

40-8778
Molycorp, Inc.
A Unocal Company
P.O. Box 500
Washington, Pennsylvania 15301
Telephone (412) 222-5605

UNOCAL 76

MOLYCORP

January 28, 1997

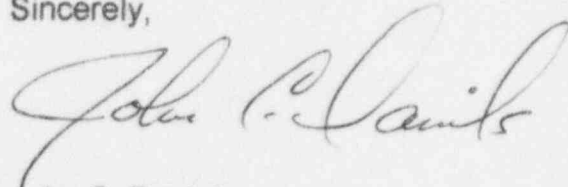
Mr. LeRoy S. Person
Project Manager
United States Nuclear Regulatory
Commission
Low Level Waste and Decommissioning
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and
Safeguards
Washington, D.C. 20555

Clean up of Off-Site Contamination
Findlay Property

Dear Mr. Person:

Enclosed are responses to your comments to Final Radiological Status Report (Findlay Property). If upon review, additional clarification is required, please contact me.

Sincerely,



John C. Daniels
Project Professional

xc: B. Dankmyer

9702180093 970128
PDR ADOCK 04008778
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180016

Attachment 1

Response to:

U.S. NUCLEAR REGULATORY COMMISSIONS STAFF REVIEW
"RADIOLOGICAL STATUS REPORT FOR THE
REMOVAL ACTION CONDUCTED ALONG
THE NORTHERN BOUNDARY OF THE MOLYCORP INC. PROPERTY
WASHINGTON, PENNSYLVANIA"

1) Page 2-5. Paragraph 4

The statement that an activity concentration of 5pCi/g (Th-232) was chosen to achieve reasonable assurance against future potential liability. Should not be construed as an NRC agreement that Molycorp is relieved from future liability through approval of the remediation.

Response

Molycorp understands that the selected remedial activity concentration should not be construed as an NRC agreement that Molycorp is relieved from future liability through NRC's approval of this (the Findlay property) remediation.

2) Page 2-5. Paragraph 5&6

The statement that: (1) "it was discovered that uranium is equilibrium with its daughters was also present and indeed the principal decay chain series:" and (2) "the source of the uranium and uranium decay chain radionuclides is unknown at this time. " need to be discussed in light of the concentration of uranium and daughters that were found during site characterization and the concentrations that were present in the original ore that was processed. The report should state the contribution, if any, that operations on the Findlay property contributed, or could have contributed to these concentrations.

Response

The statement "the source of the uranium and uranium decay chain radionuclides is unknown at this time" requires clarification. The source of the uranium and uranium decay chain radionuclides is likely an ore processed at the Molycorp facility processed by Molycorp or its' predecessor company. However no data is known to exist as to the constituency regarding the original ore or the product.

A review of the data presented in the Site Characterization Report (SCR) and the Impoundment Closure Plan indicates the following. Uranium in the input ore (from the

Araxa mine) ranged from 0.04% to 0.06% by weight (page 5-1 SCR) while the thorium concentration ranged from 1.87% to 2.08 %. The average ratio of the concentration of uranium to thorium is approximately $1/4000$ (0.25×10^{-3}). This is contrasted with samples from the thorium pile, the impoundment closure and the Findlay remediation. Table 5-5 (page 5-9 SCR) indicates the ratio of uranium series radionuclides (thorium-230) to the thorium series in the waste slag found in the thorium pile ranges from 0.071 to 0.30, a higher ratio than the source ore. This ratio indicates above background concentration of uranium. This is further corroborated by samples from the impoundment closure (see table 1). As is exhibited in the table, some samples indicate uranium series radionuclides in concentrations greater than the thorium series. The range for this ratio is 0.17 to 1.59. Table 2 present the ratio of uranium to thorium concentrations for the material placed in the rolloffs (see also Figure 1). As is indicated, the range of this ratio varies between 0.2 and 6.1. Thus in both instances the concentration of uranium is greater than the concentration of thorium. This is contrary to what would be expected from the input or source ore data.

The conclusion is that while the source of uranium concentrations in samples greater than the thorium concentrations is unknown, it can be assumed that other ores were processed which would give rise to these ratios. As stated this could have occurred under the predecessor firm or prior to the need for licensing i.e. the 1940's or earlier.

