

SEQUOYAH FUELS CORPORATION

SEQUOYAH FACILITY

GORE, OKLAHOMA

COMPREHENSIVE RADIOLOGICAL SOLID WASTE

STORAGE AND DISPOSAL PLAN

LICENSE SUB-1010

DOCKET 40-8027

May 25, 1985

8507080017 850524
PDR ADOCK 04008027
C PDR

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
2.0 DESCRIPTION OF FACILITY ACTIVITIES	1
3.0 SOLID WASTES	2
3.1 Non-Radiological Solid Waste	2
3.1.1 Fluorine Cell Sludge	2
3.2 Radiological Solid Wastes	4
3.2.1 Fluoride Scrubber Waste	4
3.2.2 Raffinate Sludge	9
3.2.3 Contaminated Trash	12
3.2.3.1 Combustible Trash	12
3.2.3.2 Non-Combustible Trash	14
3.2.4 Damaged Yellowcake Drums	14
3.3 Summary of Contaminated Materials	14
4.0 DISPOSAL SITE DESCRIPTION.	17
5.0 DESCRIPTION OF WASTE MANAGEMENT METHODS.	20
5.1 On-Site Storage	20
5.1.1 Raffinate Sludge	20
5.2 On-Site Disposal.	22
5.2.1 Fluoride Sludge and Non-Combustibles	22
5.2.2 Disposal Procedure	22
5.3 Combustible Wastes.	26
6.0 ENVIRONMENTAL MONITORING	28
6.1 Monitor Systems	28
6.2 Records	28
7.0 EVALUATION OF ALTERNATIVES	28
ATTACHMENT I: HYDROGEOLOGIC ASSESSMENT OF PROPOSED WASTE DISPOSAL SITE	
ATTACHMENT II: CURRENT PLANT GEOPHYSICAL SETTING	

LIST OF FIGURES

Figure		Page
1	Sequoyah Plant Conversion of Mill Concentrate to Uranium Hexafluoride	3
2	Sequoyah Plant Fluoride Waste Disposal System.	5
3	Proposed Disposal Site - Sequoyah Facility	18
4	Proposed Contaminated Incinerator System, Sequoyah	27

LIST OF TABLES

Tables		Page
1	Fluoride Sludge Data	7
2	RCRA EP Leach Test Results - Fluoride Sludge	8
3	Constituents of Settled Raffinate Sludge	11
4	Contaminated Ash Radionuclide Composition.	13
5	Contaminated Non-Combustible Material.	15
6	Radiological Solid Waste Summary	16

COMPREHENSIVE RADIOLOGICAL SOLID WASTE
STORAGE AND DISPOSAL PLAN
SEQUOYAH FUELS CORPORATION
License SUB-1010

1.0 INTRODUCTION

Condition 2 of Amendment 25 to the Sequoyah Facility License SUB-1010 requires Sequoyah Fuels Corporation to submit a comprehensive plan for management of the solid wastes generated as a result of the facility's licensed activities. The plan to satisfy this condition is described in this document. The document also presents information in support of an Amendment, in accordance with 10 CFR 20.302, to authorize on-site storage of raffinate sludge and on-site burial of fluoride sludge and contaminated non-combustible materials, e.g. plant equipment, scrap and incinerator ash. The on-site storage and burial activities are in accordance with options 5 and 4, respectively, of the NRC Branch Technical position on "Disposal and On-Site Storage of Thorium or Uranium Wastes from Past Operations" (Federal Register, Vol. 46, No. 205, October 23, 1981)

2.0 DESCRIPTION OF FACILITY ACTIVITIES

The Sequoyah Facility produces high purity uranium hexafluoride (UF_6) from uranium concentrate (yellowcake). The process includes purification and conversion of the yellowcake to uranium trioxide,

followed by dry chemical reduction, hydrofluorination, and fluorination to yield uranium hexafluoride. The manufacturing process steps are described schematically in Figure 1.

In the course of these activities, the facility generates solid wastes which contain low levels of radiological contamination in the form of uranium, thorium and radium.

