RECEIVED

JAN 13 1997

OSTI

**COMMENT AND RESPONSE
DOCUMENT FOR THE LONG-TERM
SURVEILLANCE PLAN FOR THE
GUNNISON, COLORADO DISPOSAL SITE
GUNNISON, COLORADO**

December 1996

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

**COMMENT AND RESPONSE DOCUMENT FOR THE
LONG-TERM SURVEILLANCE PLAN FOR THE
GUNNISON DISPOSAL SITE, GUNNISON, COLORADO**

December 1996

**Prepared for
U.S. Department of Energy
Environmental Restoration Division
UMTRA Project Team
Albuquerque, New Mexico**

**Prepared by
Jacobs Engineering Group Inc.
Albuquerque, New Mexico**

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

UMTRA DOCUMENT REVIEW FORM

SITE: Gunnison, Colorado
DOCUMENT: LTSP, DOE/AL/62350-222, REV. 1, May 1996
COMMENTOR: GRAND JUNCTION PROJECTS OFFICE
Date: JULY 24, 1996

COMMENT 1:

Check the labeling of Chance Gulch on figures 2.3, 2.5 and 2.6. The USGS Topographic Map shows it as the next drainage to the west (about 1500 feet from the site).

Response by: Barbara Bridgeman
Date: November 20, 1996

The drainage shown on the drawing empties into Chance Gulch, as does Sage Hen Gulch which is the next drainage to the west.

Plans for Implementation:

Drawings have been corrected.

COMMENT 2:

Miscellaneous typographical comments.

Section 2.3.3, first paragraph: The barbed-wire fence is 4-strand, rather than 5.

Section 2.3.4, next to last paragraph: There are 44 warning (perimeter) signs (and 1 entrance sign), rather than 41.

Section 4.1.2, second paragraph after Table 4.1: Check sampling dates, it should read "1998 through 2001", rather than 2000.

Section 4.1.6, second paragraph: cross-hole "tomography" rather than "topography".

Several locations: Gate is referred to as a singular, it should be plural (3 gates).

Response By: Malu Gawthrop Cooper
Date: November 12, 1996

Concur.

Plans for Implementation:

All recommended changes have been made.

COMMENT 3:

Section 2.3.2, items 1,2,3, and 4 can be replaced with the following road log:

Mile 0.0: Junction of U.S. 50 and Colorado 135, in center of Gunnison at stop light, proceed east on U.S. 50.

Mile 5.9: Turn right on gravel road, Gunnison County Road 42 (also known as Six mile Lane).

Mile 6.5: Bear left at Y in road.

Mile 7.4: Turn right on BLM road 3068.

Mile 8.7: Turn right at south entrance gate.

Response By: Malu Gawthrop Cooper
Date: November 18, 1996

Concur.

Plans for Implementation:

Changes have been made as noted.

COMMENT 4:

Section 3.6.1, first paragraph, last sentence: The lead inspector does not sign a certification statement.

Section 3.6.1, second paragraph, last sentence: Checklist revisions are not documented in inspection report. The checklist is revised as appropriate for the next inspection and the completed checklists become part of the permanent site file.

Recommendation: Revise LTSP to reflect actual practice.

Response By: Malu Gawthrop Cooper

Date: November 18, 1996

Concur.

Plans for implementation:

Changes have been made to clarify text.

COMMENT 5:

Section 3.6.5. The site inspection report is an evolving document. It does not necessarily include everything as stated in this section. The regulation (10 CFI 40, Appendix A, Criterion 12) does not specify inspection report content. The regulation only states that inspection results shall be reported to NRC within 90 days of the last site inspection of a given year.

Recommendation: Do not specify inspection report content, merely state that results shall be reported to NRC within 90 days (check wording in 10 CFR 40, app. A, criterion 12). Otherwise we are not in compliance with what the LTSP specifies.

Response By: Malu Gawthrop Cooper

Date: November 21, 1996

Concur.

Plans for Implementation:

The text is now a suggested report format.

COMMENT 6:

General comment: There are several monitor wells at the site that are not part of the post-closure monitoring well network. These wells should be formally abandoned and the LTSP should reflect the additional abandoned wells.

Response By: Anchor Holm

Date: November 21, 1996

Concur.

Plans for Implementation:

The text and figures have been updated to reflect the status of monitoring wells.

SITE: Gunnison, Colorado
DOCUMENT: LTSP, DOE/AL/62350-222, REV. 1, May 1996
COMMENTOR: Colorado Department Public Health Environment
DATE: May 1996

COMMENT 1:

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.

