40-8027

KERR-McGEE NUCLEAR CORPORATION
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

June 2, 1978

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. W. T. Crow
Fuel Processing & Fabrication Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Crow: Docket: 40-8027

Your letter of May 18, 1978, requested additional information concerning our application to amend license No. SUB-1010 permitting additional liquid waste pondage. Attached are revised pages to our March 3, 1978, application which answers your questions; specifically:

1. Pond No.1 should have been referenced instead of Pond No.2 in the title at the top of the first page.

   This has been done.

2. Kerr-McGee will submit data to verify that the lining material is adequate for storage of the raffinate solution.

   Table No. 2 has been added to the application. This table lists properties of the Hypalon liner including compatibility data for ammonium nitrate solutions and other more severely corrosive chemicals.

3. Kerr-McGee will establish a monitoring program for the pipeline collection system underneath Pond No. 3. The program shall include:

   a) the frequency of sampling;

      A new Section No. 6 is added describing the monitoring and sampling frequency.

   b) the chemical and radiological materials to be analyzed;

      This is described in Section No. 6.

   c) action levels and the corrective action to be taken should be provided for both the pipeline collection system and for the four monitoring wells;

FEE EXEMPT

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add'l info

A new Section No. 7 is added which describes (a) actions to take including increased surveillance in the event of minor leakage and (b) the criteria for transferring the contents of the affected basin to the spare basin and repairing the liner in the event of a serious leak.

While it is our intent to use Pond No. 3 for storing ammonium nitrate solution made from treated raffinate, it is possible that untreated raffinate may be placed in the pond. This application is applicable to both the treated and untreated raffinate.

Your prompt approval of this application will enable Pond No. 3 to be constructed during 1978, as planned and needed.

Very truly yours,

W. J. Shelley, Director
Regulation and Control

WJS:jt

Attachments

Amendment of License SUB-1010 to Permit the Construction of Liquid Storage Pond #3 and Remodeling of Pond #1.

1. Planned Future Use of Retention Ponds

The new Pond #3 will be used for storage of liquid ammonium nitrate fertilizer solution. This fertilizer is produced by removing the small quantity of radioactive material and other sludge solids from the raffinate wasted during the solvent extraction operation. The use of this pond is planned to begin September 1, 1978.

Pond #1 will be used for treatment of the raffinate until mid 1979, transferring the radioactive free (3pCi/l) fertilizer solution to one of the basins in Pond #3. Beginning mid 1979, Pond #1 sludges will be transferred to Pond #2 for disposal. Pond #1 will then be remodeled to meet Regulatory Guide No. 3.13 while Pond #2 is used for the raffinate treatment. Table No. 1 more clearly shows the sequence of the planned activities.

By providing two basins in Pond #3 (one a spare) and the eventual conversion of Pond #1 for similar use, alternate storage volume will be available if the integrity of other basins in use is determined insufficient to retain their contents safely.

2. Pond #3 Location

A sketch of the existing raffinate storage ponds Nos. 1 and 2 are found on page 4-12 of the demonstration section of License SUB-1010 as renewed October 7, 1977. The proposed new Pond #3 will be located south of Ponds 1 and 2 as depicted on the enclosed drawing No. 110-C-1008 "General Plot Plan Raffinate Pond No. 3." This site is owned by Kerr-McGee Nuclear Corporation. Its location does not occupy the channel of any permanent or intermittent watercourse and is protected against water runoff from surrounding drainage areas. A seven-foot chain link security fence surrounds the site to restrict access by animals and unauthorized individuals. The fenced area is sufficiently large to permit maintenance on the outer slopes of the embankments. Ponds Nos. 1 and 2 have not been frequented by waterfowl, to our knowledge, during the past years. The slightly ammoniacal odor of the treated raffinate discourages waterfowl from landing on these ponds. A protected wildlife refuge nearby attracts these birds, consequently they are not enticed to land on the ponds.

