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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges
John H Frye, III, Chairman
Dr. James H. Carpenter
Dr. Jerry R. Kline

In the Matter of Kerr-McGee Chemical Corporation (West Chicago Rare Earths Facility)

Docket No. 40-2061-ML

ASLBP No. 83-495-01-ML

November 14, 1989

MEMORANDUM AND ORDER
(Denying Motions for Summary Disposition
on Contentions 4(a) and 3(g)(2) and Scheduling a Hearing)

Contention 4(a)

We find that Illinois' motion and Kerr-McGee's cross-motion for summary disposition of contention 4(a), concerning the proper treatment of Kerr-McGee's application under Criterion 1 of 10 CFR Part 40, Appendix A, must be denied and a hearing held limited to certain issues specified below. Following that hearing, we will issue an initial decision explaining our reasoning in full. In this Memorandum and Order, we limit ourselves to explaining the issues on which we require testimony.

In part, Criterion 1 specifies that we must consider hydrologic conditions which contribute to the isolation of

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the tailings from groundwater. While Illinois' arguments concerning hydrology are somewhat varied, essentially they boil down to the proposition that Table E-6, p. E-15, of the Staff's Supplement to the Final Environmental Impact Statement (SFES) indicates that the West Chicago site is the only site which will not contain radionuclides from the tailings within the disposal site boundary for 1000 years. Staff recognizes and Kerr-McGee does not contest this proposition. Illinois believes that under these circumstances, Criterion 1 requires disapproval of Kerr-McGee's proposal.

Both Staff and Kerr-McGee take the position that the fact that the West Chicago site will not completely contain the tailings is not a problem. While we reject Illinois' position that the West Chicago site must be rejected without further consideration, the inconsistent hydrogeological analyses of Kerr-McGee and Staff, which predict quite disparate groundwater concentrations of some heavy metals and anions, prevent our approval of Kerr-McGee's cross-motion. The Board must decide what degree of groundwater quality changes should be expected, including an understanding of the degree of confidence associated with any particular forecast. These predictions are a major element in this proceeding because they are essential in weighing the extent of the benefit which would be obtained

by moving to another site against the cost of such a move. We find the SFES and the Kerr-McGee Engineering Report inconsistent in the respects enumerated below. The error bounds on the results of both Kerr-McGee's and Staff's analyses are apt to be large. While the results of Kerr-McGee's analyses are small enough to permit the conclusion that the West Chicago site is acceptable, we find that the analyses contained in the SFES are too close to the line between what is acceptable and what is not to permit us to approve the West Chicago site with an appropriate degree of confidence in the correctness of that result. These disparate results prevent our reaching a favorable conclusion on Kerr-McGee's cross-motion on contention 4(a). Consequently, we are scheduling a hearing on that contention to be limited to the following issues.

1. According to the Kerr-McGee Engineering Report, the estimate of cell infiltration is 0.025 cm per year. (Vol. II, p. 2-80). However, the solute transport analysis in the SFES assumes an infiltration rate of 3 cm per year. (SFES, p. E10). We need to resolve this 100 fold difference in the estimated source strength in terms of a most probable value and its uncertainty.

2. Both the SFES and the Engineering Report analyses are predicated on similar values for the hydraulic gradient and hydraulic conductivity of the E stratum groundwater

zone. However, neither report clearly describes the uncertainty in these values. Moreover, neither report provides any insight as to the probable variations in the groundwater flow during the next several centuries, in response to periods of either wet or dry climatic episodes.

3. The staff view that there has been no decrease in fluoride concentrations with time (SFES, p. 4-99 and figure 4.34) needs to be resolved with the Kerr-McGee Engineering Report, Volume II statement that fluoride concentrations are decreasing (P. 2.61).

4. The reports do not describe what groundwater flow is indicated by the observed decrease with time in the sulfate chloride and fluoride concentrations in the glacial drift strata.

5. The SFES states that "about 38% of recharge water enters the Silurian" dolomite aquifer (p. 4-91). In contrast, the Engineering Report states that "only a very small percentage of the water entering the glacial aquifer from the surface finds its way to the dolomite aquifer." (Vol. I, p. 5). The Board needs to understand the reasons for these discrepant statements.

6. The SFES states that 60 wells were identified within a 2 mile radius of the Kerr-McGee site (P. 4-91) but does not tell the reader how much water is being withdrawn nor is there any indication of the extent to which such

withdrawal contributes to the movement of recharge surface waters down into the dolomite aquifer. Further, there is no discussion of possible and/or probable increases in the withdrawal and the resulting effects on the groundwater kinematics. As a matter of first impression, we take this issue to be quite consequential for both the staff and Kerr-McGee analyses (modelling).

