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Molycorp

December 14, 1999

Mr. Larry Camper, Chief  
Decommissioning Branch  
United States Nuclear Regulatory  
Commission  
One White Flint North  
11555 Rockville Pike  
Rockville, Maryland 28052

**Subject: Response to NRC  
October 19, 1999, Request for Additional  
Information on the Molycorp  
Washington, PA,  
Part 1 Decommissioning Plan**

Dear Mr. Camper,

In a letter to Mr. Jack Daniels dated October 19, 1999, the Nuclear Regulatory Commission requested that Molycorp provide additional information pertaining to the Part 1 Decommissioning Plan (June 30, 1999) for the Washington, Pennsylvania site. The requested information is enclosed.

Any written correspondence concerning this subject should be directed to me at the Molycorp address shown on the above letterhead. If you have any questions or need to reach me by telephone, please do not hesitate to contact me at 847-310-6801 or you can contact Mr. George Dawes at 724-222-5605, extension 517.

Sincerely,

  
J.J. Dean

Enclosure: Response to NRC Comments

Docket No.: 040-8778  
License No.: SMB-1393

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**Response To NRC October 19, 1999, Comments on  
Molycorp Washington, PA, Part 1 Decommissioning Plan**

NRC Comment #1:

A concise division between Part 1 and Part 2 of the decommissioning plan is needed. Items remaining in Part 1 of the decommissioning plan need further detail, specifically in the areas of the schedule and proposed tasks (e.g., specifications for, and location of, staging areas and stockpiles)

Molycorp Response #1:

The division between the Part 1 Decommissioning Plan Revision (Part 1) and the Part 2 Decommissioning Plan to be submitted April 14, 2000 (Part 2) is distinct. Part 1 was submitted under the unrestricted use criteria in the SDMP Action Plan. The information contained in Part 1 is intended to be sufficient to allow NRC approval as a partial decommissioning plan that is separate from Part 2. NRC has approved partial decommissioning plans in the past for other decommissioning sites. The proposed tasks in the Part 1 plan are:

- 1) excavation of overburden and contaminated material,
- 2) temporary staging and stockpiling of excavated materials,
- 3) packaging and loading into trucks or rail cars,
- 4) transportation of contaminated material to an NRC approved location,
- 5) final status survey of site buildings, land, excavated areas, and excavated materials, and
- 6) Implementing radiation protection, training, and environmental monitoring programs to ensure that the proposed tasks are accomplished in accordance with NRC regulations.

Part 2 of the decommissioning plan will be submitted under the restricted use provisions of 10 CFR 20.1403, and will provide the details as to the location and design of an onsite storage cell. Molycorp intends to propose that the onsite cell be designated as an NRC approved location to receive the material excavated under Part 1. Part 2 will include all of the information required to demonstrate compliance with 10 CFR 20.1403, including dose assessment, ALARA analysis, institutional controls, financial assurance, and public advice. A description of any radiation protection or environmental monitoring program requirements, in addition to those provided in Part 1, will also be included.

The NRC requested additional information regarding the location and specifications for staging areas and stockpiles. The stockpiles will be located adjacent to the areas requiring excavation and outside the limits of the 100-year flood plain. Temporary

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erosion control measures will be installed as necessary around the stockpiles to ensure protection from sediment and contamination transport in stormwater runoff. Staging areas containing material expected to exceed the unrestricted use criteria will have HDPE or VLDPE liners. Stockpiles of overburden material containing material expected to be below the unrestricted use criteria may not be lined. Fugitive dust emissions will be minimized through the use of water and/or other dust suppressants. Stockpiles expected to remain for an extended period of time (several weeks to months) will be covered after excavation in the area is completed. If the existing environmental air monitoring stations are not properly located in relation to any long-term stockpiles, temporary air monitoring stations may be put into place. Operational radiation protection monitoring will be augmented to include routine air and surface water samples in the vicinity of both long-term and short-term stockpiles. The controls described above will ensure that the concentrations of source material in air and water at site boundaries will be maintained well below the 10 CFR 20, Appendix B, Table 2, and effluent limits.

