ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

June 3, 2004

Mr. Tom McLaughlin
Mail Stop T-7F27
U.S. Nuclear Regulatory Commission
Division of Waste Management
11545 Rockville Pike
Rockville, MD 20852

SUBJECT: ANALYTICAL RESULTS FOR SOIL SAMPLES FROM THE MOLYCORP, INC., YORK FACILITY, YORK, PENNSYLVANIA (DOCKET NO. 040-08794, RFTA NO. 03-007)

Dear Mr. McLaughlin:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) analyzed 48 soil samples that were collected by the Pennsylvania Department of Environmental Protection (PADEP) at the Molycorp, Inc. York, Pennsylvania facility on May 5, 2004. These samples were collected from surface (0 to 6 inches) soil locations and the analytical results are presented in ORISE Table 1.

The primary contaminants at the Molycorp facility are natural thorium and radium with limited quantities of natural uranium. The site-specific soil guidelines, as presented in the York Facility Decommissioning Plan, are as follows (RSI 2000 and NRC 1981 and 1983):

Radionuclide	Soil Concentration Above Background (pCi/g)
Natural uranium	10
Total thorium	10
Radium-226	5
Excess uranium	30
Excess Th-230	14.3

The samples were analyzed by gamma spectroscopy (Procedure CP1, Revision 13) to determine the presence and concentration of natural uranium, total thorium, and radium-226 in the samples (ORISE 2004a). ESSAP's Quality Control (QC) requirements were met for these analyses (ORISE 2004b). In order to confirm compliance with the release criteria, the unity rule was used to determine that the sum of each radionuclide divided by it's site release criterion is less than or equal to one. ESSAP used the same "sum-of-fractions" (SOF) calculation method as provided by the licensee (MACTEC 2003). The SOF reflects current Molycorp calculational methods for soil samples. With one exception (Sample Number 850S091), the ESSAP analytical results indicate that the soil samples collected from these locations meet the unrestricted release criteria for the site.

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If you have any questions, please direct them to me at (865) 576-0065 or Tim Vitkus at (865) 576-5073.

Sincerely,

Wade C. Adams

Wade C. Adams
Project Leader/Health Physicist
Environmental Survey and
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WCA:ar

Enclosures

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Distribution approval and concurrence:	Initials	Date
Technical Management Team Member	TJV	6/3/2004
Quality Manager	QTP	6/3/04
Laboratory Manager	RDC	6/3/04

ORISE TABLE 1

RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES
SAMPLES COLLECTED ON MAY 5, 2004 BY PADEP
GAMMA SPECTROSCOPY (CP1, REVISION 13)
MOLYCORP, INC.
YORK, PENNSYLVANIA

ORISE Sample Number	PADEP Survey Unit/ Sample Location[a]	Radionuclide Concentrations (pCi/g)									
		U-238	U-235	Ra-226	Total U[b]	Excess U[c]	Excess Ra[d]	Th-232	Th-228	Total Th[e]	SOF[f]
850S049	29 C21-c	2.13 ± 0.67[g]	0.09 ± 0.11	1.17 ± 0.12	4.34	0.96	0.00[h]	1.44 ± 0.24	1.51 ± 0.12	2.95	0.17
850S050	29 C21-d	1.43 ± 0.91	0.03 ± 0.14	1.38 ± 0.15	2.89	0.05	0.00	2.27 ± 0.31	2.45 ± 0.18	4.71	0.26
850S051	29 Z6-a	0.86 ± 0.38	0.05 ± 0.07	0.79 ± 0.09	1.78	0.07	0.00	0.80 ± 0.15	0.89 ± 0.07	1.69	0.00
850S052	29 Z6-d	1.79 ± 0.74	0.14 ± 0.12	1.31 ± 0.14	3.72	0.48	0.00	1.53 ± 0.25	1.49 ± 0.12	3.02	0.15
850S053	29 Z6-b	2.38 ± 1.04	0.01 ± 0.13	1.49 ± 0.15	4.77	0.89	0.00	1.55 ± 0.25	1.58 ± 0.13	3.14	0.25
850S054	3 Z6-c	1.88 ± 0.80	0.12 ± 0.12	1.32 ± 0.15	3.89	0.56	0.00	1.67 ± 0.24	1.59 ± 0.13	3.26	0.19
850S055	14 E7-d	1.48 ± 0.52	0.15 ± 0.09	1.18 ± 0.12	3.10	0.29	0.00	1.68 ± 0.21	1.71 ± 0.12	3.39	0.13
850S056	14 E7-a	2.40 ± 0.94	0.01 ± 0.12	1.40 ± 0.15	4.81	1.01	0.00	1.82 ± 0.27	1.77 ± 0.14	3.59	0.30
850S057	14 E7-b	1.64 ± 0.58	0.03 ± 0.09	1.19 ± 0.12	3.31	0.45	0.00	1.42 ± 0.18	1.53 ± 0.11	2.94	0.10
850S058	14 E7-c	1.23 ± 0.76	0.09 ± 0.11	1.13 ± 0.12	2.55	0.10	0.00	1.65 ± 0.24	1.61 ± 0.13	3.26	0.09
850S059	13 A8-b	1.48 ± 0.67	0.06 ± 0.11	1.28 ± 0.13	3.02	0.21	0.00	1.48 ± 0.21	1.51 ± 0.12	2.99	0.10
850S060	13 A8-a	1.73 ± 0.89	0.07 ± 0.13	1.65 ± 0.16	3.53	0.08	0.00	2.08 ± 0.27	2.03 ± 0.15	4.12	0.28
850S061	13 A8-d	2.54 ± 0.80	0.08 ± 0.13	1.76 ± 0.16	5.15	0.78	0.00	1.70 ± 0.27	1.77 ± 0.14	3.46	0.32
850S062	13 A8-c	1.45 ± 0.58	0.02 ± 0.10	1.53 ± 0.14	2.91	0.00	0.08	1.57 ± 0.19	1.57 ± 0.12	3.14	0.14