3. Hydrogeologic Setting of Pond #3

At the site of the proposed pond, holes were drilled into the bedrock and cores were taken at the four corners of the pond to determine the site specific lithologic conditions. Two cross-sections diagonally across the pond area were constructed from the data and are shown in drawing No. SQ 14, attached. The subsurface investigation revealed a hydrogeologic setting very similar to that found in the extensively explored area around Pond #2 as reported in January 1977.

Groundwater conditions underlying the proposed pond are expected to be similar to those beneath Pond #2. The water table should occur at less than 30 feet and be a subdued expression of the topography. Groundwater monitoring wells will be located around the pond to show specific water table configuration and quality before the pond is put into use. Simple aquifer tests will be conducted to determine aquifer properties and note rate of natural groundwater movement. The monitoring and testing will be done to establisn baseline conditions. These monitoring wells will serve to detect pond leakage in the unlikely event it should occur.

4. Construction of Pond #3

As can be seen from drawing No. 100-C-1008, Pond #3, consists of two separate retention basins, each with a planned liquid capacity of 12.75×10^6 gallons while maintaining a safe embankment freeboard of 3 ft. above the liquid level. The basin embankments will be stabilized to prevent erosion. Grasses will be grown on the outer banks. There will be no dry radioactive material produced by evaporation of liquid from the basins. Dry fertilizer which might form around the sides of a pond because of evaporation, will be dissolved by the next rain and return into the basin.

The interior of each basin will be lined with an essentially impervious Hypalon lining designed to prevent seepage. See Table No. 2 for data on the liner. The number of construction joints of the liner will be minimized. A layer of sand is immediately below the liner and above the clayey subbase soil. The pond bottom is sloped approximately 2°. The slope and the sand serves two purposes; (1) venting air which may otherwise form a bubble under the liner and (2) in the event of leakage, it provides a porous path for the liquid leakage to follow to the seepage collection piping beneath the liner. (See drawings Nos. 110-C-1009 and 110-C-1011.)

The seepage assessment system includes six perforated pipelines extending East to West across each basin beneath its liner. The mid point of each pipe is slightly higher than the rest of the nearly horizontal section of the pipe. This causes a slight slope which directs any seepage collected to the piping elbows located at the inside bottom of the basin where the embankment begins. The basin bottom is sloped 2° from the North to the South. Leakage detected at any one sampling point is located within an identifiable section, 1/12 (8.33%) of the basin area. The sample is taken by snaking a semi-rigid hose down the 3" pipe to the bottom pipe elbows and pumping any liquid obtainable up through the hose to a sample bottle.

In addition to the pipeline collection system, there are four wells; one at each corner outside of the pond. These wells range from 32 ft. deep to 42 ft. deep. The wells will be built to prevent their contamination by surface waters.

The design of the basins and the seepage assessment system together with the spare ponding capability provides for the needs of any routine or emergency maintenance.

Hemphill Corporation has been commissioned as the design and construction consultant. The Hypalon liner will be supplied by a reputable contractor.

5. Remodeling of Pond #1

Pond #1 will be remodeled to closely duplicate Pond #3. There may be as many as four basins in Pond #1. The dimensions of each basin may vary somewhat as compared to the basins in Pond #3. Each basin in Pond #1 will have its own leakage assessment system designed, built and sampled in the manner described for Pond #3.

6. Routine Monitoring Program

The perforated pipeline collection system under each basin of Pond #3 has twelve sampling points, each representing ~8.33% of the basin area. Sampling equipment will be operated routinely at each of the twelve sampling points using the frequency listed below. If leakage is detected the sampling frequency may be changed as described in Section 7.

SAMPLING FREQUENCY

a) Daily for the first 5 days after beginning use of the basin, then

b) Weekly for four weeks, then

c) Monthly for three months, then

d) Quarterly.

It is anticipated that the pipeline system will usually be dry. The sampling record will be marked "dry" when no liquid is obtained from a proper attempt to withdraw liquid from a sampling point. In the event that liquid is collected, it will be analyzed for nitrate.

