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December 17, 2002

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

**SUBJECT: ANALYTICAL RESULTS FOR SAMPLES COLLECTED DURING THE PERIOD
JUNE 2002 THROUGH AUGUST 2002 AT THE ROYERSFORD WASTEWATER
TREATMENT FACILITY ROYERSFORD, PENNSYLVANIA (TAC NO. U01050,
RFTA NO. 02-005 AND 03-001)**

Dear Ms. Ullrich:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) received ten samples from the Royersford Wastewater Treatment Facility in Royersford, Pennsylvania. The samples were received without proper chain-of-custody (C-o-C) and sample identification. As a result, ESSAP initiated a C-o-C and assigned an identification number to each sample. Percent solids (Procedure SP3, Revision 0), gamma spectroscopy (Procedure CP1, Revision 11), and strontium-90 (Procedure AP4, Revision 11) analyses were performed on the eight sludge and two digester samples. In addition, tritium (Procedure AP2, Revision 12) analysis was performed on the digester samples. The results are presented in pCi/L for the digester samples, whereas the results for the sludge samples are presented as pCi/g dry weight for strontium-90 and pCi/g wet weight for gamma spectroscopy. The results are presented in Tables 1 through 4.

ESSAP's Quality Control (QC) procedures were followed for these analyses. Analytical and instrumentation QC for these analyses were within acceptable limits. The QC files are available for your review upon request.

Please contact me at (865) 241-3242 or Wade Ivey at (865) 576-9184 with any questions or comments.

Sincerely,



Dale Condra
Laboratory Manager
Environmental Survey and
Site Assessment Program

RDC:WPI:ar

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|-----------------------------------|---------------------------|
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| File/816 | |

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NMSS/RGNI MATERIALS-002

ORISE TABLE 1

**PERCENT MOISTURE
IN SLUDGE AND DIGESTER SAMPLES
SP3, REVISION 0
ROYERSFORD WASTEWATER TREATMENT FACILITY
ROYERSFORD, PENNSYLVANIA**

ESSAP Sample ID	NRC Region I Sample ID	Percent Solids^a
816M001	Sludge #1	40.74
816M002	Sludge #2	44.51
816M003	Sludge #3	45.51
816M004	Sludge #4	24.71
816M005	Sludge #5	30.59
816M006	Sludge #6	41.75
816M007	Sludge #7	33.21
816M008	Sludge #8	42.86
816M009	Secondary Digester #1	4.63
816M010	Secondary Digester #2	6.23

^aPercent solids was calculated by:

$$\text{Percent Solids} = \left(\frac{\text{dry weight}}{\text{wet weight}} \right) \times 100$$

ORISE TABLE 2

CONCENTRATIONS OF SELECTED GAMMA EMITTING RADIONUCLIDES
 IN SLUDGE AND DIGESTER SAMPLES
 BY GAMMA SPECTROSCOPY CP1, REVISION 11
 ROYERSFORD WASTEWATER TREATMENT FACILITY
 ROYERSFORD, PENNSYLVANIA

ESSAP Sample ID	NRC Region I Sample ID	Radionuclide Concentrations and MDCs (pCi/g ^a or pCi/L ^b)				
		Mn-54	Co-58	Co-60	Zn-65	Nb-95
816M001	Sludge #1	78.1 ± 3.0 ^c (0.96) ^d	3.11 ± 0.77 (0.98)	596 ± 18 (0.91)	14.8 ± 2.4 (2.4)	0.94 ± 0.60 (0.98)
816M002	Sludge #2	40.6 ± 1.9 (0.88)	3.50 ± 0.78 (0.89)	443 ± 14 (0.86)	7.1 ± 2.2 (2.1)	1.06 ± 0.55 (0.90)
816M003	Sludge #3	64.1 ± 2.5 (0.76)	2.65 ± 0.57 (0.77)	612 ± 19 (0.81)	12.9 ± 1.8 (2.0)	1.01 ± 0.46 (0.76)
816M004	Sludge #4	4.96 ± 0.28 (0.19)	0.19 ± 0.12 (0.20)	77.4 ± 2.4 (0.20)	0.98 ± 0.41 (0.47)	0.08 ± 0.11 (0.19)
816M005	Sludge #5	8.16 ± 0.49 (0.37)	0.16 ± 0.23 (0.38)	142.6 ± 4.5 (0.34)	1.84 ± 0.89 (0.96)	0.07 ± 0.23 (0.37)
816M006	Sludge #6	43.7 ± 1.9 (0.98)	1.01 ± 0.61 (1.0)	566 ± 18 (0.95)	9.1 ± 2.1 (2.4)	0.03 ± 0.59 (0.96)
816M007	Sludge #7	25.4 ± 1.1 (0.47)	0.70 ± 0.29 (0.48)	310.5 ± 9.6 (0.49)	5.6 ± 1.1 (1.2)	0.19 ± 0.28 (0.46)
816M008	Sludge #8	91.7 ± 3.5 (1.1)	2.44 ± 0.88 (1.1)	745 ± 23 (1.0)	15.2 ± 2.3 (2.8)	0.91 ± 0.70 (1.1)
816M009	Secondary Digester #1	28,300 ± 1,200 (310)	10,000 ± 1,000 (710)	59,200 ± 2,100 (240)	3,550 ± 810 (810)	8,500 ± 2,600 (2,100)
816M010	Secondary Digester #2	23,920 ± 990 (270)	8,130 ± 720 (640)	50,500 ± 1,700 (210)	3,840 ± 700 (770)	6,000 ± 2,200 (1,900)

