IUC INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

October 17, 2001

VIA EXPRESS COURIER

40-8681

Mr. Melvyn Leach, Director
Fuel Cycle Licensing Branch
Mail Stop T-8A33
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

Re: Information on Drummed Uranium Material
Amendment Request to Process an Alternate Feed Material from Molycorp at White Mesa Uranium Mill
Source Material License No. SUA-1358

Dear Mr. Leach:

International Uranium (USA) Corporation ("IUSA") submitted on December 13, 2000 a request to amend Source Material License No. SUA-1358 to authorize receipt and processing of a uranium-bearing material from the Molycorp, Inc. ("Molycorp") facility located in Mountain Pass, California (the "Mountain Pass Facility"). This material resulted from the mineral recovery of natural ore for the production of lanthanides. IUSA also submitted supplemental information to NRC on January 2, 2001 relating to this amendment request. The material addressed in IUSA's amendment request and supplemental information letter will be removed by Molycorp's Lanthanide Division from three former impoundments at their mine and mill site at the Mountain Pass facility. The amendment request and January 2, 2001 letter referred to the material to be removed from the three Molycorp impoundments as the "Uranium Material." That Uranium Material is referred to herein as the "Pond Uranium Material." This letter addresses a small quantity of additional material from the Mountain Pass facility, currently stored in approximately 36 drums at that facility, which IUSA requests be included in the foregoing requested license amendment. This additional material is referred to herein as the "Drummed Uranium Material."

The Drummed Uranium Material is similar to the Pond Uranium Material in source, chemical composition, radiological composition, and physical properties, and is expected to be indistinguishable from the Pond Uranium Material during and after processing at the White Mesa Mill (the "Mill"), and in its impacts on Mill tailings. This letter provides a detailed comparison of the Pond Uranium Material with the Drummed Uranium Material, and demonstrates that the

NMSS/RPOB

Drummed Uranium Material is sufficiently similar that it can properly be included with the Pond Uranium Material in the same license amendment.

Historical Summary of Sources

As described in the January 2, 2001 letter, Molycorp has operated a surface mining and milling operation for the mineral recovery and chemical separation of lanthanides and other rare earths from bastnasite ores since the 1950's. From 1965 through 1984 Molycorp constructed and operated three lead sulfide ponds for the evaporation of lead sulfide sludges from the clarifier/thickener operation. The lead sulfide sludges contain uranium, which is also precipitated in the thickener. All three of the lead sulfide ponds were taken out of service prior to 1985. All of the Pond Uranium Material comes from these ponds and is associated with these pre-1985 activities.

From 1985 onward, the same uranium-bearing lead sulfide stream that had previously been transferred to the ponds, was managed as follows. From 1986 through 1995, this material was filtered and accumulated in drums. In 1995, Molycorp treated the drum contents with stabilization cement and sodium silicate to stabilize the lead content. For the period from 1995 to 1998, the stabilized material was returned to the Molycorp mineral recovery circuit for further recovery of lanthanides. During the same period, a portion was also shipped off site to recovery facilities and/or land disposal facilities. A Molycorp flow sheet and text, which describe the operations that generated the Drummed Uranium Material, are provided in Attachment 1.

The stabilized material that was returned to the Molycorp mineral recovery circuit was reintroduced just prior to the hydrochloric acid leaching step, and continued through the remainder of the circuit with the roasted bastnasite ores. These activities ceased in March 1998. The reintroduction area, containing only the equipment where the stabilized material was repulped and slurried, was decommissioned under the oversight of the State of California environmental authority after March 1998. The residuals from these decommissioning activities, containing the original stabilized drum contents treated with leach acid, were returned to drums. The approximately 36 drums (approximately 11 tons) from this area constitute the "Drummed Uranium Material."

The portion of the stabilized drummed material that Molycorp had previously shipped off site to other facilities was estimated to contain less than 0.05 percent total uranium and thorium. That material exhibited the RCRA TCLP characteristic for lead, and was shipped as RCRA characteristic waste D008. None of this previously shipped material will be included in the Drummed Uranium Material to be shipped to the Mill.

The Drummed Uranium Material to be shipped to the Mill is estimated to contain greater than 0.05 percent total uranium and thorium. Amendment 10 to Molycorp's Radioactive Material License, issued by the State of California, indicates that all the drummed stabilized lead sulfide sludges at the Mountain Pass facility have been classified as uranium and thorium source material. A copy of Molycorp's License Amendment 10 is provided in Attachment 2. Molycorp personnel have conducted ongoing telephone communications with the State of California environmental authorities, throughout 2001, regarding modifications to Molycorp's

decommissioning work plans. According to Molycorp personnel, based on those communications, the Drummed Uranium Material will be classified as uranium and thorium source material.

The December 13, 2000 amendment request sought authorization to process approximately 21,300 tons (16,400 CY) of Pond Uranium Material at the Mill as an alternate feed/ore. This letter requests that up to approximately 50 additional drums (approximately 16 tons) of Drummed Uranium Material be included in the same license amendment as the Pond Uranium Material for processing as an alternate feed/ore at the Mill, to ensure that all of the Drummed Uranium Material is also included in the requested amendment.

Radiochemical Data

Molycorp estimates that the Drummed Uranium Material has an approximate uranium content ranging from 0.10 percent to approximately 0.14 weight percent (0.12 to 0.18 percent U_3O_8), or greater, with an estimated overall average grade of 0.12 percent uranium (0.14 percent U_3O_8) for the entire volume of Drummed Uranium Material. This average uranium content is very similar to the Pond Uranium Material, which was estimated to have a uranium content ranging from 0.002 to 0.49 weight percent (0.0024 to 0.59 percent U_3O_8) and an approximate average of 0.15 weight percent uranium (0.18 percent U_3O_8). Data provided by Molycorp on the radiochemical content of the Drummed Uranium Material is included in Attachment 3.

According to data provided by Molycorp, the Drummed Uranium Material may have an approximate total thorium content ranging from 11 to 288 mg/kg (ppm). According to data provided by Molycorp, the Pond Uranium Material may have an approximate total thorium content ranging from 62 to 5954 mg/kg (ppm).

Consequently, as demonstrated by the Molycorp data, the Drummed Uranium Material is expected to be comparable in uranium content, but may be significantly lower in thorium content, than the Pond Uranium Material.

Hazardous Constituent Data

The December 13, 2000 amendment request demonstrated that the Pond Uranium Material was not and did not contain RCRA listed hazardous waste as defined in 40 CFR 261 et. seq. As will be described under the Chemical Composition and Hazardous Waste Protocol Sections, below, the Drummed Uranium Material also is not, and does not contain, RCRA listed hazardous waste.

Chemical Composition of Drummed Uranium Material Compared to Pond Uranium Material

Molycorp's characterization of the Drummed Uranium Material was based on known process history and a sampling and analysis program, including:

1. Radiological samples from six drums analyzed for total uranium content, total thorium content, and radium-228 content.

2. Chemical characterization samples from six drums analyzed for TCLP, STLC, and TTLC for 17 metals, and thorium and uranium.

Molycorp's analytical results from sampling of the Drummed Uranium Material is provided in Attachment 3.

Based on the total metals analysis, thirteen metals, including antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, molybdenum, nickel, selenium, silver, thallium and thorium, which were present at either moderate or very low (trace) levels in the Pond Uranium Material, were also present at the same levels in the Drummed Uranium Material. Based on the total metals analysis, the concentrations of two metals, barium and lead, were lower in the Drummed Uranium Material, and the concentrations of two metals, copper and zinc, were higher in the Drummed Uranium Material. The presence of all of these metals is typical in bastnasite ores, and in the ore body mined by Molycorp.

According to Molycorp personnel, the differences in levels of barium, lead, copper, and zinc in the Pond Uranium Material and Drummed Uranium Material was to be expected, for two reasons. First, the material accumulated in the ponds was generated from ores managed up to 1985. The material stabilized and later returned to the operation was generated from ores managed from 1985 to 1995. Because the mineral recovery operations can vary over time, it would be expected that levels of some of the secondary metals, such as barium and lead, in the ores managed in those different decades would vary appreciably, either up or down.

Second, Molycorp began the reintroduction of stabilized lead sulfide sludges for further recovery of lantahanide values in 1985. As a result of this reintroduction, higher levels of some metals such as copper and zinc were precipitated with the lead sulfide sludge. The higher levels of copper and zinc in the Drummed Uranium Material relative to the Pond Uranium Material are consistent with this process information. The higher levels of copper and zinc in the Drummed Uranium Material are not expected to pose any additional worker safety, environmental or process issues at the Mill.

