

November 22, 2006

Mr. Thomas Gieck, Remediation Manager
Umetco Minerals Corporation
PO Box 1029
Grand Junction, CO 81502

SUBJECT: LICENSE AMENDMENT NO. 58 TO UMETCO MINERALS CORPORATION'S
LICENSE SUA-648 - MODIFICATION OF GAS HILLS POND NO. 2 AND C-18
COVERS (TAC LU0143)

Dear Mr. Gieck:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the requests submitted by Umetco Minerals Corporation (Umetco), both dated February 7, 2006. Based on the review of the aforementioned submittals, the staff determined that the Gas Hills Pond No. 2 cover and the C-18 cover designs are adequate. The NRC staff's review is documented in the enclosed technical evaluation report (Enclosure 1).

License Condition (LC) 58 has been revised to include the updated soil radium data for the topsoil of the C-18 cover. LC 61 has been revised to include the changes in design for Gas Hills Pond No. 2 cover. License Amendment No. 58 is enclosed (Enclosure 2).

In addition to the above amendments, LC 60 has been revised to reflect NRC organizational changes within the NRC. All correspondence related to this license shall be sent to the following address: Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Mailstop T7-E18, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by express delivery to 11545 Rockville Pike, Rockville, MD 20852-2738.

If you have any questions concerning this letter or the enclosures, please contact Robert Lukes, at (301) 415-4025, or by e-mail, at rgl@nrc.gov.

T. Gieck

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at: <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 40-0299
License No.: SUA-648

Enclosures: 1. Technical Evaluation Report
2. License Amendment No. 58

cc: M. Moxley, DEQ WY

T. Gieck

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cc: M. Moxley, DEQ WY

(CLOSES TAC LU0143)

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**TECHNICAL EVALUATION REPORT
FOR UMETCO MINERALS CORPORATION'S
MODIFICATION TO POND NO. 2 AND C-18 COVER DESIGN CRITERIA
AT THE GAS HILLS URANIUM MILL SITE**

DOCKET NO.: 40-0299 **LICENSE NO.:** SUA-648

DATE: October 12, 2006

FACILITY: Umetco Minerals Corporation - Gas Hills Uranium Mill Tailings Site, Natrona County, Wyoming

TECHNICAL REVIEWER: Robert Lukes

PROJECT MANAGER: Robert Lukes

BACKGROUND:

By two letters, each dated February 7, 2006, Umetco Minerals Corporation (Umetco) submitted requests for amendments to Source Materials License SUA-648, License Conditions 58 and 61 to U.S. Nuclear Regulatory Commission (NRC) staff (Umetco, 2006a & b). In one letter, modification of License Condition 58, the licensee requested a change to the average allowable radium-226 (Ra-226) content for the C-18 pit topsoil from 5 to 10 picocuries per gram (pCi/g). In the second letter, modification of License Condition 61, the licensee requested that NRC staff change the allowable Ra-226 content in the cover materials of Gas Hills Pond No. 2 (GHP-2) from 10 to 15 pCi/g. Umetco also requested, in the second letter, a change to the allowable background exposure limit on the cover from 30 microRoentgens per hour ($\mu\text{R/hr}$) to 40 $\mu\text{R/hr}$. Both issues are being evaluated in a single Technical Evaluation Report because the issues are similar in scope.

During the review of the request to modify License Condition 61 a potential violation was noted by NRC technical reviewers. Subsequently, NRC staff requested that Region IV inspect the Umetco facility. The inspection revealed a violation did occur, as noted in IR04000299-06-001, which involved improper verification of soil materials prior to placement over tailings. This license amendment request is the corrective action to the issued violation.

TECHNICAL EVALUATION:

GHP-2 Frost Protection and Exposure Rate Criteria

Radon Attenuation

The limit for the average long-term release of radon-222 (Rn-222) from uranium byproduct materials to the atmosphere is 20 picocuries per square meter per second ($\text{pCi/m}^2/\text{s}$) from the surface of the tailings cell for 1000 years, to the extent reasonably achievable, but at least 200

years, as stated in Criterion 6(1) of 10 CFR Part 40, Appendix A. Rn-222, the decay product of Ra-226, is a gas with a short half-life, that decays to a solid particle. The long-term Rn-222 flux rate can be estimated from the physical and radiological characteristics of the contaminated and barrier materials using a series of hand calculations or a computer code.

Radon Flux Model Parameters:

The staff evaluated the licensee's input used in the RADON computer code to ensure that the values are either based on site-specific testing or conservative estimates. The staff also evaluated the licensee's justification and assumptions made in choosing these values and confirmed that each input value was representative of the proposed material, consistent with anticipated construction specifications, and based on long-term conditions.