Response By: Dave Ward
Date: October 9, 1996

Compliance standards in the RAP for hazardous constituents without MCLs and which exceeded contract-required detection limits (antimony, vanadium, and zinc), or for which background concentrations exceeded MCLs (net gross alpha, radium 226, 228, and uranium), were calculated using statistical routines built into the SPEAR database. Critical review of these results during assembly of the LTSP revealed an error in the SPEAR statistical routines, in which the reported confidence intervals referred to the uncertainty of the mean values rather than a statistical maximum that was unlikely to be exceeded.

For the LTSP, the underlying data for these constituents were reviewed and augmented with new data collected between 1992 and the end of 1995. In all cases except for net gross alpha, the proportion of non-detects exceeded 50% or more, precluding the use of parametric statistics. Sufficient numbers of samples were available, however, to permit formulation of non-parametric prediction intervals giving approximately 95% coverage with 95% confidence, using the maximum observed concentration (cf. EPA, 1992: Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance, Table A-6). If the second largest observation were used, coverage would be closer to 90%, doubling the false-positive rate to an unacceptable level.

For net gross alpha, log-normal statistics could have been used, but predicated a 95% upper tolerance level that was larger than the largest observation. For simplicity and conservatism, non-parametric statistics were used here as well.

The UMTRA Project quality assurance procedures incorporate several procedures designed to detect outliers due to analytical error, including duplicates of selected analyses, measurements of trip blanks and spiked samples to assess background and recovery, and comparison with historical data. Thus, the reported maximal values are believed to represent actual field conditions.

A qualitative test for outliers that can be used here, based on the shape of the lognormal distribution, is to compare the largest and second largest values. The lognormal distribution is the most probable distribution for inorganic geochemical data (EPA, 1992). The lognormal distribution has a large tail toward high values, so that the difference between the two largest values is often much greater than a factor of 2. Here, the largest value is less than twice as large as the second largest value in all cases, corroborating the hypothesis that the largest values are not outliers.

Plans for Implementation:

Table 2.3 and 4.2 has been changed to show the screening level of Uranium as 0.013. Clarification has been added to Section 2.6.2 in the second paragraph:

Data collected prior to 1992 were subject to less rigorous QA/QC criteria, and thus required additional screening to detect statistically anomalous values. This was accomplished for each constituent by examining the data well-by-well for consistency with a lognormal distribution. One anomalous data point was identified (for uranium) and removed from consideration.

COMMENT 2:

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.

Response By: Dave Ward

Date: October 1996

Concur. The proposed concentration limits match the contract-required detection limits, which is denoted by footnote d.

Plans for Implementation:

Table 2.3 has been corrected.

COMMENT 3:

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.

Response By: Dave Ward

Date: October 1996

See response to CDPHE Comment 1. The observed maximum is a statistical maximum, based on non-parametric statistics. Parametric methods are precluded by the large proportion of non-detects.

Plans for Implementation:

Clarification has been made to 2.6.2. See Response 1.

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 believe 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.

Response By: Dave Ward

Date: October 1996

It was the intent of DOE to include Pb-210 among the hazardous constituents to be analyzed for in the event that evaluative monitoring was triggered by exceeding the screening criteria. Pursuant to this, Pb-210 was listed in Table 2.3 but was inadvertently placed in the final section of the table on p. 2-22 under the category of General water quality indicators. It will be moved to the category of Hazardous constituents without MCLs, with a proposed concentration limit of 2.8 pCi/L, calculated as outlined above, in the Response to Comment 1. Thus, the entry for Pb-210 will be amended, along with one of the footnotes, to read:

Constituent	MCL	Tailings Solutions			No. of Samples	Background		Proposed Concentration Limit
		No. of Samples	Median	Maximum		Median	Maximum	
<u>Hazardous constituents without MCLs</u>								
...								
Lead-210	—	—	—	—	46	0.2	2.8	2.8
...								

Note: All units in milligrams per liter except radium-226 and -228, lead-210, and net gross alpha which are reported in picocuries per liter.

