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Energy/ Environment Systems Division

May 18, 1992

Ms. Elizabeth Ullrich U.S. Nuclear Regulatory Commission Region 1 475 Allendale Road King of Prussia, PA 19406

SUBJECT: STRONTIUM-90 DATA FOR THE ROYERSFORD SLUDGE SAMPLES

Dear Ms. Ullrich:

Enclosed are the strontium-90 results of analyses performed on samples submitted by the Royersford Wastewater Treatment Plant. Sludge cake samples, summarized in Table 1, are reported in units of activity per gram of wet sample. Liquid sludge samples, summarized in Table 2, are reported in units of activity per liter of sample. Filtrate liquid samples, summarized in Table 3, are reported in activity per liter of sample. Vegetation samples from the reed beds, summarized in Table 4, are reported in units of activity per gram of ashed sample.

Previous gamma spectroscopy and wet chemistry analysis of these samples were submitted in a letter report dated May 8, 1991. Table 2 from the May 8, 1991 letter report was in error. The radionuclide concentrations were reported in pCi/l which is correct, however, the table stated that the concentrations were pCi/g. A revised table is enclosed.

You may contact me at FTS 615-576-0065 if you have any questions regarding these data.

Sincerely,

Wade C. Adams

Health Physicist/Project Leader

Environmental Survey and

Site Assessment Program

WCA:dac

Enclosures

cc: J. Kinneman, NRC/Region I

D. Tiktinsky, NRC/NMSS 6E6

T. Mo, NRC/NMSS 6H3

PMDA, 6E6

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TABLE 1
RADIONUCLIDE CONCENTRATIONS MEASURED
IN SLUDGE SAMPLES (8.3% to 20.7% solids) FROM
ROYERSFORD WASTEWATER TREATMENT PLANT
ROYERSFORD, PENNSYLVANIA

Dates & Times (1990)	Sr-90 (pCi/g)				
7/9 - 1700	$11.7 \pm 0.3^{a}$				
7/10 - 1040	$33.0 \pm 0.5$				
7/11 - 1330	<1.8				
7/12 - 1815	<3.4				
7/13 - 1930	<1.5				
12/12 - 1530	$2.2 \pm 0.3$				
12/12 - 1530	$2.1 \pm 0.3$				
12/12 - 1530	7.2 ± 0.6				

 $<sup>^{</sup>a}$ Uncertainties represent the 95% confidence level based only on counting statistics; additional laboratory uncertainties of  $\pm$  6 to 10% have not been propagated into these data.

TABLE 2
RADIONUCLIDE CONCENTRATIONS MEASURED
IN LIQUID SLUDGE SAMPLES (3%-6% solids) FROM
ROYERSFORD WASTEWATER TREATMENT PLANT
ROYERSFORD, PENNSYLVANIA

Dates & Times (1990)	Sr-90 (pCi/l)
5/16 - 1030	639 ± 17ª
5/17 - 1130	606 ± 17
5/21 - 1125	331 ± 12
5/24 - 1035	746 ± 17
5/25 - 1225	1423 ± 31
6/26 - 1620	753 ± 24
6/28 - 2045	671 ± 16
7/5 - 1300	542 ± 13
7/6 - 2130	740 ± 16
7/7 - 1015	264 ± 9.8
7/9 - 1700	660 ± 16
7/10 - 1040	68 ± 8
7/11 - 1330	32 ± 8
7/12 - 1815	<16
7/13 - 1930	<24

 $<sup>^{</sup>a}$ Uncertainties represent the 95% confidence level based only on counting statistics; additional laboratory uncertainties of  $\pm$  6 to 10% have not been propagated into these data.

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TABLE 3
RADIONUCLIDE CONCENTRATIONS MEASURED
IN FILTRATE SLUDGE SAMPLES (<3% SOLIDS) FROM
ROYERSFORD WASTEWATER TREATMENT PLANT
ROYERSFORD, PENNSYLVANIA

Times & Dates (1990)	Sr-90 (pCi/l)				
5/21 - 1250	11.0 ± 3.1°				
6/26 - 1620	$6.1 \pm 2.8$				
6/28 - 2045	<4.5				
7/5 - 1300	<3.5				
7/6 - 2130	6.8 ± 2.4				
7/7 - 1015	4.7 ± 2.8				
7/9 - 1700	< 5.6				
7/10 - 1040	<7.5				
7/11 - 1330	<9.2				
7/12 - 1815	<46				

<sup>&</sup>lt;sup>a</sup>Uncertainties represent the 95% confidence level based only on counting statistics; additional laboratory uncertainties of  $\pm$  6 to 10% have not been propagated into these data.

TABLE 4
RADIONUCLIDE CONCENTRATIONS MEASURED
IN REED STALK SAMPLES FROM
ROYERSFORD WASTEWATER TREATMENT PLANT
ROYERSFORD, PENNSYLVANIA

Date & Times (1990)	Sr-90 (pCi/g)
12/12 - 1530	$0.2 \pm 0.1^{a}$
12/12 - 1530	$0.3 \pm 0.1$
12/12 - 1530	$0.3 \pm 0.1$

 $<sup>^{</sup>a}$ Uncertainties represent the 95% confidence level based only on counting statistics; additional laboratory uncertainties of  $\pm$  6 to 10% have not been propagated into these data.