It is expected that the four monitoring wells will always have water in them. Samples will be taken before the pond is used. After the first use of a pond basin these wells will be sampled monthly for a period of three months, then quarterly. Sample analysis will be for gross alpha, beta nitrate, fluoride, uranium and radium.

7. Corrective Action in Case of Leakage

It is unlikely that the monitor wells would collect pond liquid without the pipeline system having previously gathered some of the seepage. In the event that pond liquid is found in one or more monitor wells, the contents of the pond basin in use will be transferred to the spare basin. The liner would then be inspected and repaired. The monitor wells would be pumped periodically to purge the local ground water of the seepage liquid, until well samples returned to near "background" conditions. Re-use of the pond basin will require the sampling frequencies given in Section 6.

If a liquid sample from the pipeline collection system shows an unusually high nitrate concentration, an estimate of the leak rate will be made. This may be done by attempting to pump the sampling point dry at timed intervals and measuring the volume removed. By knowing the liquid accumulation rate and its nitrate concentration, the severity of the leak can be determined. When the severity is considered low, a more frequent sampling may be done and the pipeline system periodically pumped dry, returning the seepage to the basin.

A more severe problem would be flooding of the pipeline system because of rapid leakage. Should flooding occur, the contents of the affected basin will be transferred to the spare basin, and liner repairs made. Consideration will be given to drilling intercepter wells for the purpose of additional sampling and for pump purging the ground water. The sampling frequencies given in Section 6 will apply when the basin is re-used.

TABLE NO. 2

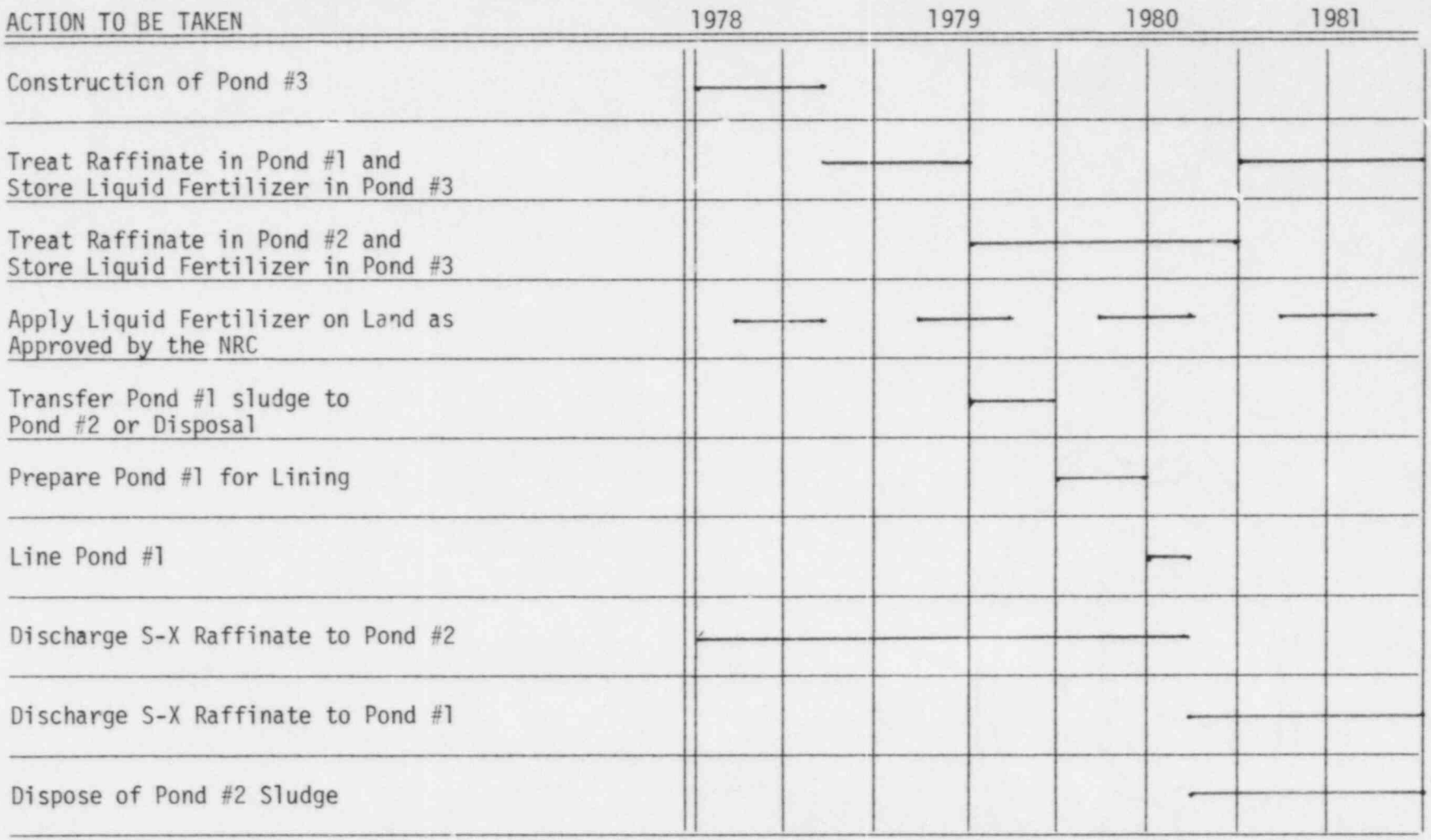
Specification No. P-32-0
Hypalon Pond Liner Data

