensee to EFN. In the acquisition agreement between EFN and Umetco, EFN agreed to abide by all commitments and representations made to the U.S. Nuclear Regulatory Commission by Umetco.

With this license renewal, NRC will be authorizing continued mill operations under the Performance-Based License Condition (PBLC) format. Under Performance-Based Licensing, the licensee has the burden of ensuring the proper implementation of the PBLC. The licensee may:

- Make changes in the facility or process, as presented in the application,
- Make changes in the procedures presented in the application, or
- Conduct tests or experiments not presented in the application, without prior NRC approval, if the licensee ensures that the following conditions are met:

  (1) The change, test, or experiment does not conflict with any requirement specifically stated in the license (excluding material referenced in the Performance-Based License Condition), or impair the licensee's ability to meet all applicable NRC regulations.

  (2) There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

  (3) The change, test, or experiment is consistent with NRC's conclusions regarding actions analyzed and selected in the EA.

Otherwise, the licensee is required to submit an application for a license amendment from NRC. The licensee's determinations whether the above conditions are satisfied will by made by a Safety and Environmental Review Panel (SERP).

The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management and shall be responsible for managerial and financial approval changes; one member shall have expertise in operations and/or construction and shall have expertise in implementation of any changes; and one member shall be the corporate radiation safety officer or equivalent. Additional members may be included in the SERP as appropriate, to address technical aspects in several areas, such as health physics, surface water hydrology, specific earth

sciences, and others. Temporary member, or permanent member other than the three identified above, may be consultants.

The licensee shall maintain records until license termination of any changes made pursuant to the PBLC. These records shall include written safety and environmental evaluations, made by the SERP, that provide the basis for determining that the change complies with the requirements referred to in the above conditions. The licensee shall furnish an annual report to NRC that describes such changes, tests, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit any pages of its license application that have been revised to reflect changes made under this condition.

EFN has not yet submitted its standard operating procedures (SOPs) for operation of the SERP. Therefore, NRC will require, by license condition, that EFN submit the SOPs for NRC review by March 31, 1997, and until such time as NRC approves the SOPs, EFN will not be authorized to implement the PBLC. EFN agreed to this license condition by telephone conversations on December 31, 1996.

NRC's inspection function remains unchanged with the administration of Performance-Based Licensing. Operational changes, regulatory commitments, and recordkeeping requirements implemented by EFN through the PBLC are subject to NRC inspection and possible enforcement actions.

1.1 Background Information

By letter dated February 6, 1978, Energy Fuels Nuclear, Inc. (EFN) applied to NRC for a source and byproduct material license to construct and operate the White Mesa uranium milling facility located approximately 9.5 kilometers (km) (6 miles) south of Blanding, Utah (see Figure 1.1). As a result of studies conducted for the Final Environmental Statement (FES) (NUREG-0556; NRC, 1979), NRC concluded that mitigative measures proposed and implemented by the applicant would reduce any adverse environmental impacts associated with the White Mesa project to acceptable levels. Following issuance of the FES in May 1979 and the staff's Safety Evaluation Report (SER) in August 1979, NRC issued Source Material License SUA-1358 on August 7, 1979.

SUA-1358 was renewed in 1985, and was due to expire on September 23, 1991. As stated above, Umetco submitted a license renewal application by letter dated August 23, 1991, and NRC notified Umetco that the license was in timely renewal by letter dated November 7, 1991.

Source Material License SUA-1358 and ownership of the White Mesa mill were transferred from Umetco to EFN in May 1994. The mill was operated on a continual basis from May 1980 until February 1983, and then intermittently from October 1985 to the present time.

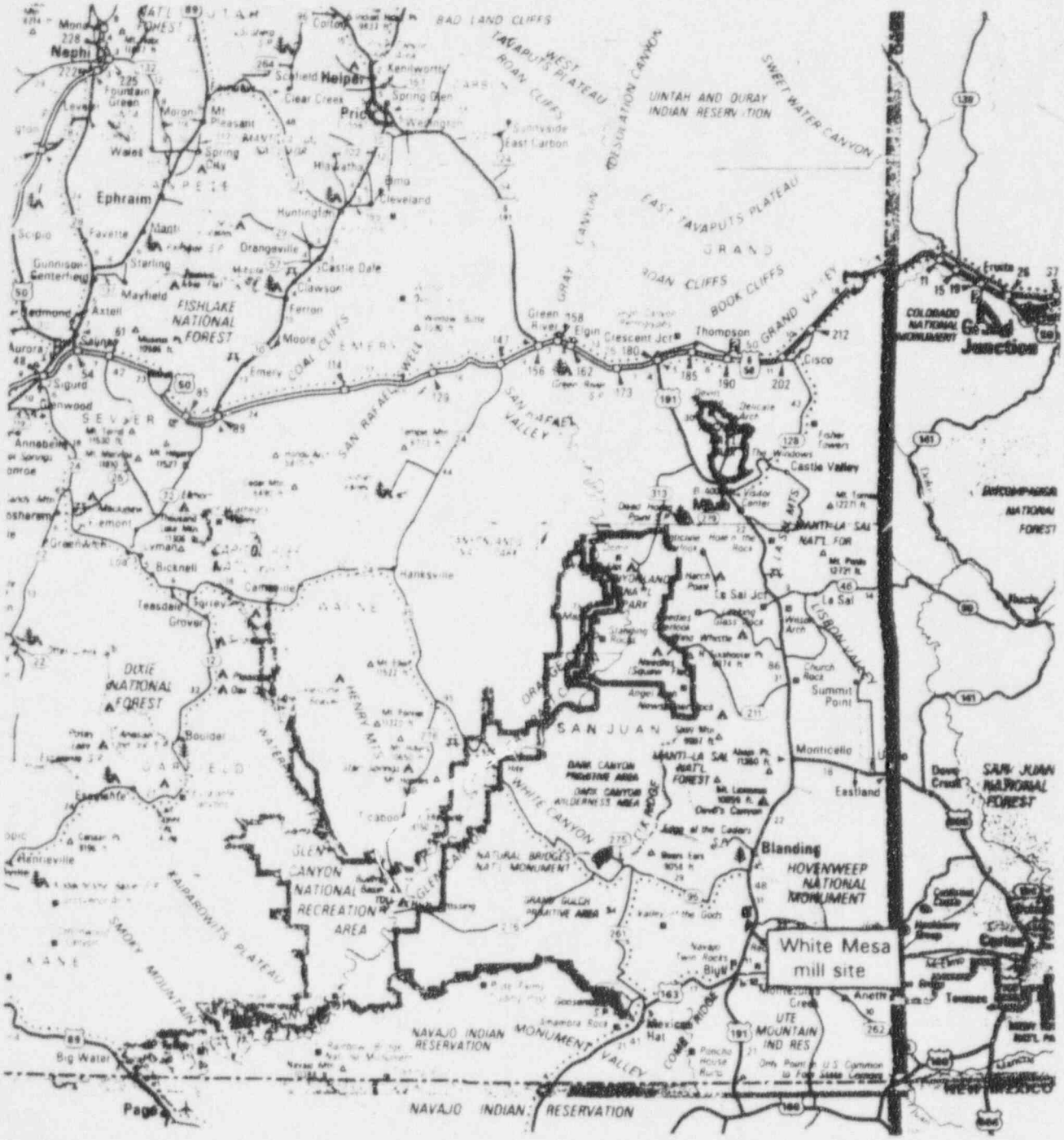


Figure 1.1 Location of the White Mesa Uranium Mill

1.2 Proposed Action

The proposed action is to renew SUA-1358 for operation of the White Mesa mill at a maximum production rate of 4380 tons of yellowcake per year. Additionally, EFN will be authorized, by license condition, to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by its milling operations authorized by the renewal license.

1.3 Review Scope

1.3.1 Federal and State Authorities

NRC source material licenses are issued under Title 10, Code of Federal Regulations, Part 40 (10 CFR Part 40). As stated in 10 CFR 40.3, "A person subject to the regulations in this part may not receive title to, own, receive, possess, use, transfer, provide for long-term care, deliver or dispose of byproduct material or residual radioactive material as defined in this part or any source material after removal from its place of deposit in nature, unless authorized in a specific or general license issued by the Commission ..." Source material is defined under 10 CFR 40.4 as (1) uranium or thorium, or any combination thereof, in any physical or chemical form, or (2) ores which contain by weight 0.05 percent or more of uranium, thorium, or any combination thereof.

In addition, the Uranium Mill Tailings Radiation Control Act of 1978, as amended (UMTRCA), requires persons who conduct uranium source material operations to obtain a byproduct material license to own, use, or possess tailings and wastes generated by the operations (including above-ground wastes from in situ operations). This EA has been prepared under 10 CFR Part 51, "Licensing and Regulatory Policy and Procedures for Environmental Protection," which implements NRC's environmental protection program under the National Environmental Policy Act of 1969 (NEPA). In accordance with 10 CFR Part 51, an EA serves to (a) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI), (b) facilitate preparation of an EIS when one is necessary, and (c) aid the NRC's compliance with NEPA when an EIS is not necessary.