3.0 SOLID WASTES

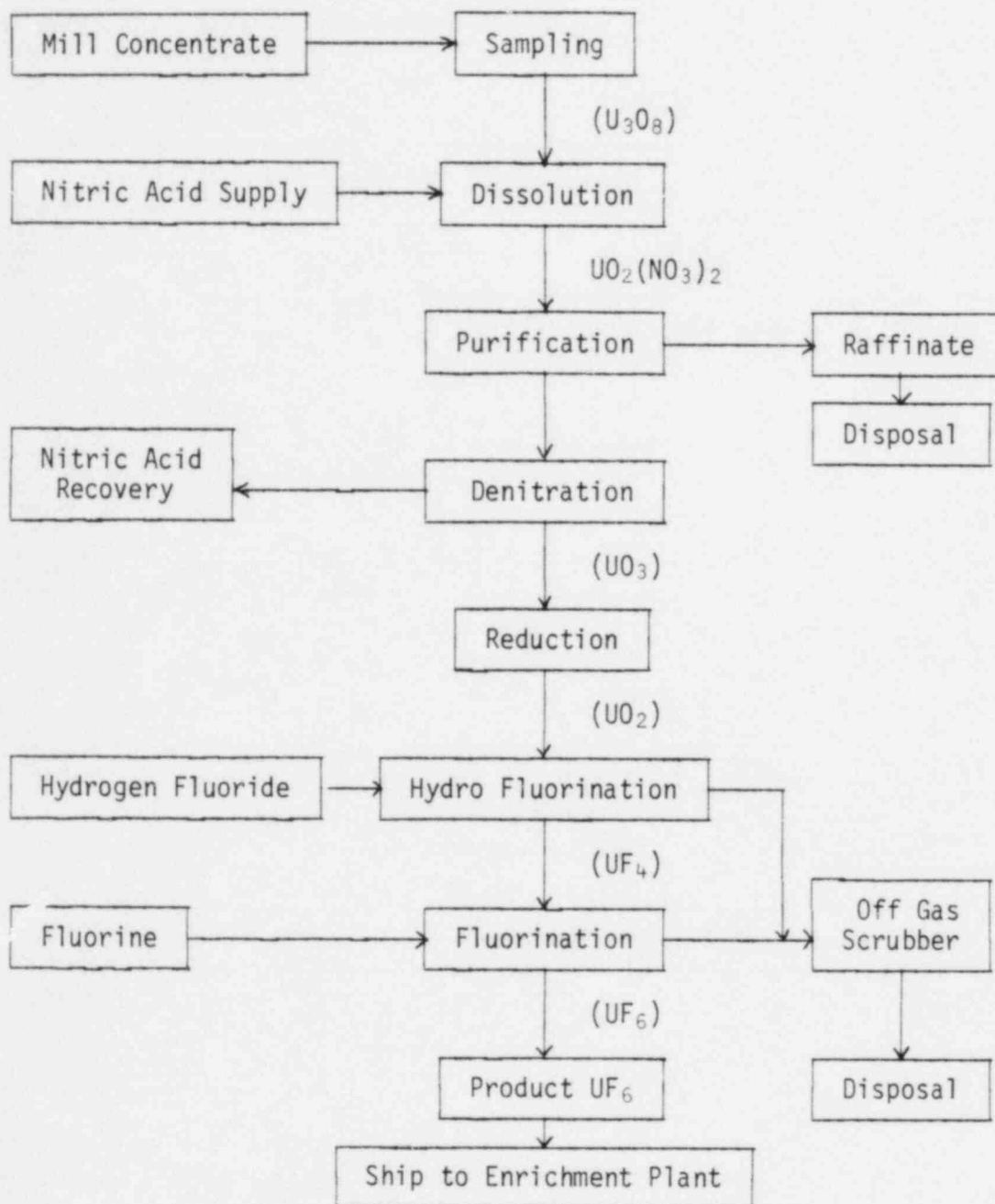
In the course of conversion of yellowcake to UF_6 , the plant generates process related non-radiological and radiological wastes as described below.

3.1 Non-Radiological Solid Waste

3.1.1 Fluorine Cell Sludge

Fluorine cell sludge generated from the facility electrolytic fluorine production process is disposed of at a commercial hazardous waste site. This material is presently being shipped to the USPCI Lone Mountain facility in Oklahoma. Sludge generated and disposed during 1983 and 1984 was 48,980 pounds and 67,720 pounds, respectively. These wastes are packaged, transported and disposed under RCRA rules and regulations.

FIGURE 1
 SEQUOYAH PLANT
 CONVERSION OF MILL CONCENTRATE TO URANIUM HEXAFLUORIDE



3.2 Radiological Solid Wastes

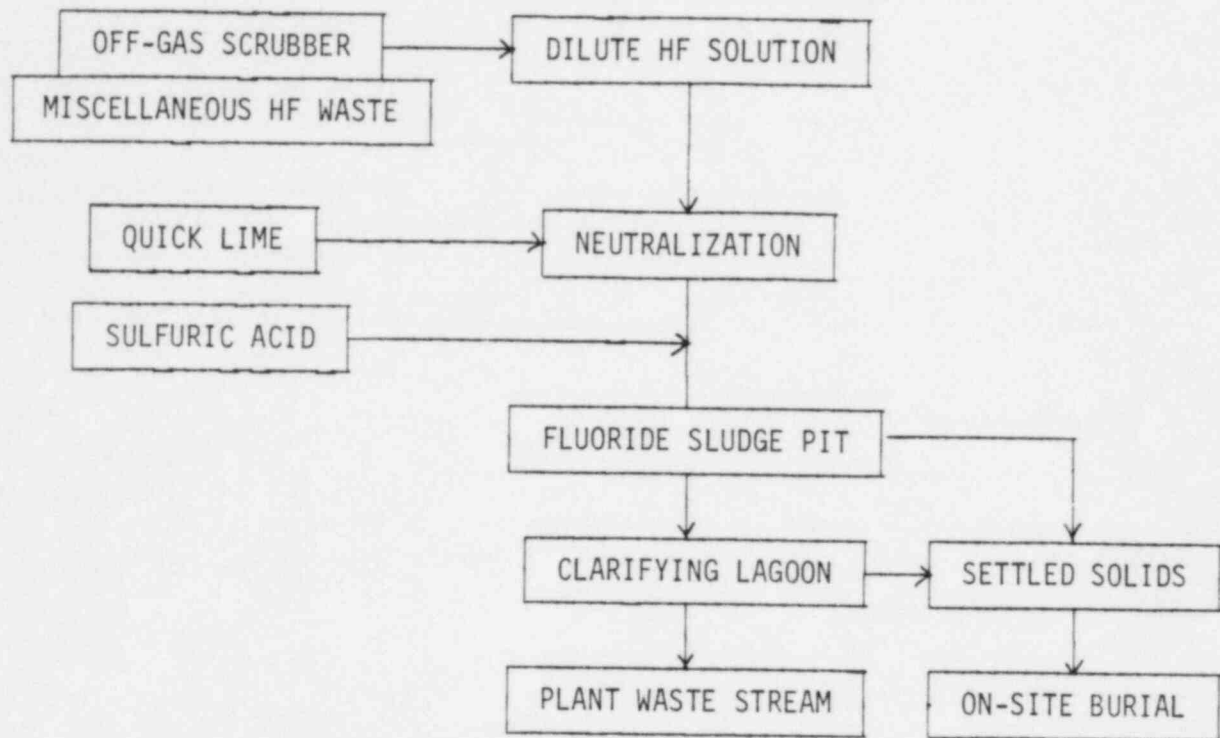
The Sequoyah Plant process generates two liquid waste streams of varying composition which, when treated, produce radiologically contaminated solids.

