

United States Department of Energy



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

RECEIVED
AUG 07 1996
OSTI

July 1996

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

RB

MASTER



Uranium Mill Tailings Remedial Action Project

This report has been reproduced from the best available copy. Available in paper copy and microfiche.

Number of pages in this report: 10

DOE and DOE contractors can obtain copies of this report from:

**Office of Scientific and Technical Information
P. O. Box 62
Oak Ridge, TN 37831
(615) 576-8401**

This report is publicly available from:

**National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650**

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.

**COMMENT AND RESPONSE DOCUMENT FOR THE
LONG TERM SURVEILLANCE PLAN FOR THE BODO CANYON
DISPOSAL SITE, DURANGO, COLORADO**

July 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**

UMTRA DOCUMENT REVIEW FORM

(1)

COMMENT

Site: Durango, Colorado Date: 10 June 1996
Document: Long-Term Surveillance Plan
Reviewer: U.S. Nuclear Regulatory Commission (NRC)

Comment: 1

Six wells are identified on page 5-16 as the ground water monitoring network. However, the Surveillance Plan contains a diagram illustrating the geologic materials monitored and the three dimensional location with respect to the disposal cell for only one of these wells (well 612, Figure 5.2, page 5-4). The Remedial Action Plan and the Technical Evaluation Report were inspected to identify the geologic materials monitored by the other wells. However, no descriptions were found for the remaining wells. Without illustrations, it is not possible to determine which geologic materials are being monitored and the relationship of the wells to the local ground water flow system and the disposal cell. To address this concern, illustrations showing the geologic materials monitored by a well and it's three-dimensional relationship to the disposal cell, would be included in the Surveillance Plan for all the ground water monitor wells (wells 605, 607, 608, 612, 621, and 623.)

RESPONSE

Page: ____ By: J. Carman (TAC) Date: 28 June 1996

Appropriate graphical representations (cross sections) have been prepared to illustrate the relationship of the completion intervals for the subject wells to site geologic materials, ground water flow, and the disposal cell as requested by the NRC. Minor text modifications introducing the new figures were made.

UMTRA DOCUMENT REVIEW FORM

(2)

COMMENT

Site: Durango, Colorado Date: 10 June 1996
Document: Long-Term Surveillance Plan
Reviewer: U.S. Nuclear Regulatory Commission (NRC)
Comment: 2

On page A3-15 of Attachment 3 of the Surveillance Plan it is stated that "The toe drain will be permanently closed when it has been determined that the remaining volume of drainable pore water from the cell will not develop unacceptable hydrostatic pressures within the cell or produce seepage at the cell boundary" . . . "A 6-month waiting period after the initial closing of the drain will be needed to confirm that the steady-state phreatic surface of the pore water within the tailings pile is below the elevation of 7055 ft". The LTSP does not discuss how this confirmation will be made, how, and how often water levels will be obtained to confirm that the phreatic surface of the pore water within the tailings pile is below the 7055 ft. as specified.

RESPONSE

Page: By: B. Bridgeman (TAC) Date: 28 June 1996

Historically, the toe drain has been closed during the winter months and the resulting rise in the phreatic surface within the cell has been monitored with data loggers. The data logger in the north vent pipe currently reads the water depth at 6-hour intervals. The data loggers in the wells (MW1 and P7) also read water depths at 6-hour intervals. The resulting data are plotted and the trend is developed by drawing a curve through the data. A horizontal line drawn at elevation 7055 ft is graphically compared to the data trend to determine if the water level will exceed 7055 ft. Extrapolation of the water level data trend will change as more water is released from the cell. Currently, a fit of the square root equation fits the data. However, as the water level decreases, the extrapolated curve will become tangential to elevation 7055 ft, and typical curve-fitting methods will not work; at this time, the drain should be closed. Water levels in the cell will continue to drop. Attachment 3 of the LTSP will be modified to include the following discussion and figure:

3.1 DETERMINATION OF TOE DRAIN CLOSURE

When the toe drain is closed, whether permanently or for other reasons (e.g., maintenance, winter shutdown), the data logger results (which are obtained at 6-hour intervals) should be retrieved and examined to determine the water level trend. When the trend shows the water level will remain below the critical elevation of 7055 ft, the toe drain may be left closed and checked again after a 6-month interval. As long as extrapolation of the data continues to show the water level stays below the critical

elevation, the toe drain should be left closed and checked at 6-month intervals for a minimum of 2 years. After this 2-year period, the toe drain may be permanently closed as outlined below. Figure A3.6 shows a typical example of the data logger results and how the trend of the phreatic surface has been determined.

UMTRA DOCUMENT REVIEW FORM

(3)

COMMENT

Site: Durango, Colorado Date: 10 June 1996
Document: Long-Term Surveillance Plan
Reviewer: U.S. Nuclear Regulatory Commission (NRC)
Comment: 3

The staff is aware that some erosion damage has occurred at the outlet of Drainage Ditch #1 during the past several years. This damage was apparently caused by erosion in the small ephemeral stream which flows adjacent to the channel outlet. The NRC staff observed this damage in 1993, and verbally recommended to DOE that a permanent solution be developed to prevent recurrence of the erosion damage. The staff recognizes that the overall erosion protection design is adequate, even if damage occurs at the channel outlet. However, the damage which occurs is very unsightly because a large quantity of rock is displaced, and it may not always be clear to an inspector that tailings are not in imminent danger of being eroded. Therefore, the staff considers that DOE should take steps to design preventative measures to prevent this erosion from occurring each time a flood occurs in the adjacent stream.