Impacts from the commercial scale operation of the site were previously evaluated in the FES (NRC, 1979). The EA and SER for the previous renewal of SUA-1358 were issued by the NRC staff on September 26, 1985.

A new SER will accompany this EA. In preparing these two documents, the staff will evaluate the potential impacts associated with the continued commercial operation of the White Mesa mill. Should the NRC issue a FONSI, based on the licensee's application materials, previous operational data, and information in the FES and previous EA, a renewed commercial source material license would be issued to EFN.

The State of Utah Department of Environmental Quality (UDEQ) administers and implements the State's rules and regulations.

1.3.2 **Basis of NRC Review**

The NRC, Division of Waste Management, staff has assessed the environmental and safety impacts associated with the renewal of EFN's commercial license for the White Mesa mill, and documented the results of the assessment in this report. The staff performed this appraisal in accordance with the requirements of 10 CFR Part 51.

In conducting its assessment, the staff considered the following:

- Information contained in the previous environmental evaluations of the White Mesa project (i.e., the 1979 FES and the 1985 EA);
- Information contained in EFN's August 23, 1991, renewal application, and supplementary information submitted by letters dated December 13, 1991; July 28, October 5, and November 22, 1994; and December 13, 1996;
- Information contained in EFN amendment requests, NRC approvals of such requests, and land use and environmental monitoring reports transmitted subsequent to August 23, 1991;
- Personal communications with EFN and UDEQ; and
- Information derived from NRC staff site visits and inspections of the White Mesa mill site.

2.0 SITE DESCRIPTION

2.1 Location

The project site is located in central San Juan County, Utah, approximately 9.5 km (6 miles) south of the city of Blanding. The mill can be reached by taking a private road for approximately 0.5 miles west of Utah State Highway 191.

All operations to be authorized by the renewed license will be conducted within the confines of the existing site boundary. The project site consists of 1971 hectares (ha) (4871 acres) of private land together with mill site claims. The mill site itself occupies approximately 20 ha (50 acres) and the tailings disposal cells another 182 ha (450 acres).

2.2 Climate and Weather

Southeastern Utah's climate is classified as arid, with an average annual precipitation of 30 centimeters (cm) (12 inches), 75 percent of which falls as rain. Two separate rainfall seasons can be distinguished in the area, with the first occurring during late summer and early fall, and the second between the months of December and March. Temperatures in summer normally range from 4°C (40°F) to 32°C (90°F), while winter temperatures range between -9°C (15°F) and 13°C (55°F). The yearly normal mean temperature is 9°C (50°F).

The mean annual relative humidity is 44 percent and is normally highest in January and lowest in July. The average evaporation rate for the period from May through October is 118.8 cm (46.8 inches), with the greatest evaporation occurring normally during the month of July. The dominant wind directions are from the north to northeast (approximately 30 percent of the time) and out of the south to southwest (approximately 25 percent of the time). Wind speeds are generally less than 15 miles per hour (mph), with winds faster than 25 mph occurring less than one percent of the time.

2.3 Geology

2.3.1 **Regional Geology**

The project site lies within a region designated as the Canyon Lands section of the Colorado Plateau physiographic province. Elevations in the region range from approximately 923 meters (3000 feet) in the bottom of canyons to over 3385 m (11,000 ft) among the peaks of the Henry, Abajo and La Sal Mountains to the northeast. The average elevation for the area, excluding deeper canyons and isolated mountain peaks, is about 1524 m (5000 ft).

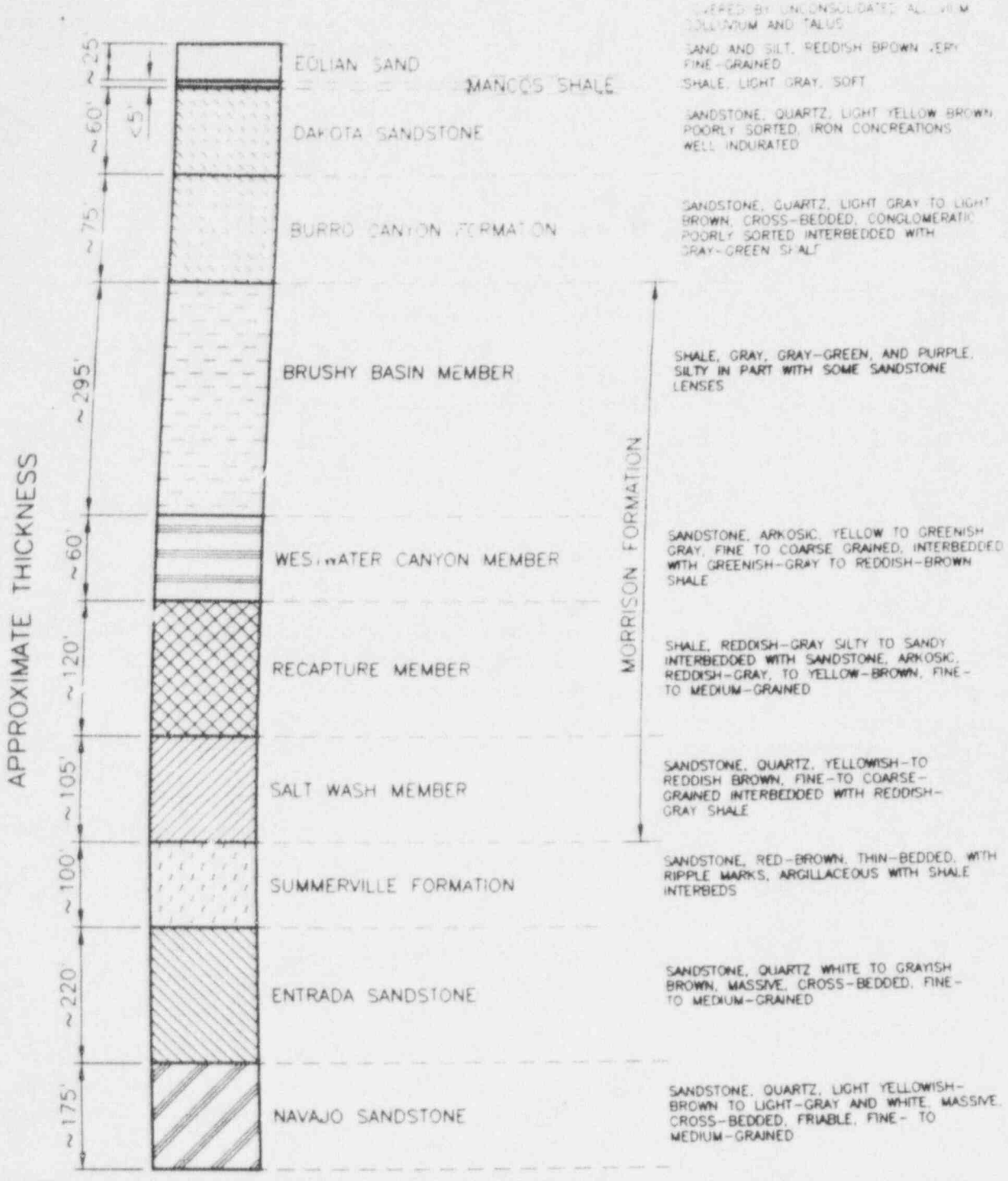
The sedimentary rocks exposed in southeastern Utah have a total thickness of approximately 1828 to 2133 m (6000 to 7000 ft). These sedimentary units range in age from Pennsylvanian to Late Cretaceous; older rock units which underlie those of Pennsylvanian age are not exposed in the project area.

Structural features in the project area have been divided into three main categories on the basis of origin or mechanism of the stress that created the structure. These categories are: (1) structures related to large-scale regional uplifting or downwarping directly related to movements in the basement complex (the Monument Uplift and the Blanding Basin); (2) structures due to diapiric deformation of thick sequences of evaporite deposits, salt plugs and salt anticlines (the Paradox Fold and Fault Belt); and (3) structures formed due to magmatic intrusions (the Abajo Mountains).

A generalized stratigraphic column for the region is provided as Figure 2.1. The Summerville Formation, Entrada Sandstone, and Navajo Sandstone are the deepest units of concern encountered at the site.

2.3.2 **Local Geology**

The White Mesa mill site is located on the western edge of the Blanding Basin, sometimes referred to as the Great Sage Plain, lying east of the north/south-trending Monument Uplift, south of the Abajo Mountains and adjacent to the northwest-trending Paradox Fold and Fault Belt. The Abajo Mountains are the most prominent topographic feature in the region, rising over 1219 m (4000 ft) above the surface of the plain. The lithology of the immediate area is composed of thousands of feet of multi-colored pre-Tertiary age marine and non-marine sedimentary rocks. Erosion on the regionally-uplifted sedimentary strata has produced an array of spectacularly eroded canyons and mesas for which the area is famous.