The NRC also requested additional information as to the schedule for the decommissioning tasks described in Part 1. Because of the inextricable link between the excavation of material under Part 1 and the onsite cell/restricted use proposals to be provided in Part 2, it is difficult to project an exact schedule for the completion of Part 1 tasks at this time. The activities described in Part 1 could be readily completed within 24 months of NRC approval, as required by 10 CFR 40.42(g)(1)(vi). However, it may not be appropriate to begin the site excavation before NRC approval of Part 2 because of the possibility that material stockpiling may be required for unnecessarily long periods of time pending the approval of Part 2. Molycorp believes that there is considerable uncertainty in the NRC approval date for Part 2 due to the complexity of the technical and policy issues involved. Therefore, Molycorp requests an alternate decommissioning schedule for the Part 1 plan, in accordance with 10 CFR 40.42(i)(5), as provided below:

“ Molycorp will complete decommissioning of the site as soon as practicable, but no later than 24 months after NRC approval of the Part 2 Decommissioning Plan.”

This alternate schedule would allow NRC approval of the Part 1 plan prior to Part 2 approval while reducing the risk of Molycorp being required to request an alternate decommissioning schedule at some time in the future. Such a request may be required if the projected Part 2 approval date would cause the site decommissioning to be delayed until some time later than 24 months after the Part 1 approval date.

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**NRC Comment # 2:**

The thorium concentration data within the DP (Part 1 Decommissioning Plan) is not consistent with the Earth Vision distribution figures in the DP or the concentration data from the Site Characterization Report (SCR). Further, there is no explanation for the relationship between data and figures from the DP and those from the SCR, and no justification has been provided for the exclusion of the slag pile data from thorium distribution and volume considerations.

**Molycorp Response # 2:**

The response addresses the points raised in the comment in the following order:

- a) relationship between thorium concentration data in the DP and concentration data from the SCR,
- b) consistency of concentration data and Earth Vision figures within the DP,
- c) relationship between figures from the DP and those in the SCR
- d) exclusion of slag pile data from thorium distribution and volume considerations.

2a. Relationship between thorium concentration data in the DP and concentration data from the SCR.

The principal relationship between thorium concentration data in the DP and concentration data in the SCR is that an adjustment has been made to report concentrations in the DP as total thorium. The concentration measurements reported in the SCR are in units of pCi/gm Th-232, whereas the data in the DP are SCR values multiplied by two to provide concentrations as pCi/gm total thorium (Th-232 + Th-228). In this adjustment, it is assumed that Th-232 daughters are in secular equilibrium with Th-232. Table 2-1 in the DP is a summary of SCR Appendix N data for all boreholes that contain concentrations above 10 pCi/g total thorium. Table 2-1 shows, for each borehole location 1) thickness of clean overburden, 2) maximum total thorium concentration, 3) thickness of the contaminated zone (greater than 10 pCi/gm), and 4) average total thorium concentration in the soil column containing less than 10 pCi/gm and above the detection limit (approximately 3 pCi/gm total thorium).

2b. Consistency of concentration data and Earth Vision figures within the DP.

The thorium concentration data is presented in both tabular and graphic format in the DP. Both of these are derived from the SCR Appendix N data (adjusted for total thorium) so they do have a consistent basis. The Earth Vision software, Version 7, produced figures

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2-1 through 2-7b. The input data for the Earth Vision figures was the SCR Appendix N concentration data (multiplied times two). The plan view projections show the site areas expected to contain soil concentrations above 10 pCi/gm total thorium and above 30, 100, 200 500 and 1000 pCi/gm total thorium respectively. The accompanying "side view projections" show the contaminated zones in a North-South vertical cross section (profile) viewed from the east. Care must be taken in interpreting the side view projections. Depth below surface of the thorium concentration zones cannot be determined directly from these figures as grade level varies by more than 10 feet across the site from east to west. As a result, there is no fixed elevation to represent ground surface in these views. The information is presented as a qualitative representation of contamination depth.

2c. Relationship between figures from the DP and those in the SCR

In the figures under discussion, soil concentration levels are projected onto site views. There are three main differences between the figures in the DP and SCR. They are:

- 1) figures in the DP are produced by Earth Vision, Version 7 and those in the SCR were produced using an earlier version of the software,
- 2) figures in the DP are based on total thorium concentration and the SCR figures are based on Th-232 concentration only,
- 3) different concentration intervals are used in the two reports.

