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Docket 40-8768
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WMUR:DMG/TDV
Docket No. 40-8768

MEMORANDUM FOR: Ross A. Scarano, Chief
Uranium Recovery Licensing Branch

THRU: John J. Linehan, Section Leader
Operating Facilities Section I
Uranium Recovery Licensing Branch

FROM: Daniel M. Gillen
New Facilities Section
Uranium Recovery Licensing Branch

Terry D. Vandell
Operating Facilities Section I
Uranium Recovery Licensing Branch

SUBJECT: REVIEW OF PROPOSED EVAPORATION POND, KERR-MCGEE NUCLEAR CORPORATION (04008768N01E)

RECEIVED
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U.S. NUCLEAR REGULATORY COMMISSION

Kerr-McGee submitted, by letter dated January 2, 1981, a geotechnical report presenting the results of the investigation for the proposed SPRB evaporation ponds. In addition, a contingency plan for leakage and a drawing of the evaporation ponds' design were submitted by letter dated October 15, 1980.

The proposed evaporation ponds have been designed to consist of two square cells equal in size (100 ft. x 100 ft.) and separated by a dividing embankment. The proposed perimeter embankments and dividing embankment have a maximum height of eight feet, exterior and interior slopes of 2½H:1V, and a crest width of 10 feet. Fill for the embankments would consist of sandy silty clays excavated from the preferred site for the impoundment (location No. 2 on Attachment 1). The fill would be compacted to 95 percent of the maximum dry density and placed within plus or minus two percent of the optimum moisture content as determined by ASTM D-698.

Kerr-McGee proposes to line the interior slopes and floors with a 30-mil, reinforced, hypalon liner anchored in a one-foot deep trench near the crest of the impoundments. The proposed leak detection system for each cell consists of a two-inch diameter PVC pipe laid in a depressed trench at the lowest point (center line) of the cell bottom. The cell

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bottoms slope toward their center lines at an angle of three degrees. Sand is to be placed in the trenches as well as in a six-inch bedding layer directly below each cell floor liner. The collector pipes lead to sumps, one for each cell, thus providing two independent leak detection systems. Kerr-McGee's proposed corrective action in case of leakage from the pond is presented in Attachment 2.

A minimum freeboard of two feet is specified in the design of the evaporation ponds, but no backup data are provided.

The following are conclusions and recommendations based on a review of Kerr-McGee's submittals:

1. Based on the embankment geometry, a review of Kerr-McGee's soil boring data, the compaction specifications, and the proposal of a liner and leak detection system, the embankment design is considered conservative with regard to stability requirements. This conclusion assumes that location No. 2 on Attachment 1 is the site of the ponds.

2. Using a PMF series previously calculated for the region in which the ponds will be located, and an independent calculation of wave run-up, it was determined that Kerr-McGee's design freeboard of 2.0 feet meets the requirements of Regulatory Guide 3.11.

3. The permeabilities of the sandy silty clays that would form the ponds' bottoms and sides, and a sand that would be used for the bedding material, are likely to differ by three orders of magnitude and provide an efficient leak detection system. However, in order to ensure this, it should be required that:

   a. Prior to placing the sand bedding layer, the silty clay subgrade should be compacted and any sand seams and pockets that are visible should be covered by compacted clay soils. A sand seam intersecting the pond bottom could negate the effectiveness of the path for leakage to the collector pipe. The finished subgrade should be graded to a surface tolerance of less than or equal to 1 inch.

   b. The bedding sand should have no more than 12 percent passing the number 200 seive and laboratory permeability tests on both the subgrade material and bedding sand should be performed to verify variance of at least 3

orders of magnitude. In addition, the bedding sand should be extended up the embankment slopes to enable detection of any leakage through the liner covered sides of the cells. The proposed design only indicates bedding beneath the floor liner.

