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RI-ILL-1 40-2061-ML 12/15/89

DOCKETED USNRC

(1)

Comments of Don L. Warner
with respect to Contention 4(a)

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OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

1. I share the ASLB's concern with respect to the differing rates of cell infiltration used by Kerr-McGee and the NRC staff. As I understand it, Kerr-McGee obtained a value of 0.001 inches per year through use of the HELP model (Kerr-McGee, Vol. II, p. 2-74). A second value of 0.07 inches per year was also calculated with the HELP model. The minimum rate of cell infiltration used by Kerr-McGee was, apparently, 0.01 inches per year (Vol. II, p. 2-80). The reason for selection of that value was not explained. Values of cell infiltration up to 5 inches per year were used (Kerr-McGee, Vol. II, p. 2-80). The NRC staff used only one value, 3 cm or 1.2 inches per year (SFES, p. E-10). Thus, the values that have been speculated as being within the range of possibility are from 0.001-5 inches per year, a 5,000 fold difference. I believe that the natural rate of infiltration for the area of 3.6 inches per year (SFES, p. 4-91) should be assumed as a conservative or worst-case value. This is because the long-term integrity of covers such as that proposed for the West Chicago site have not been demonstrated and it is possible that such a cover will deteriorate from natural effects so that it will, eventually, allow infiltration at the same rate as other land in the vicinity.

2. I share the ASLB's concern with respect to the variability of the E stratum and would extend that concern to other geologic units underlying the West Chicago site. The E stratum ranges in thickness from about 1.3 feet to 25.5 feet over the site (Kerr-McGee, Vol. II, p. 2-42). According to Schubert (Docket No. 40-2061-ML; ASLB No. 83-495-01-ML) the E sand is apparently absent in drill hole B-9 and reaches 43 feet or possibly more on the north end of the disposal site. Hydraulic conductivity values for the E sand range from 22.3 to 568 feet per day (Kerr-McGee, Vol. II, Tables 2-15 & 2-16). The NRC used a single hydraulic conductivity value of about 192 feet per day in its modeling, about one-third of the maximum value. This points out the reason for concern about the range of geologic variability at the Kerr-McGee site. It is the principal reason why the type of modeling done by the NRC is inappropriate for meaningful characterization of that site.

As I have in my earlier affidavits, I will quote from the originators of vertical-flow cell infiltration model with respect to the limitations of their model when linked to the AT123D model for such a site. According to Gilbert et al (1983) "The aquifer structure at an actual site will, of course, be much more complicated than the simple structure assumed for the generic model described above. There will be different hydrological strata with three-dimensional, inhomogeneous structures, and there will be dispersion (even within homogeneous regions) of the ion-exchange rates, which leads to dispersion of the distribution coefficients. Mechanisms other than ion exchange between water and adsorbing surfaces may be important for both release and transport of radionuclides. The migrating regions of radioactive contamination in the unsaturated zone will, therefore, assume various shapes and will not have sharp boundaries, and the migration through

the aquifer to the well will be more complicated than described. A more sophisticated model that took these complications into account would require site-specific data on the hydrological structure and properties. . . . The simple model described above provides generic estimates of the contamination of drinking water that can be expected to occur . . . ." I interpret these comments as supporting my position with respect to the NRC modeling work.

5. I agree with the estimate of the NRC staff that probably about 38% of groundwater recharge presently reaches the Silurian dolomite aquifer at the West Chicago site (SFES, p. 4-91). It disagrees with the Kerr-McGee statement that "only a very small percentage of water entering the glacial aquifer from the surface finds its way to the dolomite aquifer." The rate of recharge to the dolomite aquifer could be even greater, in the future, as will be discussed under my response to 6.

6. The ASLB is prudent in its concern for the Silurian dolomite aquifer, a major groundwater supply unit for northern Illinois. The permanent siting of a waste disposal facility over such an aquifer is questionable practice when other locations exist in the State that are more geologically suitable. Large scale withdrawal of water from the Silurian dolomite aquifer and consequent lowering of the piezometric surface in that aquifer has, undoubtedly, stimulated greater vertical recharge through the overlying glacial deposits at the West Chicago site and in the vicinity. Additional withdrawals that resulted in an even lower piezometric surface in the Silurian dolomite aquifer would be expected to cause an increased rate of vertical recharge to the Silurian dolomite aquifer.