3.2.1 Fluoride Scrubber Waste

One liquid waste stream is generated by a wet scrubber which removes unreacted fluorides from the dry uranium fluorination process. This fluoride scrubber effluent waste stream is treated with quick lime (CaO) which neutralizes the acidic solution and precipitates the fluorides as insoluble calcium fluoride (CaF_2). The scrubber system and resulting sludge handling method is depicted schematically in Figure 2.

The fluoride sludge slurry is treated with sulfuric acid to adjust the pH and precipitate excess calcium. It is then pumped to a settling pond where the solids settle leaving a clear solution. The clarified neutral solution is combined with plant process water and the sewage lagoon overflow. A concrete stilling basin at the point of combination allows mixing of the flows prior to controlled release through a flume so that the rate of discharge can be measured. This combined plant water discharge is permitted by EPA NPDES Permit OK0000191 and is identified as Outfall 001. Discharge is to a small natural drainageway that flows south from the facility and then west to the Illinois River.

FIGURE 2
SEQUOYAH PLANT
FLUORIDE WASTE DISPOSAL SYSTEM



As a result of the treatment of the fluoride waste liquids, the settled solids contain calcium fluoride and small amounts of calcium sulfate and hydroxide. This material, which accumulates at the bottom of a settling pond, is called fluoride sludge. Prior to deletion of 10 CFR 20.304 (January 28, 1981) the fluoride sludge was transferred from the settling basin to a pit for on-site disposal in accordance with NRC regulations. Since deletion of 10 CFR 20.304, fluoride sludge has been stored in surface impoundments.

The current inventory of this fluoride sludge is 323,000 cubic feet. Approximately 39,000 cubic feet of sludge is generated annually. An analysis of the wet fluoride sludge for physical, chemical, radiological and RCRA EP leachability characteristics is provided in Table 1.

The fluoride sludge has been analyzed by the RCRA EP leach test method. This leach test shows the solids are not a hazardous waste. In fact, the RCRA EP leach test metal concentrations are below the National Interim Primary Drinking Water Standards recommended by USEPA. The leach results are provided in Table 2.

TABLE 1

FLUORIDE SLUDGE DATA

1.	a. pH	10.5	
	b. Moisture	55% Average	
	c. Density	1.4 g/cc	
2.	<u>Chemical Analyses</u>	<u>ppm</u>	<u>Probable Compound</u>
	Aluminum	4,000	$Al_2(OH)_6$
	Boron	3,000	Hydrated Calcium Borate
	Calcium	300,000	Calcium Hydroxide
			Calcium Carbonate
			Calcium Fluoride
	Iron	1,000	Ferric Oxide
	Potassium	550	Potassium Iron Sulfate
	Magnesium	1,500	Magnesium Hydroxide
	Sodium	7,000	Sodium Silicate
	Remainder of heavy metals in amounts less than 100 ppm.		
3.	<u>Radioactivity*</u>	<u>pCi/l</u>	<u>Probable Compound</u>
	Uranium	740.	Uranium Oxide
	Thorium-230	5.5	Thorium Oxide
	Radium	0.1	Radium Hydroxide
4.	<u>RCRA EP Leach Data**</u>	<u>pCi/gm</u>	
	Uranium	670.	
	Thorium-230	8.5	
	Radium-226	1.2	

* Note that the uranium natural daughters are out of equilibrium because the uranium in this slurry originated from uranium hexafluoride not collected in the secondary cold traps. The uranium in the UF_6 has been stripped of its radium and thorium daughters in the purification process. Therefore, the uranium analysis is an equal mixture of uranium 238 and 234. We calculate that it will require approximately 190,000 years for the uranium 234 to come into equilibrium with its thorium and radium daughters.

** 40 CFR 261.24, Appendix II.

Table 2
RCRA EP LEACH TEST RESULTS
Fluoride Sludge

<u>Parameter</u>	<u>EP Leach*</u> <u>(mg/l)</u>	<u>NIPDW Standard**</u> <u>(mg/l)</u>
As	0.033	0.05
Ba	0.048	1.00
Cd	0.005	0.01
Cr	0.019	0.05
Hg	0.001	0.002
Se	0.008	0.01
Ag	0.003	0.05
Pb	0.032	0.05

* EP Toxicity Test Procedure described in 40 CFR 261.24,
Appendix II.