NOTE:

1. THIS DRAWING IS NOT TO SCALE.
2. ALL THICKNESSES ARE APPROXIMATE

Figure 2.1 Generalized Stratigraphic Column for the White Mesa Mill Site (after Titan, 1994b)

The mill rests on alluvial windblown silt and sand which covers sandstones and shales of Jurassic and Cretaceous age. The surface of the mesa is nearly flat, with a surface relief of 30 m (98 ft). The maximum relief between White Mesa and the adjacent Cottonwood Canyon is about 230 m (750 ft).

2.3.3 **Seismicity**

The historical record of seismicity for the region is about 150 years old. Since 1853, approximately 1200 seismic events have been recorded within 322 km (200 miles) of the project area. The nearest of these events occurred in the Glen Canyon Recreation Area, 63 km (38 miles) away, and at a location approximately 88 km (53 miles) to the northeast of the site. An intensity V (Modified Mercalli Scale) event occurred on August 29, 1941, just east of Durango, Colorado, 153 km (99 miles) away. Based on the region's seismic history, the probability of a major damaging earthquake occurring at or near the site is remote.

2.4 Water Resources

2.4.1 **Surface Water**

Runoff in the project area is directed by the general surface topography either westward into Westwater Creek, eastward into Corral Creek, or to the south into an unnamed branch of Cottonwood Wash. Low average annual rainfall, local soil characteristics, and the porous nature of local stream channels cause these streams to flow intermittently in response to local snowmelt and rainstorms. These same conditions, in concert with the gentle slope of White Mesa, also contribute to the lack of perennial surface waters on or in the vicinity of the site.

North of the site, a small drainage area of approximately 25 ha (62 acres) provides limited surface runoff to the site. Total runoff from the site is estimated to be less than 1.3 cm (0.5 inches) annually.

The San Juan River, a major tributary to the upper Colorado River, is located approximately 29 km (18 miles) south of the mill site.

2.4.2 **Groundwater**

The Dakota Sandstone is the rock unit that underlies the mill and the tailings disposal cells. At the mill site, this formation extends to depths of 13 to 20 m (43 to 66 feet) below the surface, and it is typically composed of sandstones with random discontinuous shale and siltstone layers. Beneath the site, the Dakota Sandstone is very dry to dry, with an average volumetric water content of 3 percent. Its porosity is predominately intergranular, ranging from 13.4 to 26.0 percent, with an average value of 19.0 percent. Measured saturated hydraulic conductivities from packer tests range from 9.1E-04 to 2.71-E06 centimeters per second (cm/sec), with a geometric mean of 3.89E-05 cm/sec. (Titan, 1994b)

The underlying Burro Canyon Formation is similar to the Dakota Sandstone. Composed of very fine- to coarse-grained sandstones, with discontinuous random shales, the Burro Canyon becomes argillaceous near its lower contact with the bentonitic mudstones and claystones of the Brushy Basin Member (Morrison Formation). Beneath the site, groundwater is first encountered at this contact as a zone of perched water. This zone occurs at depths of 22 to 33 m (73 to 109 feet) below the surface, and its thickness varies across the project area, from 17 m (55 feet) in the northern section to less than 1.5 m (5 feet) in the southern area. Potentiometric maps suggest that the predominant direction of groundwater flow in the saturated portion of the Burro Canyon Formation beneath the site is to the south-southwest (Titan, 1994b).

The Burro Canyon outcrops along the walls of Westwater Creek Canyon and Corral Canyon, and groundwater from the perched zone discharges into these canyons, as evidenced by the occurrence of springs and productive vegetation patterns. Based on the results of 12 pumping/recovery tests and 30 packer tests, the hydraulic conductivity of the saturated portion of the Burro Canyon Formation ranges from 1.4E-06 to 1.2E-03 cm/sec, with a geometric mean of 1.0E-05 cm/sec (Titan, 1994b). Water yields at the test wells were very low, typically less than 0.5 gallons per minute (gpm), although slightly higher yields (on the order of 2 gpm) may be possible in localized zones of higher permeability, resulting from lenses of coarser material or localized fracturing.

The quality of the Burro Canyon perched water beneath and downgradient from the site is poor and extremely variable. The concentrations of total dissolved solids (TDS) measured in water sampled from upgradient and downgradient wells range between approximately 1000 and 5000 milligrams per liter (mg/l). Sulfate concentrations measured in three upgradient wells varied between 670 and 1740 mg/l.

As stated above, the Brushy Basin Member of the Morrison Formation is composed of bentonitic mudstones and claystones. In the region, the thickness of this unit ranges from 60 to 135 m (200 to 450 feet). A total of approximately 365 m (1200 feet) of unsaturated, low permeability shales and poorly sorted sands of the Morrison and Summerville Formations separate the Brushy Basin from the underlying Entrada and Navajo Sandstones.

The Entrada and Navajo Sandstones are prolific aquifers beneath and in the vicinity of the site. Water wells at the site are screened in both of these units, and therefore, for the purposes of this discussion, they will be treated as a single aquifer. Water in the Entrada/Navajo Aquifer is under artesian pressure, rising 245 to 275 m (800 to 900 feet) above the top of the Entrada's contact with the overlying Summerville Formation; static water levels are 120 to 150 m (400 to 500 feet) below ground surface. Within the region, the aquifer is capable of yielding domestic quality water at rates of 150 to 225 gpm, and for that reason, it serves as the source of water for the mill. Additionally, two domestic water supply wells drawing from the Entrada/Navajo Aquifer are located 4.5 miles southeast of the mill site on the Ute Indian Reservation.

2.5 Topography

The mill site is located on a slightly tilted platform that, from the air, appears similar to a peninsula, as it is surrounded by steep canyons and washes and is connected to the Abajo Mountains to the north by a narrow neck of land. On the mesa, the topography is relatively flat, sloping at less than one percent to the south and nearly horizontal from east to west.

2.6 Demography

According to the 1990 census, the population density of San Juan County, in which the mill is located, is 0.6 persons per square kilometer (1.6 individuals per square mile); by comparison, the statewide density is greater than 8 individuals per square kilometer (20 persons per square mile). The town of Blanding, Utah, approximately 9.5 km (6 miles) north of the mill, is the largest population center near the project with 3162 persons. Approximately 5.6 km (3.5 miles) southeast of the project site is the White Mesa Reservation, a community of approximately 320 Ute Mountain Indians, although only an estimated 60 to 75 individuals live within 8 km (5 miles) of the site. The nearest resident is located approximately 5 km (3 miles) to the northeast of the mill, which is in the prevailing wind direction. Table 2.1 provides population centers located within 60 km (37 miles) of the mill site.

2.7 Land Use

Approximately 60% of San Juan County is Federally-owned land administered by the U.S. Bureau of Land Management, the National Park Service, and the U.S. Forest Service. Primary land uses includes livestock grazing, wildlife range, recreation, and exploration for minerals, oil, and gas. A quarter of the county is Indian land owned either by the Navajo Nation or the Ute Tribe. The area within 8 km (5 miles) of the project site is predominantly range land owned by residents of Blanding. The White Mesa mill site itself encompasses approximately 202 ha (500 acres).

A more detailed discussion of land use at the White Mesa site, in surrounding areas, and in southeastern Utah, is presented in the FES prepared for the project (NRC, 1979). Results of archeological studies conducted at the site and in the surrounding areas as part of the original environmental report are also documented in the FES.

EFN is currently required by license condition to conduct an annual land use survey of the area within 8 kilometers (5 miles) of the site and to submit a report of the survey to NRC. However, this survey is not required by the regulations, and therefore, with this renewal, NRC will drop this condition from the license. EFN is already required to comply with annual dose limits to individual members of the public (10 CFR 20.1301), and its demonstrations of compliance address observed changes in land use.

Table 2.1
Population Centers within 60 Kilometers of the White Mesa Mill Site
(modified from Umetco, 1991)

Town	1990 Population	Distance from Site (km)*	Distance from Site (miles)
White Mesa, UT (unincorporated)	320†	6.4	4
Blanding, UT	3162	9.5	6
Bluff, UT	847	25	15
Montezuma Creek, UT	1223	32	20
Monticello, UT	1806	43	27
Aneth, UT	991	43	27
Mexican Hat, UT	495	48	30
Eastland/Ucolo, UT	249	51	32
Dove Creek, CO	623	59	37

* Approximate distance from mill site by air
† Approximate population

3.0 PROCESS DESCRIPTION

A simplified flow diagram of the White Mesa mill circuit is provided as Figure 3.1.

3.1 Mill Circuit

Ore and other feed material is delivered to the site by truck. Once at the site, following weighing of the truck, an ore load is dumped at a specific location on the ore pad. Preliminary analyses are then conducted, and the moisture content of the ore determined. Loaders or trucks then haul stockpiled ore to the ore grizzly.

A semi-autogenous grinding (SAG) mill is used to grind the ore, and the resultant slurry is pumped to two mechanically-agitated storage tanks. Material from these tanks is pumped to a two-stage acid leach process, in which sulfuric acid, an oxidant, and steam are used to leach the ore slurry.