4. A quality control program for installation and testing of the Hypalon liner should be developed by Kerr-McGee and submitted to WMUR for review and approval. The review should be based upon the recommendations in the forthcoming branch position paper on liners.

5. The corrective action for leakage as submitted by Kerr-McGee (Attachment 2) should be modified in the following manner:

   a. If leakage of any amount is detected, the liquid should initially be analyzed for chloride and TDS and if the concentrations exceed Wyoming DEQ drinking water standards, then they should also be analyzed for calcium, alkalinity, sodium, uranium, gross alpha, gross beta, radium-226, selenium, arsenic, and sulfate.

   b. Liner repairs should be required upon the detection of contaminated liquids. The proposed pump-back of "low" leak rates is not considered an acceptable fix for a leaky liner. However, capability of leakage pump-back must be maintained as an interim measure during liner repair.

6. The proposed frequency for sampling of the leak detection system should be changed to require a daily check of the system.

7. Groundwater monitor wells and lysimeters are not needed at the Kerr-McGee evaporation pond sites because (1) the depth to the first aquifer is so deep, approximately 190 feet (the "W" aquifer) and (2) the underlying subsurface material is extremely clayey and silty.

   Even if a major release to the subsurface occurred from the evaporation ponds, the rate of seepage flow to the "W" aquifer would be extremely slow, and many of the contaminants would be attenuated as a result of the large amounts of clay in the subsurface. As a license condition, it should be stated,

however, that the NRC may require aquifer monitor wells around the evaporation ponds if conditions should warrant it (i.e., large subsurface release of very poor quality water).

Suction-pressure lysimeters would not "work" at this site because the upper unsaturated subsurface material is too clayey and would only tend to plug off the lysimeter tips.

The NRC staff feels that daily monitoring of the leak detection sumps and quick remedial response to pond leaks are suitable, considering the hydrogeology at this site.

8. The installation of a fence that would prevent the intrusion of game animals (muledeer, and antelope) into the evaporation pond area should be required.

The conclusions and recommendations listed above have been addressed to Kerr-MGee in the EIA and should be included in the license conditions.

Original Signed by
D. M. Gillen
Daniel M. Gillen
New Facilities Section
Uranium Recovery Licensing Branch
Division of Waste Management

Original signed by
Terry D. Vandell
Operating Facilities Section I
Uranium Recovery Licensing Branch
Division of Waste Management

