RETURN TO 396-SS

40-8027
RE: 8779
PDR/LPDR

Log Jan 88-1
Remitter Kerr-McGee
Check No. 146778
Amount $150
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Date Check Rec'd. 2/9/88
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SEQUOYAH FUELS CORPORATION

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December 28, 1987

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Mr. Leland C. Rouse, Chief
Uranium Fuel Licensing Branch
Division of Fuel Cycle and Material Safety, NMSS
U. S. Nuclear Regulatory Commission
Washington, D. C. 20055

Re: License No. SUB-1010; Docket No. 40-8027
Improved Raffinate Treatment System

Dear Mr. Rouse:

Sequoyah Fuels Corporation (SFC) has completed development of an improved treated ammonium nitrate (raffinate) process for the Sequoyah Facility. The process modification improves treatment capacity, increases solids and constituent removal efficiency and eliminates the centrifuge operation previously required following final barium chloride treatment for radium removal.

The improved processing system incorporates staged raffinate treatment by cycling through several clarifiers. Barium chloride ($BaCl_2$) is added during two stages of the process to enhance radium removal efficiency; addition is done in the initial staged neutralization treatment and again at final pH adjustment. The initial neutralization and $BaCl_2$ treatment is done at a pH around 3.5 with final treatment as the pH is raised to approximately 7.5.

The attached revisions to Chapter 1, Section 1.8, page I.1-5 dated 12/07/87 and Chapter 10, Section 10.4.1 page II.10-12 dated 12/07/87 describe the improved treatment system. These revised pages replace pages I.1-5 dated 8/23/85 and page II.10-12 dated 8/20/86. Also included is a new figure 10.4-1, page II.10-12A.

Should you have any questions concerning this improved treatment

28913

system, please contact me at your earliest convenience.

Sincerely,

J C Stauter

John C. Stauter, Director
Nuclear Licensing and Regulation

JTC/JCS/jms

Enclosures as stated (8)

xc: R. L. Bangart, Region IV

1. Treated ammonium nitrate shall be used as fertilizer only for crops which are not used directly as human food, such as animal forage or seed production.
2. Neutralization of raffinate shall occur in two stages with barium treatment done in both stages. The pH shall be adjusted in stages slowly from below 3.5 to approximately 7.5 to increase the efficiency of the removal of Ra-226 and other trace metals.
3. The treated ammonium nitrate shall be analyzed prior to use and shall be released for use as a fertilizer only if:

   a. The Ra-226 content does not exceed 2 pCi/l of solution or 0.1 pCi/gN.

   b. The average uranium concentration does not exceed 0.1 mg/l.

   c. The quantity of each trace element applied by using the treated ammonium nitrate as fertilizer at the planned application rate is not to exceed the total cumulative loading (lb/acre) as specified in Table 1-1. The total cumulative loadings can be achieved by a single or multiple application of the treated ammonium nitrate waste over the usable lifetime of the treatment area. Once the total cumulative loading value for any element is reached within a treatment area, that area is to be removed from further fertilization by the treated ammonium nitrate.

4. The total quantity of nitrogen applied to any land in any one year by using treated ammonium nitrate as fertilizer will not exceed 700 lb. N/Acre.

5. Quantitative analyses for metals and specified isotopes shall be performed as outlined in the enclosed Appendix I, Revision 1.

6. The designated treated ammonium nitrate (fertilizer) application test areas shall be the Rabbit Hill and the 270 acre sites.

A liquid waste stream is generated by the hydrofluoric acid scrubber. This fluoride waste stream is combined with acid spilled in the HF vaporizer room sump and laboratory wastes. The combined stream is treated with lime which neutralizes acids and precipitates fluorides as calcium fluoride.

The alkaline sludge is permitted to settle in a retention basin. The flow is treated with sulfuric acid to adjust the pH and precipitate excess calcium. It is then permitted to clarify. The clarified treated waste overflows and is combined with clean bypass water and the sewage lagoon overflow. A concrete stilling basin at the point of combination allows mixing of the flow with sanitary and domestic waste liquids and controlled release through a flume so that the rate of discharge can be measured. Discharge flows to the unnamed headwaters of the Robert S. Kerr Reservoir through a natural watercourse.

The waste stream from the solvent extraction system, known as raffinate, is primarily a solution of nitric acid, metallic salts and minute quantities of uranium and the radioactive daughter products of normal uranium decay. This stream is combined with spent sodium hydroxide from the solvent treatment and miscellaneous digester scrubber systems, waste sodium carbonate solutions and with any recovered weak acids.

The untreated stream (Figure 10.4-1) from S-X is pumped into a clarifier basin and allowed to cool. Barium chloride ($BaCl_2$) is added to this low pH untreated raffinate through a static mixer as the raffinate is transferred to a second clarifier basin. where the pH is slowly adjusted with anhydrous ammonia from below 3.0 to approximately 7.5. Uranium, thorium, radium and trace metals are removed by this treatment process. The neutralized solution is then pumped through a second static mixer where additional $BaCl_2$ is blended and discharged to a third basin to remove remaining radium. Ammonia is added as required during this solution transfer to maintain the 7.5 pH.