Drummed lead sludges produced after 1985, including the portion to be shipped to IUSA, were stabilized by the addition of sodium silicate and stabilization cement. Commercial stabilization cements are dry mixtures of varying concentrations of silica, alumina, lime (calcium oxide), iron oxide, and/or magnesia, which activate and harden when mixed with water to create an inorganic matrix that binds specific metals. The constituents of the additives, such as silica and lime, are not hazardous or RCRA regulated wastes themselves, and are made up primarily of naturally-

occurring cations such as calcium, iron, and silicon. These naturally-occurring materials are also found in natural ores processed at the Mill and in the contents of the tailings impoundments at the Mill. Their presence is not expected to pose any additional worker safety, environmental, or processing issues at the Mill.

The stabilized drum contents were later mixed with mineral acids, such as hydrochloric acid, and were reintroduced to the bastnasite circuit. The acidified material, a portion of which constitutes the Drummed Uranium Material, would be expected to have higher levels of chloride or other acid anions than the Pond Uranium Material. The Mill plans to introduce the Drummed Uranium Material to the Mill circuit at the stage before the acid leach circuit, where it will be leached with acid for recovery of contained uranium values. The mineral acid anions are not expected to pose any additional worker safety, environmental, or processing issues at the Mill.

IUSA/UDEQ Hazardous Waste Protocol

The December 13, 2000 amendment request described in detail the IUSA/Utah Department of Environmental Quality ("UDEQ") Protocol for Determining Whether Alternate Feed Materials are Listed Hazardous Waste (the "Protocol").

In conformance with the requirements of the Protocol, IUSA has performed a source investigation to collect information regarding the composition and history of the Drummed Uranium Material and any existing generator or agency determinations regarding its regulatory status. Based on this source investigation, IUSA has determined that:

1. The Drummed Uranium Material was generated from a known process under the control of the generator.

2. Specific information exists about the generation and management of the Drummed Uranium Material to support a conclusion that the Drummed Uranium Material is not and does not contain any listed hazardous waste.

3. The generator and the State of California consider the Drummed Uranium Material to be Uranium and Thorium Source Material.

In the Affidavit included as Attachment 4, Molycorp confirms that the Uranium Material was generated from a known process under the control of the generator.

Based on the findings above, both Molycorp and IUSA have concluded that the Drummed Uranium Material is not a RCRA listed hazardous waste. IUSA has also engaged an independent consultant, experienced in RCRA matters and chemical processing, who has reviewed the site history, Drummed Uranium Material processing history, analytical data, correspondence, IUSA/UDEQ Protocol, and license termination planning documents available from Molycorp to date. The consultant has confirmed that the Drummed Uranium Material is not and does not contain RCRA listed hazardous waste. A copy of the consultant's review is provided in Attachment 5.

Compatibility with IUSA Mill Tailings

The processing of the Drummed Uranium Material will not increase the Mill's production to exceed the License Condition No. 10.1 limit of 4,380 tons of U_3O_8 per calendar year. Because production will remain within the limits assessed in the original Environmental Assessment, the process will be essentially unchanged. Because the Drummed Uranium Material is similar physically and in content to the Mill's existing tailings, processing of the Drummed Uranium Material will result in no significant environmental impacts beyond those originally evaluated. None of the differences between the Pond Uranium Material and the Drummed Uranium Material will have any impact on the Mill's existing tailings or tailings impoundments.

The disposal of the 11e.(2) byproduct material resulting from processing the Drummed Uranium Material will not change the characteristics of the Mill tailings from the characteristics associated with normal milling operations.

As described in the December 13, amendment request, it will be a condition of the license amendment that the Mill shall not accept any Uranium Material at the site, including the Drummed Uranium Material, until IUSA has determined, in accordance with a SERP-approved procedure, that the Mill has sufficient licensed tailings capacity. The tailings capacity must be sufficient to permanently store:

(a). all 11e.(2) byproduct material that would result from the processing of all the Uranium Material, including the Drummed Uranium Material;
(b). all other ores and alternate feed materials on site; and
(c). all other materials required to be disposed of in the Mill's tailings impoundments pursuant to the Mill's reclamation plan.

Transportation Considerations

Molycorp anticipates that the total amount of Drummed Uranium Material will be approximately 36 to 50 drums, or approximately 11 to 16 tons of material. The Drummed Uranium Material will be shipped by exclusive-use truck from the Mountain Pass facility to the Mill in sealed drums. Molycorp anticipates that all of the Drummed Uranium Material can be transported in one or two trucks. The shipment(s) will leave the Mountain Pass facility before December 31, 2001. The DOT description selected by the transportation contractor for this Drummed Uranium Material is "Environmentally Hazardous Substance, Solid, n.o.s., (lead, uranium) 9, UN3077, PGIII." Molycorp will arrange with a materials-handling contractor for the proper labeling, placarding, manifesting, and transport of the Drummed Uranium Material. The truck will be "dedicated exclusive use" (i.e., the only material on the truck will be the Drummed Uranium Material).

The Drummed Uranium Material will be transported along the same route selected for the Uranium Material in the amendment request: via I-15 and I-70 to U.S, Highway 191 at Crescent Junction, Utah, and via Highway 191 south through Moab and Blanding to the Mill. For the following reasons, it is not expected that transportation impacts associated with the movement of

the Drummed Uranium Material by truck from the Mountain Pass facility to the Mill will be significant:

- The Drummed Uranium Material will be shipped as an "environmentally hazardous substance" in one or two dedicated, exclusive-use truck(s) (i.e., no other material will be transported on the truck(s) with the Drummed Uranium Material). The drums will be appropriately labeled, placarded, and manifested, and the shipment will be tracked by the shipping company from the Mountain Pass site until it reaches the Mill.

- On average during 1998, 459 trucks per day traveled the stretch of State Road 191 between Monticello, UT and Blanding, UT (December 12, 2000 transmittal from State of Utah Department of Transportation ("UDOT") to IUSA). The Drummed Uranium Material will be shipped in one or two truckloads. The increased truck traffic load from one or two trucks will be negligible.

- The truck(s) involved in transporting the Drummed Uranium Material to the Mill site will be surveyed and decontaminated, as necessary, prior to leaving the Mountain Pass site for the Mill and again prior to leaving the Mill site.

- The Drummed Uranium Material will be transported in drums with secured lids, which will eliminate any risk of airborne dusts. Although the Drummed Uranium Material is known to contain lead, there will be no lead related hazard associated with transport, because there will be no exposure pathway for ingestion or inhalation of the covered drum contents during transport.

Process

The Drummed Uranium Material will be temporarily stored in drums on the existing ore storage pad until a sufficient quantity of material is available to begin processing activities. The Drummed Uranium Material will be introduced into the Mill via the existing remote drum handling station, which was previously installed to handle drums of other alternate feed materials (i.e., KOH and Cotter Concentrate). This drum emptying system was designed to eliminate or reduce employee exposure to or contact with the material by use of remote operated mechanical equipment and use of water sprays as appropriate to suppress dust. The drum handling system empties drums into a mixing tank ahead of the leach circuit. Once the solution is transferred from the mixing tank to the acid leach tank, processing will be identical to that described in the amendment request for the Pond Uranium Material.

Safety Measures

The Drummed Uranium Material will be delivered to the Mill in closed drums. The Drummed Uranium Material will be introduced through the existing drum handling equipment, and will proceed through the leach circuit, CCD circuit, and solvent extraction or ion exchange circuit in normal process fashion. As described in the amendment request, because there are no major changes to the Mill circuit, and since the process sequence will be similar to conventional uranium solutions, it is anticipated that no extraordinary safety hazards will be encountered.

As was described in the amendment request:

1. Employee exposure potential is expected to be no more significant than what is encountered in conventional milling operations.
2. IUSA does not anticipate any additional worker hazard due to lead, or any other constituent of this material.
3. IUSA does not anticipate any unusual or extraordinary airborne contamination dispersion due to this material.
4. The Mill's existing air monitoring procedures will be sufficient for this material.
5. The Mill's existing PPE apparel and spill response procedures will be sufficient for this material.
6. Additional employee respiratory protection will be implemented as required.

Schedule

As mentioned above, Molycorp plans to ship all of the Drummed Uranium Material before December 31, 2001. NRC's timely review of this letter will assist IUSA in meeting Molycorp's mandated schedule. Therefore, IUSA requests that the NRC please review the enclosed information on a timely basis as a supplement to the previously submitted license amendment request for the Pond Uranium Materials. I can be reached at (303) 389.4131.