3) Page 2-5. Paragraph 6

The statement that "it is noted that the concentration (of uranium) is below that requiring a source material license (.05%)" does not relieve the license of cleanup requirement in the event that the uranium originated from prior ore processing at the licensee's facility. the origin of the source material should be discussed (see item 2 above) and an explanation should be provided for why it is not the licensee's responsibility for cleaning up this material.

Response

The statement was one of fact which reflects the magnitude of the concentration. Molycorp realizes its responsibility to remediate the area and has proceeded accordingly. As regards the origin of the source material, this was discussed in the prior response. The only additional information is that the physical characteristics of the material, i.e. slag, indicates material from a high temperature process typical of the type carried out on the site.

4) Page 2-5. Paragraph 8

The statement that "Hole punching for subsurface gamma logging was not possible

in the Proximity of the Molycorp property line due to the presence of large subsurface, "solidified" slag deposits." requires an explanation or clarification regarding what the licensee did to assure that property on the Findlay side of the property line met the cleanup criteria.

Response

Test pitting, or more correctly an open pit was excavated to assure that all residual material on the Findlay side of the property met the averaging criteria noted in NUREG 5849.

5) Page 3-3. Paragraph 1

The report states that "Remaining slag was excavated, with the exception of small amounts left in the north wall due to ALARA concerns." is confusing. The report should be revised to explain whether the criteria were met and how the ALARA principle was applied in the cleanup.

Response

As stated in the prior response the averaging process called for in NUREG-5849 was met on the Findlay side of the property. The reference to ALARA concerns will be removed as not pertinent.

TABLE 1
Impoundment Sample Review
All Samples with Concentrations of
Th-232 or U-238 Greater than 5 pCi/g

Date	Sample	Th-232 pCi/g	U-238 pCi/g	U238/Th232
6/15/95	pond 1-1R	5.2	2.5	0.48
	pond 3-3	4.6	6.9	1.50
	pond 3-3R	3.7	5.9	1.59
	pond 3-5	6.4	8.7	1.36
	pond 3-5R	6	8.1	1.35
	pond 5-2	13.1	8.6	0.66
	pond 5-2R	10.5	7.4	0.70
	pond 5-4	6.5	4.9	0.75
	pond 5-5	19.5	6.4	0.33
	pond 8-1	19.5	3.4	0.17
	pond 8-2	8	3	0.38
	pond 8-3	25.3	4.6	0.18
	pond 8-4	14.1	3.6	0.26
	pond 8-5	15.5	3.6	0.23
7/15/95	mc 1-5-6	5.8	1.2	0.21
	mc 1-smdc	5	2.7	0.54
	mc 2-4-6	11.8	4.4	0.37
	snd-c-p2	8	4.8	0.60
	mc 6-5-6	14.2	2.3	0.16
	mc-6-sc	15.6	3	0.19
8/11/95	mc-5-4-6	36	7.5	0.21
	mc 5-4-12	21	5	0.24
8/21/95	mc 8-cl4-6	10.7	1.8	0.17

