

August 11, 2006

Mr. Joseph Vranka, Manger  
Radiation Control Program  
Hazardous Materials and Waste Management Division  
Colorado Department of Public Health and Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530

Dear Mr. Vranka:

I am responding to your March 31, 2006 submittal requesting our review and comment on the Draft Completion Review Report (CRR) for the license termination of the Maybell Title II heap leach site (Colorado Radioactive Materials License # 660-01). We thank you for the opportunity to comment on this draft version of the CRR and we look forward to working with your staff to facilitate the submittal of the Final CRR. The review was conducted by an interoffice staff team identified in Enclosure 1.

We have reviewed the Draft CRR in accordance with the criteria in the Office of State and Tribal Programs (STP) Procedure *SA-900: Termination of Uranium Milling Licenses in Agreement States*. STP Procedure SA-900 describes NRC's review process for making the determination that all applicable standards and requirements have been met prior to Agreement State uranium milling license termination, as required by 10 CFR 150.15a(a) and Section 274c of the Atomic Energy Act of 1954, as amended.

We appreciate Colorado Department of Public Health and Environment's (CDPHE) effort to follow the suggested format in STP Procedure SA-900 for preparing the CRR and the arrangement for the Maybell site visit on July 10, 2006. Our comments on the Draft CRR are documented in Enclosure 2. These comments need to be addressed in the Final CRR. We are prepared to hold a teleconference with you and your staff to discuss our comments and to assist you in resolving the comments prior to your submittal of the Final CRR. We would appreciate receiving your response to these comments within 90 days of the date of this letter. Please let us know if you need additional time.

If you have any questions on the comments, or if you would like to schedule a teleconference, please contact me at 301-415-3340 or Ms. Sandra Lai of my staff at 301-415-4012; E-mail: [SXL5@nrc.gov](mailto:SXL5@nrc.gov).

Sincerely,

/RA/

Janet R. Schlueter, Director  
Office of State and Tribal Programs

Enclosures:  
As stated

Mr. Joseph Vranka, Manger  
Radiation Control Program  
Hazardous Materials and Waste Management Division  
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Janet R. Schlueter, Director  
Office of State and Tribal Programs

Enclosures:  
As stated

Distribution: DCD (SP08)  
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\*See previous concurrence.

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## REVIEWERS

<u>NAME</u>	<u>AREA COVERED</u>
Daniel Rom NMSS <sup>1</sup>	Geotechnical Stability
Terry Johnson NMSS	Surface Water Hydrology and Erosion Protection
Sandra Lai STP <sup>2</sup>	Radiation Cleanup and Control, Radon Emanation
Paul Michalak NMSS	Groundwater Remediation
Dennis Sollenberger, PhD STP	Technical Resource
Kevin Hsueh, PhD STP	Technical Resource
John Hull, JD OGC <sup>3</sup>	Legal Support

Note:

1. Office of Nuclear Material Safety and Safeguards
2. Office of State and Tribal Programs
3. Office of the General Counsel

**ENCLOSURE 1**

U.S. Nuclear Regulatory Commission (NRC) Review Comments  
of the  
Colorado Department of Public Health and the Environment's (CDPHE)  
Draft Completion Review Report (CRR)  
for the  
License Termination of the Maybell Title II Site (RML 660-01).

The NRC staff, in its review of the Draft CRR for the Maybell Title II Site, followed procedures, guidance, and criteria found in STP Procedure SA-900 "Termination of Uranium Milling Licenses in Agreement States." Based on the review, staff offers the following comments on the Draft CRR for your consideration and resolution. The comments are divided into four technical review areas: (1) geotechnical stability; (2) surface water protection and erosion control; (3) radiation cleanup and control, and radon emanation; and (4) groundwater remediation. We request each identified comment be addressed in the Final CRR or explained to us for resolution.

**ENCLOSURE 2**

I. Geotechnical Stability

Our review of the Geotechnical Stability section of the CRR indicates that all applicable standards and requirements have been met for this section. However, the following additional information, or areas of comments, need to be addressed to provide a more substantial basis or understanding of the bases used by CDPHE in making its determination.

Comment	Section of CRR	Reviewer Comment	Comment Resolution
1	Page 20, Tables 2.1.5-3 and 2.1.5-4	Graphical results of density test locations should be provided.	

## II. Surface Water Hydrology and Erosion Protection

Our review of the Surface Water Hydrology and Erosion Protection section of the CRR indicates that additional information is needed to provide sufficient information on the bases used by CDPHE in making its determination that the site will meet Criteria 1, 4, and 6. This information is needed to help us in making our determination that all applicable standards and requirements have been met for this section. The following comments should be addressed in the next version of the CRR or in the Comment Resolution section provided.