** The national Interim Primary Drinking Water Standards
are codified under 40 CFR 141.

The fluoride sludge was also evaluated for RCRA corrosivity and reactivity as specified by EPA and does not meet the definition of hazardous waste under the criteria of these tests.

The fluoride solids radiological contamination consists of natural uranium, with only small amounts of thorium and radium daughters. The radionuclide activity of the sludge is approximately 33 uCi/ft³.

3.2.2 Raffinate Sludge

The second waste stream comes from the solvent extraction system. This stream is termed raffinate and contains the impurities from the purification of the uranium process feed. It is primarily a solution of dilute nitric acid and the impurities are metallic salts, radioactive daughter products of normal uranium decay, and trace quantities of uranium.

The raw raffinate waste stream is reacted with gaseous ammonia to neutralize the nitric acid and precipitate metal ions as hydroxides or hydrated oxides. This neutralization step also removes residual uranium and thorium. Following neutralization, the solution is pumped to a settling basin where the precipitate (sludge) settles out.

The resulting clear supernatant solution contains from 100 to 200 pCi/l of Ra-226 compared to an initial concentration of approximately 3000 pCi/l Ra-226. This solution is then treated with a soluble barium compound to precipitate a barium-radium complex and produce a clear liquid containing less than 3 pCi/l of Ra-226. This clear liquid, known as treated raffinate, is stored in lined surface impoundments prior to application as fertilizer on Sequoyah Fuels-owned land or disposal by deep well injection.

The raffinate sludge, which settled out, remains in the settling basin. At the plant production capacity of 10,000 STPY uranium, raffinate sludge (pond settled volume) is generated at a rate of 1.91×10^6 gallons per year. Present inventory awaiting disposition is 14.5×10^6 gallons. A typical analysis of constituent species, including radionuclides, in the wet settled raffinate sludge is provided in Table 3.

TABLE 3

CONSTITUENTS OF SETTLED RAFFINATE SLUDGE*

CHEMICAL SPECIES

<u>Constituent</u>	<u>ppm</u>
Al	1500
As	120
B	<130
Ca	1000
Cl (including Br and I)	50
C (from CO ₂)	200
Fe	2500
F	10
K	50
Mg (including Mn, Ni, Pb)	600
Mo	300
Na	1200
N	7300
P	40
Si	2400
S	3300
V	200
Zr	<1000

RADIONUCLIDES

<u>Constituent</u>	<u>pCi/g</u>
Ra	22.0
Th-230	5,060.0
Th-234	<640.0
Th-228 + 232	<450.0
Other	
Pb-210, Po-210, Ac-227, Ra-228, Pa-231, U-235	<750.0
U-238 + U-234	<270.0

*The analysis is wet basis. The remainder of the weight is water either as free water or as chemical water (hydroxyl groups, water of hydration).

3.2.3 Contaminated Trash

The facility generates materials which are radiologically contaminated with natural uranium. This material is physically separated into combustible and non-combustible materials and is stored on-site. Prior to deletion of 10 CFR 20.304, this contaminated trash was buried on-site.

3.2.3.1 Combustible Trash

Contaminated burnable trash is currently accumulating at an estimated rate of 11,750 cubic feet per year.

The purchase of an incinerator for burning the contaminated combustible trash is planned.

Incineration will significantly reduce the volume (approximately 93%) to be disposed. With the use of the incinerator, the estimated annual generation rate of contaminated ash would be approximately 840 cubic feet per year. An estimate of the concentration of radioactive constituents in the ash has been made and is provided in Table 4.

TABLE 4

CONTAMINATED ASH
RADIONUCLIDE COMPOSITION

<u>Radionuclide</u>	<u>Concentration</u>
U-nat	30,000 pCi/g
Ra-226	0.6 pCi/g
Th-230	0.6 pCi/g

3.2.3.2 Non-Combustible Trash

Non-combustible contaminated materials include carbon filters, sand and gravel, insulating material, metal and/or plastic piping. This material is being generated at a rate of 3,500 cubic feet per year. There are approximately 12,000 cubic feet stored on-site awaiting disposal. The facility estimates that 65,000 cubic feet of these non-combustible materials will be produced by the year 2000. A typical description of the contaminated non-combustible material in storage is shown in Table 5.

3.2.4 Damaged Yellowcake Drums

Yellowcake is shipped in 55-gallon drums to the Sequoyah Facility. The facility accumulates approximately 50 damaged drums per year. Damaged drums are compacted and returned to the Quivira Mining Company mill at Ambrosia Lake, New Mexico for disposal in the tailings pile under mill License SUA-616, Amendment 36 issued by the New Mexico Environmental Improvement Division, Radiation Protection Bureau on August 13, 1984. Undamaged drums are returned to concentrate producers or decontaminated, crushed and sold as scrap.

3.3 Summary of Contaminated Materials

Table 6 is a summary of radiologically contaminated solid wastes generated at the Sequoyah Facility.