Here, the number of samples and median values have been updated to reflect the data available in the SEE-UMTRA database. It is unclear where the earlier sample count of 58 originated. Approximately 80% of the sample lies below the detection limit, and 44% were reported to have a value of 0.0 pCi/L. The median value of 0.2 is below the detection limit, and hence is based on estimated values. This may have provided the rationale for previously reporting the median at 0.0 pCi/L. The maximum detected value remains unchanged at 2.8 pCi/L, and is less than twice as large as the second largest value. Because less than 50% are without measured or estimated values, a 95% upper tolerance level could be calculated by assuming a lognormal distribution and replacing the zero values with one half of the smallest estimated value. This would result in a proposed concentration limit higher than 2.8 pCi/L, however, so the non-parametric statistics are more conservative, as was also the case for net gross alpha.

Plans for Implementation:

Table 2.3 changed as shown above.

SITE: Gunnison, Colorado
DOCUMENT: LTSP, DOE/AL/62350-222, REV.1 MAY 1996
COMMENTOR: Nuclear Regulatory Commission
Date: November 21, 1996

DISCUSSION 1:

Concerns regarding the potential for the breakdown of erosion protection material arose as a result of the staff site visit of July 10, 1996. The concerns centered on the potential long-term effects of freeze-thaw cycles on microscopic fracturing of the larger riprap. This long-term deterioration, in the staff's opinion, could eventually result in the larger riprap not meeting the design specifications. The May 1996 LTSP does not address this potential for deterioration in sufficient detail to specifically monitor this larger riprap material. Following a series of telephone conversations with the Department of Energy (DOE) on this matter, the DOE Site Manager provided the staff with a September 5, 1996, draft revision of the applicable portion of the May 1996 LTSP. This draft revision, which addresses specific monitoring of the larger erosion protection riprap and would result in the creation of a new section of the LTSP entitled "Site Specific Concerns", has been reviewed by the staff and satisfactorily addresses the staff concerns.

COMMENT 1:

Revise the May 1996 LTSP to reflect the changes indicated in the September 5, 1996, draft rewrite. In addition, ensure that the locations designated for more detailed, repetitive inspection for each of the three specific riprap types (B,C, and D) are shown on Plate 1 (Baseline map) of the LTSP, as well as on the inspection drawing accompanying the completed annual inspection report.

Response By: Sharon Arp
Date: September 5, 1996

Plans for Implementation:

A new section 3.4, Site Specific Concerns has been added and the Plate has been revised.

DISCUSSION 2:

LTSP page 2-9 (third paragraph of Section 2.4) indicates that the 1.5-foot-thick radon barrier is designed to reduce the radon flux to less than 20 picocuries per square meter per second. This should be corrected since DOE's radon attenuation model (see NRC's Final Technical Evaluation Report, Section 6.2.2) included the 73-inch frost barrier as well as the 1.5-foot-thick radon barrier in order to achieve the long-term radon flux standard.

COMMENT 2:

Revise the LTSP to be consistent with the staff's TER conclusion which is based upon the design and analyses presented in the Remedial Action Plan (RAP) and associated documents.

Response By: Martin Brennan

Date: December 1996

Concur.

Plans for Implementation:

Section 2.4 revised to state that the three layers (radon/infiltration barrier, frost barrier, and coarse grained bedding layer) are designed to reduce the radon²²² flux from the disposal cell.

DISCUSSION 3:

Although LTSP page 1-18 indicates that existing well GUN-08-0609 (which is to serve as one of the two background ground water monitor wells) is plotted on the Baseline Map (Plate 1), this is not the case.

COMMENT 3:

Designate the location of well GUN-08-0609 on LTSP Plate 1.

Response By: Anchor Holm

Date: December 16, 1996

Concur.

Plans for Implementation:

Plate 1 has been revised.

DISCUSSION 4:

The proposed concentration limits for hazardous constituents presented in Table 2.3, page 2-21, included some values that have increased substantially from those that were proposed in the RAP and reiterated in the Staff's TER, i.e., arsenic, net gross alpha, radium-226/228, antimony, tin, vanadium, and zinc.

COMMENT 4:

Discuss the basis for these increased limits, including clarification of what additional background data was used to modify the values. This information does not have to be included in the LTSP. It should be provided as additional information supporting changes from what was presented in the RAP.

Response By: Dave Ward
Date: October 1996

Compliance standards in the RAP for hazardous constituents without MCLs and which exceeded contract-required detection limits (antimony, vanadium, and zinc), or for which background concentrations exceeded MCLs (net gross alpha, radium 226, 228, and uranium), were calculated using statistical routines built into the SPEAR database. Critical review of these results during assembly of the LTSP revealed an error in the SPEAR statistical routines, in which the reported confidence intervals referred to the uncertainty of the mean values rather than a statistical maximum that was unlikely to be exceeded.