Next, a multi-staged counter-current decantation (CCD) washing circuit is employed to separate the strong acid liquor and wash the leached residue. During each CCD stage, solid particles settle to the bottom of the thickener tank, leaving a clarified uranium-bearing solution at the top. This solution is transferred "up-stage," where the same process of decantation takes place. Overflow from the top (i.e., the first) CCD thickener tank is sent to the two-stage leach process mentioned above, the overflow of which is clarified prior to

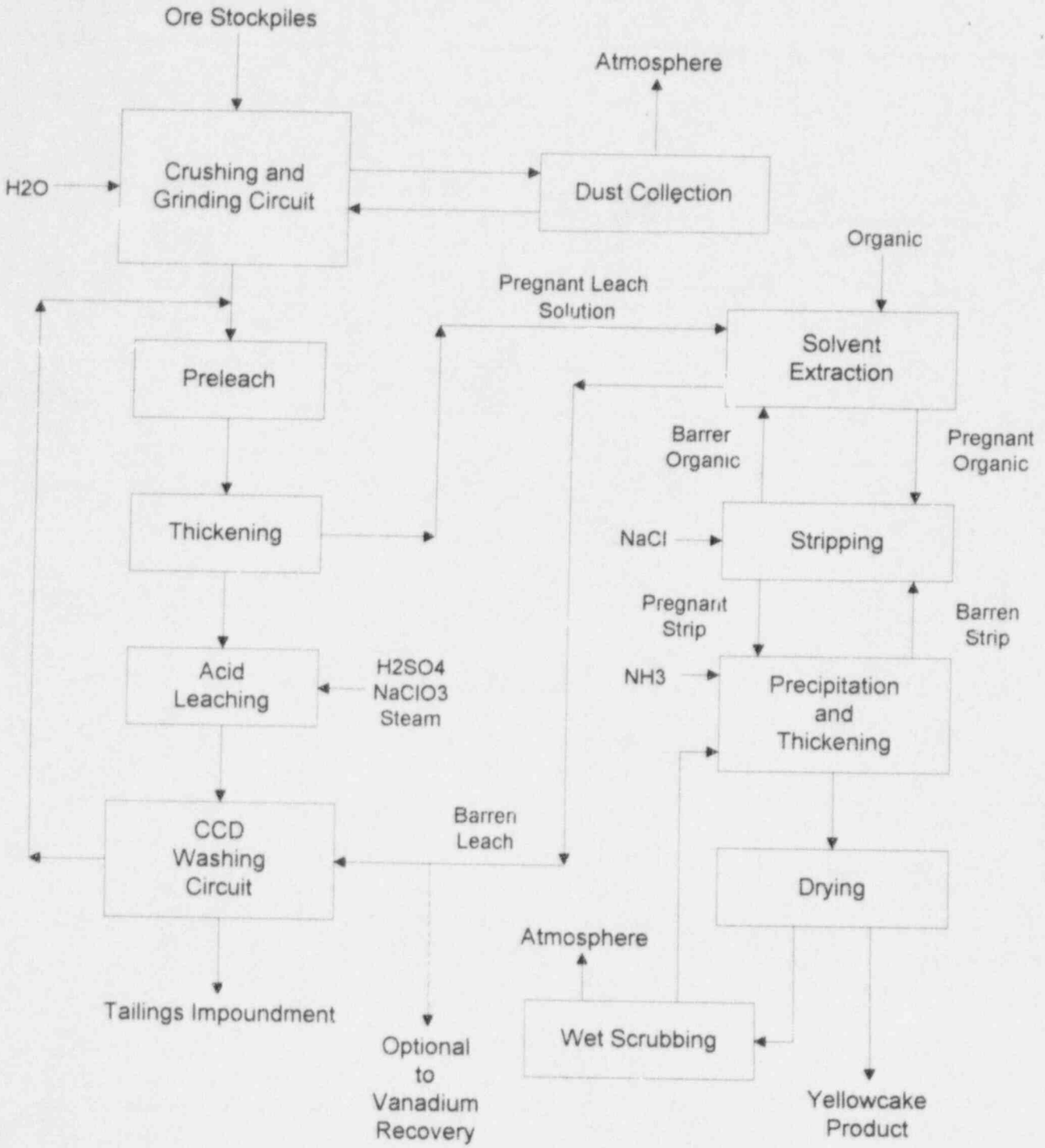


Figure 3.1 Generalized Flow Diagram of the Uranium Milling Process for the White Mesa Mill (modified from NRC, 1979)

solvent extraction. The slurry at the bottom of the tank is progressively transferred "down" the circuit. From the final thickener tank, it is sampled and then pumped to the tailings retention area.

Meanwhile, the uranium-bearing liquid is transferred to a solvent extraction process which is carried out in a series of mixing and settling vessels. Amine-type compounds and kerosene are added to dissolve the uranyl ions from the leach solution. The solution is then stripped of uranium by acidification and pumped to a precipitation tank.

Within the precipitation tank, the pregnant solution is neutralized and yellowcake is settled. The yellowcake is next transferred to a centrifuge where it is further concentrated. The thickened yellowcake slurry is transferred to either of two propane gas/diesel-fired multiple-hearth dryers. Both dryers feed to a common packaging hopper and drum filling station, where the dried yellowcake is powdered and packaged in 55-gallon drums.

These drying, powdering, and packaging operations are performed within an enclosure under negative pressure, with wet scrubbers used to collect airborne particulates. During the entire route of production, concrete curbing and sumps are designed to intercept any spillage and return it to the appropriate process circuit.

3.2 Mill Waste Disposal

Mill tailings are deposited within tailings cells located at the facility. The tailings, along with liquid waste, are slurried by pipeline to the impoundment system, which consists of a series of synthetically-lined cells that are designed for phased construction and reclamation. Cells are presently designated 1-I, 2, 3, and 4A (the higher the number refers to the more recently constructed cell).

The four tailings cells are designed to accept the quantity of waste to be produced during a 15-year operating period, at an ore processing rate of 2000 tons per day. The tailings and evaporation cells are designed and constructed as partially below-grade disposal facilities. Any change in the maximum operational freeboard and tonnage limits for the cells, as specified in the renewal application, will continue to require NRC approval due to the safety and environmental concerns involved. EFN also implements procedures to minimize dispersal of blowing tailings.

Each cell has a leak detection system designed to provide an early warning of catastrophic liner failure. These systems are checked daily as part of the tailings disposal system monitoring program, which also includes checks on slurry pipeline connections and wear, cell fluid levels, liner integrity, and the effectiveness of dust minimization methods. Each tailings cell embankment is also regularly monitored for stability and the results reported to NRC. Tailings Cell 4A was designed, constructed, and placed into operation in 1990, according to an NRC-approved plan and in accordance with U.S. Environmental Protection Agency (EPA) regulations.

As stated above, all production spillage or wastes, such as tailings and process water, are either returned to the mill circuit or sent by pipeline to the appropriate tailings impoundment, while sanitary wastes are disposed of separately in a State-approved

seepage system. This is currently required by license condition and will continue to be so required.

EFN will continue to be required to dispose of mill-generated waste considered as 11e.(2) byproduct material (e.g., contaminated equipment and parts) within Tailings Cell 2, in accordance with its procedure, "Radioactive Contaminated Waste Disposal," amended as noted in NRC's approval letter of August 1, 1995. EFN also disposes of uncontaminated wastes in Cell 2.

EFN is authorized currently to accept byproduct material from licensed in-situ leach facilities for disposal in Tailings Cell 3. Conditions of this authorization will continue to be specified by license condition. Environmental impacts associated with this disposal were assessed as part of the NRC licensing action approving EFN's amendment request.

4.0 EVALUATION OF ENVIRONMENTAL IMPACTS

4.1 Introduction

Operation of the mill will directly use about 202 ha (500 acres) of land for mill buildings and tailings cells. During operation, effluent releases (e.g., fugitive dust, hydrocarbons, radionuclides) will be maintained at levels as low as is reasonably achievable. Tailings, which are produced in large quantities and contained in lined disposal cells, will be reclaimed at the end of the project, in accordance with an NRC-approved reclamation plan. Mill operations should not, under proper operating conditions, have a significant impact on air and water quality. Environmental impacts associated with the original construction of the facility were assessed in the FES (NRC, 1979).

4.2 Air Quality Impacts

During operation of the mill, hydrocarbon release from the boiler, gaseous emissions from process chemicals, and fugitive dust and radon emissions from the ore pads will occur. Dust and radon levels will be controlled through spraying, while the other gaseous emissions should not exceed regulatory standards. Other emissions will be discussed in Section 4.6, "Radiological Impacts."

4.3 Historical and Cultural Resources

A historical survey was conducted in the project vicinity as part of the initial license application, and six historical sites were identified. However, none of these sites is in an area which will be affected by operations at the mill.