During onsite discussions in 1993, the staff suggested that one method of permanently solving the erosion problem would be to relocate and straighten the perennial stream so that its flow would not be directed toward the outlet of the channel. This design option would consist of little more than an earthmoving operation to excavate a new channel and fill in the old eroded one. Further, this option would also protect the tow of the holding pond located in this area. In lieu of a permanent solution, DOE should carefully monitor the erosion situation in this area. Erosion markers should be installed and the magnitude and rate of erosion should be evaluated. DOE should provide additional information in the LTSP related to the specific aspects of erosion monitoring this area.

RESPONSE

Page: ____ By: J. Lommler (TAC) Date: 28 June 1996

The DOE and its contractors have been aware of the erosion occurring at the outlet of Drainage Ditch #1 since spring of 1992. The DOE, the RAC, and the TAC held several meeting and conference calls. Opinions and recommendations from several team members were similar to those outlined in the NRC staff position, "Surface Erosion, #1." All team members agreed that "no action" was appropriate for the following reasons:

1. A riprap wall was designed and installed to prevent the ephemeral stream from eroding into contaminated material in the cell. The finished wall is 62.5 ft wide at the top, 10.0 ft wide at the bottom, and 16.5 ft deep.

2. The riprap wall centerline is approximately 128 ft from the stream centerline, which at the time of construction provided 100 ft of erodible soil between the stream and the riprap wall.
3. The elevation of the bottom of the protective riprap wall is approximately 1.5 ft lower than the elevation of the ephemeral stream bottom.
4. The centerline of the protective riprap wall is a minimum of 150 ft from the nearest buried contaminated material.
5. Observed erosion along the south side of the ephemeral stream has moved the bottom of the stream laterally (i.e., toward the protective riprap wall) approximately 3 to 5 ft. The top of the stream bank has sloughed in and been eroded away, forming a flatter stream side slope (i.e., approximately 2.0 to 1 slope to a 3.0 to 1 slope). As a result of sloughing, the top of the bank receded up to approximately 30 ft. If the stream-side bank sloughed back all the way to the edge of the riprap wall, an 8.5 to 1 slope would be formed, which is a very flat, stable slope angle.

DOE agrees that it is unsightly, but that it is performing as designed. The DOE believes spending additional dollars on a drainage structure that is performing as designed is not in the best interest of the taxpayer.

UMTRA DOCUMENT REVIEW FORM

(4)

COMMENT

Site: Durango, Colorado Date: 10 July 1996
Document: Long-Term Surveillance Plan
Reviewer: U.S. Nuclear Regulatory Commission (NRC)
Comment: 4 (verbal)

The LTSP states that well 623 serves as a background location for shallow groundwater within alluvium; however this well is located near downgradient compliance well 608, also completed in alluvium. Please clarify the conditions that make this well a suitable indicator of background conditions.

RESPONSE

Page: ____ By: J. Carman (TAC) Date: 11 July 1996

The occurrence of alluvium/colluvium within the Bodo Canyon area is primarily controlled by bedrock topography. Drainages incised on the bedrock surface contain the thickest portions of alluvium/colluvium and the occurrence of ground water in unconsolidated sediments at the site generally is limited to these areas. As stated in Section 5.1.1 of the draft LTSP, ground water in the shallow alluvium was mostly encountered northeast of the disposal cell in the vicinity of well 606. Shallow ground water monitor well 608, completed in alluvium/colluvium east of the holding pond on the north side of the disposal cell, monitors ground water transmitted within a northeast-trending paleochannel incised upon the bedrock surface (see Figures 5.1 and 5.3). Ground water occurring within unconsolidated sediments in this channel constitutes a separate preferred flow path.

Monitor well 623 is completed within alluvium/colluvium occurring in the north arroyo drainage. The north arroyo and the paleochannel that runs beneath the disposal cell converge east of well 623. Ground water monitored by well 623 originates north and west of the site and thus is considered generally representative of background conditions for locally saturated alluvium/colluvium. Cross-section Figure 5.4 has been modified to indicate the influence of bedrock topography on lateral hydraulic separation in this area.

The following additional text will be added to the second paragraph of Section 5.2.1, "Direct Ground Water Monitoring Network."

Well 623 is completed in alluvium/colluvium fill in a bedrock drainage (north arroyo) on the north side and away from the disposal cell. Ground water monitored by well 623 originates north and west of the site. Downgradient of well 623, the north arroyo and

the paleochannel that runs under the disposal cell converge to form a single alluvium/colluvium-filled drainage. These conditions are such that well 623 receives no ground water flow contribution from beneath the disposal cell, and thus is considered representative of background conditions for locally saturated alluvium/colluvium.