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Energy/  
Environment  
Systems Division

January 30, 1990

Mr. Donald Gibbons  
Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Subject: EVALUATION OF SAMPLE ANALYSES - CHEMETRON PROJECT

Dear Mr. Gibbons:

The attached table presents the results of U-238 analyses by ORAU and Alpha Energy Laboratory (analytical service contractor to NES) on split soil samples from the Chemetron site. Considerable difficulty was encountered in obtaining consistent and comparable analyses by wet chemistry methods; both laboratories therefore eventually performed the analyses by gamma spectrometry. Results are generally comparable, within their associated 95% uncertainty levels. Notable exceptions are samples T-5, T-7, and T-8. It should be noted that these samples were not thoroughly ground, sieved, and mixed to assure homogeneity before splitting, and the laboratories encountered situations where there were marked differences between sample fractions. In several such cases the same sample was exchanged between laboratories, and acceptable agreement obtained. I, therefore, would not consider the differences in analyses of samples T-5, T-7, and T-8 to be particularly significant.

Analyses by Alpha Energy and ORAU also provided good agreement when compared with the option 1 guideline level for depleted uranium. In only two cases (samples T-4 and T-5) were the end results different, and even in those cases the results were in agreement at the extremes of the analytical uncertainties. Based on this evaluation, it is ORAU's opinion that the gamma spectrometry analyses by NES's contractor laboratory accurately evaluates the concentrations of U-238 in soil.

In addition to the laboratory analyses, the field determination, performed by NES using portable survey instruments, is also provided for each of the samples. With exception of samples T-6 and T-8, the field measurement decisions were in agreement with the laboratory analyses. This suggests that because of non-homogenous distribution and relatively poor counting statistics, field measurements may be unreliable for excavation control, in cases where the U-238 concentration is near the option 1 level, e.g. between 30 and 60 pCi/g.

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Mr. Donald Gibbons

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If there are any questions about this information, I may be contacted at FTS  
626-3303 or (615) 576-3305.

Sincerely,

  
James D. Berger, Director  
Environmental Survey and  
Site Assessment Program

JDB:jls

Attachment

cc: G. Sjoblom, NRC/NMSS, 6H3  
~~G. Sjoblom, NRC/NMSS, 6H3~~  
D. Tiktinsky, NRC/NMSS, 6A4  
M. Nappe, NES Corp.  
D. Sreniawski, NRC/Region III

RESULTS OF CROSS-CHECK ANALYSES  
CHEMETRON SOIL SAMPLES  
NEWBURGH HEIGHTS, OHIO

Sample ID <sup>a</sup>	Location	Analysis By	Concentration (pCi/g) U-238	Comparison With Option 1 Guideline Level (35 pCi/g)
T-1	North Site	ORAU	3.6 ± 0.3 <sup>b</sup>	below
		Alpha Energy	7.3 ± 5.2	below
		NES	c	below
T-2	North Site	ORAU	24.2 ± 0.3	below
		Alpha Energy	25.3 ± 4.3	below
		NES	---	below
T-3	Grid B-11	ORAU	93.9 ± 0.5	above
		Alpha Energy	93.9 ± 15.1	above
		NES	---	above
T-4	Grid B-5	ORAU	29.6 ± 0.2	below
		Alpha Energy	45.5 ± 15.1	above <sup>d</sup>
		NES	---	below
T-5	Grid B-3	ORAU	19.4 ± 0.5	below
		Alpha Energy	40.9 ± 12.3	above <sup>d</sup>
		NES	---	below
T-6	Grid E-4	ORAU	57.7 ± 0.4	above
		Alpha Energy	53.7 ± 13.6	above
		NES	---	below
T-7	Grid B-12	ORAU	92.7 ± 0.3	above
		Alpha Energy	57.4 ± 5.8	above
		NES	---	above

RESULTS OF CROSS-CHECK ANALYSES  
CHEMETRON SOIL SAMPLES  
NEWBURGH HEIGHTS, OHIO  
(Continued)

Sample ID <sup>a</sup>	Location	Analysis By	Concentration (pCi/g) U-238	Comparison With Option 1 Guideline Level (35 pCi/g)
T-8	Grid F-3	ORAU	40.1 ± 0.3	above
		Alpha Energy	57.2 ± 12.9	above
		NES	---	below
T-9	off-site (bkgd)	ORAU	0.7 ± 0.2	below
		Alpha Energy	0.6 ± 1.8	below
		NES	---	below
T-10	off-site (bkgd)	ORAU	1.2 ± 0.3	below
		Alpha Energy	3.2 ± 1.3	below
		NES	---	below

<sup>a</sup>As assigned by NES.

<sup>b</sup>Values are for U-238; uncertainties represent the 95% confidence levels based on counting statistics only.

<sup>c</sup>NES evaluation based on direct measurement with pancake GM detector.

<sup>d</sup>Concentration would be below the guideline value at the lower end of the uncertainty level.