Archaeological surveys of the project site conducted in 1977 and 1979, identified 121 prehistoric sites which are affiliated with the San Juan Anasazi Indians who occupied this area of Utah from about 0 A.D. to 1300 A.D. As a result of the archaeological findings, a Memorandum of Agreement (MOA) between NRC, the Utah State Historic Preservation Officer, and the Advisory Council on Historic Preservation was established to specify requirements necessary to minimize adverse impacts to the previously identified archaeological sites.

The requirements were incorporated into SUA-1358 when initially issued. The requirements have been modified following subsequent amendments to the MOA. The most recent modifications were incorporated into SUA-1358 through the issuance of a license amendment on May 11, 1983. These requirements will be included in the renewed license.

The licensee will also be required to conduct, as a minimum, an archaeological and historical artifact survey of areas not previously surveyed prior to their disturbance.

4.4 Impacts to Water Resources

4.4.1 Surface Water Impacts

Continued operation of the mill should have negligible impacts on surface waters on and in the vicinity of the project site, because (1) mill effluents are not discharged to local surface waters; (2) sanitary wastes are discharged to State-approved leach fields; and (3) tailings from mill operations are discharged by pipeline to partially below-grade, lined impoundments. In addition, as noted above, EFN has committed to regular inspections of the tailings disposal system, including disposal cell embankments.

4.4.2 Groundwater Impacts

For the following reasons, the NRC staff does not believe that groundwater beneath or in the vicinity of the site will be adversely impacted by continued operation of the mill:

1. Four tailings cell have been constructed to accept tailings slurry and solutions and other approved wastes. Each of the cells has been designed and constructed to minimize seepage of tailings fluids into the subsurface. Cells 1-I, 2, and 3 have a 6-inch compacted sandstone bedding layer, an overlying synthetic liner, and a leak detection system consisting of: (1) a 12-inch thick compacted sand layer on the upstream face of the downstream retention dike, (2) a 3-inch diameter perforated pipe installed at the toe of the sand layer, and connecting to (3) a 12-inch diameter access riser pipe.

   Cell 4A is constructed with a 12-inch thick clay base layer overlain by a synthetic liner covering both the bottom and side slopes of the cell. A leak detection system is located beneath the synthetic liner. This system is composed of 4-inch perforated pipes embedded in granular materials in synthetically-lined trenches excavated into the clay base. These pipes are connected in turn to a 12-inch diameter access pipe.

   As part of EFN's inspection procedures for the tailings management system, daily measurements are taken of liquid levels in the leak detection system for each cell. If specific changes in these levels are recorded, site management is notified immediately. Quarterly sampling of a number of monitor wells completed in the Burro Canyon perched water zone and located around and among the tailings cells, is also required by EFN's inspection procedures. Further discussion of the licensee's groundwater detection monitoring program is provided in Section 4.6.1.

2. Based on estimates of net infiltration and volumetric moisture content of the vadose zone (i.e., the unsaturated portions of the Dakota and Burro Canyon Sandstones) and an average thickness of the vadose zone, EFN estimates that it would take 50 to 150 years for moisture to travel from the bottom of a tailings disposal cell to the perched water zone, depending on the extent of failure of the tailings disposal cell liner (Titan, 1994). Tailings disposal cell seepage traveling along joints or fractures in the Dakota Sandstone could potentially reduce this travel time to a few days or months. Jointing is common in the Dakota along the mesa's rim; however, coring studies to date have revealed no evidence of continuous fractures or joints with depth. Once in the saturated portion of the Burro Canyon, the travel time for seepage from a tailings impoundment to the downgradient edge of the mesa has been estimated at 8900 to 13,400 years (Titan, 1994b).

3. The Morrison and Summerville Formations form an approximately 1200-foot thick low-permeability barrier to ground water flow separating the Entrada/Navajo Aquifer from the Burro Canyon perched zone. The NRC staff considers that this barrier makes it unlikely that contaminants from the tailings disposal cells would ever impact water quality of this aquifer.

4.5 Impacts on Ecological Systems

4.5.1 **Endangered Species**

In the vicinity of the site, four animal species classified as either endangered or threatened (i.e., the bald eagle (*Haliaeetus leucocephalus*), the American peregrine falcon (*Falco peregrinus anatum*), the black-footed ferret (*Mustela nigripes*), and the Southwestern willow flycatcher (*Empidonax traillii extimus*)) could occur. While the ranges of the bald eagle, peregrine falcon and willow flycatcher encompass the project area, their likelihood of utilizing the site is extremely low. The black-footed ferret has not been seen in Utah since 1952 and is not expected to occur any longer in the area.

No populations of fish are present on the project site, nor are any known to exist in the immediate area of the site. Four species of fish designated as endangered or threatened occur in the San Juan River 29 km (18 miles) south of the site. There are no discharges of mill effluents to surface waters, and therefore, no impacts are expected for the San Juan River due to operations of the White Mesa mill.

Currently, no designated endangered plant species occur on or near the plant site.

4.5.2 **Wetlands**

No true wetlands exist on the project site. Two small catch basins approximately 18 m (60 feet) in diameter, fill for brief times in the fall or spring if heavy rainfall occurs. These catch basins are the only "aquatic" habitat found on the project site, and they more properly represent terrestrial environments. No wetland plants have been found in these basins.

4.6 Radiological Impacts

4.6.1 Operating Data

Sampling results discussed in this section were provided by the licensee in accordance with the requirements of 10 CFR 40.65, as modified by license conditions currently in SUA-1358. The renewal license will retain these same license conditions, which address: (1) stack sampling, (2) surface water sampling, (3) groundwater sampling, (4) lower limits of detection, and (5) inspections and calibrations of the critical orifice assembly.

a. Air Particulate Sampling

EFN's air particulate monitoring program consists of continuous environmental sampling stations at four locations, three of which are located at the site boundary, and one at the nearest residence, which is 5 km (3 miles) northeast of the site. Samples are collected quarterly and analyzed for U-nat, Th-230, Ra-226, and Pb-210.

Data collected during continuous mill operations in 1989-90. and again in 1995-96, indicated that measured concentrations of U-nat, Th-230, Ra-226, and Pb-210 were small fractions (i.e., less than ten percent) of the appropriate 10 CFR Part 20 limits for unrestricted areas. Concentrations of these radionuclides measured at the BHV-5 sampling station tended to be elevated during mill operations due to increased dust from the ore stockpile and the increased traffic around the ore stockpile and mill areas.

b. Stack Effluent Sampling

During operations, stack sampling is performed quarterly on the yellowcake stacks (i.e., the dryer and baghouse stacks) and semi-annually on the grizzly and demister stacks. Stack samples are analyzed for U-nat, Th-230, Ra-226, and Pb-210. Measurements performed in 1989 and 1995-96 indicate that emissions of these radionuclides have been consistently low. In addition, measurements of product loss through the yellowcake stacks have been well below levels originally predicted in the FES for the facility (NRC, 1979).

c. Radon Gas Monitoring

Environmental monitoring for radon gas using thermoluminescent dosimeters (TLDs) was discontinued with NRC approval in September 1995. The licensee will demonstrate compliance with the 10 CFR Part 20 annual dose limit of 100 mrem through MILDOS-AREA modeling calculations.

The licensee will still be required to keep radon-222 emissions from an existing mill tailings pile from exceeding 20 pCi/m^2-s of radon-222, in accordance with the requirements of 40 CFR 61.252.

d. Direct Gamma Exposure

Direct radiation exposure measurements are made quarterly at the four air particulate monitoring stations. The greatest differential between measured exposure rate and background for the same time period since 1989 was 8.6 mR/qtr. However, measured exposure rates are normally at or slightly above or below background rates.

e. Surface Water Sampling

Surface water monitoring is conducted at two sampling locations, known as Westwater Canyon and Cottonwood Creek, adjacent to the mill. Grab samples are collected annually from Westwater Canyon and quarterly from Cottonwood Creek. The samples are analyzed for total and dissolved U-nat, Ra-226, and Th-230, as well as for pH, specific conductivity, temperature, total dissolved and suspended solids, gross alpha concentrations. Measured values for these consituents and parameters over the period of mill operations since 1980 have been consistently low.

f. Ground Water Sampling

Groundwater monitoring samples have been collected quarterly from seven monitoring wells and the culinary water well. These samples were analyzed for pH, specific conductance, chlorides, sulfates, TDS, and U-nat, and water level measurements were also taken. Groundwater samples were analyzed semiannually for arsenic, selenium, sodium, Ra-226, Th-230, and Pb-210. No trends are apparent from measurements taken since 1985.

With this license renewal, EFN proposed that groundwater detection monitoring be conducted in accordance with the program described in the document entitled, "Points of Compliance, White Mesa Uranium Mill," submitted by letter dated October 5, 1994. Under this program, samples will be collected quarterly from five "point of compliance" (POC) wells, completed in the Burro Canyon Formation (wells WMMW-5, -11, -12, -14, and -15) (see Figure 4.1). These samples will be analyzed for chloride, potassium, and nickel, and water level measurements also will be taken. EFN selected these indicator parameters, because the concentrations of these species are significantly higher in the tailings pond fluid than in the perched water of the Burro Canyon, and they are representative of both anionic and cationic species.

