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

C 40-3453
40-6659
40-8681
40-8698
40-8602

APR 16 1980

MEMORANDUM FOR: Leo Higginbotham, Assistant Director
Division of Fuel Facilities and Materials
Safety Inspection
Office of Inspection and Enforcement

FROM: Ross A. Scarano, Chief
Uranium Recovery Licensing Branch
Division of Waste Management

SUBJECT: TRANSMITTAL OF NRC CONSULTANT REPORTS ON TAILINGS RETENTION SYSTEM CONSTRUCTION

As requested by Mr. Doug Sly of your office, we are transmitting our consultant reports for the following five projects for which we have requested inspections of embankment construction in progress or recently completed:

1. Atlas Minerals, Moab (40-3453)
2. Petrotomics, Shirley Basin (40-6659)
3. Energy Fuels Nuclear, White Mesa (40-8681)
4. Plateau Resources, Shootering Canyon (40-8698)
5. United Nuclear, Morton Ranch (40-8602)

Also included is the list of specifications to be used as a guideline during inspections at the Shootering Canyon site. A copy of this package has been forwarded to Mr. Glen Brown, Region IV.

If you have any questions or the need for further information please contact Mr. John J. Linehan of my staff at x74103.

for John Linehan
Ross A. Scarano, Chief
Uranium Recovery Licensing Branch
Division of Waste Management

Enclosures:
As stated

cc: Glen Brown, R:IV

SUMMARY - SHOOTERING CANYON STAGE I EMBANKMENT
SPECIFICATIONS

I. General Embankment Characteristics

A. Crest Elevation: 4433
B. Crest Width: 85 ft.
C. Pool Elevation: No tailings placed against embankment during Stage I
D. Upstream and Downstream Slopes: 2:1

II. Foundation Preparation

A. Topsoil and loose soils removed from dam and reservoir areas
B. Zone 1 (core area)

1. Excavate foundation through overburden soils one foot into bedrock
2. Exposed bedrock slush grouted

C. Foundation soils under other zones scarified and recompacted

III. Embankment and Liner Construction

A. Shell Sections (Zone 2)

1. Pediment boulders, cobbles, gravel, and sand
2. Maximum size: 12 inches
3. 12 inch + material raked to outer portion for slope protection
4. Test fill required prior to placement of this zone, to determine compaction characteristics
5. 12 inch lifts except in outer 10 feet of shell where 18 inch lifts are allowed
6. Finer fraction of Zone 2 placed against Zone 3
7. Field density tests: frequency of one test for each 50,000 cubic yards

B. Transition Zone (Zone 3)

1. Fine sand conforming to the following gradation:

Sieve Size, U.S. Standard Sieve Mesh	Percent by Weight Passing Individual Sieves
No. 30	100
No. 50	70-100
No. 200	0-20

2. Compaction: The higher in-place dry density achieved by either

   a. Average of 85% but not less than 80% relative density as determined by ASTM D-2049

   b. At least 95% of maximum dry density as determined by ASTM D-698-70

3. Loose lift thickness of 8 inches
4. Moisture control: 1% dry of optimum to 1% wet of optimum
5. Test frequencies:

   a. Field density: 1 test per 2000 cubic yards
   b. Moisture-density, Atterberg limits and gradation tests:

      1 test per 30,000 cubic yards

C. Impervious Core (Zone 1) and Liner

1. Sandy, silty, clayey soil (formed by breakdown of shales)
2. Maximum size of 1 inch; Percentage of fines (minus No. 200 sieve) greater than or equal to 50.
3. Compaction: At least 95% of maximum dry density as determined by ASTM D-698-70
4. Loose lift thickness of 8 inches
5. Moisture control: Optimum moisture content to 3 percent wet of optimum
6. Test frequencies: same as Zone 3
7. Thickness of liner

   a. 10 percent of applied hydraulic head
   b. Minimum of 2 feet

8. Liner covered by granular sub-drain and layer of mine waste rock

   a. Sub-drain: 18 inches thick and meets Zone 3 criteria
   b. Waste Rock: 12 inches thick

D. Blanket Drain and Filter

1. Tied into toe drain
2. Blanket drain 20 inches thick with 6 inch thick filters
3. Uniformly wetted and compacted by 4 passes of 20 ton vibratory equipment
4. Blanket drain gradation:

Sieve Size, U.S. Standard Sieve Mesh	Percent by Weight Passing Individual Sieves
2"	100
1-1/2"	95-100
3/4"	25-70
3/8"	10-30
No. 4	0-5

5. Filter gradation:

Sieve Size, U.S. Standard Sieve Mesh	Percent by Weight Passing Individual Sieves
3/8"	100
No. 4	95-100
No. 8	70-100
No. 16	20-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

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PITCOTOMICS, SHIRLEY BASIN

DOCKET FILE

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SEP 24 1979

Docket No. 40-6659

MEMORANDUM FOR: John Linehan, Leader
Uranium Recovery Licensing Branch

FROM: William S. Bivins, Leader
Hydrologic Engineering Section, HMB, DSE

SUBJECT: ADDITIONAL HYDROLOGIC ENGINEERING INPUT PETROTOMICS URANIUM MILL

Enclosed is additional hydrologic engineering input prepared by T. L. Johnson, which supplements our hydrologic engineering summary of October 26, 1977, transmitted from L. G. Hulman to L. C. Rouse.

We find the tailings beach and downstream toe ditches to be acceptable, subject to the license conditions stated in the enclosure. In light of recent problems with erosion problems on the upstream embankment slope, we recommend that I&E visit the site to assure that the placement of the tailings beach is progressing satisfactorily.

William S. Bivins

William S. Bivins, Leader
Hydrologic Engineering Section
Hydrology-Meteorology Branch
Division of Site Safety and
Environmental Analysis

CORPS OF ENGRS. WILL CONDUCT AN INSPECTION IN NOV.

Enclosure:
As Stated

cc: w/enclsoure
J. Martin
D. Muller
W. Kreger
R. Jackson
W. Bivins
L. Heller
J. Kane
P. Garcia
T. Johnson

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ADDITIONAL HYDROLOGIC ENGINEERING IMPACT
PETROTOMICS URANIUM MILL
DOCKET NO. 40-6659

At the time of transmittal of the 1977 summary, we concluded that additional information and redesign would be required for the erosion protection of the upstream dam face. In addition, a design change utilizing downstream toe ditches was recently proposed. We have evaluated both issues. The upstream slope protection, in the form of a tailings beach, has been documented by the licensee. Based on our review of the submitted information, we conclude that the beach as proposed is acceptable to preclude damage to the upstream embankment slope due to severe wind-wave activity. As a license condition, the beach and upstream dam face should be inspected periodically by the licensee.

We also evaluated the capability of the ditches along the downstream dam toe to provide adequate discharge capacity and to resist erosion. Based on our evaluation of the information supplied by the licensee we conclude that the ditches are adequately sized and will not erode significantly during a PMF, due to the short duration of flooding on the small drainage area. It is possible that some minor erosion could occur. To accommodate this, periodic maintenance and repair of damaged portions of the ditches will be needed. As a license condition, the licensee should be required to inspect the ditches for signs of erosion, degradation, and aggradation, and to make the necessary repairs to achieve original design conditions. Any area sustaining unusual erosion should be reported to NRC promptly.