TABLE 5

CONTAMINATED NON-COMBUSTIBLE MATERIAL

(Quantity in Storage)

Number	
<u>of Drums</u>	<u>Content of Drums</u>
4	Spray Cans
34	Crushed Glass
22	Sand Blasting Sand
134	White Insulation
36	UF ₄ Filter Tubes, Carbon
55	Bricks from Denitrators, HF Scrubber
1,057	Rusty Metal, Dirt, Hoses, Oil Absorbant, Sand and Gravel
144	Incinerator Ash (from uncontaminated material)

TABLE 6

RADIOLOGICAL SOLID WASTE SUMMARY

<u>Type of Waste</u>	<u>Inventory** (cubic feet)</u>	<u>Annual Generation (cubic feet)</u>	<u>Disposal Method</u>
Raffinate Sludge	2,000,000	120,000	Process for U recovery at mill
Fluoride Sludge	320,000	39,000	On-site Burial
Refuse*	12,000	3,500	On-site Burial
Incinerator Ash	1,080***	840	On-Site Burial
Damaged Drums	-	50 drums/yr	Quivira Mill Tailings Pile

* Equipment, soil, rubble, laboratory materials, etc.

** Inventory as of October, 1984

*** Ash accumulated from burning non-contaminated combustible material.

4.0 DISPOSAL SITE DESCRIPTION

This section describes the site specific aspects of the proposed on-site contaminated solid waste disposal area. Fluoride sludge, non-combustible trash and incinerator ash will be homogenized and buried at this site.

The proposed burial area is shown in Figure 3. It is located immediately north of the plant site in the southeast quarter of Section 16 and the northeast quarter of Section 21, R21E, T12N, Sequoyah County, Oklahoma. The fully developed site will cover approximately 25 acres. A total of 36 pits are currently projected each with a disposal capacity of 50,000 cubic feet. Based on plant waste generation it is projected that one disposal pit per year will be required.

A subsurface investigation of the proposed disposal site included test borings to obtain geologic and hydrologic data. The corporate hydrology staff hydrogeologic assessment of the proposed disposal site is included as Attachment I. A description of the plant geophysical setting is included as Attachment II.

To insure against impact from high water or area flooding a minimum surface elevation of 520 feet at the disposal site was chosen in order to place the area well above the flood plain. Robert S. Kerr

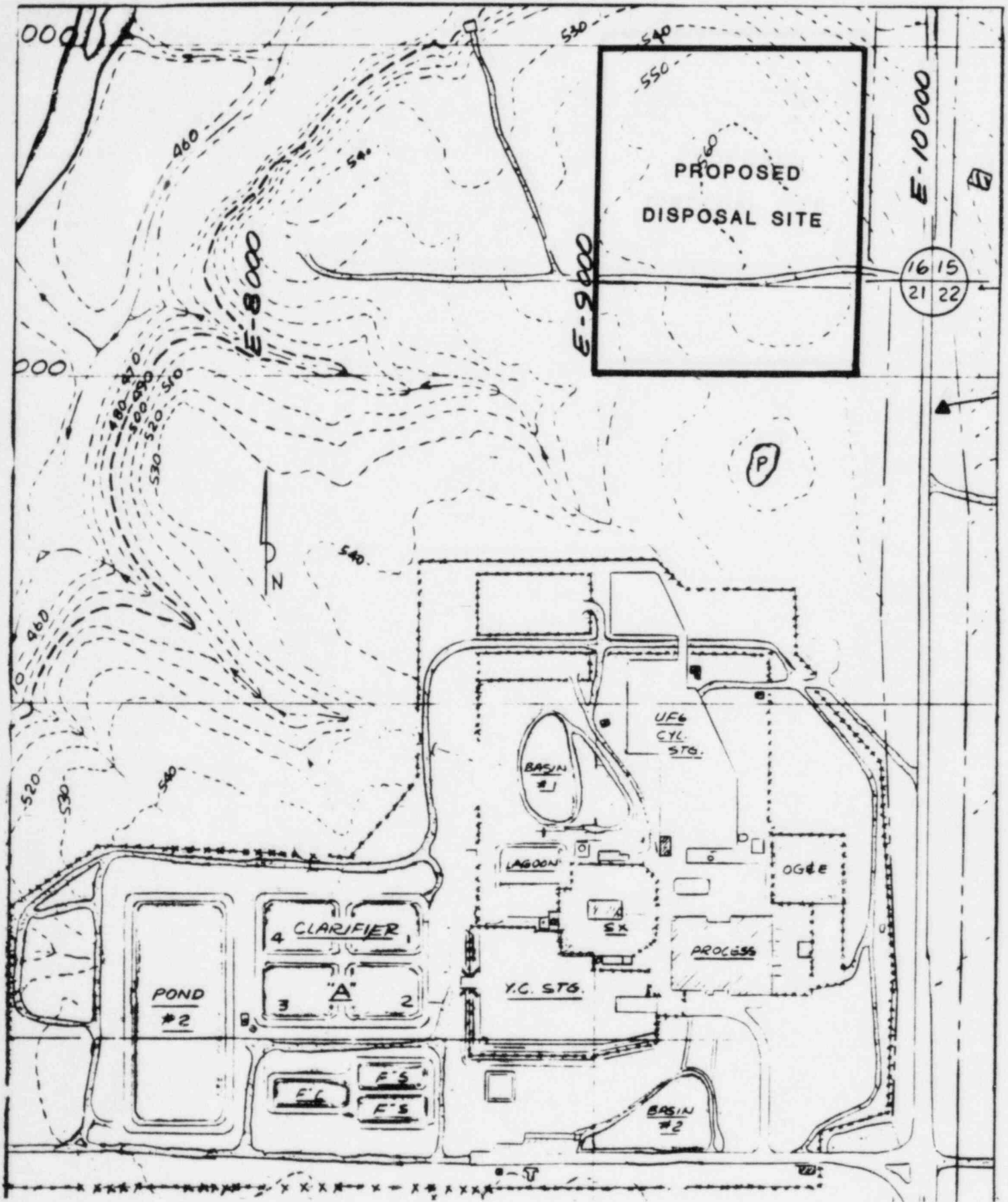


FIGURE 3 PROPOSED DISPOSAL SITE - SEQUOYAH FACILITY

Reservoir, has a normal water level of 450 feet above sea level and a high water level of 490 feet. The proposed site ground level elevation varies from 550 to 560 feet and meets this criterion.

