

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
KERR-MCGEE CHEMICAL CORPORATION	)	Docket No. 40-2061-ML
(West Chicago Rare Earths Facility)	)	ASLBP No. 83-495-01-ML

TESTIMONY OF PAUL BENIOFF ON CONTENTION 4A, ISSUE 3

Q.1. Dr. Benioff, please state your name, your position and the nature of your work at Argonne National Laboratory.

A.1. My name is Paul Benioff. I am employed by the Argonne National Laboratory as an environmental chemist in the Environmental Assessment and Information Sciences Division. My responsibilities include assessments of environmental impacts on water quality, preparations of sampling plans for hazardous waste sites, addressing other hazardous and radioactive waste management issues, and project management. A statement of my professional qualifications is attached to this testimony.

Q.2. What is the purpose of your testimony?

A.2. The purpose of this testimony is to resolve the difference between the Kerr-McGee Engineering Report, Volume II statement (p 2.61) that fluoride concentrations are decreasing with time and the staff position expressed in the SFES (p 4-99 and Fig. 4.34) that there has been no decrease with time in fluoride concentrations.

Q.3. What type of analysis has Kerr-McGee carried out to determine the time dependence of fluoride concentrations in the B series wells?

A.3. From the description given in the Kerr-McGee Engineering Report, Volume II, P 2-61, Tables 2-21, and 2-22, it appears that a statistical analysis was carried out on fluoride concentration data for each of the wells, B-1 through B-7, separately. The purpose of the analysis appears to be to determine if fluoride concentrations in each of the seven B wells are increasing with time, decreasing with time, or not showing a statistically significant change with time. The results, given in Tables 2-21 and 2-22, are that the fluoride concentrations in the B series wells increase with time in B-1, are indeterminate in B-3 and B-6, and are decreasing in B-2, B-4, B-5, and B-7.

Q.4. What conclusions has Kerr-McGee stated in their Engineering Report?

A.4. On page 2-61 of Volume II of the Kerr-McGee Engineering Report, paragraph 2, which gives Kerr-McGee's conclusion, reads in its entirety: "Fluoride concentrations are decreasing in all of the B-series wells except B-1, B-3, and B-6. As discussed above, concentrations increased abruptly in well B-1 in early 1982, and have been decreasing since for most ions; however, a clear pattern of decrease of fluorides over this time period is not evident. The decrease is statistically significant in all of the wells except B-3 and B-6. Statistical summaries are presented in Tables 2-21 and 2-22."

Q.5. Does Kerr-McGee conclude that fluoride concentrations are decreasing with time in all B series wells?

A.5. No. The interpretation columns in Tables 2-21 and 2-22 in Volume II of the Engineering Report state that concentrations of fluoride are increasing with time in well B-1, indeterminate in wells B-3 and B-6, and decreasing in wells B-2, B-4, B-5, and B-7.

Q.6. How was the analysis described on p 4-99 and in Figure 4.34 of the SFES carried out?

A.6. The data base used for the SFES analysis is that given in Appendix C of the SFES and Table 4.18 of the FES. The analysis presented in the SFES is not a statistical analysis of the time variation of fluoride concentrations in each of the B series wells. Each open circle point in Figure 4.34 in the SFES represents an average B series fluoride concentration obtained by averaging the concentrations measured in the same time period in water samples taken from wells B-1 through B-5.

Q.7. Why were fluoride concentration data for wells B-6 and B-7 excluded from the averaging?

A.7. Wells B-6 and B-7 were excluded from the averaging because data on fluoride concentrations were not available for those wells for the period of time from 1976 to 1985 for which data were available for wells B-1 through B-5. Inclusion of the B-6 and B-7 data into the averaging for the time period for which it was taken might have skewed the average and distorted the trend.

Q.8. What conclusion does the SFES make about the time dependence of fluoride concentrations in the wells?

A.8. The SFES concludes on page 4-99 that the data in Figure 4.34 show that there is no general decrease with time in the average fluoride concentration in the B series wells. It also concludes for the F series wells, which were analyzed in the same manner, that average concentrations for those wells show a trend that closely parallels that for the B series wells over the period of time for which fluoride concentration data are available for the F series wells.

Q.9. Is the conclusion reached in the SFES inconsistent with that reached by Kerr-McGee on page 2-61 in Volume II of the Engineering Report?

A.9. Not necessarily. The reason is that if one combines three types of data, namely, (1) data from wells that show increasing concentrations with time, (2) data from wells for which the trend is indeterminate, and (3) data from wells for which the concentrations decrease with time (as shown in Tables 2-21 and 2-22 of the Engineering Report, Volume II), the time dependence of the average as determined in the SFES can either increase, decrease, or be independent with time. Which it is depends on the dominant trend in the data for all the B wells.

Q.10. Why did you present an analysis of the time dependence of the average B series well fluoride concentrations instead of analyzing the time dependence of the concentrations in the individual wells as Kerr-McGee did?

A.10. The reason is that I was interested in determining whether the source of the contamination, i.e. contaminated soils or groundwater under the Factory and Disposal Sites, was being cleaned up slowly by leaching resulting from percolating rainwater and snowmelt. To determine this it is more reasonable to determine the time dependence of the average concentration of a contaminant, such as fluoride, under the disposal site. This is because averaging gives the desired type of data to study the effect of leaching on contaminants over a large area such as the Factory or Disposal Sites. Also one is interested in this case in the fluctuations of the averages, which are shown by the scatter of points in Figure 4.34, and not in the larger fluctuations in the data for the individual wells.