The final ammonium nitrate product from the raffinate treatment system is continuously analyzed. Material not meeting specifications is recycled for further processing. The treated ammonium nitrate solution is stored in surface impoundments prior to use as fertilizer on Sequoyah Fuels owned land.

RAFFINATE TREATMENT SYSTEM

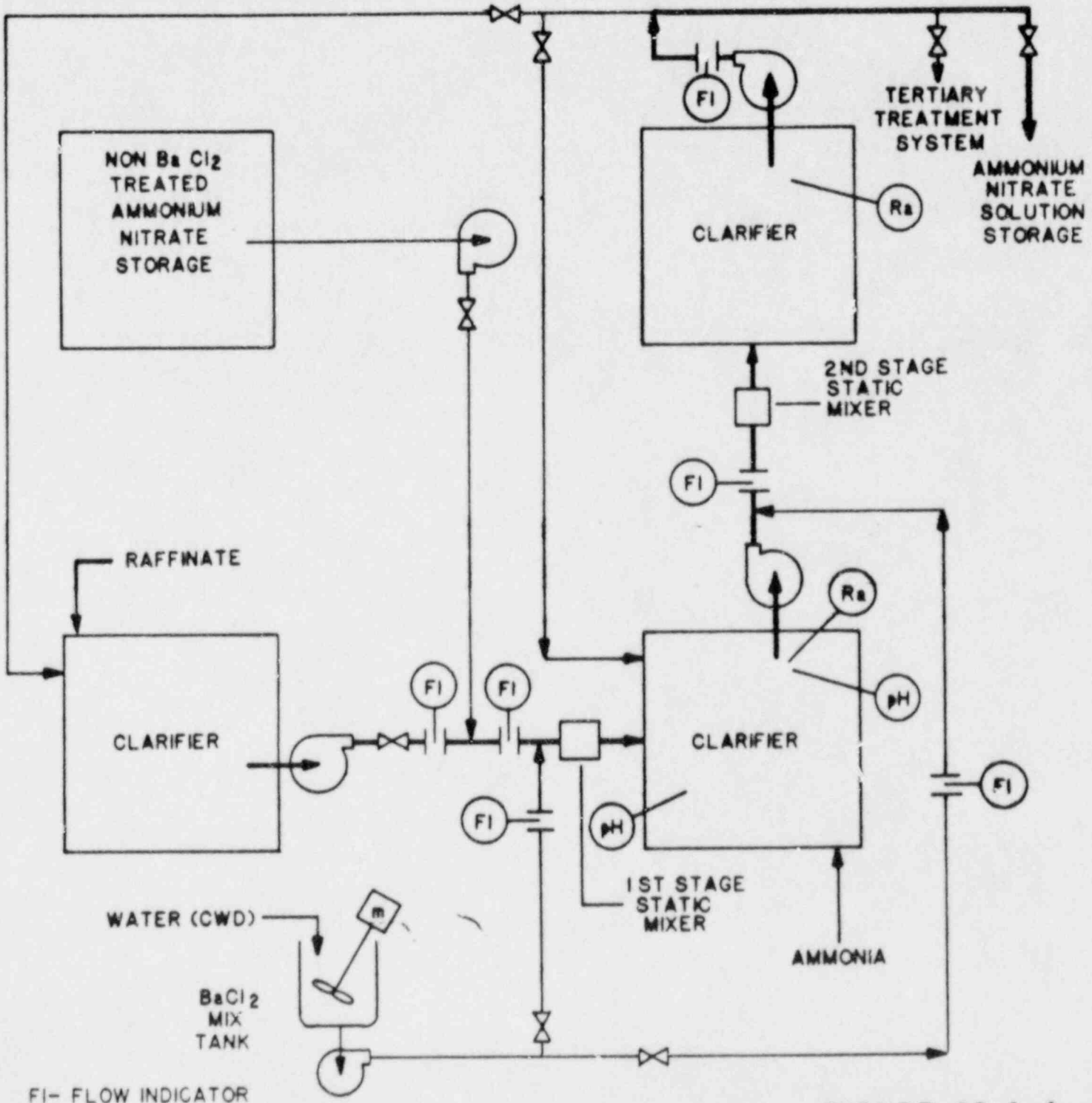

FIGURE 10.4-1

A F F I D A V I T

STATE OF OKLAHOMA
COUNTY OF OKLAHOMA

SS: License SUB-1010; Docket 40-8027
RE: 8779
Improved Raffinate Treatment
System

I, James G. Randolph, President, Sequoyah Fuels Corporation, hereby attest that the facts contained in the attached documents are accurate to the best of my knowledge.

James G. Randolph, President
Sequoyah Fuels Corporation

Subscribed and sworn before me on this 23rd day of DECEMBER, 1987.

Mary Jo Pattroff
Notary Public

My Commission Expires:

3-16-91

DOCKET NO. 40-8027
CONTROL NO. 28913
DATE OF DOC. 12/28/87
DATE RCVD. 01/05/88
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FCAF ✓
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DATE 1/7/88 INITIAL CEC