The site is located at a topographical high with a gradual slope to the south and west and a steeper slope toward the north and east. Runoff from precipitation is directed from the entire area toward established drainages that flow west into the Illinois River.

The disposal pits will be developed and closed in a manner to assure that transport of radioactive and other pollutants away from the burial site is highly unlikely. The excavation and reclamation will be during dry summer months to minimize water accumulation. Each pit will be excavated to a depth of 14 to 15 feet and sized to hold a year's generation of both fluoride and contaminated material wastes. The top of the waste layer will be kept at least four feet below surface level and covered with a minimum of 3 feet of clay and one foot of topsoil. The summer placement, the clay caps and the natural surrounding contour will effectively eliminate water intrusion.

In-situ clay soil will be used as the lining for the disposal pits. Groundwater will be protected through the method of pit construction and the depths of pit placement. Pit excavation will be restricted to a minimum of 10 feet (3m) above the water table.

5.0 DESCRIPTION OF WASTE MANAGEMENT METHODS

5.1 On-Site Storage

5.1.1 Raffinate Sludge

The Sequoyah Facility will store raffinate sludge in Pond No. 4 in accordance with license Amendment Number 25. The sludge currently stored in Pond No. 2 and the clarifier basins will be transferred to Pond No. 4 and stored until permanent disposition. Pond No. 2 will be cleared and evaluated for rehabilitation and use as a new lined pond in accordance with Regulatory Guide 3.13.

Various methods of disposal of the raffinate sludge have been considered. The preferred method is reprocessing to recover the residual uranium. The material contains sufficient concentrations of uranium to make reprocessing economical and further, would conserve a natural resource.

The raffinate sludge will be prepared for shipment to a licensed uranium mill for processing in the mill circuit. The sludge will be treated at the Sequoyah facility by filtration and washing to remove nitrates and dewatered to reduce the volume for shipping to a mill in certified yellowcake slurry tanks. The slurry trailers are designated as sole use and are operated by Sequoyah Fuels Corporation for transport of yellowcake slurry to the Sequoyah Facility. Use of this transport equipment for sludge is provided in the container certification.

Appropriate unloading and storage facilities will be installed at the uranium mill for handling the treated sludge as mill feed. The water content provides a free-flowing material and eliminates any concern about dust problems.

The specific activity of the sludge (dry basis) is 98×10^3 pCi/g, the specific activity of yellowcake is 550×10^3 pCi/g and is 3×10^3 pCi/g for uranium ore. On an activity basis, one ton of raffinate sludge is equivalent to about 33 tons of uranium ore.

Sequoyah Fuels Corporation has not as yet obtained authorization from an operating mill (NRC or licensing agreement state) for processing the raffinate sludge at a mill site. The current market conditions in the uranium milling industry are such that most of the uranium mills have been shut down or placed on a standby condition. Therefore, authorization is requested for long-term storage on-site of the raffinate sludge, as provided under option 5 of the NRC Branch Technical Position. Storage will be in Pond 4 which has previously been thoroughly leak tested by storage of treated raffinate. Pond 4 is currently licensed to accept raffinate sludge from the clarifiers.

5.2 On-Site Disposal

5.2.1 Fluoride Sludge and Non-Combustibles

The fluoride sludge inventory of approximately 320,000 ft³ is being stored in surface ponds identified in Figure 3. Contaminated non-combustibles such as metal, glass, scrapped equipment, and dirt are also being stored on-site in 55 gallon drums. Disposal of these materials on-site will provide for long term stabilization of the waste. There will be negligible effects to the environment and no significant exposure of the general population either during or after disposal activities.

From the start of plant operations in 1970, fluoride sludge was buried on-site in pits until the deletion of 10 CFR 20.304 on January 28, 1981. Subsequent to January 1981, the fluoride sludge has been stored in surface impoundments. Throughout both these periods, monitor wells around the earlier permitted fluoride sludge burial areas have shown no evidence of release of radionuclides or fluorides into the soil or groundwater.

5.2.2 Disposal Procedure

Radiation monitoring, airborne and personnel, during disposal activities will be done on a regular basis to provide assurance that no person receives a dose in excess of maximum permissible limits specified in 10 CFR 20. In

addition, the postoperational monitoring of air and surface and groundwater will detect any breaches of stabilization. Routine area inspection will detect damage from natural erosional forces and/or human activities in time to assure appropriate repair.

The disposal plan for the fluoride sludge and noncombustible materials described herein is in accordance with Option 4 of the Branch Technical Position. The maximum of uranium in material to be buried will conform with the Option 4 limit of 1000 pCi/g (soluble) and 2500 pCi/g (insoluble) for uranium without daughters present. The disposal area is zoned for industrial use and documentation will be prepared showing the location of the affected area. The area will be restricted so that excavation will be limited and use of the land for residential or industrial structures and agricultural purposes will be prohibited. Deed notices will carry the appropriate disclosure of use of the land.