The licensee's flux model used a contaminated material thickness of 500 centimeters (cm), which is conservative. Data from recent subgrade samples indicate that the Ra-226 activity levels have decreased and range from 21 to 31 pCi/g. Additionally, sampling also indicated that an emanation coefficient of 0.17 and a diffusion coefficient of 0.0031 centimeters squared per second (cm^2/s) are more realistic values than that of the default radon code parameters. The contaminated material density value of 1.75 grams per cubic centimeter (g/cm^3) was based on test results and used to calculate a porosity of 0.34. The diffusion coefficient was the code calculated value and the long-term moisture content of the contaminated material was a conservative estimate of 6 percent.

The average Ra-226 value for the frost protection layer used in the model is 15 pCi/g. After reviewing site background data, NRC staff determined that a Ra-226 activity of 15 pCi/g for the frost protection layer is a more realistic value than the previously approved 10 pCi/g. This complies with Appendix A, Criterion 6(5) that states "...near surface cover must be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils." To be conservative, Umetco used the cover Ra-226 values in the model, although it is not required (the standard applies only to the radon emissions from byproduct material).

Modeling Results:

Umetco used the RADON computer code to calculate the long-term radon flux (NRC Regulatory Guide 3.64, 1989). The Umetco flux model results indicate that the proposed change to the Ra-226 activity level along with the more realistic tailings data will change the expected radon flux from the previously calculated 14.3 pCi/m²/s to 14.6 pCi/m²/s. The NRC staff also performed modeling using higher Ra-226 levels (62 pCi/g), a more conservative emanation coefficient (.20), and the code calculated diffusion coefficient (.01277 cm^2/s) which resulted in flux levels that were also less than the limit of 20.0 pCi/m²/s.

Conclusions:

The NRC staff determined that the radon flux was calculated appropriately. NRC staff has determined the cover is adequate to meet the requirements set forth in Criterion 6(1) of 10 CFR Part 40, Appendix A.

Cover Gamma Attenuation and Radioactivity Content

Umetco radiation surveys of the GHP-2 cover indicate that the average exposure rate over the cover is 38 $\mu\text{R/hr}$. The previously established background for the Umetco site is 30 $\mu\text{R/hr}$. 10 CFR Part 40, Appendix A, Criterion 6(1), states that the direct gamma exposure rate should be reduced to background levels. Evaluation of area surveys on and off the site indicate that background values vary greatly from 16 - 97 $\mu\text{R/hr}$. Determining an accurate background for the site is subject to bias due to the great variance of the area's radiation levels. An appropriate background would be one that is conservatively estimated considering site background data and radium levels in the area. NRC staff has concluded that the proposed value of 40 $\mu\text{R/hr}$ is appropriate considering Ra-226 activity and area radiation levels. Furthermore, changing the allowable average exposure rate inside the site boundary from 30 to 40 $\mu\text{R/hr}$ does not pose a significant risk to public health, safety, and the environment. NRC staff has determined that the new average allowable exposure rate of 40 $\mu\text{R/hr}$ satisfies 10 CFR Part 40, Appendix A, Criterion 6(1).

Top Soil Criteria for the C-18 Pit

NRC staff agrees that the required value of 5 pCi/g of Ra-226 concentration in the 30-cm growth medium is overly conservative and not a realistic estimate of actual background activity on site. NRC staff has reviewed the survey data and agrees that the appropriate background activity can be estimated to be 10 pCi/g for areas within the site boundary. Additionally, NRC staff calculated the radon exit flux from the elevated Ra-226 concentration in the top soil and found it to be much less than the required 20.0 pCi/m²/s. The elevated Ra-226 level in the top soil does not pose a significant risk to the public health, safety, and the environment and is a conservative estimate of Ra-226 concentration background within the site boundary.

ENVIRONMENTAL IMPACT EVALUATION:

The requested changes to the approved reclamation plan for Pond No. 2 and the C-18 pit are minor and meet regulatory criteria. Additionally, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite, no significant increase in individual or cumulative occupational exposure, and no increase in potential for radiological accidents due to the requested action. Furthermore, no significant construction impact due to the requested action is expected. Therefore, in accordance with the categorical exclusion contained in Paragraph (c)(11) of 10 CFR 51.22, concerning a change in process operations, an environmental assessment is not required for this licensing action, and submittal of an environmental report is not necessary.