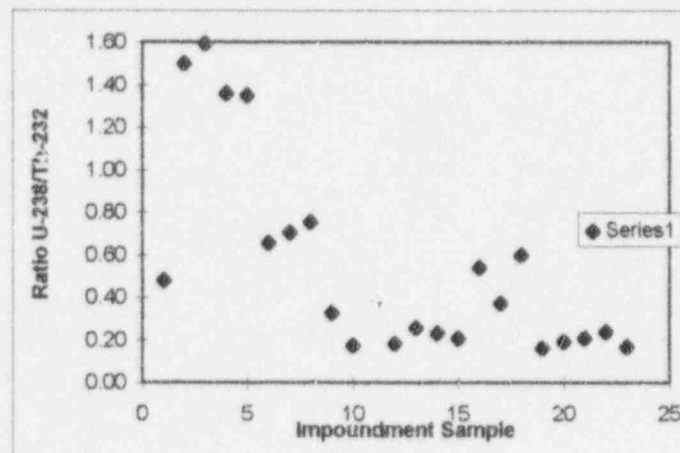


TABLE 2

Ratio of Uranium (Ra-226) to Thorium
in Waste in Rolloffs

ROLL OFF IDENTIFICATION	AVE CONC Ra-226 pCi/g	AVE CONC Th-232 pCi/g	Ra-226/Th-232 ratio
FN001	8.2	3	2.7
FN002	6.6	3	2.2
FN003	7.7	5.7	1.4
FN004	7.9	6	1.3
FN005	6.4	9.4	0.7
FN006	6.7	1.1	6.1
FN007	8.6	11.2	0.8
FN008	7.4	10.5	0.7
FN009	6.5	3	2.2
FN010	6.1	3.6	1.7
FN011	5.7	2.9	2.0
FN012	7.8	3.6	2.2
FN013	6	3.8	1.6
FN014	7.8	3.6	2.2
FN015	5.9	2.6	2.3
FN016	6.4	5.4	1.2
FN017	5	4	1.3
FN018	5.7	2.4	2.4
FN019	6.4	4.1	1.6
FN020	6.4	4.1	1.6
FN021	5.6	1.6	3.5
FN022	5.6	1.6	3.5
FN023	6.4	5.4	1.2
FN024	8	15.6	0.5
FN025	8.7	8.8	1.0
FN026	8	9.4	0.9
FN027	7.1	8.9	0.8
FN028	7.5	13.6	0.6
FN029	7.5	13.6	0.6
FN030	6.4	4.8	1.3
FN031	4.4	2.4	1.8
FN032	5.9	6.7	0.9
FN033	8.1	11.1	0.7
FN034	6.6	8.2	0.8
FN035	6.7	9.4	0.7
FN036	5.1	6.2	0.8
FN037	5.8	5.3	1.1
FN038	6.4	5	1.3
FN039	3.3	6.9	0.5
FN040	3.3	6.9	0.5
FN041	3.3	6.9	0.5
FN042	7	4.5	1.6
FN043	7	4.5	1.6
FN044	6.3	7.6	0.8

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ROLL OFF IDENTIFICATION	AVE CONC Ra-226 pCi/g	AVE CONC Th-232 pCi/g	Ra-226/Th-232 ratio
FN045	6.3	7.6	0.8
FN046	8.6	16.8	0.5
FN047	6.5	10.6	0.6
FN048	6.5	10.6	0.6
FN049	4.8	11.3	0.4
FN050	5.1	14.5	0.4
FN051	4.7	5.3	0.9
FN052	4.7	5.3	0.9
FN053	4.7	5.2	0.9
FN054	7.5	6.8	1.1
FN055	7	11.8	0.6
FN056	7	11.8	0.6
FN057	5.1	8.5	0.6
FN058	7.5	6.8	1.1
FN059	4.6	4.8	1.0
FN060	5.7	10.6	0.5
FN061	5.1	15.5	0.3
FN062	5.1	3.6	1.4
FN063	3.9	7.7	0.5
FN064	4.9	6.3	0.8
FN065	3.8	4.6	0.8
FN066	4.8	3.5	1.4
FN067	4.8	3.5	1.4
FN068	4.8	3.5	1.4
FN069	5.8	24.8	0.2
FN070	5.8	24.8	0.2
FN071	4.4	1.4	3.1
FN072	5.9	11.6	0.5
FN073	5.4	8.8	0.6
FN074	7	11.8	0.6
FN075	7	11.8	0.6
FN076	5.4	8.8	0.6
FN077	5.4	8.8	0.6
FN078	6.9	22.3	0.3
FN079	3.1	4.6	0.7
FN080	3.1	4.6	0.7
FN081	3.1	4.6	0.7
FN082	3.4	4	0.9
FN083	3.4	4	0.9
FN084	3.8	7.8	0.5
FN085	4.9	4.2	1.2
FN086	7	4.2	1.7
FN087	7	4.2	1.7
FN088	5.9	9.3	0.6