Comment	Section of CRR	Reviewer Comment	Comment Resolution
1	Page 30, Section 2.2.2	During a site visit on July 10, 2006, the staff noted that the riprap near the upstream end of the discharge channel appeared to be placed in a manner that may not meet in-place gradation requirements. It appeared that the rock (especially near the surface) was much smaller than the specified D50 size of 22 inches. Further, the presence of the large 22-inch rock was not obvious in a relatively large area of the channel. To resolve this concern, CDPHE should provide additional information, data, and analyses that fully document the conclusions that the rock in the channel meets construction specifications. Such information could include details of CDPHE's review of: (1) records of rock placement that show that in-place gradation requirements have been met; (2) photographs taken during construction that show that adequate rock has been placed; and/or (3) records of specific inspections that were conducted that verified the adequacy of the rock layer. If such information is not available, CDPHE could request, and review the results of, several additional in-place gradation tests that confirm that the rock layer meets specifications.	

Comment	Section of CRR	Reviewer Comment	Comment Resolution
2	Page 30, Section 2.2.1	<p>During a site visit on July 10, 2006, the staff noted the presence of gullies on the south side of the cell. It was also noted that: (1) some rock had been placed on the slopes to retard gully advancement; (2) there may be further potential for gullies to form on the slope, since the slope is about 500 feet long and drops 40-50 feet from the repository toe to the channel; and (3) formation of gullies and gully advancement may need to be considered in the design of the riprap for the toe of the repository. At this time, it is not immediately obvious that the riprap design for the toe of the repository is adequate to prevent long-term gully intrusion into the cell. To resolve this concern, CDPHE should provide additional documentation of its review of the repository toe design. CDPHE should provide information, data, and analyses that fully document its conclusions that the riprap toe design is adequate. Such information could include details of CDPHE's review of the potential for gullies to advance headward on the south side of the cell and the ability of the toe design to provide adequate protection for such phenomena.</p>	

### III. Radiation Cleanup and Control / Radon Emanation

Our review of the Radiation Cleanup and Control / Radon Emanation section of the CRR indicates that additional information is needed to provide sufficient information on the bases used by CDPHE in making its determination that all applicable standards and requirements have been met. The following comments should be addressed in the next version of the CRR or in the Comment Resolution section provided.

Comment	Section of CRR	Reviewer Comment	Comment Resolution
1	Page 35, Section 3.3.1	<p>In the last sentence of the last paragraph, “CDPHE, the Colorado Geological Survey and Little Snake Resource Area of the Bureau of Land Management thoroughly reviewed and commented on the <i>Soil Cleanup Plan</i> and approved its implementation.”:</p> <p>What are the bases and the results for the review? Please include a summary of the results and reference.</p>	
2	Page 35, Section 3.1.2	<p>In the 1<sup>st</sup> sentence of the 1<sup>st</sup> paragraph, “Remediation of the process area took place over a period of several years...”:</p> <p>Please specify the year of the beginning and the year of the end of the remediation.</p>	
3	Page 35, Section 3.1.3	<p>In the 2<sup>nd</sup> sentence of the 1<sup>st</sup> paragraph, “These soil verification survey data were collected ..., and process area and in 2004 for the new evaporation pond area.”:</p> <p>The summary of the final status survey for the new evaporation pond area is missing in this section. CDPHE needs to determine whether the survey results in that area were found acceptable or not.</p>	



Comment	Section of CRR	Reviewer Comment	Comment Resolution
4	Page 36, Section 3.1.3	<p>In the 3<sup>d</sup> and the 4<sup>th</sup> paragraphs, “All data collected between June 1995... CR-May-4.1, CR-May-4.2 and CR-May4.3 (Umetco, 2005).”:</p> <p>Please explain the difference between measurements taken at ground surface and measurements taken at one foot above the ground surface.</p>	
5	Pages 36 and 37, Section 3.1.3	<p>In Tables 3.1.3-1, 3.1.3-2 and 3.1.3-3:</p> <p>1. The data in these tables is not sufficient to demonstrate that each 100m<sup>2</sup> area unit is within the allowable limit (i.e. 5pCi/g excluding background radiation or 6.7pCi/g including background radiation in land averaged over any 100m<sup>2</sup> area, 40 CFR 192). CDPHE should either provide sample data, or include language in the CRR stating that in all the licensed area, the Ra-226 reading is within the allowable standard. Please include information of whether remediation has been conducted for those areas that exceeded the limit.</p> <p>2. In the notes at the bottom of Tables 3.1.3-1, 3.1.3-2 and 3.1.3-3, please include the reference of the cleanup criteria of Ra-226.</p> <p>Suggestion: Table 3.1.3-1 may contain sample data for each 100m<sup>2</sup> area instead of the whole mined area/unmined area/process area.</p> <p>A conclusion stating that the activity for each 100m<sup>2</sup> area did not exceed the allowable limit should be included in this section.</p>	

Comment	Section of CRR	Reviewer Comment	Comment Resolution
6	Page 37, Section 3.1.3	In Table 3.1.3-3:  Please state whether the results in this table include background radiation.	
7	Page 38, Section 3.1.4	1. What percentage of the survey units was surveyed by CDPHE?  2. Please state the reference for the verification report that contains the survey results.	
8	Page 38, Section 3.1.5	Please include the reference for the CDPHE survey results.	
9	Page 38, Section 3.1.6	Please include the references for the gamma survey and laboratory results reported for the soil samples.	
10	Page 39, Section 3.2	In Tables 3.2-1 and 3.2-2, the value of the Radium activity of the random fill is significantly greater than the background reading (1.7 pCi/g). Please explain this difference and the type of fill used.	
11	Page 39, Section 3.2	In 1 <sup>st</sup> sentence of the paragraph below Table 3.2-1, "Results of the RADON model analysis...":  Please state the reference of the results of the RADON model analysis.	
12	Page 39, Section 3.2.1	In the 1 <sup>st</sup> sentence of the 1 <sup>st</sup> paragraph, "Umetco completed separate radon flux measurements ...":  Please state the reference of radon flux measurements.	