Sincerely,

for Michelle R. Rehmann
Environmental Manager

MRR
Attachments

cc: John Espinoza, Molycorp
Ronald E. Berg, IUSA
Richard Bartlett, IUSA
David C. Frydenlund, IUSA
Ron F. Hochstein, IUSA
R. William von Till, NRC
William J. Sinclair, UDEQ
Don Verbica,UDEQ
Dennis Downs,UDEQ
Terry Brown, EPA Region 8
Richard Graham, EPA Region 8
Loren Setlow, EPA
Paul Giardina, EPA Region 2

Attachment 1

Molycorp Operational History and Flowsheet
for Drummed Uranium Material

Molycorp, Inc.
67750 Bailey Road
Mountain Pass, California 92366
Telephone (760) 856-7697
Facsimile (760) 856-6622

John F. Espinoza – Hazardous Materials Specialist

Molycorp

October 15, 2001

Material Operation and Generation of Current Drummed Material

This material results from an operation that involves the reintroduction of stabilized lead filtercake. Historically, lead, lead/iron, or iron filtercake was produced from the leaching operation, explained below. This material was produced and packaged in drums beginning in 1985 through 1995. These drums were then stabilized (with cement and/or sodium silicate) and repackaged into sling bins. Some of the filtercake was then reintroduced into the slurry tank and reworked. The reintroduction area has been decommissioned and decontaminated with DTSC (Cal-EPA) oversight. The residues contained in drums are resulting from this activity.

Material Operation and Generation of Lead Ponds Material

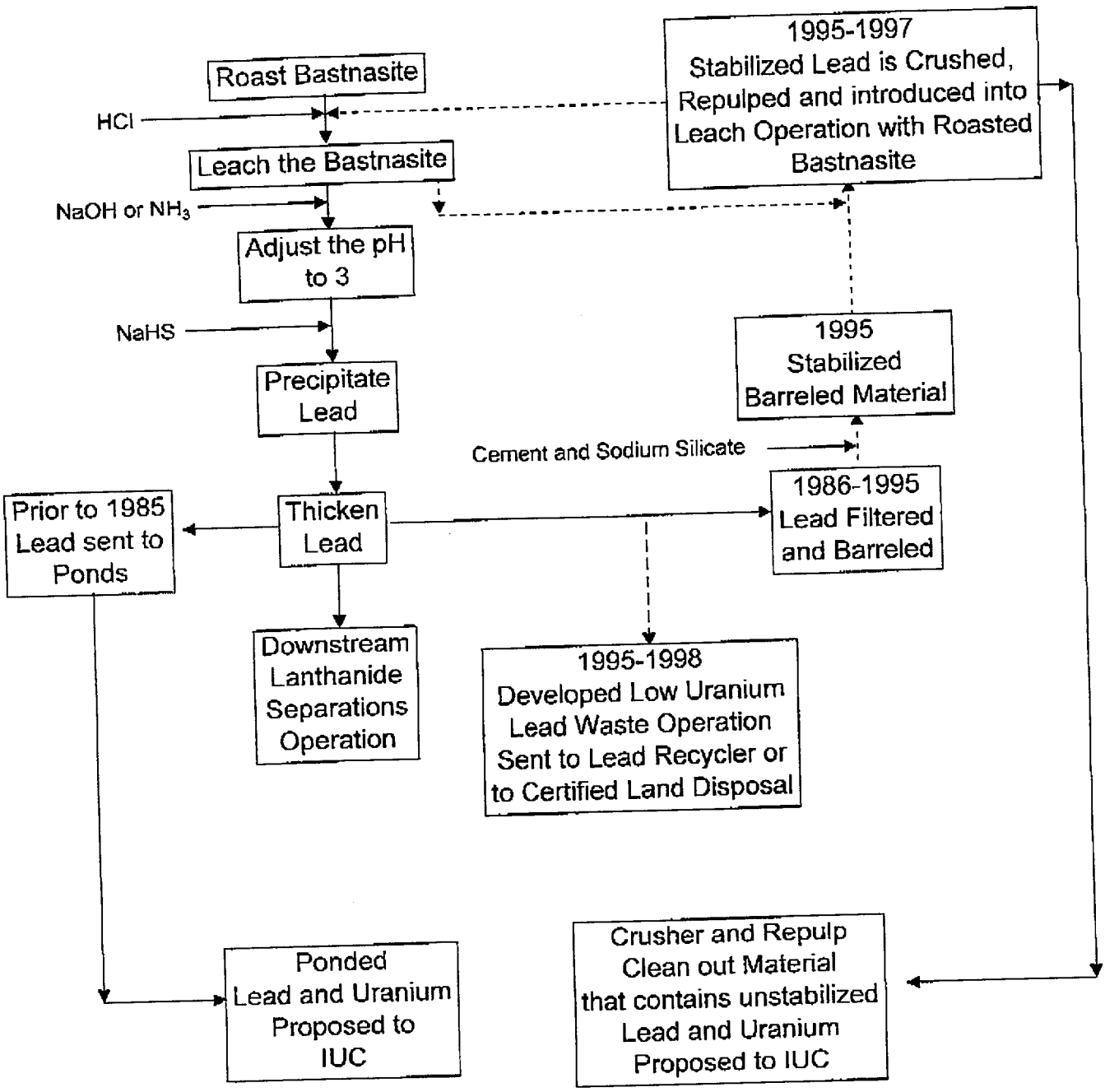
In this stage (up to 1985), the material results from the lead removal from a lanthanide chloride solution, created by leaching roasted bastnasite with HCl. The liquid fraction with +- 0.2 free normal HCl is neutralized to pH 3.5 with ammonia. Sodium hydrosulfide is then added to precipitate dissolved lead. The precipitates are settled in a thickener and then transferred to any of the three lead sulfide ponds.

If you have any questions, please call me at 760-856-7697.

Sincerely,

John F. Espinoza

Simplified Operations Flow Diagram showing how the Lead Reintroduction System Clean-up Material comes from the same Source as the Ponded Lead/Uranium



Note: During the Crushing and Repulping process which used low pH leach liquor, the Lead becomes unstabilized in the equipment and does not pass the RCRA non-hazardous test. Thus the lead and uranium is the same source as the ponded lead material as seen in the operations drawing.

RDW Sept 2001
JFE Oct 2001

Attachment 2

Molycorp Radioactive Material License Amendment 10

State of California-Health and Welfare Agency

Department of Health Services

RADIOACTIVE MATERIAL LICENSE

Pursuant to the California Code of Regulations, Division 4, Title 17, Chapter 5, Subchapter 4, Group 2, Licensing of Radioactive Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, use, possess, transfer, or dispose of radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders of the Department of Health Services now or hereafter in effect and to any standard or specific condition specified in this license.

1. Licensee	MolyCorp, Inc. Mountain Pass Plant	3. License No. 3229-36	Amendment No: 10
2. Address	P.O. Box 124 Mountain Pass, CA 92366	4. Expiration date August 5, 1998	(3)
Attention:	Grover Eaton Manager of Permitting	5. Inspection agency	Radiologic Health Branch Los Angeles

License Number 3229-36 is hereby amended as follows:

6. Nuclide	7. Form	8. Possession Limit
A. Cesium 137	A. Sealed source (Texas Nuclear Model 570-57157C)	A. One source not to exceed 200 millicuries.
B. Cesium 137	B. Sealed source (Ohmart Corp. Model A-2102)	B. One source not to exceed 130 millicuries.
C. Cesium 137	C. Sealed sources (Texas Nuclear Model 696894)	C. Three sources not to exceed 100 millicuries.
D. Uranium, natural or depleted	**D. Soil mixture**	**D. Not to exceed 40,000 pounds of Uranium (6000 millicuries).**
E. Thorium, natural	**E. Soil mixture**	**E. Not to exceed 1900 pounds of Thorium (100 mCi).**

9. Authorized Use

A. To be used in a Texas Nuclear Corporation source holder Model 5190 for storage only.

B. To be used as a component of an Ohmart Company source holder Model SR-A for the measurement of density.

C. To be used in a Texas Nuclear source holder Model 5201 as c component in systems for the measurement of density.

D. & E. To be used incidental to stabilization, storage and processing of Pb/Fe filter cakes.

State of California-Health and Welfare Agency | Department of Health Services

RADIOACTIVE MATERIAL LICENSE

License Number: 3229-36

Supplementary Sheet

Amendment Number: 10

LICENSE CONDITIONS

10. Radioactive material shall be used only at the following locations:

    (a) 67750 Bailey Road, Mountain Pass, CA

11. This license is subject to an annual fee for sources of radioactive material authorized to be possessed at any one time as specified in Item 8 of this license. The annual fee for this license is required by and computed in accordance with Sections 30230-30232 of the California Radiation Control Regulations and is also subject to an annual cost-of-living adjustment pursuant to Section 113 of the California Health and Safety Code.