I. Physical Properties

Property	Test Method	Requirement
Tensil Strength	ASTM D-412	1,000 psi, Min.
Elongation at Break	ASTM D-412	250% Min.
Water Absorption	ASTM D-471(7 days @70°F)	5% (wt.) Max.
Cold Bend (1/8")	ASTM D-2136	-30°F, no cracks
Brittleness	ASTM D-746(B)	-45°F, no failure
Ozone Resistance	ASTM D-1149(A)	No cracks (7 x mag.)
Heat Aging -		
Tensil Strength	ASTM D-573	1,000 psi, Min.
Elong. at Break	& D-412	150% Min.
	14 days @ 212°F	
1-Ply Thickness	--	15 mil. (nominal)
Scrim Material	--	Polyester fiber
Liner Thickness	--	28 mil., Min.
Sheet Strength - wrap	ASTM D-751	80 lbs., Min.
- fill	Grap Method	80 lbs., Min.
Tear - wrap	ASTM D-751	20 lbs., Min.
- fill	Tongue Method	20 lbs., Min.
Mullins Burst	ASTM D-751	90 psi, Min.
Puncture Resistance	FTMS-101-B Method 2031	100 psi, Min.
Pinholes	Spark Test or Light Source Scanner	No pinholes
Chemical Resistance	--	Highly resistant to aqueous solutions of nitric acid and other inorganic acids. Excellent compatibility with ammonium nitrate* and other ammonical solutions.

*The Kerr-McGee Nuclear Corporation has a Hypalon-lined pond at its Cimarron facility near Crescent, Oklahoma. This pond has contained ammonium nitrate solutions and withstood weather conditions for a period of seven years without observable deterioration.

TABLE NO. 1


ACTION TO BE TAKEN
1978
1979
1980
1981
Construction of Pond #3
Treat Raffinate in Pond #1 and Store Liquid Fertilizer in Pond #3
Treat Raffinate in Pond #2 and Store Liquid Fertilizer in Pond #3
Apply Liquid Fertilizer on Land as Approved by the NRC
Transfer Pond #1 sludge to Pond #2 or Disposal
Prepare Pond #1 for Lining
Line Pond #1
Discharge S-X Raffinate to Pond #2
Discharge S-X Raffinate to Pond #1
Dispose of Pond #2 Sludge