Attachments:
As stated

6/4/81 -- MAG II

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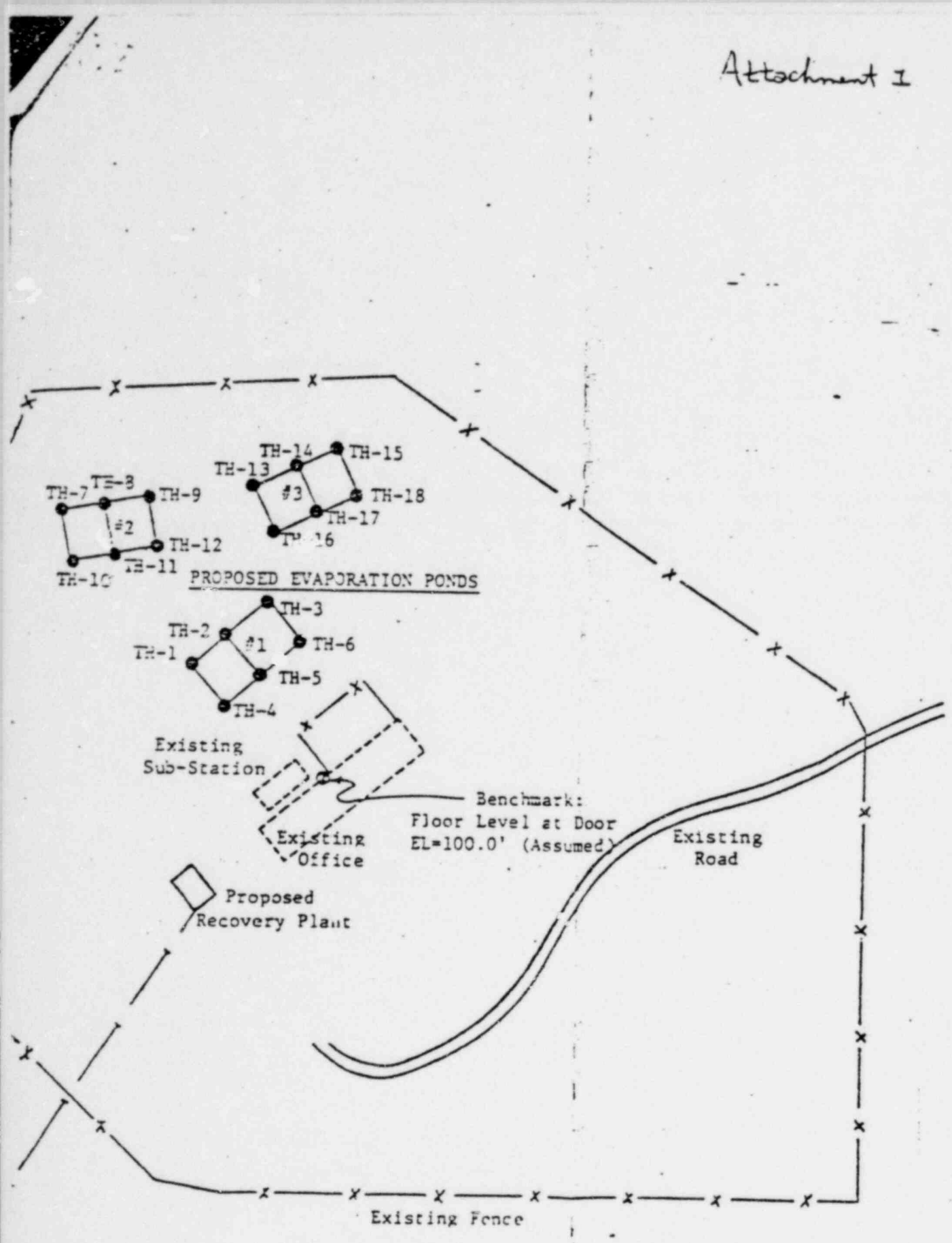
DATE	6/2/81	6/2/81	6/2/81				