ORISE TABLE 2 (Continued)

CONCENTRATIONS OF SELECTED GAMMA EMITTING RADIONUCLIDES
 IN SLUDGE AND DIGESTER SAMPLES
 BY GAMMA SPECTROSCOPY CP1, REVISION 11
 ROYERSFORD WASTEWATER TREATMENT FACILITY
 ROYERSFORD, PENNSYLVANIA

ESSAP Sample ID	NRC Region I Sample ID	Radionuclide Concentrations and MDCs (pCi/g ^a or pCi/L ^b)				
		Ag-110m	Sb-124	Sb-125	Cs-134	Cs-137
816M001	Sludge #1	3.01 ± 0.64 (0.79)	2.64 ± 0.77 (0.78)	7.6 ± 1.5 (1.6)	3.34 ± 0.93 (1.0)	48.3 ± 2.1 (0.78)
816M002	Sludge #2	1.80 ± 0.49 (0.74)	1.47 ± 0.70 (0.70)	4.9 ± 1.3 (1.6)	2.45 ± 0.80 (0.93)	49.5 ± 2.2 (0.71)
816M003	Sludge #3	2.19 ± 0.46 (0.60)	2.72 ± 0.58 (0.59)	6.3 ± 1.2 (1.2)	2.77 ± 0.69 (0.79)	50.8 ± 2.2 (0.60)
816M004	Sludge #4	0.28 ± 0.10 (0.15)	0.24 ± 0.10 (0.15)	0.68 ± 0.25 (0.35)	0.25 ± 0.15 (0.20)	15.05 ± 0.66 (0.16)
816M005	Sludge #5	0.19 ± 0.19 (0.28)	0.32 ± 0.20 (0.29)	1.19 ± 0.49 (0.67)	0.77 ± 0.33 (0.38)	21.69 ± 0.98 (0.30)
816M006	Sludge #6	1.94 ± 0.52 (0.76)	1.88 ± 0.74 (0.75)	3.2 ± 1.2 (1.6)	2.09 ± 0.80 (1.0)	49.3 ± 2.4 (0.76)
816M007	Sludge #7	0.89 ± 0.27 (0.36)	1.07 ± 0.21 (0.35)	2.06 ± 0.58 (0.74)	1.01 ± 0.35 (0.48)	26.4 ± 1.1 (0.37)
816M008	Sludge #8	2.69 ± 0.67 (0.89)	2.62 ± 0.89 (0.89)	7.3 ± 1.5 (1.8)	3.16 ± 0.85 (1.2)	50.9 ± 2.3 (0.90)
816M009	Secondary Digester #1	1,600 ± 220 (340)	830 ± 550 (810)	970 ± 500 (550)	540 ± 220 (290)	4,910 ± 310 (220)
816M010	Secondary Digester #2	1,210 ± 210 (240)	800 ± 470 (710)	880 ± 350 (480)	380 ± 230 (260)	4,280 ± 260 (190)

^aThe concentrations of the sludge samples are in pCi/g.

^bThe concentrations of the digester samples are in pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^dMDC values are in parenthesis.

ORISE TABLE 3

**CONCENTRATIONS OF STRONTIUM-90
IN SLUDGE AND DIGESTER SAMPLES
BY LOW BACKGROUND BETA COUNTING
AP4, REVISION 11; CP3, REVISION 1
ROYERSFORD WASTEWATER TREATMENT FACILITY
ROYERSFORD, PENNSYLVANIA**

ESSAP Sample ID	NRC Region I Sample ID	Sr-90 Concentrations (pCi/g^a or pCi/L^b)
816M001	Sludge #1	2.26 ± 0.36 ^c
816M002	Sludge #2	1.73 ± 0.30
816M003	Sludge #3	2.83 ± 0.37
816M004	Sludge #4	4.35 ± 0.43
816M005	Sludge #5	2.29 ± 0.32
816M006	Sludge #6	2.06 ± 0.31
816M007	Sludge #7	2.48 ± 0.32
816M008	Sludge #8	2.95 ± 0.33
816M009	Secondary Digester #1	58.5 ± 8.0
816M010	Secondary Digester #2	74.0 ± 9.7

^aThe concentrations of the sludge samples are in pCi/g. The average MDC for a one hour count of a 2 g sludge sample for Sr-90 is 0.33 pCi/L.

^bThe concentrations of the digester samples are in pCi/L. The average MDC for a one hour count of a 0.1 L digester sample for Sr-90 is 8.7 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

ORISE TABLE 4

**CONCENTRATIONS OF TRITIUM
IN DIGESTER SAMPLES
BY LIQUID SCINTILLATION ANALYSIS
AP2, REVISION 12; CP4, REVISION 1
ROYERSFORD WASTEWATER TREATMENT FACILITY
ROYERSFORD, PENNSYLVANIA**

ESSAP Sample ID	NRC Region I Sample ID	Tritium Concentrations^a (pCi/L)
816M009	Secondary Digester #1	560 ± 230 ^b
816M010	Secondary Digester #2	570 ± 230

^aThe average MDC for a one hour count of a 0.01 L digester sample for tritium is 370 pCi/L.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.