12. Radioactive material shall be used by, or under the supervision of, the following individuals:

    (a) Tony D. Garcia
    (b) Jack Jolley
    (c) Kevin Cosgrove
    (d) Kevin Curnutt
    (e) Craig E. Dial
    (f) Jeffrey Bennett
    (g) Dave Dorn
    (h) Tim Eyres
    (i) Brian A. Finnell
    (j) Laura Hennen
    (k) Jim Kaminski
    (l) Jim Madden
    (m) Marvin Szoychen

13. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 7, 8 and 9 of this license in accordance with statements, representations, and procedures contained in the documents listed below. The Department's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    (a) The application with attachments dated May 12, 1984, signed by George H. Ducker as modified by the letter with attachments dated July 5, 1984, signed by Keith L. Elliott.

    (b) The letter with attachments dated March 23, 1987, signed by Keith L. Elliott.

    (c) The amendment application with attachments dated January 12, 1989, signed by Jim Strong, Environmental Engineer.

    (d) The letters with attachments dated March 1, 1989 and May 9, 1989, both signed by Jack L. Jolley.

    (e) The letter with attachments dated November 7, 1994, December 14, 1994, and January 13, 1995, all signed by William J. Almas regarding stabilization, storage and processing of Pb/Fe filter cake.

State of California-Health and Welfare Agency Department of Health Services

RADIOACTIVE MATERIAL LICENSE License Number: 3229-36

Supplementary Sheet Amendment Number: 10

14. (a) The Radiation Safety Officer in this program shall be Jack Jolley.

(b) The Alternate Radiation Safety Officer in this program shall be William J. Almas.

15. Sealed sources described in Sub-items A, B, and C of this license shall be tested for leakage and/or contamination at intervals not to exceed three years.

16. The following individuals are authorized to collect wipe test samples of sealed sources possessed under this license using leak test kits acceptable to the California Department of Health Services:

(a) the Radiation Safety Officer

(b) qualified individuals designated in writing by the Radiation Safety Officer

17. Quantitative analytical assays for the purpose of tests for leakage and/or contamination of sealed sources shall be performed only by persons specifically authorized to perform that service.

18. Records of leak test results shall be kept in units of microcuries and maintained for inspection. Records may be disposed of following Department inspection. Any leak test revealing the presence of 0.005 microcuries or more of removable radioactive material shall be reported to the Department of Health Services, Radiologic Health Branch, 601 N. 7th Street P.O. Box 942732, Sacramento, CA 94234-7320, within five days of the test. This report shall include a description of the defective source or device, the results of the test, and the corrective action taken.

19. Installation, relocation, and initial radiation survey of devices containing radioactive material described in this license may be performed by the following individuals:

(a) Jack Jolley

20. The licensee shall conduct a physical inventory every six months to account for all sealed sources and/or devices received and possessed under the license. Records of the inventories shall be maintained for inspection, and may be disposed of following Department inspection.

21. Radioactive materials shall be used by occupational workers in such a manner that the dose limits specified in Title 10, Code of Federal Regulations, Part 20, Subpart C (Sections 20.1201 through 20.1208) are not exceeded.

22. The licensee shall monitor occupational exposures to radiation and shall supply and require the use of individual monitoring devices by personnel as required by Title 10, Code of Federal Regulations, Part 20, Section 20.1502 (a).

State of California-Health and Welfare Agency | Department of Health Services

RADIOACTIVE MATERIAL LICENSE

License Number: 3229-36

Supplementary Sheet

Amendment Number: 10

23. **The licensee shall monitor occupational intakes of radioactive material by, and assess the committed effective dose equivalent to, individuals who may have exceeded or are likely to exceed, the limits specified in Title 10, Code of Federal Regulations (CFR), Part 20, Section 20.1502 (b). Suitable and timely measurements used for determination of such internal exposures shall be performed as specified by 10CFR 20.1204.**

For the State Department of Health Services

Date January 19, 1995

By: _____

Radiologic Health Branch
P.O. Box 942732, Sacramento, CA 94234-7320

Radiologic Health Branch
744 P Street
Sacramento, California 95814

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

Instructions: 1. Refer to Guide for Applicants, Form RH 2051. 2. Where the space provided on this form is insufficient, attach supplemental sheets referencing the part being expanded. 3. Submit all material in duplicate to the Radiologic Health Branch at the Address given above. 4. Medical applicants should request other forms if in-vivo use is involved.

1. a. Name of applicant Molycorp, Inc. (a Unocal Company)

   b. Mailing address: Number and Street 67750 Bailey Road, P.O. Box 24

   City and State Mountain Pass, CA Zip 92366

   c. Telephone number: Area Code 619 Number 856-2201 Extension 273

2. a. Type of business: ☐ individual ☐ partnership or association ☒ corporation

   b. List all addresses at which radioactive material will be used or stored:

   Street Address 67750 Bailey Road, P.O. Box 124 City Mountain Pass, CA Zip 92366

   Street Address _____ City _____ Zip _____

   Street Address _____ City _____ Zip _____

   Will radioactive material be used at temporary job sites? ☐ Yes ☒ No

   c. This is an application for:

   ☐ A new radioactive material license

   ☐ Renewal of radioactive material license No. _____

   ☒ Amendment to radioactive material license No. 3229

3.

a. Nuclide	b. chemical and/or physical form	c. Possession limit
U source material	In a soil type material. Material contains 50% water. Stored in 55 gal drums.	40,000 lbs
Th source material	U is as a sulfide and Th as an oxide. After stabilization material will be in a weak concrete matrix in lined fabric bags.	1900 lbs

4. Describe the proposed use of the radioactive material.

   See Attached

5. Radiation safety officer and individuals authorized to use radioactive material.

List radiation safety officer first. Attach Form RH 2050-A, Statement of Training and Experience, for each individual who will use radioactive material.

William J. Almas, Radiation Safety Officer

6. Radiation detection instruments.

Make & Model Number	Description	Number Available	Purpose for Which Used
See Attached			

7. Method, frequency, and standards used in calibrating instruments listed above.

See Attached

8. Personnel monitoring and bioassay procedures.

See Attached

9. Facilities and equipment.

See Attached

10. Radiation safety program.

See Attached

11. Effluent and environmental monitoring.

See Attached

12. Waste disposal.

See Attached

13. Decommissioning and decontamination plans.

See Attached

14. Certificate.

The applicant and any official executing this certificate on behalf of the applicant named in Item 1 certify that all information contained herein, including any supplements attached hereto, is true and correct. The individual executing this certificate has authority to commit the applicant relative to matters involving in this application.

Date: _____ By: _____

_____

Attachment 3

Uranium Content Estimates and Analytical Data
for Drummed Uranium Material

Sample No.	Thorium (ppm)	Uranium (ppm)	Th + U (ppm)	Th + U Equivalent Rad* (pCi/g)	Ra 226 Equivalent Rad (pCi/g)	Ra 228 Equivalent Rad (pCi/g)	Total Activity (pCi/g)
WD-RA-1	113	1190	1303	390.9	50	75	515.9
WD-RA-2	11	1220	1231	369.3	50	75	494.3
WD-RA-3	226	1440	1666	499.8	50	75	624.8
WD-RA-4	133	1030	1163	348.9	50	75	473.9
WD-RA-5	178	1370	1548	464.4	50	75	589.4
WD-RA-7	288	1060	1348	404.4	50	75	529.4
Average	158.2	1218.3	1376.5	413.0	50	75	538.0
SD							57.9
Std Error	413.1						23.6
80% Conf.							572.8
* Based on 150 pCi/g for every 500 ppm of Th + U							

Waste Determination Categorization
Drummed Waste from Closure Activities at Warehouse B and Reintroduction Area