For the LTSP, the underlying data for these constituents were reviewed and augmented with new data collected between 1992 and the end of 1995. In all cases except for net gross alpha, the proportion of non-detects exceeded 50% or more, precluding the use of parametric statistics. Sufficient numbers of samples were available, however, to permit formulation of non-parametric prediction intervals giving approximately 95% coverage with 95% confidence, using the maximum observed concentration (cf. EPA, 1992: Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance, Table A-6). If the second largest observation were used, coverage would be closer to 90%, doubling the false-positive rate to an unacceptable level.

For net gross alpha, lognormal statistics could have been used, but predicated a 95% upper tolerance level that was larger than the largest observation. For simplicity and conservatism, non-parametric statistics were used here as well.

The UMTRA Project quality assurance procedures incorporate several procedures designed to detect outliers due to analytical error, including duplicates of selected analyses, measurements of trip blanks and spiked samples to assess background and recovery, and comparison with historical data. Thus, the reported maximal values are believed to represent actual field conditions.

A qualitative test for outliers that can be used here, based on the shape of the lognormal distribution, is to compare the largest and second largest values. The lognormal distribution is the most probable distribution for inorganic geochemical data (EPA, 1992). The lognormal distribution has a large tail toward high values, so that the difference between the two largest values is often much greater than a factor of 2. Here, the largest value is less than twice as large as the second largest value in all cases, corroborating the hypothesis that the largest values are not outliers.

Plans for Implementation:

Table 4.2 has been changed to show the screening level of Uranium 0.013. Clarification has been added to Section 2.6.2 in the second paragraph:

Data collected prior to 1992 were subject to less rigorous QA/QC criteria, and thus required additional screening to detect statistically anomalous values. This was accomplished for each constituent by examining the data well-by-well for consistency with a lognormal distribution. One Anomalous data point was identified (for uranium) and removed from consideration.

DISCUSSION 5:

The TER indicated that in the LTSP, DOE should address the need for sampling any observed water along the existing gullies. The LTSP did not include any discussion on this subject.

COMMENT 5:

The LTSP should be revised to include, either in the checklist or in the "site-specific concerns" section, discussion on checking adjacent gullies for seepage and sampling any seepage observed.

Response By: Dick Heydenburg

Date: December 16, 1996

Site inspections will also include a visual survey of the north side of the gully heading east from the disposal cell to check for the limited possibility of seepage of fluid from the vadose zone in the vicinity of the disposal cell. This area from the southeast corner of the disposal cell toward monitor well 714 is the most likely place where seepage (if any) would occur because this is the low point of the disposal cell, the only area near the disposal cell where perched water was observed during drilling of one of the monitor wells (725), and presents the shortest distance to a potential near-surface point of exposure of tailings moisture. Any observed areas of seepage will be sampled and analyzed for hazardous constituents. Concentrations consistently above MCLs would lead to further evaluation and investigation.

Plans for Implementation:

The text in section 3-2 was revised to reflect this information.

DISCUSSION 6:

The LTSP (page A1-1) acknowledges that: (1) the final disposal site will consist of approximately 92 of the roughly 115 acres transferred on June 15, 1992, to the DOE by

the Secretary of the Interior by means of 43 CFR Public Land Order 6931, and (2) that the legal description of the final disposal site will be included in the revised LTSP subsequent to completion of the final site survey.

COMMENT 6:

Provide the legal description of the final disposal site in the revised LTSP.

Response by: Paul Martinez

Date: December 1996

Concur.

Plans for Implementation:

Real Estate information has been updated.

DISCUSSION 7:

The LTSP Baseline Map (Plate 1) indicates that the map is in draft form pending completion of the final site survey.

COMMENT 7:

Provide the final Baseline Map in the revised LTSP.

Response by: John McBee

Date: December 16, 1996

Concur.

Plans for Implementation:

The final Plate has been included.

DISCUSSION 8:

LTSP Section 3.6.2 (Site inspection maps) indicates that the map (Plate 1) will be annotated by the inspection team to include traverses made during the course of the annual inspection.

COMMENT 8:

Revise the LTSP to ensure that the locations of the traverses are indicated on the inspection drawing accompanying the completed annual inspection report.

Response by: Malu Gawthrop Cooper

Date: December 16, 1996

Concur.

Plans for Implementation:

Section 3.6.5 now states that locations of the traverses are indicated on the inspection drawing accompanying the completed annual inspection report.