The data will be analyzed using the Shewhart-Cusum control chart technique. These charts have been developed on a well-by-well basis, with a separate control chart for each of the four indicator parameters. If limits on the control charts are exceeded for a parameter at a well, a program of confirmatory sampling will commence. This will involve monthly sampling for six months; a separate analysis-of-variance technique will be employed to determine whether there is a significant difference between these samples and those collected prior to the confirmatory

sampling program. If the data are significantly different, then a corrective action plan will be developed.

The NRC staff found the proposed groundwater detection monitoring program to be acceptable, with modifications as follows: (1) that well WMMW-17 be included in the sampling program; and (2) that uranium be added as an indicator parameter to be analyzed for. EFN agreed to these modifications in a telephone conversation on December 11, 1996. EFN will be required, by license condition, to conduct its groundwater detection monitoring in accordance with the proposed program, as modified.

Finally, the licensee will continue to be required to (1) analyze liquid found in the leak detection system during weekly inspections for specified constituents; (2) conduct statistical analyses to determine if significant linear trends exist, and (3) propose corrective action for NRC review and approval if such trends do exist.

4.6.2 Radiological Assessment

a. Offsite Impacts

The radiological impacts from milling operations at the White Mesa site have been assessed previously and documented in the FES (NRC, 1979) and the 1985 EA (NRC, 1985a). In the previous EA, the staff analyzed impacts associated with milling at a nominal rate of 2000 tons of ore per day, and an average ore grade of 0.60 percent, for a yellowcake production rate of 4380 tons per year, and determined that both site boundary radionuclide concentrations and individual dose commitments were small fractions of the applicable standards.

As part of its November 22, 1994, amendment request for authorization to install a second dryer, EFN provided updated MILDOS-AREA calculations and results. In approving EFN's request, the NRC staff determined, based on its review of the MILDOS-AREA results, that releases from the mill would not result in a member of the public receiving a radiation dose in excess of the 10 CFR Part 20 limit (i.e., 100 mrem per year).

It should be noted that actual radiation doses to the public will likely be less than modeled, because EFN normally processes lower grade ores, at a rate less than 2000 tons of ore per day.

b. Radiological Impact on Biota Other than Humans

Although no guidelines concerning acceptable limits of radiation exposure have been established for the protection of species other than man, it is generally agreed that the limits for humans are also conservative for other species. Doses from gaseous effluents to terrestrial biota (such as birds and mammals) are quite similar to those calculated for man and arise from the same dispersion pathways and considerations. Because the effluents of the facility will be monitored and

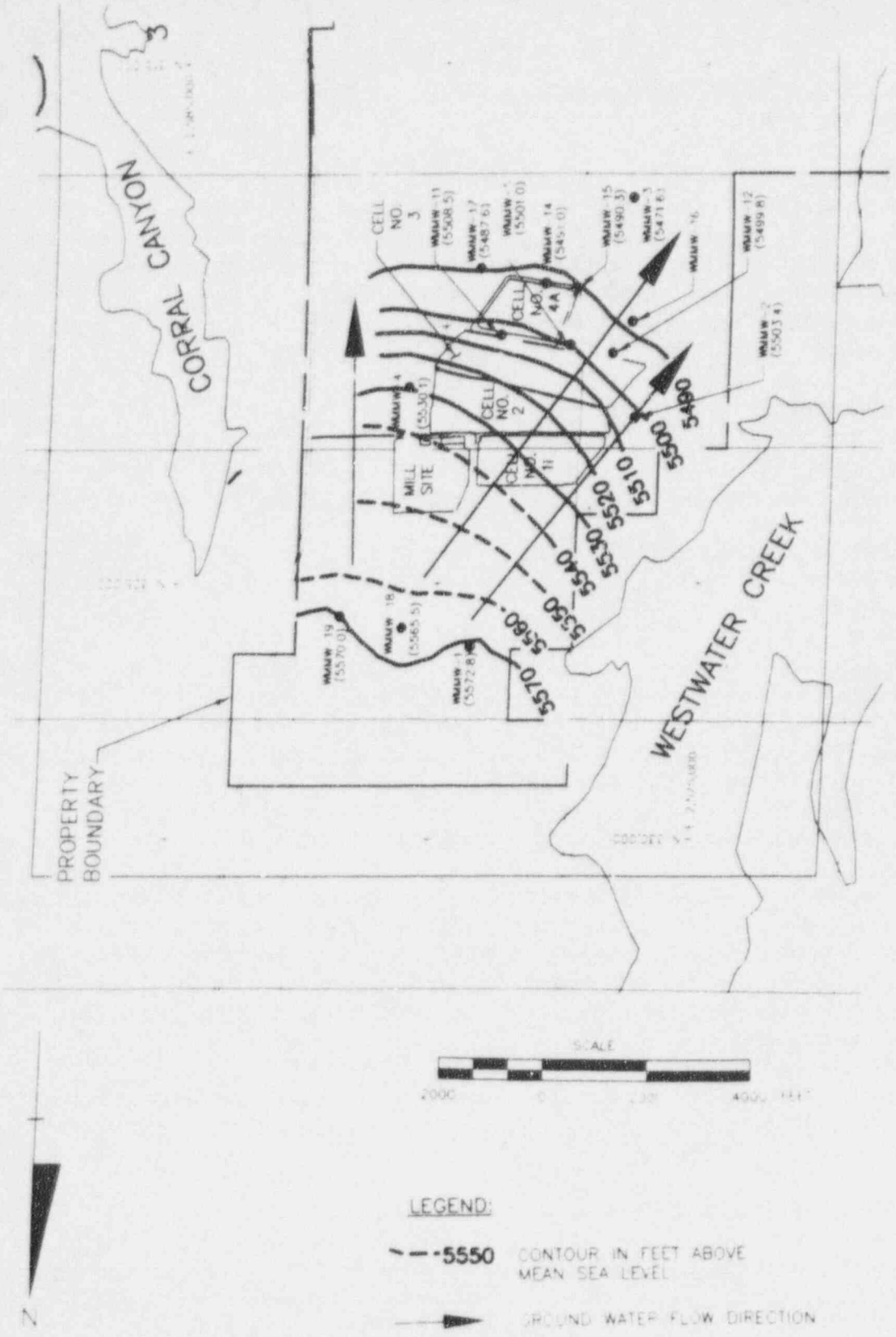


Figure 4.1 White Mesa Point of Compliance Well Locations (after Titan, 1994a)

maintained within safe radiological protection limits for man, no adverse radiological impact is expected for resident animals.

4.7 In-Plant Safety

The licensee has established and conducts an in-plant safety and radiation safety program. EFN stated that the in-plant safety program meets the requirements of the Mine Safety and Health Administration (MSHA), as well as those pertinent requirements of the Occupational Safety and Health Administration (OSHA). The licensee's operation is based on good safety practices and procedures. During mill operations, EFN has a full-time safety official on staff to meet all safety requirements established by Federal regulations. During routine radiation safety inspections, NRC, to the best of its ability, observes in-plant industrial safety for deficiencies and brings any identified deficiencies to the attention of plant management.

NRC, through 10 CFR Part 20 and license conditions, requires a radiological safety program that contains the basic elements needed to assure that exposures are kept low or, in any event, as low as is reasonably achievable (ALARA). Therefore, an in-plant radiation safety program including the following is required:

- Qualified management of the radiation safety program and appropriate training of personnel;
- Written radiation procedures;
- Airborne and surface contamination sampling and monitoring;
- Internal and external radiation monitoring programs;
- An approved respiratory protection program; and
- An annual ALARA audit and frequent in-house inspections.

NRC considers the program of in-plant safety, as required by Federal regulations, and the radiation safety program as defined by 10 CFR Part 20 to be sufficient to protect the worker during normal operations. The NRC evaluation of the licensee's radiation safety program is discussed more fully in the SER.

5.0 ENVIRONMENTAL EFFECTS OF ACCIDENTS

5.1 Failure of Chemical Storage Tanks

At the mill, tanks are used to store a variety of industrial chemicals, process fluids, and slurries, as well as flammable liquids. Various systems have been implemented to contain or direct routine or unplanned spillage. Tanks which are most likely to overflow are equipped with high-level alarms to reduce the possibility of spillage due to tank overflow. Spills resulting from the failure of any chemical holding tank would first be contained by engineered dikes or curbs. If the volume was too great, such as that from a rupture in one

or more of the large production tanks, flow would be captured by a lined catchment basin west of the mill, with a capacity of 1.5 million gallons. As a final containment, if all liquids within the mill process storage area escaped, Cell No. 1-I is engineered to capture this kind of catastrophic flow.

5.2 Fires and Explosions

The most likely place for a fire to occur would be in the solvent extraction building or in the yellowcake or vanadium dryers. The possibility of a fire as a result of an explosion in the yellowcake dryer and solvent extraction building is remote since Industrial Safety Codes will be strictly enforced. The solvent extraction circuit is located in a separate building due to the large quantities of kerosene present.