Location	Contents	Waste Status	Sample No.	Sample Date	Drum No.	Units	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury
	TCLP Standards					**mg/L**		**5**	**100**		**1**	**5**			**5**	**0.2**
	STLC Standards					**mg/L**	**15**	**5**	**100**	**0.75**	**1**	**5**	**80**	**25**	**5**	**0.2**
	TTLC Standards					**mg/kg**	**500**	**500**	**10000**	**75**	**100**	**2500**	**8000**	**2500**	**1000**	**20**
Warehouse "B"	Stablized Filter Cake	Potential Alternate Feedstock	WD-WB-9	01-Sep-00	8	mg/kg									**15800**	
			WD-WB-9	01-Sep-00	8	mg/L		< 0.002	0.78		< 0.02	0.2			**28.2**	< 0.001
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-1	26-Sep-00	37	mg/kg	< 7.5	10.6	267	20	8	14	26	762	**73400**	0.52
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			38											
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			39											
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-2	26-Sep-00	40	mg/kg	11	25.3	339	46	5	21	19	468	**62700**	1.5
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			41											
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-3	26-Sep-00	42	mg/kg	10	21.5	348	37	3	18	21	423	**65300**	1.68
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			43											
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			44											
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-4	26-Sep-00	45	mg/kg	< 8.3	9.8	228	19	16	15	32	1230	**70500**	0.09
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			46											
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			47											
Reintro Area	Sludge (Lower Sump)	Potential Alternate Feedstock			48											
Reintro Area	Sludge (Lower Sump)	Potential Alternate Feedstock			49											
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			50											
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock			55											
Reintro Area	Sludge/Water (Upper Sump)	Potential Alternate Feedstock			56											
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock	WD-RA-5	06-Oct-00	58	mg/kg	< 7.4	3.5	154	21	12	8	76	1400	**72200**	< 0.03
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock			59											
Reintro Area	Solids/Water	Potential Alternate Feedstock			61											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			16											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			17											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			18											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			19											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			20											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			21											
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			24											
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			25											
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			26											
Reintro Area	Small Tank)	Potential Alternate Feedstock			27											
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			28											
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			29											
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			30											
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock			32											
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock	WD-RA-7	06-Oct-00	33	mg/kg	7	18.5	541	23	2	33	17	204	**40100**	1.1
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock			34											

Waste Determination Categorization
Drummed Waste from Closure Activities at Warehouse B and Reintroduction Area

Location	Contents	Waste Status	Sample No.	Sample Date	Drum No.	Units	Molybdenum	Nickel	Selenium	Silver	Thallium	Thorium	Uranium	Vanadium	Zinc
	TCLP Standards					mg/L			1	5					
	STLC Standards					mg/L	350	20	1	5	7			24	250
	TTLC Standards					mg/kg	3500	2000	100	500	700			2400	5000
Warehouse "B"	Stablized Filter Cake	Potential Alternate Feedstock	WD-WB-9	01-Sep-00	8	mg/kg						57	401		
			WD-WB-9	01-Sep-00	8	mg/L			< 0.01	< 0.1					
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-1	26-Sep-00	37	mg/kg	17	113	< 0.75	36	6	113	1190	210	12000
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			38										
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			39										
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-2	26-Sep-00	40	mg/kg	62	61	0.9	13	5	11	1220	90	5320
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			41										
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-3	26-Sep-00	42	mg/kg	35	61	1.1	19	5	226	1440	60	4260
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			43										
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock			44										
Reintro Area	Sludge (Large Tank)	Potential Alternate Feedstock	WD-RA-4	26-Sep-00	45	mg/kg	18	139	< 0.83	63	9	133	1030	260	14500
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			46										
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			47										
Reintro Area	Sludge (Lower Sump)	Potential Alternate Feedstock			48										
Reintro Area	Sludge (Lower Sump)	Potential Alternate Feedstock			49										
Reintro Area	Sludge/Water (Lower Sump)	Potential Alternate Feedstock			50										
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock			55										
Reintro Area	Sludge/Water (Upper Sump)	Potential Alternate Feedstock			56										
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock	WD-RA-5	06-Oct-00	58	mg/kg	< 7.4	208	< 0.74	80	11	178	1370	< 15	9590
Reintro Area	Sludge (Upper Sump)	Potential Alternate Feedstock			59										
Reintro Area	Solids/Water	Potential Alternate Feedstock			61										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			16										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			17										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			18										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			19										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			20										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			21										
Reintro Area	Stablized Filter Cake	Potential Alternate Feedstock			24										
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			25										
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			26										
Reintro Area	Small Tank)	Potential Alternate Feedstock			27										
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			28										
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			29										
Reintro Area	Stablized Filter Cake (From Small Tank)	Potential Alternate Feedstock			30										
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock			32										
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock	WD-RA-7	06-Oct-00	33	mg/kg	24	45	< 0.52	7	5	288	1060	60	2830
Reintro Area	Stablized Filter Cake (Floor Sweepings Lower Pad)	Potential Alternate Feedstock			34										

Attachment 4

Molycorp Affidavit
Confirming No RCRA Listed Hazardous Waste
in Drummed Uranium Material

Affidavit Of William L. Sharrer

I, William L. Sharrer, being duly sworn according to law, depose and state as follows:

1. Since 1999, I have been employed as the Public and Environmental Affairs Manager by Molycorp, Inc. at the company's Mountain Pass facility. ("the Facility"). I am responsible for ensuring that the Facility operates in compliance with applicable laws. I have personal knowledge of the raw materials used, the production processes employed, and the waste handling procedures followed at the Facility. I am also familiar with the hazardous waste regulations set out in U.S. Code of Federal Regulations, Title 40, Part 260-262.

2. Molycorp proposes to ship to IUSA's White Mesa Mill in Blanding Utah, the following materials: drummed lead sulfide sludge residue, containing more than 0.05 percent uranium and thorium, from decommissioning of the stabilized lead filtercake reintroduction area, for processing as alternate feed materials. All of the proposed alternate feed materials are secondary products or waste streams produced in the extraction of rare earth minerals at the Facility, and contain no wastes from any other source.

3. The drummed lead sulfide sludge residue consists of stabilized precipitates of lead sulfide and other metals from the extraction of rare earth minerals from bastnasite ores. Bastnasite ore from a first stage flotation plant was roasted to convert carbonates to oxides, then leached in a hydrochloric acid solution. The dissolved fraction was sent to a lead sulfide removal step, where ammonia, sodium hydrosulfide and flocculent were added, and the mixture fed to a clarifier. Thickened clarifier sludge from this area, containing lead sulfide, iron salts, and uranium, was transferred to the lead sulfide tailings

ponds prior to March 1985. From 1986 to 1995, a portion of the sludge containing less than 0.05 percent uranium and thorium was shipped off site either for recovery of lead or for disposal. From 1995 to 1998, the stabilized lead filtercake was acidified and reintroduced to the Molycorp mineral circuit for further recovery of lanthanides. This reintroduction area was decommissioned after March 1998. The drummed lead sulfide sludge residue consists of material removed from the circuit during the decommissioning of this area. All constituents of the drummed lead sulfide sludge residue come from the rare earth extraction process. No waste from any other source has been or will be added to the drummed lead sulfide sludge.

4. Based on the processing steps employed in the recovery of rare earth elements, the proposed alternate feed materials do not contain any of the listed wastes enumerated in U.S. Code of Federal Regulations, Title 40, Part 261, Subpart D as amended by the U.S. Federal Register August 6, 1998.

5. Based on my knowledge of waste management at the Facility, the proposed alternate feed materials have not been mixed with wastes from any other source, which may have been defined as or which may have contained listed wastes enumerated in U.S. Code of Federal Regulations, Title 40, Part 261, Subpart D as amended by the U.S. Federal Register August 6, 1998.

6. Specifically, the proposed alternate feed materials do not contain hazardous wastes from non-specific sources (U.S. RCRA F type wastes) because (a) Molycorp does not operate any processes at the Facility which produce the types of wastes listed in Section 261.31 of Title 40 of the U.S. Code of Federal Regulations, and (b) Molycorp has never accepted at the Facility, nor have the proposed alternate feed materials ever been combined with, wastes from any other source which contain U.S. RCRA F type wastes as defined therein.

7. Specifically, the proposed alternate feed materials do not contain hazardous wastes from specific sources (U.S. RCRA K type wastes) because Molycorp does not

operate any of the processes which produce the types of wastes listed in Section 262.31 of Title 40 of the U.S. Code of Federal Regulations, and (b) Molycorp has never accepted at the Facility, nor have the proposed alternate feed materials ever been combined with, wastes from any other source which contain U.S. RCRA K type wastes as defined therein.

8. Specifically, the proposed alternate feed materials are not U.S. RCRA P or U type wastes as defined in Section 261.33 of Title 40 of the U.S. Code of Federal Regulations because they (a) are not manufactured nor formulated commercially pure grade chemicals, off spec commercial chemical products or manufacturing chemical intermediates, residues from containers that held commercial chemical products or manufacturing chemical intermediates, or any residue or contaminated soil, water or other debris resulting from a spill cleanup, and (b) Molycorp has never accepted, nor have the proposed alternate feed materials ever been combined with, wastes from any other source which contain U.S. RCRA P or U type wastes as defined therein.