ORISE TABLE 1 (continued)

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ORISE Sample Number	PADEP Sample Location[a]	Radionuclide Concentrations (pCi/g)									
		U-238	U-235	Ra-226	Total U[b]	Excess U[c]	Excess Ra[d]	Th-232	Th-288	Total Th[e]	SOF[f]
850S063	13 A10-b	2.38 ± 0.76	0.12 ± 0.16	1.48 ± 0.15	4.88	0.90	0.00	1.52 ± 0.22	1.49 ± 0.12	3.01	0.24
850S064	13 A10-a	2.14 ± 0.68	0.14 ± 0.10	1.67 ± 0.15	4.42	0.47	0.00	2.01 ± 0.24	1.96 ± 0.14	3.97	0.32
850S065	13 A10-d	2.26 ± 0.84	0.09 ± 0.12	1.56 ± 0.15	4.62	0.71	0.00	1.92 ± 0.25	1.71 ± 0.13	3.63	0.31
850S066	13 A10-c	2.29 ± 0.63	0.15 ± 0.17	1.82 ± 0.16	4.73	0.46	0.00	1.80 ± 0.22	1.78 ± 0.13	3.57	0.31
850S067	13 A12-b	2.16 ± 0.81	0.05 ± 0.13	1.87 ± 0.18	4.38	0.29	0.00	1.83 ± 0.25	1.73 ± 0.14	3.56	0.30
850S068	13 A12-a	1.62 ± 0.78	0.12 ± 0.17	1.76 ± 0.16	3.36	0.00	0.14	1.87 ± 0.27	1.72 ± 0.13	3.59	0.25
850S069	13 A12-d	2.30 ± 0.65	0.21 ± 0.15	1.58 ± 0.15	4.81	0.72	0.00	1.52 ± 0.19	1.53 ± 0.11	3.05	0.24
850S070	13 A12-c	2.12 ± 0.80	0.03 ± 0.13	1.72 ± 0.16	4.26	0.40	0.00	1.60 ± 0.28	1.79 ± 0.14	3.38	0.24
850S071	33 Y13-b	2.29 ± 0.87	-0.03 ± 0.15	1.46 ± 0.16	4.56	0.83	0.00	1.78 ± 0.32	1.78 ± 0.15	3.56	0.28
850S072	33 Y13-a	2.26 ± 0.68	0.09 ± 0.11	1.51 ± 0.14	4.61	0.75	0.00	1.75 ± 0.24	1.73 ± 0.13	3.48	0.27
850S073	33 Y13-d	1.72 ± 0.68	0.00 ± 0.11	1.52 ± 0.14	3.44	0.19	0.00	1.72 ± 0.23	1.60 ± 0.12	3.33	0.20
850S074	33 Y13-c	2.33 ± 0.89	0.07 ± 0.13	1.51 ± 0.16	4.74	0.83	0.00	1.81 ± 0.27	1.66 ± 0.14	3.47	0.30
850S075	20 B15-b	2.43 ± 0.90	0.16 ± 0.19	1.80 ± 0.17	5.01	0.63	0.00	1.85 ± 0.31	1.78 ± 0.14	3.63	0.34
850S076	20 B15-a	2.40 ± 0.95	-0.02 ± 0.13	1.86 ± 0.18	4.78	0.54	0.00	1.74 ± 0.27	1.61 ± 0.13	3.35	0.31
850S077	20 B15-d	2.31 ± 0.81	0.17 ± 0.13	1.65 ± 0.16	4.80	0.66	0.00	1.66 ± 0.24	1.67 ± 0.13	3.33	0.27

ORISE TABLE 1 (continued)