Attachment 1



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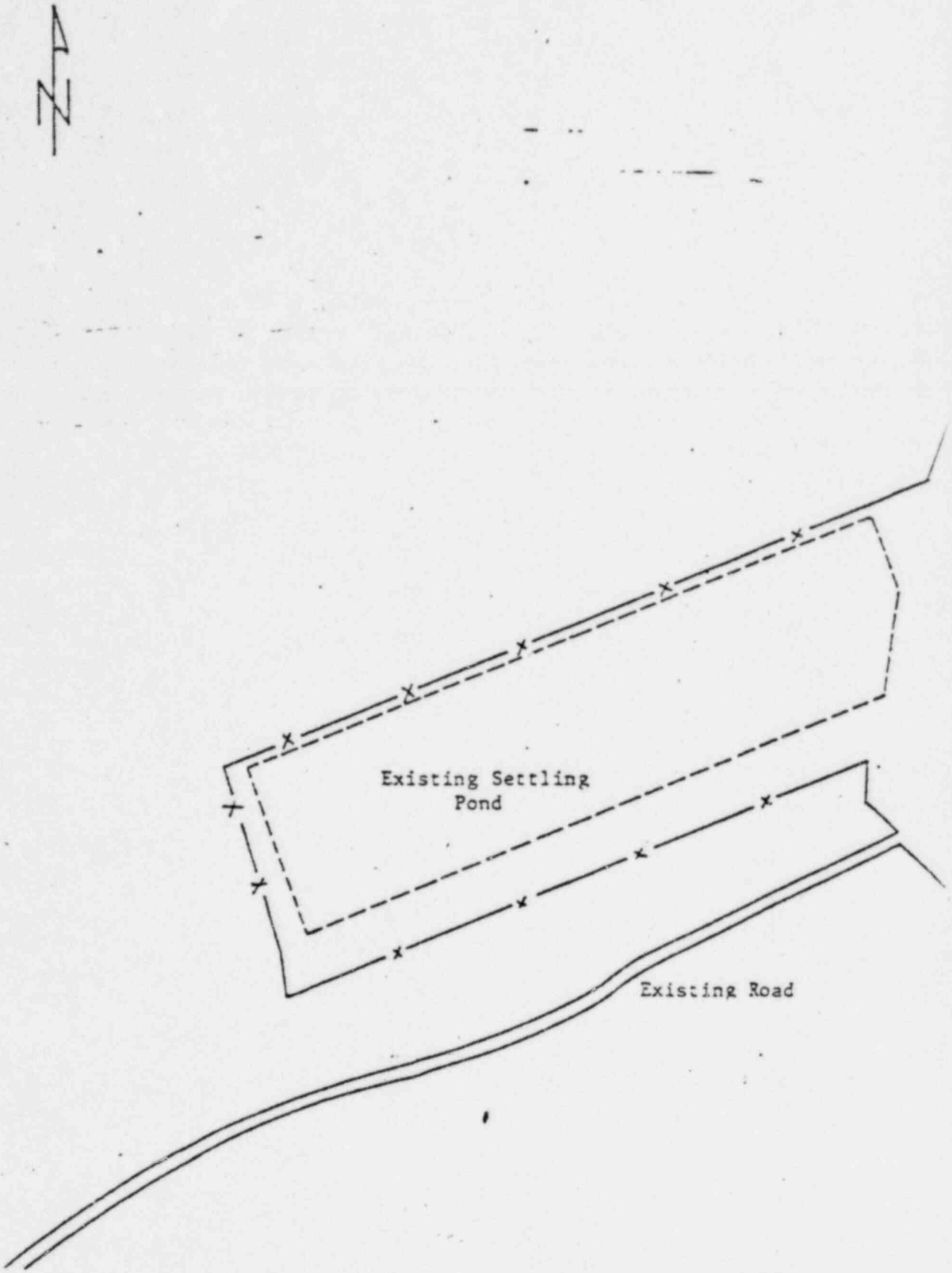
LOCATIONS OF EXPLORATORY HOLES
Scale: 1"=200'



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Attachment 2

15 October 1980

Kerr-McGee Nuclear Corporation
Source and By-Product Material License
Number SUA-1378, LC-16

CORRECTIVE ACTION IN CASE OF LEAKAGE FROM THE EVAPORATION POND

The pipeline collection system is designed to detect leakage of the pond contents. A routine sampling procedure will be used to monitor pond leakage. The sampling frequency will be as follows:

a) Daily for the first five days after beginning use of the basin, then
b) weekly for four weeks, then
c) two week intervals.

The detection system is normally expected to be dry. If no liquid is obtained from a sampling point, the sampling record will be marked "Dry". In the event that liquid is collected, it will be analyzed for chloride. If the liquid sample shows an unusually high chloride content, an estimate of the leak rate will be made by using a suitable pumping method with volume per unit of time recorded. The severity of the leak can be determined by this procedure. Samples showing high chloride content will also be analyzed for the following constituents: sodium, ammonium, radium, gross alpha and gross beta. If the leak rate is considered low, a more frequent sampling may be done and the pipeline system periodically pumped dry and the pumped seepage will be returned to the basin.

A more severe problem would be flooding of the pipeline system. If this condition is found to exist, the contents of the affected basin will be transferred as soon as possible to the spare basin and the leak will be located and repaired. The sampling frequencies listed previously will be used each time a basin is first put into service.

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