William L. Shearer

Sworn to and subscribed before me
this 15 day of OCT, 2001

Paula A. Simpson

Notary Public

NOTARY PUBLIC
STATE OF NEVADA
County of Clark
PAULA I. SIMPSON
No: 93-1464-1
My Appointment Expires Mar. 26, 2002

My Commission Expires: Mar 26, 2002

Attachment 5

Memorandum from Independent Consultant
Regarding No RCRA Listed Hazardous Waste
in Drummed Uranium Material

Review of Chemical Contaminants in Molycorp Drummed Uranium Material to Determine the Potential Presence of RCRA Listed Hazardous Waste

I have performed an independent evaluation of the environmental regulatory status of the Molycorp drummed recycle material, referred to as the "Drummed Uranium Material" in the IUSA letter to NRC dated October 17, 2001.

1.0 Site History and Background

Since 1951, Molycorp has operated a surface mining and milling operation for the recovery and chemical separation of lanthanides and other rare earths from bastnasite ores. Bastnasite ore from a first stage flotation plant was roasted to remove excess carbonates, then leached in a hydrochloric acid solution. Insolubles from the leach solutions are fed to a cerium circuit. The dissolved fraction (leach liquor) is sent to a lead sulfide removal process. Ammonia, sodium hydrosulfide and flocculants are added to the leach liquor, which is fed to a clarifier. Thickened clarifier sludge from this operation, containing lead sulfide, iron salts, and uranium was transferred to the lead sulfide tailings ponds. The clarified leach liquor was fed to the SX-ion exchange circuit for recovery of lanthanides and other rare earth minerals.

From 1965 through 1984 Molycorp constructed and operated three lead sulfide ponds, for the evaporation of lead sulfide sludges from the clarifier/thickener operation. The lead sulfide sludges contain uranium, which is also precipitated in the thickener. All three of the lead sulfide ponds were taken out of service prior to 1985. All of the Pond Uranium Material comes from these ponds and is associated with these pre-1985 activities.

From 1985 onward, the same uranium-bearing lead sulfide stream that had previously been transferred to the ponds was managed in one of several ways. From 1986 through 1995, this material was filtered and accumulated in drums. In 1995, Molycorp treated the drum contents with cement and sodium silicate to stabilize the lead content. For the period from 1995 to 1998, a portion of the stabilized material was returned to the Molycorp process circuit for further recovery of lanthanides and rare earths. During the same period, a portion that was estimate to contain less than 0.05 percent total uranium and thorium was also shipped off site to recycling facilities and/or land disposal facilities. The portion of the stabilized material that Molycorp had previously shipped off site to other facilities exhibited the RCRA TCLP characteristic for lead, and was shipped as RCRA characteristic waste D008. The material previously shipped off site is not included in the Drummed Uranium Material to be shipped to the IUSA White Mesa Mill (the "Mill").

The stabilized material was reintroduced into the Molycorp mineral recovery circuit just prior to the hydrochloric acid leaching step, and continued through the remainder of the circuit with the roasted bastnasite ores. These activities ceased in March 1998. The reintroduction area, containing only the equipment where the stabilized material was acid leached, was decommissioned under the oversight of the State of California environmental authority after March 1998. The residuals from these reprocessing

activities, containing the original stabilized drum contents treated with leach acid, were returned to drums. The approximately 36 drums from this area constitute the "Drummed Uranium Material" referred to in the IUSA letter of October 17, 2001. The Drummed Uranium Material to be shipped to the Mill is estimated by Molycorp to contain greater than 0.05 percent total uranium and thorium. Amendment 10 to Molycorp's Radioactive Material License indicated that all the drummed stabilized lead sulfide sludges at the Mountain Pass facility have been classified as uranium and thorium source material. According to Molycorp personnel, based on ongoing discussions with the State of California Department of Health Services, the Drummed Uranium Material to be shipped to IUSA will be classified as uranium and thorium source material.

2.0 Basis of this Evaluation

In a February 1999 decision regarding the Mill, the Atomic Safety and Licensing Board Presiding Officer suggested there was a general need for more specific protocols for determining if alternate feed materials contain hazardous components. In their Memorandum and Order of February 14, 2000, the Commission concluded that this issue warranted further staff refinement and standardization.

IUSA has taken a proactive role in the development of a "Protocol for Determining Whether Alternate Feed Materials are Listed Hazardous Wastes" (November 22, 1999). This Protocol was developed in conjunction with, and accepted by, the State of Utah Department of Environmental Quality ("UDEQ") (Letter of December 7, 1999).

Sufficient site history and background information was available to perform the Source Investigation required by the Protocol in Step 1 of the Protocol Decision Logic Diagram ("the Protocol Diagram") for the Drummed Uranium Material. To perform my independent evaluation, I have reviewed the following documents:

1. IUSA/UDEQ Protocol for Determining Whether Alternate Feeds Are Listed Hazardous Wastes (IUSA, November, 1999).

2. The Molycorp letter to IUSA of October 15, 2001 and attached flow sheets, which describe the bastnasite circuit operational history and the management of the uranium-bearing lead sulfide sludges in the ponds and drums.

3. Additional operational history from the Molycorp Lead Sulfide Ponds Closure Plan (February, 1997)

4. Chemical characterization and radiological information for the Drummed Uranium Material provided by Molycorp.

5. The Molycorp Affidavit of October 15, 2001 confirming that the Drummed Uranium Material contains no RCRA listed hazardous waste.

6. The Mountain Pass Facility Radioactive Material License Amendment 10, issued by the State of California Department of Health Services, dated January 19, 1995.

7. Additional telephone discussions with Molycorp personnel regarding the source of cement used in stabilization of the Drummed Uranium Material.

The information is sufficient to conclude that the Drummed Uranium Material was generated from a known process under the control of the generator. As described below, the information was also sufficient to confirm that the Drummed Uranium Material is not and does not contain any RCRA listed hazardous waste.

3.0 Application of IUSA/UDEQ Hazardous Waste Protocol to Molycorp Drummed Uranium Material

3.1 Source Investigation

Several of the information sources enumerated above were used to perform the Source Investigation indicated in Box 1 of the Protocol Diagram. Molycorp's characterization of the Drummed Uranium Material was based on a number of radiological and chemical characterization samples including:

1. Radiological samples from six drums analyzed for total uranium content, total thorium content, and radium-228 content.

2. Chemical characterization samples from six drums analyzed for TCLP, STLC, and TTLC for 17 metals, and thorium and uranium.

It should be noted that the frequency of six samples from 36 containers, or one-in-six, is higher than the one-in-ten to one-in-twenty sampling frequency recommended by U.S. EPA for environmental characterization of homogeneous drummed material. That is, the Drummed Uranium Material can be considered well-characterized.

Molycorp's characterization of the Drummed Uranium Material was also based on the known process history of a material that has remained, for its entire life cycle to date, under control of the generator.

3.2 Other Determination Methods in the IUSA/UDEQ Protocol

Even when a proposed alternate feed material was produced by a known process under the control of the generator, IUSA requires that its regulatory consultant perform, as a mater of due diligence, an independent evaluation of any hazardous waste or hazardous/toxic material requirements that may apply to the material based on its chemical composition, process source, or handling history.

The protocol describes additional steps IUSA will take to assess whether contaminants associated with any potential RCRA waste listings are present in the material, and the likelihood that they resulted from RCRA listed hazardous wastes or RCRA listed

processes. These include tabulation of all potential listings associated with each known chemical contaminant in the material, and the review of chemical process and material/waste handling history at the site to assess whether the known chemical contaminants in the material resulted from listed or non-listed sources. This evaluation is described in Box 8 and Decision Diamonds 9 through 11 in the Protocol Diagram.

Although the requirements of Box 8 and Decision Diamonds 9 through 11 are not applicable to the Drummed Uranium Material (because the Drummed Uranium Material was produced by a known process under the control of the generator), I have nonetheless utilized this approach to perform a rigorous and complete evaluation.

4.0 Chemical Contaminants in Molycorp Drummed Uranium Material

The chemical characterization data used in this evaluation is discussed below.

Chemistry of Bastnasite Ores

Bastnasite ores contain uranium, thorium, and a wide range of secondary metals, in addition to lanthanide series elements and other rare earth elements. The concentrations of secondary metals vary depending on the source and grade of the ore body. According to Molycorp personnel, the Mountain Pass facility mines and recovers minerals from an ore body that contains barium, copper, lead, zinc and a number of other metals.