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		U-238	U-235	Ra-226	Total U[b]	Excess U[c]	Excess Ra[d]	Th-232	Th-288	Total Th[e]	SOF[f]
850S078	20 B15-c	1.69 ± 0.62	0.20 ± 0.10	1.65 ± 0.15	3.58	0.04	0.00	1.56 ± 0.20	1.62 ± 0.12	3.18	0.17
850S079	2 B18-b	2.63 ± 0.80	-0.08 ± 0.13	1.68 ± 0.16	5.17	0.95	0.00	1.75 ± 0.28	1.68 ± 0.13	3.43	0.34
850S080	2 B18-a	1.33 ± 0.70	-0.02 ± 0.12	1.28 ± 0.12	2.64	0.05	0.00	1.63 ± 0.26	1.51 ± 0.12	3.14	0.11
850S081	33 B18-d	2.31 ± 0.66	0.17 ± 0.11	1.48 ± 0.14	4.79	0.83	0.00	1.91 ± 0.24	1.79 ± 0.13	3.70	0.31
850S082	2 B18-c	1.54 ± 0.58	0.11 ± 0.10	1.30 ± 0.13	3.19	0.24	0.00	1.66 ± 0.21	1.57 ± 0.12	3.23	0.15
850S083	2 D18-b	2.10 ± 0.83	0.11 ± 0.12	1.52 ± 0.16	4.31	0.58	0.00	1.68 ± 0.24	1.71 ± 0.14	3.38	0.24
850S084	2 D18-a	2.04 ± 0.83	0.08 ± 0.12	1.54 ± 0.16	4.17	0.51	0.00	1.60 ± 0.27	1.46 ± 0.12	3.06	0.22
850S085	2 D18-d	2.04 ± 0.63	0.07 ± 0.09	1.23 ± 0.12	4.14	0.81	0.00	1.54 ± 0.21	1.22 ± 0.10	2.76	0.18
850S086	2 D18-c	1.44 ± 0.75	0.20 ± 0.11	1.01 ± 0.12	3.08	0.43	0.00	1.89 ± 0.25	1.50 ± 0.12	3.38	0.16
850S087	21 G14-a	3.09 ± 1.02	0.32 ± 0.18	1.96 ± 0.22	6.50	1.13	0.00	2.43 ± 0.36	2.26 ± 0.19	4.68	0.55
850S088	21 G14-d	1.99 ± 0.71	0.06 ± 0.12	1.20 ± 0.13	4.04	0.79	0.00	1.88 ± 0.26	1.85 ± 0.14	3.73	0.24
850S089	21 G14-c	2.92 ± 0.66	0.18 ± 0.12	1.47 ± 0.14	6.03	1.45	0.00	1.82 ± 0.23	1.82 ± 0.13	3.63	0.38
850S090	21 G14-b	2.52 ± 0.87	0.19 ± 0.13	1.44 ± 0.14	5.22	1.08	0.00	1.98 ± 0.28	1.92 ± 0.15	3.91	0.35
850S091	3 Z17-b	5.41 ± 2.02	0.16 ± 0.28	1.21 ± 0.20	10.97	4.20	0.00	17.05 ± 1.47	17.20 ± 1.14	34.25	3.75
850S092	3 Z17-c	1.79 ± 0.71	0.06 ± 0.11	0.82 ± 0.10	3.63	0.96	0.00	1.94 ± 0.24	1.78 ± 0.13	3.72	0.20

ORISE TABLE 1 (continued)

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		U-238	U-235	Ra-226	Total U[b]	Excess U[c]	Excess Ra[d]	Th-232	Th-288	Total Th[e]	SOF[f]
850S093	3 Z11-a	2.69 ± 0.77	0.06 ± 0.10	1.11 ± 0.12	5.44	1.58	0.00	1.81 ± 0.22	1.64 ± 0.12	3.45	0.32
850S094	3 Z11-b	2.41 ± 0.93	0.16 ± 0.23	1.48 ± 0.16	4.97	0.93	0.00	2.01 ± 0.35	1.89 ± 0.16	3.90	0.34
850S095	3 Z11-c	2.70 ± 0.96	0.12 ± 0.20	1.55± 0.16	5.51	1.14	0.00	2.04 ± 0.28	1.90 ± 0.15	3.94	0.39
850S096	3 Z11-d	1.25 ± 0.50	0.11 ± 0.08	0.99 ± 0.10	2.60	0.25	0.00	1.48 ± 0.20	1.32 ± 0.10	2.80	0.05

[a]Sample locations provided by PADEP.
[b]Total U calculated by doubling the U-238 and adding the U-235 concentrations.
[c]Excess U calculated by subtracting the Ra-226 from the U-238 concentration.
[d]Excess Ra calculated by subtracting the U-238 from the Ra-226 concentration.
[e]Total Th calculated by adding the Th-228 and Th-232 concentrations.
[f]SOF calculated per MACTEC "Technical Basis Document: Derivation and Application of the 'Sum-of-Fractions' Calculation", Molycorp's York, PA Site; February 2003. Background concentrations of 1.51 pCi/g for Th-232 and 0.89 pCi/g for U-238 were subtracted in this calculation. Negative SOF values were set equal to zero (0.00).
[g]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.
[h]For each sample analysis, there can be excess uranium or excess radium but not both, therefore, negative values were set equal to zero (0.00).

REFERENCES

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