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February 15, 1997/3

Mr. John H. Austin  
Mail Stop 5E2  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

re: License No. SMB-1393  
Decommissioning Alternatives

Dear Mr. Austin:

We are submitting, in accordance with our licensing agreement, an overview of the decommissioning alternatives we are exploring for the Molycorp, Washington, PA site. The cost estimates for these alternatives are cursory and are not meant to be interpreted as complete and wholly documented. A complete cost accounting for the various alternatives will be submitted to your office after the site characterization has been completed and the results documented.

Sincerely,

Barbara K. Dankmyer  
Resident Manager

cc: D. Shoemaker, Molycorp - Questa  
C. Glenn, NRC - Washington  
J. Yusko, PA DER - Pittsburgh

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This report briefly summarizes Molycorp's investigations to date into disposal options for the thorium containing slag located at the Washington, PA facility. A brief description of each disposal option is made. An effort has been made to determine costs for each alternative. However, the estimates in all instances have been based on data from initial investigations and should be considered only as preliminary in nature.

#### CLEAN UP COSTS

Several alternatives are being explored for the disposal of the low level radioactive waste at Molycorp's Washington, PA site. Common to these is the actual clean up of the site. Without a complete site characterization, estimating costs associated with separating the radiologically contaminated materials from the non-contaminated soils and slags is difficult.

A preliminary estimate of \$1,500,000 for clean up has been made based upon data from a small, subsurface investigation in the vicinity of the surface impoundments. This includes contractor labor to remove the soil and slag in the contaminated areas from surface level to an averaged eight foot depth. Dosage monitoring of laborers, Molycorp personnel, and consultants is also included. This estimate is also predicated upon using a semi-manual sorting method yet to be developed by us to segregate radioactive and non-radioactive materials. Covering the site with an acceptable fill material and revegetating it has also been taken into consideration.

We have recently started discussions with TMA, Inc., Santa Fe, NM concerning an automated sorting unit. The unit is currently being operated on a site in the Johnson Islands of the Pacific Ocean, separating low level radioactive materials from non-contaminated soils for the Department of Defense. If the unit proves feasible for our site, the purchase or lease of it will undoubtedly impact clean up costs.

The results of site characterization will also necessitate a change to this base line estimate; the averaged depth will undoubtedly change, perhaps significantly. Only a minor change is expected on the overall acreage of contamination, however. The mandated levels of clean up will also impact this base line clean up estimate and the subsequent costs of disposal.

#### DISPOSAL ALTERNATIVES

We have explored six disposal alternatives to date. These include:

- 1) an on site, engineered enclosure;

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FOR  
MOLYCORP SITE IN WASHINGTON, PA

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DISPOSAL ALTERNATIVES (con't)

- 2) purchase of a subsurface mine in Pennsylvania for disposal;
- 3) purchase of a subsurface, non-working uranium mine in a western state for disposal;
- 4) finding a method for reclaiming the thorium and selling it for reuse;
- 5) determining a method for recycling or reclaiming the Cb content of the slag; exporting the material back to the source mine and establishing a processing plant in Brazil for this purpose;
- 6) sending the material to an established, commercial disposal site.

We have estimated a volume of no greater than 500,000 cu ft for cost calculations. We are assuming the slag is close in characteristic to the description in the recently submitted site characterization plan. We have also made an assumption that there is no mixed waste on site. Estimates listed for each alternative do not include the base estimate clean up cost of \$1,500,000.

Alternative 1 concerns investigating the feasibility of an engineered closure on site. Studies of probabilistic dose assessment on future populations have been included in the cost estimates of the alternative. Assumptions concerning the location on site include positioning it out of the estimated 100 year flood plain and situating it as far from the current population as practical. The construction was assumed to be massive in nature. The assumption was also made that the current slag pile would be unearthed and the material moved into the new closure. A preliminary estimate for this option is \$2,000,000.

Alternative 2 involves purchasing a subsurface mine located somewhere in Pennsylvania. Our investigations have lead us to conclude that in most instances only the mineral rights are owned by the mining company. Therefore, we have assumed that we would need to purchase the mine and also the surface acreage over the mine. Most of the mines we have inspected have been in relatively populated areas, suggesting that we would wish to purchase several acres surrounding the mine as well.