In the Molycorp mineral recovery circuit, leach liquor solution containing the desired rare earths is separated into a solid cerium portion and a liquid heavier lanthanide portion. The cerium portion is either packaged or further purified. Lead and iron are removed from the liquid portion, which is then sent to further product refining and production steps. Other metals, such as copper and zinc, are co-precipitated with the lead to varying degrees. The quality of Molycorp's lanthanide and rare earth products depends to a large degree on the efficiency at which lead and these other metals are removed in the precipitation/clarification steps. The purer the rare earth products are (lower concentrations of these metals), the greater the concentrations of these metals will be in the lead sulfide sludges and lead sulfide filter cake. As operations at Mountain Pass have been improved over the years, more copper and zinc have been precipitated with the lead.

Molycorp began the reintroduction of stabilized lead sulfide sludges for further recovery of lantahanide values in 1985. As a result of this reintroduction, higher levels of some metals such as copper and zinc were precipitated with the lead sulfide sludge. As a result, the lead sulfide sludges that were drummed after 1985 for off site recovery, on-site stabilization, and later on-site recovery, contained higher levels of copper and zinc than the sludges transferred to the ponds before 1985.

Hence, it should be expected that analytical data provided by Molycorp for the Drummed Uranium Material, which was produced after 1985, should show higher concentrations of these metals than the analytical data from the Pond Uranium Material, which was produced earlier.

Chemistry of Stabilization

As described in Section 1.0, above, the drummed sludges to be shipped to IUSA were produced from a lead sulfide filter cake that was stabilized by the addition of commercial sodium silicate and commercial stabilization cement. Commercial stabilization (or "chemical fixation") cements are dry mixtures of varying concentrations of silica, alumina, lime (calcium oxide), iron oxide, and/or magnesia, which activate and harden when mixed with water to create an inorganic matrix that binds specific metals. Since stabilization is generally performed to prepare materials for transport or disposal, addition systems that do not significantly increase the resulting volume of material are preferred. Stabilization is generally performed under conditions that result in a total addition of treatment agents (silicates plus cements) of 3 to 15 percent by weight. The constituents of the additives, such as silica and lime, are not RCRA regulated wastes themselves, and are made up primarily of naturally occurring cations such as calcium, iron, and silicon. In summary, the stabilization agents added to the Molycorp lead sulfide sludge would have been:

1. small in volume, and
2. non-hazardous

The stabilized drum contents were later treated by the addition of mineral acids, such as hydrochloric acid, to break the inorganic matrix, and were reintroduced to the bastnasite circuit. The acidified material, a portion of which constitutes the Drummed Uranium Material, would be expected to have higher levels of chloride or other acid anions than the Pond Uranium Material.

Comparison of Pond Uranium Material And Drummed Uranium Material Data

Based on the total metals analysis, thirteen metals, antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, molybdenum, nickel, selenium, silver, thallium and thorium, which were present at either moderate or very low (trace) levels in the Pond Uranium Material, were also present at the same levels in the Drummed Uranium Material. Based on the total metals analysis, the concentrations of two metals, barium and lead, were at least one order of magnitude (ten times) lower in the Drummed Uranium Material, and the concentrations of two metals, copper and zinc, were one order of magnitude higher in the Drummed Uranium Material.

According to Molycorp personnel, the presence of each of these metals is typical in bastnasite ores at varying concentrations. As described above, variations in concentrations of barium and lead are also typical in the range of bastnasites ores managed at Molycorp.

The material accumulated in the ponds was generated from ores managed up to 1985. The material stabilized and later returned to the mineral recovery operation was generated from ores managed from 1985 to 1995. It would be expected that levels of some of the

secondary metals, such as barium and lead, in the ores managed in those different decades would vary appreciably, either up or down.

As described at the beginning of this section, Molycorp made operational changes after 1985 that would be expected to increase the levels of copper and zinc in lead sludges collected after 1985. The higher levels of copper and zinc in the Drummed Uranium Material relative to the Pond Uranium Material are consistent with this process information.

Based on all of the above information, it can be concluded that:

1. The metals content of Molycorp Pond Uranium Material and Drummed Uranium Material are reasonably similar.

2. Natural variation in the quality of ores contributed to differences between concentrations of some metals in Pond Uranium Materials and Drummed Uranium Material.

3. Operational modifications after 1985 appear to have increased copper and zinc levels in Drummed Uranium Material produced after 1985, compared to Pond Uranium Material, which was produced prior to 1985.

4.1 Organic Contaminants at Molycorp

According to the Molycorp flowsheet and operational description, the Drummed Uranium Material, like the Pond Uranium Material, would not be expected to contain any organic contamination. This is consistent with site operating history as described by telephone conversations with Molycorp personnel, and in the Lead Sulfide Ponds Closure Plan, indicating that no organic compounds were produced at the facility and no organic chemicals were introduced into the mineral recovery operation.

4.2 RCRA Status of Metals at Molycorp

Lead

The major inorganic contaminants in the Molycorp sludges, both in the ponds and drums, are inorganic compounds of lead. The analytical data provided by Molycorp indicate that six of the drums were tested for total lead, and one was tested for TCLP lead.

The test results for all six drums of the drums tested indicated elevated levels of total lead. The leachate test results for the one drum sample tested for TCLP contained a lead level in excess of the RCRA TCLP threshold value of 5 mg/L in 40 CFR 261 Table 1, "Maximum Concentration of Contaminants for the Toxicity Characteristic." That is, the material in only one drum is known to contain the toxicity characteristic ("TC") for lead. However, Molycorp has assumed, based on generator knowledge and the total lead data, that all six drums contain lead in concentrations above the RCRA TCLP threshold.

According to Molycorp personnel, the presence of varying concentrations of lead is typical in bastnasite ores. Extraction of bastnasite ore is not a RCRA listed process. However, for thoroughness of this evaluation, all potential RCRA listed waste sources associated with lead have been reviewed.

Depending on their industrial source, some lead-bearing wastes may carry RCRA hazardous waste listings. No non-specific (no "P" or "U") listings are associated with lead or lead compounds. According to 40 CFR 261 Appendix VII, eighteen specific source listings may apply to wastes containing lead. The potential RCRA listings are itemized in the attached Table 1. Each listing is based on a specific chemical or industrial process. However, as described below, none of the 18 listings is applicable to the Drummed Uranium Material.

Four "F" listings are associated with lead. They specifically apply to wood treating wastewater, refinery wastewater, or leachates from land disposal of six F-listed chemicals and solvents. No wood treating, petroleum refining, or land disposal of chemical waste was conducted on the Molycorp site. None of the F listings is applicable to the Drummed Uranium Material.

Fourteen "K" listings are associated with lead. They apply specifically to wastes from pigment production, petroleum refining, steel furnaces, iron and steel pickling, copper production blowdown streams, lead smelting, or ink formulation. No pigment production, petroleum refining, steel milling, iron or steel pickling, copper production, lead smelting, or ink formulation was conducted on the Molycorp site. None of the K listings is applicable to the Drummed Uranium Material.

Based on all of the above information, none of the lead compounds in Drummed Uranium Material are indicative of RCRA listed hazardous waste.

Zinc

No RCRA TCLP threshold has been established for zinc. However, based on the total metals analysis, nearly all the drums analyzed had elevated levels of zinc. According to Molycorp personnel, the presence of zinc is typical in bastnasite ores. As described in Section 4.0, above, the elevated levels of zinc in the Drummed Uranium Material can be attributed to operational changes that increased zinc removal from the rare earth products. However, for thoroughness of this evaluation, all potential RCRA listed waste sources associated with zinc have been reviewed. These are itemized in the attached Table 2.

One "U" listing, U249, is associated with zinc. It applies specifically to disposal of less than 10 percent solutions of the commercial chemical zinc phosphide, which is used solely as a rodenticide. Molycorp did not synthesize or use this compound. The U listing is not applicable to Drummed Uranium Material.

Three "P" listings are associated with zinc. P122 applies specifically to disposal of greater than 10 percent solutions of the commercial chemical zinc phosphide, which is

used solely as a rodenticide. Molycorp did not synthesize or use this compound. P121 applies specifically to disposal of the commercial chemical zinc cyanide, which is used as either an insecticide or in plating solutions. Molycorp did not synthesize or use this compound. P205 applies specifically to the disposal of the commercial chemical zinc bis (dimethylcarbamodithioato S-S'), which is used as an accelerator in synthesis of vinyllic polymers via "zipper" polymerization reactions. Molycorp did not synthesize or use this compound. None of the P listings is applicable to the Drummed Uranium Material.

