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# STATE OF COLORADO

Roy Romer, Governor  
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*Dedicated to protecting and improving the health and environment of the people of Colorado*

## HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

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Colorado Department  
of Public Health  
and Environment

September 6, 1996

Ms. Sharon Arp  
Gunnison Site Manager  
U.S. Department of Energy  
2155 Louisiana Blvd. NE, Suite 10,000  
Albuquerque, NM 87110

RE: CDPHE Comments of the Draft Completion Report and the Long Term Surveillance Plan  
for the Gunnison, Colorado Site

Dear Ms. Arp:

The Colorado Department of Public Health and Environment has completed our review of the above referenced documents. Our specific comments are detailed in attachments to this letter. As you are well aware, the intention of the UMTRA project is to remediate the mill sites and return the land to beneficial use in the community. Due to the extensive use of Supplemental Standards for thorium deposits over a large portion of the site, and the failure of the cleanup to fully satisfy the Supplemental Standards requirements, the remediation at the Gunnison site fell somewhat short of this goal. Although contamination remains at the site, we still fully intend to safely maximize the benefit of the property for the community. Therefore, our comments focus primarily on the types of information that we believe will be needed to guide future land use decisions. In order to make land use restrictions as workable as possible for the community, we intend to allow excavation at the site, provided that disturbed materials be disposed of properly or replaced in the excavation. We will require that any enclosed structures be constructed with a radon vent system. We request your assistance in revising the Completion Report as requested in our attached comments to help provide the best available information and the least impact to the community as they begin to make plans for use of the site in the future.

Sincerely,

*Wendy K. Naugle*

Wendy K. Naugle, P.E.  
Gunnison Site Manager

cc: ☒ Holonich, NRC  
John DeVore, Gunnison County  
File GUN-15-B-Correspondence

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PDR WASTE  
WM-61

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NLO4  
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cc: NMSS/HLUR

CDPHE Comments on the Gunnison Draft Completion Report, August, 1996

Comment 1, Copy of Completion Report to Community

Due to the fact that this report will play an important role in future land use decisions at the site, and that CDPHE has already received several requests for review of the Durango Completion Report, we believe that a copy of the Completion Report should be provided to the Gunnison community, either via the public library or the county.

Comment 2, Items not included in Report - General Information

We were surprised to find that the Completion Report does not contain much of the general information about remediation that used to be included in the reports. For example, the report does not specifically state the dates of remedial action activities, or who the subcontractor was. Also missing is general information about backfill activities at the processing site, for example, the quantities of select and general backfill are not provided, nor their compaction requirements. We view the Completion Report as a stand-alone document that will be used extensively as a reference in the future as questions arise regarding how and when the remedial action was conducted. We strongly encourage DOE to further embellish the Volume 1 Summaries to contain more of this general-type information.

Comment 3, Items not included in Report - Backfill at Processing Site

The Completion Report does not include information about the backfill materials at the processing site. In particular, we need information regarding the specifications for the select backfill and confirmation that the material met the specifications. In addition, we need information regarding how the select backfill can be distinguished from the general fill and what the compaction requirements were. This information will be very important in terms of future land use at the processing site.

Comment 4, Items not included in Report - Site-specific Cleanup Procedures

The Completion Report fails to address adherence to the cleanup procedures that were established for uranium (reference MK letter to S. Arp, date 8/4/94, "Revised Gunnison Test Pit 16 Excavation Protocol"). A section should be added to the Completion Report to address this issue and confirm that the agreed-upon protocol was followed. In addition, CDPHE previously requested and was provided with information regarding the depth of excavation at the site compared against the original test pit data for uranium. We believe that this information is important to include in the Completion Report, and strongly recommend that it be added. During the groundwater compliance phase of the project, information regarding potential secondary sources of contamination will prove to be critical in terms of determining the appropriate compliance strategy. Any information that was gathered during remediation with respect to contaminant concentrations left behind should be included in the Completion Report.

Comment 5, Items not included in Report - Radon Diffusion Coefficient Data

In Calculation Number GUN-643-01-02 it is stated that "laboratory tests will be performed to verify the actual coefficient of radon barrier when treated with bentonite." We could not find this new data in the Completion Report.