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ROLL OFF IDENTIFICATION	AVE CONC Ra-226 pCi/g	AVE CONC Th-232 pCi/g	Ra-226/Th-232 ratio
FN089	5.2	3.5	1.5
FN090	5.9	4.3	1.4
FN091	5.1	4.1	1.2
FN092	6.8	10.9	0.6
FN093	5.1	4.1	1.2
FN094	6.8	10.9	0.6
FN095	6.8	10.9	0.6
FN096	4.9	2.2	2.2
FN097	3	5.7	0.5
FN098	3	5.7	0.5
FN099	6.7	4.7	1.4
FN100	8	4.4	1.8
FN101	6.7	4.7	1.4
FN102	6.7	4.7	1.4
FN103	5.8	4.1	1.4
FN104	5.8	4.1	1.4
FN105	5.7	3.3	1.7
FN106	5.7	3.3	1.7
FN107	4.4	5.6	0.8
FN108	4.4	5.6	0.8
FN109	8	4.1	2.0
FN110	7.5	2.8	2.7
FN111	9.1	4.3	2.1
FN112	8.1	4.5	1.8
FN113	8.7	2.4	3.6
FN114	7.4	3.5	2.1
FN115	7.2	2	3.6
FN116	5.7	3.8	1.5
FN117	3.8	5.3	0.7
FN118	3.8	5.3	0.7
FN119	8.3	6	1.4
FN120	6.4	3.5	1.8
FN121	8.3	6	1.4
FN122	6.4	3.5	1.8
FN123	4	4	1.0
FN124	4	4	1.0
FN125	4	4	1.0
FN126	4	4	1.0
FN127	6.5	4.1	1.6
FN128	6.5	4.1	1.6
FN129	6.3	1.7	3.7
FN130	6.3	1.7	3.7
FN131	5.7	1.9	3.0
FN132	5.7	1.9	3.0

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ROLL OFF IDENTIFICATION	AVE CONC Ra-226 pCi/g	AVE CONC Th-232 pCi/g	Ra-226/Th-232 ratio
FN133	5.7	1.9	3.0
FN134	5.7	1.9	3.0
FN135	5	2.1	2.4
FN136	5	2.1	2.4
FN137	5	2.1	2.4
FN138	5	2.1	2.4
FN139	3.2	6.1	0.5
FN140	3.2	6.1	0.5
FN141	3.2	6.1	0.5
FN142	3.2	6.1	0.5
FN143	3.4	3.7	0.9
FN144	3.4	3.7	0.9
FN145	2	4.5	0.4
FN146	2	4.5	0.4
FN147	4.4	18.3	0.2
FN148	4.4	18.3	0.2
FN149	4.4	18.3	0.2
FN150	4.4	18.3	0.2
FN151	5.6	15.1	0.4
FN152	5.6	15.1	0.4
FN153	5.6	15.1	0.4
FN154	5.6	15.1	0.4
FN155	3.8	3.8	1.0
FN156	3.8	3.8	1.0
FN157	5.3	3.2	1.7
FN158	5.3	3.2	1.7
FN159	5.3	3.2	1.7
FN160	5.3	3.2	1.7
FN161	3.8	6.8	0.6
FN162	3.8	6.8	0.6
FN163	3.8	6.8	0.6
FN164	6.9	11	0.6
FN165	6.9	11	0.6
FN166	6.9	11	0.6
FN167	2.5	4.2	0.6
FN168	3.2	4.8	0.7
FN169	2.5	4.2	0.6
FN170	3.2	4.8	0.7
FN171	3.2	4.8	0.7
FN172	3.2	4.8	0.7
FN173	2.5	4.2	0.6
FN174	4.5	4.3	1.0
FN175	4.5	4.3	1.0
FN176	4.5	4.3	1.0

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Ratio of Uranium (Ra-226) to Thorium
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ROLL OFF IDENTIFICATION	AVE CONC Ra-226 pCi/g	AVE CONC Th-232 pCi/g	Ra-226/Th-232 ratio
FN177	2.9	3.8	0.8
FN178	2.9	3.8	0.8
FN179	2.9	3.8	0.8
FN180	4.5	4.3	1.0
FN181	4.5	4.3	1.0
FN182	4.5	4.3	1.0
FN183	4.5	4.3	1.0
FN184	4.5	4.3	1.0

Figure 1

Ratio of Uranium to Thorium in Rolloff Waste