All mines that we visited were decidedly damp with free standing water in several areas. These mines were considered to be "dry", however, by Pennsylvania standards. Mines in Pennsylvania all appear to have one of three drainage characteristics:

- 1) acid drainage is present from coal operations;
- 2) limestone mines have highly basic drainage;
- 3) the mine has significant limestone deposits and also has acid drainage from coal operations.

## DISPOSAL ALTERNATIVES (con't)

Drainage would have to be addressed in both preparing the mine to receive low level radioactive waste and in closing the mine after clean up was completed. The dampness, as well as the drainage, would necessitate extensive leaching studies in the extreme upper and lower pH ranges.

Costs for purchasing a mine and surrounding land will, of course, vary depending on the mine location. Purchase costs, preparation, and closing have been estimated at \$1,000,000. Transportation costs within the state have been quoted in the vicinity of \$1,000,000.

Alternative 3 is similar to Alternative 2. A mine located in a western state is being sought which would be suitable for storage. An old uranium mine would be preferable. Mines in this area tend to be very dry in comparison to mines located in Pennsylvania. Population density in these areas of the United States tend to be considerably lower. Placing the slag in an uranium mine would not impact the surrounding environment to the degree placing it in a limestone mine in Pennsylvania would.

Costs for preparing and closing the mine should be considerably less expensive. Purchase costs, preparation, closure, and transportation to site have been initially estimated at \$2,200,000.

Alternative 4 explores finding a method for extracting the majority of the thorium from the slag and marketing it. Costs for this type of volume reduction cannot be estimated until a feasible method has been found for removing the thorium from the slag. The glass structure of the slag matrix entraps the thorium, making it exceedingly difficult, if not impossible, to leach it out. Other methods for removing the thorium will need to be investigated. Development work is being implemented on this at Unocal's Science and Technology Laboratories.

Alternative 5 explores finding a method for extracting the columbium (niobium) content of the slag for reuse. Removing the columbium will be as difficult as removing the thorium for the reasons outlined in the discussion of Alternative 4. However, if a process is developed that is practical and economically viable, the slag could be sent back to the Brazilian mine where the columbium ore was originally excavated. The mine site in Brazil also contains processing facilities. These facilities include an aluminothermic reduction process to produce ferrocolumbium alloy. This process is almost identical to the one Molycorp used in the 1960's which generated the thorium containing slag under discussion. The ferrocolumbium process is currently operating and is expected to continue in operation for several years.

The costs of developing this process and establishing a production unit cannot be estimated at this time. Transportation costs for the slag

## DISPOSAL ALTERNATIVES (con't)

from Washington, PA to the mine site in Brazil have been quoted at approximately \$3,000,000.

Alternative 6 is the most conventional and most costly method for disposing of the low level radioactive waste. A fundamental review of site options is underway. Pennsylvania's location is still being chosen and will probably not be ready for use by our decommissioning date. A corporate legal review will be conducted on any commercial site under consideration with regard to the facility's capital structure and ability to withstand long term liabilities. An initial review of at least one sight has indicated a cause for concern with respect to its ability to withstand long term liability.

Envirocare in Utah appears to be the least expensive of the facilities checked to date. Personnel at the facility have quoted \$30 per cu ft for disposal twice within the last two years to different consulting firms retained by Molycorp. In recent telephone conversations with Envirocare, Molycorp personnel have been given reason to believe the price may be negotiable depending on volume, isotopes present, etc. A price of \$15 per cu ft appears to be a realistic estimate. If this is indeed the case, the minimum estimate for this alternative, including transportation, would be \$9,500,000.

## SUMMARY

Molycorp personnel are investigating six alternatives for decommissioning its Washington, PA site. Current estimates for clean up and disposal for four of the alternatives range between \$3,500,000 and \$11,000,000. Two of the alternatives were not able to be estimated at this time because the methodology for implementing them is still being developed.

The costs for these alternatives and any others developed in the near future will be refined once the site characterization has been completed.