Additionally, the warehouse, offices, and solvent extraction building are equipped with sensor-operated fire suppression systems, and hose stations are located in the mill yard. The main water supply tank has a 250,000-gallon reserve for fire fighting, which is connected to an automatically-starting, diesel-fired pump if electrical service is interrupted. All fire suppression systems are routinely checked.

In the event of a line rupture, an explosive ammonia-air mixture could be formed inside the mill and solvent extraction buildings. Constant operator presence, facility emergency procedures, emergency vent fans, and piping sized to reduce potential ammonia release amounts all serve to minimize the potential for such an accident.

5.3 Pipeline Failure

The rupture of a pipeline between the mill and the tailings impoundments would be caught by automatic alarms or by routine daily inspection. If a leak did occur, no long-term damage would result. The pipelines are situated so that the leaking fluids would be directed into other tailings impoundments. In the event that tailings would leak into an unwanted area, that material could be retrieved by heavy equipment accompanied by appropriate radiological safety precautions, including radiological surveys.

5.4 Minor Pipe or Tank Leakage

Minor leaks resulting from, for example, loose connections in piping or tanks overflowing, will be collected in sumps designed for this type of spill. Sump pumps will be used to return the material to the circuit, and the reason for the spill will be determined and corrected.

5.5 Tailings Impoundment System Accidents

The tailings cells at the White Mesa facility were designed and constructed as partially below-grade impoundments, and in accordance with Regulatory Guide 3.11 and Staff Technical Position WM-8201. Therefore, the potential failure of the cells is considered to be unlikely. In addition, each tailings cell embankment is monitored regularly for stability as part of the licensee's site inspection program, and the results of these inspections are reported to NRC.

6.0 RECLAMATION AND DECOMMISSIONING

Following financial difficulties in February 1995, EFN agreed to voluntarily revise its surety amount to cover reclamation and decommissioning costs for the site in its current state. EFN is pursuing this action in two phases, with the first having been completed in June 1995 with NRC's approval of a revised surety amount of approximately $10.5 million. In this initial phase, EFN reviewed all major reclamation cost centers, considering the then current level of development and disturbance at the site. In the second phase, EFN is reviewing all elements of the site reclamation plan and will, if necessary, revise the earlier cost estimate.

The licensee is expected to submit the revised site reclamation plan in early 1997 for NRC review and approval. NRC will review the plan in accordance with the requirements of 10 CFR Part 40, Appendix A, and applicable staff guidance documents. Because NRC has yet to receive the reclamation plan, EFN will be required by license condition to provide the plan to NRC by June 30, 1997, for its review and approval in the form of a license amendment.

Site decommissioning will be conducted under a plan approved by NRC. EFN will be required by license condition to submit a detailed decommissioning plan to NRC for approval at least 12 months prior to the planned final shutdown of mill operations.

7.0 ALTERNATIVES

The action under consideration is the renewal of Source Material License SUA-1358, for continued operation of the White Mesa mill, as requested by EFN. The alternatives available to NRC are to:

(1) Renew the license with such conditions as are considered necessary or appropriate to protect public health and safety and the environment; or

(2) Deny renewal of the license.

Based on its review of the information identified in Section 1.3.2, the NRC staff has concluded that the environmental impacts associated with the proposed action do not warrant denial of the license renewal. It is the staff's conclusion that the impacts associated with the license renewal are within the realm of impacts anticipated in the FES (NRC, 1979) and the previous EA (NRC, 1985). Additionally, in the SER prepared for this action, the staff has reviewed the licensee's proposed action with respect to the criteria for license issuance specified in 10 CFR Part 40, Section 40.32, and has no basis for denial of the proposed action.

8.0 FINANCIAL SURETY

Under 10 CFR Part 40, Appendix A, Criterion 9, licensees are required to establish a financial surety adequate to cover the estimated costs for (1) decommissioning and decontamination of the mill and mill site, (2) reclamation of any tailings or waste disposal areas, (3) ground water restoration, as warranted, and (4) the long-term surveillance fee.

The surety is based on an estimate which must account for the total costs that would be incurred if an independent contractor were contracted to perform the work. The surety estimate must be approved by NRC and be based on an NRC-approved decommissioning and reclamation plan. The licensee must also provide the surety arrangenemt through a financial instrument acceptable to NRC. The licensee's surety mechanism will be reviewed by NRC annually to assure that sufficent funds are available to complete reclamation Additionally, the amount of the surety should be adjusted to recognize any increases or decreases in liability resulting from inflation, changes in engineering plans, or other conditions affecting cost.

The surety for the White Mesa mill is carried by Umetco, under an agreement between EFN and Umetco. The current surety amount of $10,915,647 was reviewed and approved by NRC in August 1996. EFN will be required by license condition to maintain a financial surety arrangement in accordance with the requirements of Criterion 9. The surety requirements will be reviewed at least annually by NRC to assure that the funds and the surety arrangement are acceptable.

9.0 CONSULTATION WITH THE STATE OF UTAH

A teleconference call was held on January 23, 1997, with representatives of the UDEQ/Divisions of Water Quality and Radiation Control to discuss any comments or concerns the State may have had with the NRC staff's discussions and findings, as documented in a final draft of this EA, which was transmitted electronically to the State on January 3, 1997. Issues raised by UDEQ in these teleconference calls concerned EFN's proposed groundwater detection program, as modified by the staff (see Section 4.6.1).

UDEQ recommended that the NRC require consistency in the set of indicator parameters sampled for in the tailings impoundment and groundwater monitoring programs UDEQ considered this information to be helpful in determining source term concentrations in the event of an impoundment liner failure. The staff, however, considers that the two sets of indicator parameters monitored for in these programs are appropriate and sufficient to meet their intended purpose. UDEQ agreed. Details of EFN's impoundment monitoring program are discussed in Sections 3.2, 4.4.2, and 4.6.1.

UDEQ expressed a concern about the apparent inconsistency between the groundwater monitoring programs for EFN and the Envirocare site near Clive, Utah. Pointing to differences in the number of indicator parameters to be sampled for and the "triggers" used in determining when compliance monitoring would be required, UDEQ considered that both sites should have similar monitoring programs since both accept 11e.(2) byproduct material for disposal. NRC considers that the difference in the operations of these two sites and the amount of byproduct material accepted by each is appropriate justification for the differences in the monitoring programs.

UDEQ also strongly recommended that NRC require EFN to have a quality assurance (QA) plan as part of its groundwater monitoring program. The NRC staff notes that EFN did include a QA plan as an appendix to its hydrogeologic evaluation report submitted in support of its proposed groundwater monitoring program.

10.0 FINDING OF NO SIGNIFICANT IMPACT

EFN has applied to NRC to renew Source Material License SUA-1358 to authorize continued operations at the White Mesa uranium mill, located in San Juan County, Utah. NRC has reexamined actual and potential environmental impacts associated with yellowcake production at the mill site, and has determined that renewal of the source material license (1) will be consistent with requirements of 10 CFR Part 40, (2) will not be inimical to the public health and safety, and (3) will not have long-term detrimental impacts on the environment.

Therefore, based on an evaluation of EFN's renewal request, the NRC staff has determined that the proper action is to issue a FONSI in the *Federal Register*. The following statements support the FONSI and summarize the conclusions resulting from the staff's environmental assessment:

- An acceptable environmental sampling program is in place to monitor effluent releases and to detect exceedances of appropriate limits;
- The licensee has implemented an intensive, routine inspection program of the mill process building, associated facilities, and tailings retention impoundments, and conducts an annual ALARA audit program;
- Standard operating procedures are in place for all operational process activities involving radioactive materials that are handled, processed, or stored;
- Mill tailings and process liquid effluents from the mill circuit are discharged to partially below-grade, lined tailings impoundments, with leak detection systems;
- The licensee will implement an acceptable groundwater detection monitoring program to ensure compliance with the requirements of 10 CFR Part 40, Appendix A;
- The licensee will conduct site decommissioning and reclamation activities in accordance with NRC-approved plans; and
- Because the staff has determined that there will be no significant impacts associated with approval of the license renewal, there can be no disproportionately high and adverse effects or impacts on minority and low-income populations. Consequently, further evaluation of 'Environmental Justice' concerns, as outlined in Executive Order 12898 and NRC's Office of Nuclear Material Safety and Safeguards Policy and Procedures Letter 1-50, Rev.1, is not warranted.

Based on these findings, the NRC staff recommends that EFN's license for yellowcake production at the White Mesa uranium mill be renewed. The source material license shall be based upon the licensee's renewal application, this EA, the SER, and the license conditions which address environmental issues (see Section 11). License conditions addressing radiation safety concerns can be found in the SER.