2d. Exclusion of slag pile data from thorium distribution and volume considerations.

The soil volumes reported in the DP are primarily estimates of subsurface contamination that may require excavation. There are two additional volumes of contaminated soil/slag that are stored above ground on the site. First, the material contained in the thorium pile located west of Caldwell Avenue. Second, the material contained in 192, 20 cubic yard roll-off boxes located on the main industrial area north of Caldwell Avenue. The total volume stored above ground is estimated to be about 14,000 cubic yards. This material is included in the scope of the Part 1 decommissioning plan.

**NRC Comment # 3:**

A plot plan should be provided showing the "affected" and "unaffected" areas (as recommended by NUREG/CR-5849) on the Molycorp Washington PA Site. In addition, information should be supplied (or provided by reference and document) which supports the designation of "unaffected" for every building on the Molycorp Site.

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**Molycorp Response # 3:**

Figure 2-2a in the Part 1 decommissioning plan shows the areas of the site where contamination may exceed 10 pCi/g total thorium. This includes surface and subsurface contamination. However, there is some potential that open land areas not identified on Figure 2-2a may contain residual radioactivity at levels approaching 10 pCi/g. Therefore, all of the open land areas on the site will be classified as affected areas. Since all open land areas will be classified as affected, no plot plan is required.

In addition to open land areas, land under site structures was evaluated. The land under buildings and structures that were constructed after the production of FeCb began was classified as affected because residual radioactivity could be present. The land under buildings that were constructed prior to FeCb production was classified as unaffected

The final survey classification of site buildings was reviewed. The buildings were initially classified as unaffected because Molycorp believes that there is a low probability that contamination is present at levels above the unrestricted use criteria. A more conservative evaluation was performed, based on the operational history in each building, to revise the building classifications. The buildings were classified according to the potential for past operations to generate residual contamination, regardless of the probability that the buildings currently exceed the unrestricted use criteria. Note that scoping surveys may be performed to verify the revised building classification status. Any proposed change in building classification from affected to unaffected will be submitted for NRC review.

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The following table identifies the final survey classifications for the land and buildings on the Molycorp Washington site.

**Final Survey Classification of Land and Buildings on the Washington Site**

	<b>Affected Classification</b>	<b>Unaffected Classification</b>
<b>Open land areas</b>	All open land areas	None
<b>Land Under Buildings/Structures</b>	Buildings 1, 28, 32, 34, 35, 36, 38, 39, and 42  Old ore unloading shed  Ammonia storage tank  Waste acid storage tanks  Thickener filter press  FeMo process baghouses and raw material storage bins  4 banks of transformers	2, 2W, 25, 23, 13, 14, 22, 19, 21, 31, 37, 26, old guard house, acid plant and storage tanks, rail siding.
<b>Buildings</b>	Buildings 19, 26, 29, and 33  Building 1 lab	Buildings 2, 2W, 25, 23, 22, 31, 37, 36, 42, 13, and 14  Old guard house  Acid Plant (includes two acid storage tanks)  Building 21 (includes compressor and oil storage rooms)  Building 1 (except lab)

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**NRC Comment # 4:**

Molycorp should provide (e.g., in the radiation protection program) dose estimates for workers and the public, and a radiological accident analysis for the period during decommissioning activities.

**Molycorp Response # 4:**

As described in Section 3.3.1 of the Plan, Molycorp defines administrative exposure criteria for workers during decommissioning activities that are below regulatory limits. These criteria are 100 mrem TEDE daily and a 500 mrem TEDE yearly limit, with a cumulative total of 5 person-rem TEDE for the complete project. Additionally, to ensure that occupational exposures to radiation workers do not exceed these limits, Molycorp has an established Administrative investigation levels (Procedure RPP-AP-008 "Molycorp ALARA Program") of 250mrem direct exposure and 10 DAC-HRS. If these limits are reached, an investigation is conducted to determine the cause of the exposures and steps are taken to limit future exposures. Although these procedural limits are conservative, it is expected, based on historical data at other similar decommissioning projects and overall industry experience, that only about 10% of this limit will be realized.