TABLE 2
RADIONUCLIDE CONCENTRATIONS MEASURED
IN LIQUID SLUDGE SAMPLES (3% TO 6% SOLIDS) FROM
ROYERSFORD WASTEWATER TREATMENT PLANT

RADIONUCLIDE	RADIONUCLIDE CONCENTRATION (pCi/l)  DATES and TIMES (1990)  5/16-1030 5/17-1130 5/21-1125 5/24-1035 5/25-1225 6/26-1620					6/28-2045	7/5-1300	
Cr-51	NImb	NI	NI	NI	3200 ± 4700	<4400	<4300	<3600
Mn-54	5440 ± 500°	7660 ± 540	6570 ± 540	9130 ± 680	11150 ± 670	8260 ± 570	9630 ± 590	7400 ± 550
Co-58	1960 ± 390	2390 ± 740	1750 ± 570	2410 ± 590	3380 ± 640	1940 ± 460	1960 ± 490	1380 ± 410
Fe-59	NI	NI	NI	NI	1800 ± 1500	<1400	<1500	<1300
Co-60	13040 ± 650	15660 ± 770	17980 ± 790	20400 ± 810	20820 ± 870	18880 ± 830	23010 ± 910	17940 ± 780
Zn-65	7390 ± 1090	10600 ± 1200	9100 ± 1000	12480 ± 520	13200 ± 1500	12200 ± 1200	13100 ± 1300	9200 ± 1000
Sr-90	d						does their than	
Nb-95	NI	NI	NI	NI	NI	520 ± 450	490 ± 560	<580
Zr-95	NI	NI	330 ± 480	NI	NI	<920	<1100	<800
· Ag-110m	470 ± 510	NI	NI	NI	NI	<450	<490	200 ± 320
Sb-125	NI	NI	NI	NI	720 ± 850	<930	<1000	<880
Cs-134	280 ± 230	250 ± 240	190 ± 250	250 ± 240	990 ± 600	610 ± 390	620 ± 260	300 ± 250
Cs-137	2390 ± 400	2980 ± 320	2600 ± 340	2980 ± 450	3190 ± 380	3530 ± 460	3810 ± 380	2990 ± 340
U-234								
U-235								
U-238								
Pu-238								
Pu-239/240								

## TABLE 2 (Cont'd) RADIONUCLIDE CONCENTRATIONS MEASURED IN LIQUID SLUDGE SAMPLES (3% to 6% SOLIDS) FROM ROYERSFORD WASTEWATER TREATMENT PLANT

RADIONUCLIDE	RADIONUCLIDE CONCENTRATION (pCi/l)  DATES and TIMES (1990)  7/6-2130  7/7-1015  7/9-1700  7/10-1040  7/11-1330  7/12-1815						7/13-1930	
Cr-51	<3200	<3600	<94000	<82000	<120000	<66000	<98000	
Mn-54	7420 ± 550	9640 ± 630	9760 ± 610	13500 ± 600	13970 ± 940	8710 ± 490	13470 ± 890	77.77
Co-58	1730 ± 440	2090 ± 580	1900 ± 1300	2100 ± 1300	3500 ± 1800	2370 ± 830	2600 ± 1500	
Fe-59	<1100	<1300	<9300	<10000	<12000	<8600	<11000	
Co-60	15170 ± 740	21470 ± 890	22450 ± 850	29600 ± 890	31600 ± 1100	23800 ± 770	34500 ± 1000	
2n-65	8900 ± 1000	11500 ± 1100	11300 ± 1500	19000 ± 1900	17900 ± 2000	12400 ± 1400	15100 ± 2200	
sr-90								
Nb-95	<510	<680	<7800	<7500	<9700	<6800	<8100	
Zr-95	<780	<880	<3500	<3500	<4400	<3000	<4100	
Ag-110m	<390	160 ± 330	<640	<610	<860	<560	600 ± 540	
Sb-125	<830	<930	<1000	890 ± 700	<1300	450 ± 550	<1200	
Cs-134	360 ± 260	320 ± 280	520 ± 340	660 ± 240	970 ± 390	420 ± 160	830 ± 310	
Cs-137	2560 ± 320	2810 ± 350	4180 ± 460	5470 ± 360	5790 ± 460	3620 ± 440	5120 ± 400	
U-234								
บ-235								
บ-238			first tests was					
Pu-238								
Pu-239/240								

<sup>\*</sup>Nuclide not identified.

<sup>&</sup>lt;sup>b</sup>Poor detection sensitivities for Cr-51, Fe-59, Nb-95, and Zr-95 are the result of small solids content and/or correction for decay between collection and analysis dates.

 $<sup>^{\</sup>circ}$ Uncertainties represent the 95% confidence levels, based only on counting statistics; additional laboratory uncertainties of  $\pm$  6 to 10 have not been propagated into these data.

<sup>&</sup>lt;sup>d</sup>Dash indicates analysis not yet completed.