#### IV. Groundwater Remediation

Our review of the Groundwater Remediation section of the CRR indicates that additional information is needed to provide sufficient information on the bases used by CDPHE in making its determination that all applicable standards and requirements have been met. The following comments should be addressed in the next version of the CRR or in the Comment Resolution section provided.

Comment	Section of CRR	Reviewer Comment	Comment Resolution
1	Page 8, Criterion 1 - Siting	The CRR indicates that groundwater is from 200 to 220 feet below the Heap Leach Repository. Please provide a geologic cross-section that illustrates subsurface features (e.g., clays, silts, sands, silty sandstones) within the 200+ foot vadose zone underneath the Heap Leach Repository.	
2	Page 4, Heap Configuration;  Page 18, Section 2.1.8, Contaminated Materials and Page 10, Criterion 5 - Groundwater Protection, first paragraph and page 41, Section 4.1, third paragraph	It is understood that "During this 30-year monitoring period, there have been no contaminants from the heap leach operations detected in groundwater at the site." However, given the placement of contaminated scrap and soil in the Heap Leach Repository between 1995 and 1997, the present Heap Leach Repository configuration has only been monitored for approximately eight years (1998 to 2005).  Please provide the technical basis for choosing approximately eight years as a sufficiently long period to monitor the final site configuration.	

Comment	Section of CRR	Reviewer Comment	Comment Resolution
3	Page 21, Section 2.1.12; Page 26	The CRR states that 'laboratory tests show that the average hydraulic conductivity of the radon barrier materials was $7.25 \times 10^{-8}$ .' NRC guidance on evaluation for hydraulic conductivity of radon/infiltration barriers for Title I and Title II mill tailings sites states that field testing of radon barriers is warranted when reported hydraulic conductivity values are less than $10^{-7}$ cm/sec. Consequently, please provide field testing results to verify reported hydraulic conductivity values for the Heap Leach Repository radon barrier.	
4	Page 41, Section 4.1.1  CDPHE (2000) Decision Analysis - Proposed Amendment to Renew License for the Maybell Heap Leach site [ADAMS Accession No. ML003694083]	In the 1 <sup>st</sup> paragraph, the CRR indicates that the heap leach sites detection monitoring program included two upgradient wells (NE Heap and Rob Ramp) and two downgradient wells (Millsite 1 and 2). The locations of the downgradient Millsite 1 and 2 wells implies that the flow direction of the Browns Park aquifer is to the southwest. However, CDPHE (2000), on the top of page 10, indicates that Browns Park aquifer flows in a southeast direction.  To resolve this inconsistency, please provide a groundwater contour map for the Heap Leach Repository that shows the relationship between the detection monitoring system and the groundwater flow direction in the Browns Park aquifer.	

Comment	Section of CRR	Reviewer Comment	Comment Resolution
5	<p>Page 42, Section 4.1.1, 1st bullet</p> <p>Page 42, Section 4.1.3</p> <p>CDPHE (2000) Decision Analysis - Proposed Amendment to Renew License for the Maybell Heap Leach site [ADAMS Accession No. ML003694083]</p>	<p>The CRR indicates that CDPHE compared groundwater chemistry with results obtained from the upgradient DOE Title I monitoring wells and concluded that the Maybell wells were within the range of DOE determined background.” In addition, the CRR indicates that “Groundwater in the uppermost aquifer is not a current or potential source of drinking water in the area because it contains widespread ambient contamination caused by naturally occurring uranium mineralization ...” However, in CDPHE (2000) it states that “Historically, the background Rob Ramp well, which is upgradient from the Maybell heap leach site, has shown elevated concentrations of uranium, but since 1984 there has been a marked decreased in uranium concentration. The earlier elevated levels of uranium may have been associated with the mining disturbances, and once mining ceased, the groundwater quality rapidly improved.” [CDPHE (2000) page 10, fifth paragraph].</p> <p>Please expand the discussion of groundwater quality (including uranium concentrations) in the Heap Leach Repository detection monitoring system (up and down gradient) as it relates to the “DOE determined background” and the Browns Park aquifer as a potential potable source of drinking water.</p>	

Comment	Section of CRR	Reviewer Comment	Comment Resolution
6	Page 42, Section 4.1.1, 3rd bullet	The CRR states that “there are no known exposure pathways for groundwater from the upper most aquifer to a receptor.” However, a review of information from the Colorado Division of Water Resources LTTOOLS web site indicates several potential “point of exposure” wells (west to south) within one mile of the Heap Leach Repository. Please identify all “downgradient” groundwater usage in the Browns Park aquifer or in units hydraulically connected to the Browns Park within one mile of the site.	