Packaging in drums is not contemplated for the waste material. Since the fluoride sludge exhibits a RCRA EP leachate which is below the NIPDW Standards for metals, is insoluble and radionuclides are present at low levels, the dewatered sludge will be loaded into a dump truck and transported to the disposal area for placement directly

into the trench. All other materials, trash and ash, will be homogenized into the fluoride sludge matrix so that no area contains material of different composition than another. Because of its chemical characteristics, the fluoride sludge provides for a basic inert container matrix for the other materials.

The need for additional treatment of the sludge to enhance disposed mechanical stability is being evaluated. This evaluation includes a description of the stabilized material in the earlier permitted burial areas. Addition of trash such as soil and incinerator ash will further provide a method to produce an integral solidified matrix.

After the initial burials of current inventory, the annual generation of waste shown in Table 6 will require one burial cell per year at projected production rates. Material will be accumulated for a year and buried during the dry summer months to assure minimization of potential environmental impact.

The fluoride sludge and contaminated non-combustible materials will be encapsulated below grade, using the impermeable natural matrix as a liner for the material. The coefficient of permeability for the in-situ soil was

determined and test results show that a permeability coefficient requirement of 10^{-7} centimeters per second is achievable. Disposal pits will be covered with three (3) feet of clay and one (1) foot of top soil. The permeability of the clay cap will be lower than the surrounding in-situ soil. The disposal area will maintain the drainage contour it now exhibits and will be revegetated to minimize erosion and weathering. Facility personnel will monitor the site while the vegetative cover is being established and perform necessary maintenance during this time period. A slope of 1 to 2% will be established as a final grade over the disposal area to promote drainage of surface water. These steps will assure that infiltration of rainwater into the disposal pits is negligible.

The selected waste disposal site is located in a relatively remote area to minimize potential disruption and dispersion by natural forces.

The disposal site will be secured from public access by an eight-foot security fence posted with appropriate caution signs. Additional security measures include single vehicle and personnel entry gates that will remain locked except when attended by operating personnel. Manned patrols will monitor the area to discourage vandalism and/or trespassing.

A groundwater monitoring program will be established and will include at the minimum 3 downgradient and 1 upgradient monitoring wells. These wells will be sampled quarterly and analyzed for U, Ra, SO₄, F, pH and specific conductivity.

5.3 Combustible Wastes

The combustible portion of the contaminated trash will be stored in drums in the plant yard prior to processing in an approved incinerator (See Figure 4 for proposed design). The off-gas from the incinerator will be filtered through a baghouse filter and then exhausted through a stack. The system will operate with induced draft dilution air for temperature control of exhaust air entering the baghouse. An isokenetic stack sampler will be installed for effluent airborne particulate monitoring. The ash from the incinerator will be stored in drums on-site until annual disposal by blending with the calcium fluoride sludge to obtain a uniform homogeneous waste mixture.