11.0 CONCLUSION INCLUDING ENVIRONMENTAL LICENSE CONDITIONS

Upon completion of the environmental review of EFN's application for renewal of Source Material License SUA-1358, the NRC staff has concluded that the operation of the White Mesa uranium mill, in accordance with the following conditions to be included in the renewed source material license, is protective of health, safety, and the environment, and fulfills the requirements of 10 CFR Part 51. Therefore, the NRC staff recommends renewal of SUA-1358, subject, in part, to the following conditions:

1. The mill production rate shall not exceed 4380 tons of yellowcake per year.

2. A. The licensee may, without prior NRC approval, and subject to the conditions specified in Part B of this condition:

   (1) Make changes in the facility or process, as presented in the application.

   (2) Make changes in the procedures presented in the application.

   (3) Conduct tests or experiments not presented in the application.

   B. The licensee shall file an application for an amendment to the license, unless the following conditions are satisfied.

   (1) The change, test, or experiment does not conflict with any requirement specifically stated in this license, or impair the licensee's ability to meet all applicable NRC regulations.

   (2) There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

   (3) The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in this EA.

   C. The licensee's determinations concerning Part B of this condition, shall be made by a "Safety and Environmental Review Panel (SERP)." The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management and shall be responsible for managerial and financial approval changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and, one member shall be the corporate radiation safety officer (CRSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP as appropriate, to address technical aspects such as health physics, groundwater hydrology, surface-water hydrology, specific earth sciences, and other technical

disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.

D. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made by the SERP, that provide the basis for determining changes are in compliance with the requirements referred to in Part B of this condition. The licensee shall furnish, in an annual report to NRC, a description of such changes, tests, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages to the Operations Plan and Reclamation Plan of the approved license application to reflect changes made under this condition.

The licensee shall submit to NRC by March 31, 1997, for review, the standard operating procedures (SOPs) needed to implement this license condition. The licensee shall not implement any provision of this license condition until NRC has found the proposed SOPs acceptable.

3. Standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed. Additionally, written procedures shall be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies.

All written procedures for both operational and non-operational activities shall be reviewed and approved in writing by the RSO before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing operating procedures at least annually.

4. Before engaging in any activity not previously assessed by the NRC, the licensee shall administer a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act (as amended) and its implementing regulations (36 CFR 800), and the Archaeological Resources Protection Act (as amended) and its implementing regulations (43 CFR 7).

In order to ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received authorization from the NRC to proceed.

The licensee shall avoid by project design, where feasible, the archeological sites designated "contributing" in the report, "Archeological Sites Related to the White

Mesa Project," submitted by letter dated July 28, 1988. When it is not feasible to avoid a site designated "contributing" in the attachment, the licensee shall institute a data recovery program for that site based on the research design submitted by letter from C. E. Baker of Energy Fuels Nuclear to Mr. Melvin T. Smith, Utah State Historic Preservation Officer, dated April 13, 1981.

The licensee shall recover through archeological excavation all "contributing" sites listed in the attachment which are located in or within 100 feet of borrow areas, stockpile areas, construction areas, or the perimeter of the reclaimed tailings impoundment. Data recovery fieldwork at each site meeting these criteria shall be completed prior to the start of any project related disturbance within 100 feet of the site, but analysis and report preparation need not be complete.

Additionally, the licensee shall conduct such testing as is required to enable the Commission to determine if those sites designated as "Undetermined" in the attachment and located within 100 feet of present or known future construction areas are of such significance to warrant their redesignation as "contributing." In all cases, such testing shall be completed before any aspect of the undertaking affects a site.

Archeological contractors shall be approved in writing by the Commission. The Commission will approve an archeological contractor who meets the minimum standards for a principal investigator set forth in 36 CFR Part 66, Appendix C, and whose qualifications are found acceptable by the SHPO.

5. The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the licensee's milling operations authorized by this license. Mill tailings shall not be transferred from the site without specific prior approval of NRC in the form of a license amendment. The licensee shall maintain a permanent record of all transfers made under the provisions of this condition.

6. All liquid effluents from mill process buildings, with the exception of sanitary wastes, shall be returned to the mill circuit or discharged to the tailings impoundment.

7. Freeboard limits for Cells 1-I, 3, and 4A, and tonnage limits for Cell 3, shall be as stated in Section 3.0 to Appendix E of the approved license application.

8. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, for reclamation of any tailings or waste disposal areas, ground-water restoration as warranted and for the long-term surveillance fee. Within three months of NRC approval of a revised reclamation/decommissioning plan, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved plan exceed the amount covered in the existing financial

surety. The revised surety shall then be in effect within 3 months of written NRC approval.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to NRC at least 3 months prior to the anniversary date which is designated as June 4 of each year. If NRC has not approved a proposed revision to the surety coverage 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for 1 year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed and any other conditions affecting estimated costs for site closure. The basis for the cost estimate is the NRC-approved reclamation/decommissioning plan or NRC-approved revisions to the plan. The previously provided guidance entitled "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates" outlines the minimum considerations used by NRC in the review of site closure estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

The currently approved surety instrument, Irrevocable Letter of Credit No. S00017012, issued by The Bank of New York in favor of NRC, as amended, May 10, 1994, to include a Standby Trust Agreement, shall be continuously maintained by UMETCO in an amount not less than $10,915,467 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, until a replacement is authorized by NRC.

9. Disposal of material and equipment generated at the mill site shall be conducted as described in the licensee's submittals dated December 12, 1994 and May 23, 1995, with the following addition:

   A. The maximum lift thickness for materials placed over tailings shall be less than 4-feet thick. Subsequent lifts shall be less than 2-feet thick. Each lift shall be compacted by tracking heavy equipment, such as a Cat D-6, at least 4 times prior to placement of subsequent lifts.

10. The licensee shall submit a detailed decommissioning plan to the NRC at least twelve (12) months prior to planned final shutdown of mill operations.

11. The licensee shall submit to NRC for review, by June 30, 1997, a detailed reclamation plan for the authorized tailings disposal area which includes the following:

   A. A post-operations interim stabilization plan which details methods to prevent wind and water erosion and recharge of the tailings area.

   B. A plan to determine the best methodology to dewater and/or consolidate the tailings cells prior to placement of the final reclamation cover.

C. Plan and cross-sectional views of a final reclamation cover which details the location and elevation of tailings. The plan shall include details on cover thickness, physical characteristics of cover materials, proposed testing of cover materials (specifications and QA), the estimated volumes of cover materials and their availability and location.

D. Detailed plans for placement of rock or vegetative cover on the final reclaimed tailings pile and mill site area.

E. A proposed implementation schedule for items A through D above which defines the sequence of events and expected time ranges.

F. An analysis to show that the proposed type and thickness of soil cover is adequate to provide attenuation of radon and is adequate to assure long-term stability, as well as an analysis and proposal on methodology and time required to restore ground water in conformance to regulatory requirements.

G. The licensee shall include a detailed cost analysis of each phase of the reclamation plan to include contractor costs, projected costs of inflation based upon the schedule proposed in item E, a proposed contingency cost, and the costs of long-term maintenance and monitoring.

12. The licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application as revised with the following modifications or additions:

A. Stack sampling shall include a determination of flow rate.

B. Surface water samples shall also be analyzed semiannually for total and dissolved U-nat, Ra-226, and Th-230, with the exception of the Westwater Creek, which shall be sampled annually for water sediments and analyzed as above. A sediment sample shall not be taken in place of a water sample unless a water sample was not available.

C. The licensee shall utilize lower limits of detection in accordance with Section 5 of Regulatory Guide 4.14 (Revision 1), for analysis of effluent and environmental samples.

D. The inspections performed semiannually of the critical orifice assembly committed to in the submittal dated March 15, 1986, shall be documented. The critical orifice assembly shall be calibrated at least every 2 years against a positive displacement Roots meter to obtain the required calibration curve.

15. The licensee shall implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program shall be in accordance with the report entitled, "Points of Compliance, White Mesa

Uranium Mill," submitted by letter dated October 5, 1994, as modified by the following:

A. The leak detection system for all ponds will be checked weekly. If liquid is present, it shall be analyzed for chloride, sulfate, selenium, and pH. The samples will be statistically analyzed to determine if significant linear trends exist, and the results will be submitted to NRC for review.

   If a significant linear trend is indicated, the licensee will submit a proposed corrective action for review and approval to NRC. The corrective action shall include a discussion on delineation of the areal extent and concentration of hazardous constituents.

B. The licensee shall sample monitoring wells WMMW-5, -11, -12, -14, -15, and -17, on a quarterly basis. Samples shall be analyzed for chloride, potassium, nickel, and uranium, and the results of such sampling shall be included with the environmental monitoring reports submitted in accordance with 10 CFR 40.65.

REFERENCES

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NRC, 1985a, "United States Nuclear Regulatory Commission Environmental Assessment Prepared by the Uranium Recovery Field Office in Consideration of the Renewal of Source Material License SUA-1358 for the Umetco Minerals Corporation White Mesa Uranium Mill," issued September 26, 1985.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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* *

COMMENTS

Michelle,

The attached figure is from our EA for the renewal. ~~Is~~ Does the specification of $NaClO_3$ (Sodium chlorate) cause you any indigestion? EFN had

* *

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