Based on all of the above information, the presence of zinc in the Drummed Uranium Material is not indicative of RCRA listed hazardous waste.

Copper

No RCRA TCLP threshold has been established for copper. However, based on the total metals analysis, half of the drums analyzed had elevated levels of copper. According to Molycorp personnel, the presence of copper is typical in bastnasite ores. As described in Section 4.0, above, the elevated levels of copper in the Drummed Uranium Material can be attributed to process changes designed to increase copper removal from the rare earth products. However, for thoroughness of this evaluation, all potential RCRA listed waste sources associated with copper have been reviewed.

One "P" listing, P029, is associated with copper. It applies specifically to disposal of the commercial chemical cuprous cyanide, which is used in copper electroplating solutions, as an antifoulant in commercial paint formulation, as an insecticide and as a reaction catalyst in organic synthesis plants. No electroplating, commercial paint formulation, or organic synthesis occurred on the Molycorp site. Molycorp did not synthesize or use this compound. The U listing is not applicable to Drummed Uranium Material.

There are no "U," "F," or "K" listings associated with copper.

Based on all of the above information, the presence of copper in the Drummed Uranium Material is not indicative of RCRA listed hazardous waste.

Other Metals

The TTLC data from the six drums indicated that the Drummed Uranium Material contained trace or low levels of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, mercury, molybdenum, nickel, selenium, silver, thallium and vanadium. The Drummed Uranium Material did not exceed the RCRA TCLP threshold values for any of these metals.

As described above, according to Molycorp personnel, the presence of all of these metals is typical of bastnasite ores. However, for thoroughness of this evaluation, an additional potential, but unlikely, source for these metals was considered.

The Drummed Uranium Material consists of material from two sources, which could have potentially introduced metals. First, the lead sulfide sludges were generated directly from the rare earth recovery process. Because the only operation Molycorp conducted at the site was rare earth mineral recovery, and because the only material fed to the circuit was bastnasite ore, all metals in the lead sulfide byproduct itself must have originated in the bastnasite ore. Rare earth recovery from bastnasite ore is not a RCRA listed process.

Second, the drummed sludges were stabilized by the addition of commercial sodium silicate and commercial stabilization cement. As described above, commercial stabilization cements are dry mixtures of silica, alumina, lime, iron oxide, and/or magnesia. Depending on the cement producer, the source of any of these components may be either fresh mineral feeds or reclaimed waste materials fed to the cement kilns and furnaces. As a result, some commercial cements derived from reclaimed materials can contain levels of RCRA metals, or other contaminants, from the feed sources.

In order to assess the potential for introduction of additional metals via the stabilization cement, I requested that Molycorp provide the name of the supplier from which they obtained the cement. Molycorp used only one supplier, Mitsubishi Cement, of Lucerne Valley, California for stabilization cement.

According to Ube Industries-Mitsubishi, the Mitsubishi U.S. cement facilities are not reclaiming kilns. That is, they utilize only freshly quarried or newly-mined mineral feedstocks, and do not reclaim or burn wastes. Mitsubishi does, in fact, reclaim waste such as coal ash, blast furnace slag, tire rubber, and sewage sludge, but only in their six facilities in Japan. The cement purchased by Molycorp was produced in a Mitsubishi U.S. (California) facility that is not a reclaiming kiln.

Hence the stabilization cement added to the drummed lead sulfide sludge would not be a secondary contributor of metals, or other RCRA contaminants, to the Drummed Uranium Material. It can therefore be concluded that the metals identified in the Drummed Uranium Material analytical data derived from the bastnasite ore source.

5.0 Conclusions

In summary, the following conclusions can be drawn from the Molycorp site information presented above:

1. There are no organic compounds in the Drummed Uranium Material. No RCRA hazardous waste listings based on organic contaminants apply.

2. None of the metals or other inorganic elements in the Drummed Uranium Material came from RCRA listed hazardous waste sources. No RCRA hazardous waste listings based on inorganic contaminants apply.

3. The Drummed Uranium Material was generated by a known process under the control of the generator.

4. The Drummed Uranium Material is not and does not contain RCRA listed hazardous waste.

5. The information made available to me is consistent with the information requirements set forth in the Protocol.

6. This determination of no RCRA listed hazardous waste is consistent with the decision logic of the Protocol.

7. The determination via the Protocol Decision Diamond 2 that the Drummed Uranium Material is not and does not contain RCRA listed hazardous waste is supported and confirmed by the rigorous evaluation of every potential RCRA listing described in this report.

Jo Ann Tischler

10/17/01

Jo Ann Tischler
Consulting Chemical Engineer

October 17, 2001

TABLE 1 (Rev. 0): SUMMARY OF POTENTIAL RCRA LISTINGS ASSOCIATED WITH LEAD IN 40 CFR 261 APPENDIX VII

Commercial Chemicals Acutely Toxic U List	Commercial Chemicals Acutely Hazardous P List	Non-Specific Sources F List	Specific Sources K List	Is This Listing Applicable to Molycorp Lead Sulfide Sludge?
NONE				No U Listings
	NONE			No P Listings
		F035 Wood treating wastewater		No. Molycorp sludge is not from this industry.
		F037 Refinery oil/water separator solids		No. Molycorp sludge is not from this industry.
		F038 Refinery secondary oil/water separator solids		No. Molycorp sludge is not from this industry.
		F039 Leachates from land disposal of wastes F20 through F22 and F26 throughF28		No. Molycorp sludge is not from this industry.
			K002 Wastewater treatment sludge from production of chrome yellow pigment	No. Molycorp sludge is not from this industry.
			K003 Wastewater treatment sludge from production of chrome molybdate orange pigment	No. Molycorp sludge is not from this industry.
			K005 Wastewater treatment sludge from production of chrome green pigment	No. Molycorp sludge is not from this industry.

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Commercial Chemicals Acutely Toxic U List	Commercial Chemicals Acutely Hazardous P List	Non-Specific Sources F List	Specific Sources K List	Is This Listing Applicable to Molycorp Lead Sulfide Sludge?
			K046 Wastewater treatment sludge from production of lead based explosive initiators	No. Molycorp sludge is not from this industry.
			K048 Petroleum refining dissolved air flotation ("DAF") solids	No. Molycorp sludge is not from this industry.
			K049 Petroleum refining slop oil emulsion solids	No. Molycorp sludge is not from this industry.
			K051 Petroleum refining API separator solids	No. Molycorp sludge is not from this industry.
			K052 Petroleum refining leaded tank bottoms	No. Molycorp sludge is not from this industry.
			K061 Steel electric furnace emission control dust/sludge	No. Molycorp sludge is not from this industry.
			K062 Iron and steel manufacturing pickle liquor	No. Molycorp sludge is not from this industry.
			K064 Acid plant blowdown thickener slurry/sludge from primary copper production blowdown	No. Molycorp sludge is not from this industry.
			K069 Emission control dust/sludge from secondary lead smelting	No. Molycorp sludge is not from this industry.

TABLE 1 (Rev. 0): SUMMARY OF POTENTIAL RCRA LISTINGS ASSOCIATED WITH LEAD IN 40 CFR 261 APPENDIX VII

Commercial Chemicals Acutely Toxic U List	Commercial Chemicals Acutely Hazardous P List	Non-Specific Sources F List	Specific Sources K List	Is This Listing Applicable to Molycorp Lead Sulfide Sludge?
			K086 Solvent, caustic and water wash sludges from ink formulation	No. Molycorp sludge is not from this industry.
			K100 Waste leach solution from acid leaching of emission control dust/sludge from secondary lead smelting	No. Molycorp sludge is not from this industry.

TABLE 2 (Rev. 0): SUMMARY OF POTENTIAL RCRA LISTINGS ASSOCIATED WITH ZINC IN 40 CFR 261

Commercial Chemicals Acutely Toxic U List	**Commercial Chemicals Acutely Hazardous P List**	**Non-Specific Sources F List**	**Specific Sources K List**	**Is This Listing Applicable to Molycorp Lead Sulfide Sludge?**
U249 Zinc phosphide <10% solution				No. Sole use is as a rodenticide. Molycorp did not synthesize or use this product.
	P205 Zinc bis (dimethylcarbamo dithioato S-S')			No. Used as polymer accelerator. Molycorp did not synthesize or use this product.
	P121 Zinc cyanide			No. Used as an insecticide or as plating solution. Molycorp did not synthesize or use this product.
	P122 Zinc phosphide >10% solution			No. Sole use is as a rodenticide. Molycorp did not synthesize or use this product.
		NONE		No F Listings
			NONE	No K Listings