Comment 6, Radon Barrier Bentonite Content

In Volume 1, Critical Review Issues: Appendix E, Summary of Geotechnical Test Results, the table shows that the average bentonite content of the radon barrier is only 4.8%, which is below the minimum required in the design. In Volume 3, Radon Barrier, Page 3, it is stated that 105 verification tests were performed for the percent bentonite, 104 of which met or exceeded the design requirement. Since this is a critical design component, the Completion Report should contain better documentation of the procedures used to verify bentonite content, and a table which shows the actual data points (or provide an appendix that contains the raw data.)

Comment 7, Items not included in Report - Settlement

In Volume 3, Appendix E, Contaminated Material, the preload fill is briefly discussed. However, there is no mention of whether or not the predicted settlement actually occurred. Are any data or visual observations available to verify that settlement occurred as predicted?

Comment 8, Verification/Soil Cleanup, Original Test Pit Data

In comparing the original test pit data to the excavation that took place on the site, we are concerned about the fact that in the area of TP-18, it appears that very little excavation took place, yet the test pit data shows tailings to an elevation of approximately 7,041 feet and high concentrations of thorium at depth, which would have necessitated the placement of select fill in this area. Please provide information that confirms that the contaminated materials were removed from this area. (See also, Comment 14 below regarding use of the original test pit data during excavation.)

Comment 9, Verification/Soil Cleanup, Site-specific Procedures

Appendix J does not contain the site-specific Cobbles-to-fines, Surface and Subsurface Cleanup, and uranium cleanup protocols. Since we view the Completion Report as a stand-alone document, we believe it is very important to include these site-specific procedures.

Comment 10, Appendix J, Verification Measurements

Page 2 - it is unclear why there is a difference between the bulk background Ra-226 concentration of 1.8 pCi/g and the bulk 1,000 Ra-226 concentration of 2.5 pCi/g. The document should clarify that the 1,000 year value includes thorium (this explanation is much clearer in Volume 1, Remedial Action Assessment, page 10).

#### Comment 11, Land Use Controls/Future Site Use

The Supplemental Standards (Appendix K) discussion focuses on the risks resulting from radon gas emanation. This package is incomplete without a discussion of other risks that are posed by the remaining thorium, i.e. risks to persons directly exposed to the deposits. In addition, the DOE should provide information that can be used by CDPHE in the future to predict risks should any of the backfill be removed, or more importantly, if the thorium deposits themselves are disturbed.

#### Comment 12, Future Land Use Maps

The maps included in Appendix K will be beneficial in terms of identifying areas where future land use activities will need to be controlled. However, we request the following three changes: 1) Figure K-1 should include the depth to contamination. 2) An additional map should be produced that combines the data from figures K-1, K-3 and K-4. This combination map will show the depths at which material into which excavation must be controlled exists (either select backfill or thorium deposits). All maps need to include the TP-3 area (see Comment 14, below). 3) Figure K-2 will be used as part of the deed annotation for the site (that is, the figure will be part of the formal deed that will be recorded in the County Clerk's Office). Therefore, this figure needs to include the 41 thorium no-select fill grids, and the TP-3 area.

#### Comment 13, Discussion Regarding Site-specific Thorium Protocol

On page 2 of Appendix K, the value of 175 pCi/g is described as the concentration in the fines "approximately equal to 15 pCi/g or Radium-226 in bulk soil after 1,000 years of decay". This is incorrect. This value was determined to be a concentration above which the use of select backfill was necessary to keep the radon flux below 3.9 pCi/m<sup>2</sup>-sec. Due to the confusion over this value, and the lack of explanation for its derivation in the parent document (Site-Specific Protocol) the original assumptions used to generate this value (the depth of backfill, soil properties, etc) should be recapped in the Completion Report. The discussion should then include whether the final site conditions met the assumptions. That is, is it safe to assume that the grids that contain select backfill meet the radon flux standard?

#### Comment 14, Verification/Soil Cleanup, Select Backfill in Test Pit 3 Area

In Appendix K, a discussion is included regarding the area surrounding TP-3. The Thorium Protocol specifically called for placement of select backfill in the grids surrounding TP-3 because the original test pitting activities revealed thorium at depth below a level where the standards would be met. (The test pit data showed that the standards were met at the tailings/cobble interface, but below the interface, thorium concentrations were substantially higher.) This was a key issue in terms of CDPHE approval of both the Thorium and the Cobbles-to-fines protocols. Our concern was that buried lenses of higher concentration material could be left at depth when these protocols were used to halt the excavation at a higher elevation. Therefore, provisions were made to address this issue. Specifically, the original test pit data were to be utilized by site personnel to compare against what was found in the field. When

discrepancies were noted, additional test pitting was to be conducted. Apparently this did not occur, as the data for TP-3 were ignored. (See also, related Comment 8). The Thorium Protocol specifically recognized the problem in the area of TP-3 and required the placement of select backfill to minimize the radon emanation from the thorium deposit known to exist at depth. The DOE must address the issue of residual risk from radon emanation and the risks from future disturbance of the thorium deposit in this area. This information should be included in Appendix K and the area in question should also be noted on the Appendix K figures.

