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Manpower Education,  
Research, and Training  
Division

October 16, 1985

Mr. William Crow  
Division of Fuel Cycle & Materials Safety  
NMSS-SS396, Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: ISOTOPIC URANIUM IN UNC SOILS

Dear Mr. Crow:

UNC has questioned whether the average U-234/U-235 ratio of 35 determined for soils from beneath the columns area, is appropriate for other soils at the Wood River Junction site. According to UNC's vendor laboratory, there are much lower relative levels of U-234 than our analysis has indicated. To help resolve this matter, ten archived samples of soil, collected during our survey of the restricted area of the site, were selected; a small aliquot (about 20 grams) was withdrawn from each sample; and this aliquot was analyzed by alpha spectroscopy for isotopic uranium. Results are presented in the attached table.

Most of these samples contain low concentrations of U-235, resulting in large relative uncertainties. However, the presence of U-234 was readily detectable in all samples. The U-234/U-235 ratios range from 21.6 to 73.5, but six of these ratios have large associated uncertainties. The ratios of the remaining four samples range from 21.6 to 47.0 with an average of 32.7.

I believe these additional results further confirm that U-234 is a major contaminant in the residues at the Wood River Junction site and that the U-234/U-235 ratio is on the order of 30 or greater, as would be expected in enriched uranium.

If you have questions concerning these results, please contact me at FTS 626-3305.

Sincerely,

James D. Berger  
Program Manager  
Radiological Site Assessment Program

JDB:mec

Enclosure

cc: Jerry Roth, Nuclear Regulatory Commission, Region I

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ISOTOPIC URANIUM CONTENT OF SOIL  
SAMPLES FROM UNC RESTRICTED AREA

Sample ID	Uranium Concentrations (pCi/g)			
	U-234	U-235	U-238	U-234/U-235
3457	10.7 $\pm$ 2.1 <sup>a</sup>	0.41 $\pm$ 0.40	1.34 $\pm$ 0.73	26.0 <sup>b</sup>
3468	17.7 $\pm$ 2.9	0.24 $\pm$ 0.33	0.96 $\pm$ 0.67	73.5 <sup>b</sup>
3478	152 $\pm$ 2	5.55 $\pm$ 0.43	2.59 $\pm$ 0.29	27.4
3489	8.89 $\pm$ 0.94	0.41 $\pm$ 0.20	0.41 $\pm$ 0.20	21.6
3496	15.9 $\pm$ 1.9	0.30 $\pm$ 0.27	0.79 $\pm$ 0.43	52.4 <sup>b</sup>
3539	29.3 $\pm$ 2.7	0.40 $\pm$ 0.32	0.60 $\pm$ 0.39	73.0 <sup>b</sup>
3584	31.8 $\pm$ 2.3	0.68 $\pm$ 0.33	1.02 $\pm$ 0.41	47.0
3599	9.19 $\pm$ 1.54	0.27 $\pm$ 0.27	0.14 $\pm$ 0.19	34.0 <sup>b</sup>
3602	461 $\pm$ 5	13.3 $\pm$ 0.8	1.46 $\pm$ 0.28	34.6
3608	6.09 $\pm$ 1.02	0.18 $\pm$ 0.18	0.40 $\pm$ 0.26	34.0 <sup>b</sup>
Average				32.7

<sup>a</sup>Errors are 2 $\sigma$  based only on counting statistics.

<sup>b</sup>Not used in average because of large relative error.