PROPOSED LICENSE CONDITION CHANGES:

License Condition 58 should be revised as follows:

For the A-9 cover, the top 2 feet of frost protection soil will contain an average Ra-226 concentration that does not exceed the NRC-approved Ra-226 value based on data for surface soil surrounding the site. Reclamation of the A-9 Repository, C-18 pit, and of the north and south evaporation ponds, and the site grading shall be in accordance with the "Design for Enhancement of the Previously Approved Reclamation Plan for the A-9 Repository" in the

licensee's submittal dated October 27, 1998, as modified by submittals dated December 10, 1998, March 29, 1999, and February 7, 2006.

[Applicable Amendments: 42, 53, 58]

License Condition 60 has been revised to reflect NRC organizational changes within the NRC:

All correspondence related to this license shall be sent to the following address: Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Mailstop T7-E18, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by express delivery to 11545 Rockville Pike, Rockville, MD 20852. Required telephone notification shall be made to the NRC Operations Center at (301) 816-5100, unless otherwise specified.

[Applicable Amendments: 32, 45, 58, 58]

License Condition 61 should be revised as follows:

The final reclamation of the heap leach impoundment shall be in accordance with the reclamation plan submitted September 25, 1996, as supplemented or revised by submittals dated June 6, August 19, and October 15, 1997, and January 15, and February 11 and 13, 1998, and December 20, 2000.

The reclamation of Pond No. 2 will be performed according to the final plan submitted on September 11, 2003, as supplemented by a revised submittal dated February 7, 2006. In addition, the Ra-226 data for the solidified pond sludge shall be submitted to the NRC, before radon barrier placement begins, to justify that the Ra-226 values used in the radon flux model are representative. If the measured values are significantly higher than the estimated values, Umetco will provide a revised radon flux model to demonstrate that the long-term radon flux from the cover should meet the limit in Criterion 6(1).

[Applicable Amendments: 38, 44, 52, 58]

REFERENCES:

U.S. Nuclear Regulatory Commission, 1989. "Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers," Regulatory Guide 3.64, Washington, D.C.

U.S. Nuclear Regulatory Commission, 2003. "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act." NUREG-1620, Rev. 1., Washington, D.C.

Umetco Minerals Corporation, "Final Status Survey Plan", September 30, 2000, [ADAMS Accession No. ML003752893]

Umetco Minerals Corporation, "Final Background Characterization Report", September 30, 2000, [ADAMS Accession No. ML003752978]

U.S. Nuclear Regulatory Commission (2001a) Environmental Assessment for Umetco Minerals Corporation's, Gas Hills Uranium Mill Site, East Gas Hills, Natrona County, Wyoming. February 23, 2001 [Adams Accession No. ML010460319]

U.S. Nuclear Regulatory Commission (2001b) Finding of No Significant Impact in *Federal Register* concerning Approval of Amendment to Source Material License SUA-648 for Soil Decommissioning. February 23, 2001 [Adams Accession No. ML010580211]

Umetco Minerals Corporation, "Revision 1 of Final Design & Reclamation Plan for GHP No. 2/Mill Area - Umetco Gas Hills. Pages 1 Through Appendix A.", September 30, 2003, [ADAMS Accession No. ML032660329]

U.S. Nuclear Regulatory Commission, "License Amendment 52, The Umetco Minerals Corporation's Annual Surety Update And Final Design For Pond No. 2 For The Gas Hills Uranium Mill Site, SUA-648", January 31, 2006, [ADAMS Accession No. ML033170426]

Umetco Minerals Corporation, "Drawing East Gas Hills GHP#2 Gamma Exposure Rate", January 31, 2006, [ADAMS Accession No. ML060450648]

Umetco Minerals Corporation, 2006a, "Letter from Licensee, Umetco Minerals Corporation, Requesting a License Amendment to License Condition 58 for Deviation from Ra-226 Topsoil Criteria for C-18 Pit.", February 7, 2006, [ADAMS Accession No. ML060450508]

Umetco Minerals Corporation, 2006b, "Letter from licensee, Umetco Minerals Corporation, requesting an amendment to License Condition 61 for deviation from RA-226 frost protection and exposure rate criteria.", February 7, 2006, [ADAMS Accession No. ML060450643]

U.S. Nuclear Regulatory Commission, "T. Gieck Ltr Re: Suspension of Review of Umetco's Request for Amendment of License Conditions 58 and 61 (TAC LU0123).", August 11, 2006, [ADAMS Accession No. ML062220553]

U.S. Nuclear Regulatory Commission , "IR 04000299-06-001, on 8/31/2006,Umetco Minerals Corporation", September 18, 2006, [ADAMS Accession No. ML062610483]

U.S. Nuclear Regulatory Commission , "T. Gieck Letter re: REVIEW OF UMETCO'S REQUEST FOR AMENDMENT OF LICENSE CONDITIONS 58 AND 61 (TAC LU0143)", 2006, [ADAMS Accession No. ML062650471]