It is also unclear what is meant by the statement that TP-3 was between two grids and therefore, only 6 surrounding grids would have needed select backfill (Appendix K, page 4). There may be some confusion regarding the location of TP-3. TP-3 was located at the northwest corner of the site, and there are not two surrounding grids in the area.

#### Comment 15, Area-weighted Averages

On Page 6 of Appendix K, area weighted averages are discussed. The area-weighted average calculations should be included in this package as it is hard to understand the summary without being able to actually see how the calculation was performed.

#### Comment 16, Radon Flux Analysis

In the Radon Flux Analysis on Page 7 of Appendix K, it is unclear why grid B-43-16 was chosen for this analysis, when the radon flux is dependent upon both the thorium concentration and the depth of the backfill. Another grid, with less backfill and lower thorium concentration may actually have a higher flux.

#### Comment 17, Risk Calculations, Appropriate Standards

The risk calculations included on Page 8 of Appendix K should be compared against an exposure standard rather than using only a comparison between occupancy of a home with 0.02 WL. DOE orders or NRC guidance and/or regulations should be used which provide the appropriate exposure limits for workers.

#### Comment 18, Number of Grids Exceeding the Flux Standard

On Page 8 of Appendix K, the discussion states that 14 locations exceed the 3.9 pCi/m<sup>2</sup>-sec flux standard. However, on Table K-3, only 13 such grids are listed.

#### Comment 19, Location of Grid D-04-21

The discussion about the worst-case grid, D-04-21 on Page 9 of Appendix K, should more clearly indicate that this grid is on the airport property, near the emergency runway and not on the mill site itself. The text should acknowledge that since this grid is off-site, the State of Colorado will not have control over its land use.



Comment 20, Table K-1

Table K-1. The last column should be listed as a bulk value. Units should be listed for the depth column.

Comment 21, Table K-4 and use of maps K-3 and K-4

Table K-4 appears to only contain the data for the depth to the select fill layer for grids at the corners of larger areas. Can we assume then that excavation in the middle of one of these areas could be performed to some intermediate depth interpolated from the corner elevations without disturbing the select fill? If not, we will need to be provided with the depth data for every grid that contains select fill. Table K-4 will be most useful if it is used as an overall guide as to how deep an excavation can proceed at any point on the site. Thus, this table should also include the depth to the thorium deposits that did not receive select fill.

Comment 1, Groundwater Compliance Standards

On page 2-20, Section 2.6.2 new concentration limits are proposed for the disposal cell. The groundwater compliance standards were already established and concurred upon in the Remedial Action Plan (RAP). It is unclear what justification is used to revise the limits at this time, using a different statistical method, in a document that does not have formal State concurrence. Some of the concentration limits have been changed by an order of magnitude due to the fact that the observed maximum, rather than a statistical maximum value are now being used. CDPHE does not normally approve the use of the observed maximum value without a concurrent demonstration that the maximum observed value is not an outlier. Nevertheless, we do not believe that changing the concurred upon limits in the LTSP is appropriate and request that the document reflect the limits that were established in the RAP.

Comment 2, Table 2.3, Page 2-21

Several of the hazardous constituents without MCLs are indicated with the footnote b, which is indicated for the Background column. It seems that these constituents should instead have the footnote d.

Comment 3, Table 4.2, Page 4-5

Again, we do not believe that the use of the observed maximum value is appropriate for the screening level assessment, without a demonstration that the maximum observed value is not an outlier. A more appropriate value is a statistical maximum.

Comment 4

During our review of the RAP, CDPHE raised concerns about the presence of lead-210 in the leachate at the processing site. Since lead-210 had been detected at the site, and was identified as a Contaminant of Concern in the Baseline Risk Assessment (BLRA), we believed that lead-210 should be included in the groundwater compliance strategy at the disposal site. This issue was not resolved during the RAP review phase, but was instead deferred until the LTSP due to the fact that revision of the BLRA was in progress. We still consider this an open issue, and believe that lead-210 should be included in Table 2-21, and a concentration limit should be established.