Contention 3(g)(2)

Contention 3(g)(2) states:

> The evaluation of the alternative sites was not done on a standard evaluative basis and was otherwise improper in that ....
>
> (2) The modified solute transport analysis of the Proposed Action and Alternative D was not benchmarked.

Illinois did not move for summary disposition on this contention but Kerr-McGee did. As pointed out by Kerr-McGee, certain comments by the Illinois Department of Nuclear Safety on the SFES provide further explanation of the thrust of this contention:

> The computer model used for the solute transport analysis was originally written for modeling saturated zone transport. SFES at 5-16 .... The NRC Staff assumed that the West Chicago site and the Alternative D site would have an unsaturated zone directly beneath the disposal cell. The NRC Staff modified the computer program for unsaturated zone modeling. Id. No discussion of benchmarking of this program was provided in the SFES. IDNS submits that the modified computer model could not accurately model the Proposed Action and Alternative D sites.

Illinois' reply to Kerr-McGee's and Staff's response to its motion to amend contentions, Attachment A, at 5-6 (June 15, 1989).

Kerr-McGee's motion is predicated on the affidavit of Dr. Charles W. Fetter, Jr., who opines that the approach to modeling that is described in the SFES does not depart from the approach that is typically used by professionals in performing assessments like those discussed in the SFES, without any citation of the literature to support such a view. Dr. Fetter states that "in order to apply equivalent models at all the alternative sites -- and thereby enable comparison of the results -- it was necessary to modify the computer code to deal with the passage of leachate through the unsaturated zone. This was performed by the simple expedient of splicing additional code into the Oak Ridge model." He also states, "the changes were sufficiently minor that any revalidation of the model was not required."

The NRC staff supports Kerr-McGee's motion, based on the affidavit of Dr. Charley Yu, one of the authors of the SFES. Dr. Yu states that the modified code can be applied to the Proposed Action and all alternatives and, therefore, the prediction of solute concentrations for the Proposed Action and all alternatives are comparable. Dr. Yu states further that otherwise, two different computer codes would have to be used. The Board notes that the contention does not allege that two different codes should have been used,

but rather that the modified code was not "benchmarked" or validated.

Illinois relies on the affidavit by Dr. Don L. Warner, who states that "I disagree with Dr. Fetter's opinion. I consider the model modifications to be significant and I would not rely upon the results of the modified model without its having been validated."

We find that neither the staff nor Kerr-McGee affiants validate the challenged equation by derivation from first principles or cite observational data that empirically confirm the equation. The Board has some difficulty in reconciling Dr. Fetter's affidavit that such an equation "is typically used by professionals..." with his statement that, for unsaturated flow, "the flow equations are nonlinear and not subject to easy solutions." (C. W. Fetter, Jr., Applied Hydrogeology, Merrill Pub. Co., 1980, p. 89) We find that there exists a dispute of material fact and the Kerr-McGee motion is denied. Contention 3(g)(2) is set down for hearing.

Schedule

1. Kerr-McGee and Staff are to file and serve their testimony on the above issues by November 27. These witnesses are to be made available for deposition in Chicago, Illinois, at a mutually convenient time prior to December 8.

2. Illinois may file and serve any testimony it wishes to offer by December 8. Any witnesses on behalf of Illinois are to be made available for deposition in Chicago, Illinois, at a mutually convenient time prior to December 14.

3. This matter is set down for hearing on December 14 and 15, 1989, at a location to be announced in Chicago, Illinois.

4. Service is to be by express mail or equivalent.

It is so ORDERED.

Atomic Safety and Licensing Board

Dr. Jerry R. Kline
ADMINISTRATIVE JUDGE

Dr. James H. Carpenter
ADMINISTRATIVE JUDGE

John H. Frye, III, Chairman
ADMINISTRATIVE JUDGE

Bethesda, Maryland
November 14, 1989

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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KERR-MCGEE CHEMICAL CORPORATION	Docket No.(s) 40-2061-ML
(West Chicago Rare Earths Facility)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB M&O (DENYING MOTIONS...) have been served upon the following persons by U.S. mail, first class, except as otherwise noted and in accordance with the requirements of 10 CFR Sec. 2.712.

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Docket No.(s)40-2061-ML
LB M&O (DENYING MOTIONS...)

Dated at Rockville, Md. this
15 day of November 1989

Patty Henderson
Office of the Secretary of the Commission