Exposure to the public will be primarily limited to potential exposures from effluents during decommissioning, as opposed to direct exposure. Molycorp's decommissioning program establishes limits for exposure to the public as defined in 10CFR20, Appendix B, Table 2. An annual airborne concentration exceeding an average of 25% of the NRC limits at the site boundary is very unlikely. The overall public exposure is expected to be a very small fraction of the NRC limits. Radiation exposure due to transportation of radioactive waste includes exposures to both occupational workers and the general public is expected to be minimal due to the low exposure rates from the material to be shipped.

In addition to Molycorp's procedures and administrative controls, physical controls are also enacted to further reduce exposures. These controls include misting during excavation and demolition activities to reduce dust mitigation. Additionally, radiation exposure is controlled by identifying sources of radiation, restricting access to radioactive materials areas, training in safe work practices, surveillance of radiologically controlled areas, and engineering controls.

Based on radiological measurements obtained during site characterization, it is expected that a radiation worker on the site will be subjected to radiation levels of no more than 0.2 mr/hr above background. This is a conservative dose estimate using exposure rate measurements obtained during core borings on site. Although the Washington

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decommissioning project is expected to be completed in less than 9 months, worker exposure is estimated using a 12 month period. Accordingly, a worker could receive approximately 300 mrem in a 12 month period from direct radiation. Additionally, despite controls to maintain airborne activity at an absolute minimum (e.g., wetting of soils), each worker is assumed to receive 50 DAC-HRS of exposure due to airborne activity per year. This airborne exposure equates to an additional 125 mrem of exposure bringing the total exposure per worker to approximately 400 mrem/year.

The figures cited above represent a "worse case scenario" for the Molycorp project and the actual time and exposure is expected to be considerably less. Molycorp procedures include Administrative Limits for dose and DAC-HRS to workers at 250 mrem and 10 DAC-HRS respectively, and any exposures above these limits would be investigated with additional controls put in place to further reduce future exposures.

*Molycorp  
to NRC*

The NRC also requested information pertaining to potential accidents. An accident involving a fully-loaded radioactive waste shipment that overturns and spills the contents on public roadways could be considered the worst case scenario for the Molycorp decommissioning. While it has already been demonstrated that the radiation exposure from the load is negligible and would remain so if the contents were exposed, the resultant dust and spread of the soil would present a short term and minor hazard to the public. Airborne radioactivity levels during excavation activities are not expected to exceed 0.1 DAC (the respiratory protection threshold). Therefore, it is unlikely that airborne activity of any significance would be encountered with a potential spill. Thus, there are minimal radiological hazards to the public as a result of this worse case scenario.

**NRC Comment # 5:**

Molycorp should submit a revised environmental report to reflect the changes indicated by the Part 1 revision for the Molycorp, Washington DP.

**Molycorp Response # 5:**

The Environmental Report (ER) was primarily intended to address the impact of Molycorp's proposed onsite storage cell and to evaluate decommissioning alternatives other than the onsite cell. The Part 1 plan proposes only that the material be transferred to an NRC approved location. In most past cases, NRC has not required an ER for decommissioning plans that select shipment to an NRC approved location as the decommissioning alternative. Therefore, Molycorp proposes to submit the revised ER in conjunction with the Part 2 decommissioning plan revision.

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**NRC Comment # 6:**

Molycorp should provide information concerning the types of environmental monitoring to be performed during the decommissioning activities and prior to license termination.

**Molycorp Response # 6:**

Airborne effluents are the primary environmental monitoring concern during decommissioning and prior to license termination. As stated in response # 1 above, surface water monitoring will also be performed in the vicinity of stockpiles and staging areas.

