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environmental resources center

BOOKET NO. 40-8027

June 15, 1973



Mr. J. E. Rothfleisch
Directorate of Licensing
U. S. Atomic Energy Commission
Washington, DC 20545

Dear Mr. Rothfleisch:

Subject: Kerr-McKee Sequoyah Plant

This will transmit six copies of our review and comments concerning the significance of gross alpha and gross beta, radium and uranium in groundwater monitoring well samples. This is in accord with your telephone request of May 30, 1973.

Yours truly,

Norman A. Evans
Director

bf

Encl.

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Comments on possible ground water
contamination from the Sequoyah
Facility of Kerr-McGee Corporation.

1. Seepage well monitoring data for the period of January-October, 1972 were reviewed for indications of seepage from ponds. No comparable preoperational data seem to be available for making conclusive judgments. However, some comparisons were made with Colorado River data, simply because the data were readily available and because the Colorado River drains an area of large natural uranium deposits.
2. All radium concentrations for the period were reported as " <0.02 " $\times 10^{-8}$ $\mu\text{Ci/ml}$; this is approximately the same as the average radium concentration in the Colorado River.
3. Although gross alpha and gross beta analyses are simple to perform, and should be reasonably well correlated with uranium analyses, they lack the specificity desired for quantitative investigations of possible seepage.
4. Uranium concentrations are highly variable; average fractional standard deviation is 0.96. The mean concentration was 5.44×10^{-8} $\mu\text{Ci/ml}$; this is approximately 20 times higher than the average uranium concentration in the Colorado River.
5. The uranium concentrations in nearly all of the seepage monitoring wells appears to be substantially higher than would be expected from natural sources alone. Only wells 2307 and 2309 are near the concentration of 0.28×10^{-8} $\mu\text{Ci/ml}$ found in the Colorado River. Three wells (2301, 2305 and 2313) occasionally had concentrations of 60 to 480 times higher than the expected values.

CONCLUSIONS

1. There is indication of contamination with soluble uranium in most of the seepage wells.
2. The existing data are not sufficiently definitive to allow identification of the source of the contamination. It is possible that continued monitoring may produce consistent trends that could serve to identify one or more ponds as the source.
3. No meaningful interpretation of the monitoring data can be derived from the data as they are presented in the report; additional data reduction is required. Long-term means, analyses of variance, indications of error terms, graphical presentation of trends, etc. would be much more useful than the raw data for identifying trends or problems. The attached table is one small step in that direction.

URANIUM IN SEEPAGE WELLS, KERR-McGEE, JAN.-OCT., 1972
(Radioactivity concentrations are in units of 10^{-8} $\mu\text{Ci/ml}$)

<u>Location</u>	<u>Range</u>	<u>Mean(m)</u>	<u>Std. Dev.(s)</u>	<u>Fract. S.D.(s/m)</u>	<u>(Max.-m)/s</u>	<u>Comments</u>
2301	0.17 - 134.21	34.63	48.48	1.40 **	2.05 **	Highest value
2302	0.65 - 5.94	3.66	2.07	0.57	1.10	
2303	0.78 - 9.97	4.88	3.08	0.63	1.65	
2305	0.51 - 17.10	4.29	4.79	1.12	2.67 **	Moderate value
2306	0.59 - 7.25	3.44	2.44	0.71	1.56	
2307	0.12 - 1.18	0.35	0.32	0.91	2.59 **	Low value
2308	<.17 - 1.52 *	0.77	0.51	0.66	1.47	
2309	<.06 - 3.51 *	0.52	1.06	2.04 **	2.82 **	Low value
2310	<.17 - 4.32 *	2.56	1.43	0.56	1.23	
2311	1.16 - 6.83	3.60	1.89	0.52	1.71	
2312	0.72 - 8.74	2.93	2.32	0.79	2.50 **	
2313	0.85 - 52.69	8.50	16.68	1.96 **	2.65 **	High value
2314	1.16 - 8.09	4.67	2.47	0.53	1.38	
2315	<.17 - 4.62*	1.39	1.37	0.99	2.36 **	Low value
Gross Averages:		5.44		0.96	1.98	

*All "less than" values were included, as listed, in calculating means and standard deviations.

**Indicates possible abnormality.