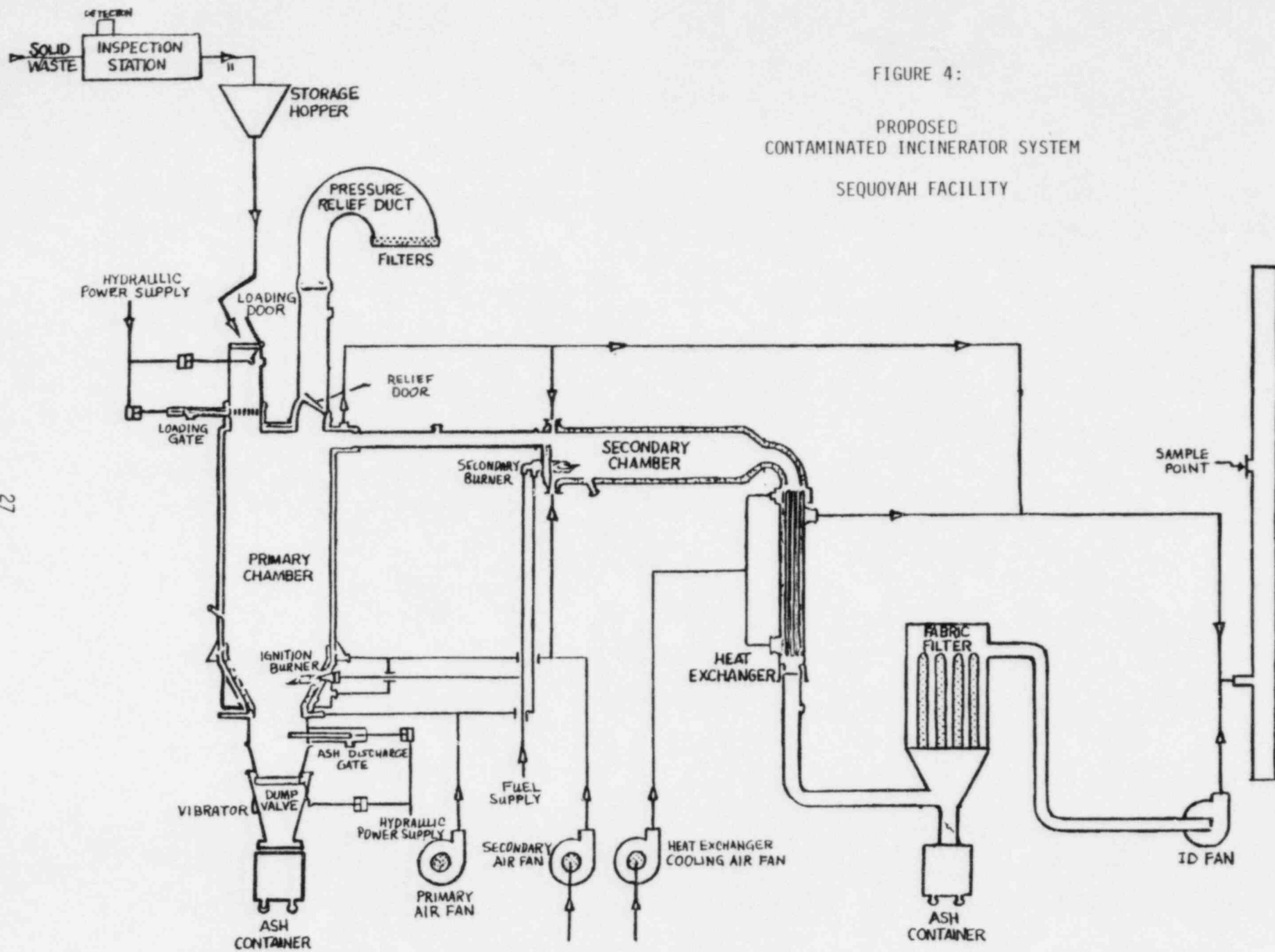


FIGURE 4:
PROPOSED
CONTAMINATED INCINERATOR SYSTEM
SEQUOYAH FACILITY

6.0 ENVIRONMENTAL MONITORING

6.1 Monitor Systems

No changes are expected in the airborne or waterborne radio-activity levels in the area as a result of the disposal actions described in this document. Measurement for airborne radio-activity will take place during storage or disposal operations in the work area and down wind at the site perimeter. Ground-water samples will be collected and analyzed on a quarterly basis from the groundwater monitoring wells. Gamma exposure rates to personnel operating the burial and storage areas will be measured and controlled to minimum levels. The facility ALARA procedures will be maintained. Radon levels are expected to be insignificant; however, measurements will be made for verification as significant quantities of materials are stored or disposed.

6.2 Records

The Health Physics Manager will maintain records of all disposal and storage activities, including appropriate authorization forms and monitoring results. These will be reviewed by the Accountability Manager, the Facility Manager and the Corporate Nuclear Licensing and Regulation Department.

7.0. EVALUATION OF ALTERNATIVES

The alternative disposal options for the radiological solid wastes generated at the Sequoyah Facility are off-site disposal at a commercial low level radioactive waste disposal facility and

decontamination and release of scrap as non-radioactive material. Each of the above alternatives has been evaluated during the development of this comprehensive waste disposal plan.

Decontamination of metal and release as scrap is being done at the facility to the maximum extent possible. This activity will continue and is an effective means for reducing the metal volume requiring disposal by other methods.

Sequoyah Fuels Corporation continues to negotiate with the appropriate regulatory agencies and licensed companies to obtain permission to reprocess the raffinate sludge. Because of the depressed state of the uranium industry and placement of mills on standby status, the only alternative at this time for the raffinate sludge is storage on-site in lined ponds until arrangements for reprocessing can be made. Storage of sludge on-site is considered an interim measure until industry conditions improve. Should approval for reprocessing of this waste not be obtained, another alternative method of disposal will be used, such as disposal at a commercial low level disposal facility. Disposal on-site is not contemplated.

Only one alternative exists for disposal of the fluoride sludge at this time -- off-site disposal. The cost of on-site burial is estimated at \$0.80 per cubic foot, compared with \$37.90 per cubic foot for commercial transport and burial at Barnwell, South Carolina. The estimated annual cost for commercial shipment and burial of sludge from the plant is \$3.32 million at the Beatty, Nevada site and \$3.17 million at the South Carolina site. Included in these costs are: transportation, \$2,100 per shipment to Nevada

0043E

or \$1,450 to South Carolina and disposal fees of \$24 per cubic foot of burial volume. The weight limitation of 42,000 pounds per shipment is a potentially costly restriction. It is estimated that 50-60 gallon drums containing solidified fluoride sludge would weigh from 700 to 850 pounds each. On this basis, more than 228 shipments per year would be required to dispose of this process sludge from Sequoyah operations.

Disposal space at existing commercial disposal facilities may not be available for this waste after January 1, 1986. Oklahoma is a member of the Central States Compact but identification of a disposal site and facility construction and operation will not take place for several years. If disposal space is made available at existing disposal sites, allocation restrictions may severely limit the amount of waste that can be disposed from Sequoyah Fuels Corporation. This allocation may make shipment to a commercial site unrealistic.

On-site disposal will eliminate all potential hazards associated with highway transportation of waste materials. The National Safety Council projects 8.38 accidents per 1 million truck miles driven. Extrapolation of this ratio yields a prediction of 2.8 accidents per year if wastes are transported to out of state burial sites.

Public access to an on-site burial location will be prevented by an eight-foot security fence posted with appropriate caution signs, locked entry gates, and manned patrols by security guards.