Dust suppression measures will be actively employed to ensure that airborne concentrations are maintained ALARA and we expect to maintain airborne concentrations at very low levels. Molycorp currently has in place seven permanent environmental air monitoring stations. One at each corner of the facility north of Caldwell road, in the parking area between building 39 and Caldwell Ave, on the top of the hill near Ellwood Park, and at the back fence line south of the Storage pile. In addition to these permanent monitoring stations, airborne monitoring will be performed in the areas where excavation and vehicle loading activities are being performed. At least one member of each crew will have a lapel sampler. Air sampling will also be performed in the immediate vicinity of the excavation for comparison to the lapel sampler and assessment of crew DAC-hours. The minimum detectable activity for the air samplers will be 10 percent of the DAC and an investigation level will be set at 2 DAC. This low investigation level will help ensure that the airborne concentrations at site boundaries are also maintained at very low levels by controlling the activity at the source. In addition to the immediate work area sampling, portable air sampling will be performed as necessary at the site boundaries that are downwind of the excavation to ensure that the 10 CFR 20, Appendix B, Table 2 limits are not exceeded. Although not anticipated, excavation will be stopped if any environmental sample exceeds the Appendix B, Table 2 limits. Investigations will be conducted and corrective actions taken to reduce airborne concentrations to acceptable levels and to ensure that future activities do not generate elevated airborne concentrations.

**NRC Comment No. 7:**

Molycorp should provide the isotopic quantities and location of all radioactive isotopes presently on the Washington site.

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**Molycorp Response # 7:**

Licensed quantities of radioactive isotopes presently on the Washington site are primarily limited to Th-232 and Th-228 (and the associated Th series decay products). Natural uranium is also present but contributes a small fraction to the total inventory. The quantity of total thorium on the site is estimated to be about 11 curies (5.5 Ci each of Th-232 and Th-228). This amount does not include the thorium naturally present in the soil and rock on the site. Assuming that the decay series members are in secular equilibrium, there are 5.5 Ci each of the principal decay series members Ra-228, Ac-228, Ra-224, Rn-220 (assuming that emanation is not significant), Po-216, Pb-212 and Bi-212. The estimated inventory of Tl-208 is about 2 Ci, due to its branching ratio of 0.36. The details of the estimated inventory calculation are provided in the Table below based on the following assumptions:

1. The volume of soil in each concentration range is assumed to contain an average concentration equal to the mid-interval concentration.
2. Volumes are from Figure 2-7a in the DP.
3. The volume added from contaminated soil stored above surface totals 378,000 ft<sup>3</sup> (14,000 cu yd). This includes the storage pile and the roll-off boxes.
4. The above-ground volume is assumed to have the same concentration profile as the sub-surface soil.
5. The total mass of contaminated soil is calculated based on an assumed average density for the soil-slag of 1.8 gm/cm<sup>3</sup>.

**Estimate of Total Thorium Inventory on Washington Site**

Concentration Interval (pCi/gm)	Mid-interval concentration pCi/gm	Sub-surface volume (ft <sup>3</sup> ) (from Fig 2-7a)	Volume added from above surface storage (ft <sup>3</sup> )	Total volume; surface + sub surface (ft <sup>3</sup> )	Mass of contaminated soil (gm)	Inventory of total thorium (Ci)
10 - 30	20	1.23E+06	1.88E+05	1.42E+06	7.23E+10	1.45E+00
30 - 100	65	8.29E+05	1.27E+05	9.56E+05	4.87E+10	3.17E+00
100 - 200	150	2.48E+05	3.80E+04	2.86E+05	1.46E+10	2.19E+00
200 - 500	350	1.42E+05	2.18E+04	1.64E+05	8.34E+09	2.92E+00
500 - 1000	750	1.77E+04	2.71E+03	2.04E+04	1.04E+09	7.80E-01
1000 - 2070	1535	5.80E+02	8.89E+01	6.69E+02	3.41E+07	5.23E-02
	sum =>	2.47E+06	3.78E+05	2.85E+06	1.45E+11	1.05E+01

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**NRC Comment # 8:**

Molycorp should clearly describe and analyze the alternatives that it considered for the Part 1 revised DP in the revised environmental report.

**Molycorp Response # 8:**

As stated in the response to Comment #5, Molycorp proposes to submit the revised environmental report in conjunction with the Part 2 revision of the plan. The only alternative that Molycorp considered in Part 1 was the excavation of material exceeding the SDMP Action Plan criteria and the transfer of excavated material to an NRC approved location. The site would be released for unrestricted use after all material above the SDMP Action Plan criteria are removed and final status surveys are completed.