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U.S. Department of Energy

Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503

LKV

MAR 25 1998

Mr. Joseph H. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop T7J9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Revision 1 of the Document, *Long-Term Surveillance Plan for the UMTRA Disposal Site, Lakeview, Oregon, August 1994*

Dear Mr. Holonich:

DOE proposes to revise the Long-Term Surveillance Plan (LTSP) for the Collins Ranch, or Lakeview, Title I Mill Tailings Disposal Site by page change and by addition of a new attachment:

Attachment 8. Procedure for Gradation Testing of Riprap

To accommodate the new attachment, page 6-4 will be revised to refer to the attachment.

The new attachment incorporates DOE's field procedure for annual measurement, or gradation testing, of the size of the riprap on the armored surface of the disposal cell.

The reason for this revision of the LTSP, and the reason for gradation testing of the riprap, is DOE's concern for the long-term survival of the riprap. When the disposal cell was built, stones placed on the armored surface of the disposal cell were of sufficient size to survive the design Probable Maximum Flood. Some stones in the riprap have shown a tendency to break into smaller pieces after several years of subareal weathering. If a sufficient number of these stones weather into smaller pieces, eventually the riprap may no longer meet the design specification. Annual gradation testing will permit DOE to gauge the rate of weathering and to demonstrate that the size of the rock remains sufficient to meet the design specification.

DOE requests NRC concurrence in the incorporation of the procedure in the LTSP.

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Please call me at (970) 248-6037 if you have questions or comments.

Sincerely,

Russel Edge

Russel Edge
Project Manager

Enclosure

cc w/enclosure:
D. Stewart-Smith, State of Oregon
File LKV 21.1.1

cc w/o enclosure:
C. Jones, MACTEC-ERS

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PAGE-CHANGE REVISION
Long-Term Surveillance Plan for the Collins Ranch Disposal Site, Lakeview, Oregon, August 1994.

Page 6-4 will be revised. The second bullet on this page:

- Rapid rock cover deterioration caused by weathering or erosion.

will be replaced by a new paragraph that implements the procedure in Attachment 8.

The page-change revision will look like this:

- Sedimentation or debris
- Removal of rock or other disposal cell material
- Seepage
- Intrusion (inadvertent ro deliberate) by humans or animals
- Animal burrowing
- Vandalism
- Trails showing human or animal activity
- Volunteer plant growth

When the disposal cell was built, stones placed on the side slope of the disposal cell were of sufficient size to survive the design Probable Maximum Flood (PMF). Some of these stones have shown a tendency to break into smaller pieces after several years of surface weathering. If a sufficient number of these stones weather into smaller pieces, the riprap may no longer meet the design specification. Therefore, beginning in 1998, DOE will implement an annual gradation testing procedure (Attachment 8). Annual gradation testing will permit DOE to gauge the rate of weathering and to demonstrate that the size of the rock remains sufficient to meet the design specification. Testing will unusually be performed during the annual site inspection. Results of the testing will be included in DOE's annual inspection report.

6.5 MODIFYING PROCESSES -- no change

ATTACHMENT 8
PROCEDURE FOR GRADATION TESTING OF RIPRAP

Procedure for Gradation Testing of Riprap

Implementation

DOE will implement the following procedure for gradation testing of riprap in 1998. The procedure will be repeated annually, usually in conjunction with DOE's annual inspection of the site. Results of the gradation testing will be included in DOE's annual site inspection report.

Rationale

DOE is concerned for the long-term survival of the riprap. When the disposal cell was built, stones placed on the armored surface of the disposal cell were of sufficient size to survive the design Probable Maximum Flood (PMF). Since placement, some stones in the riprap have shown a tendency to break into smaller pieces after several years of subareal weathering. If a sufficient number of these stones weather into smaller pieces, the riprap may eventually no longer meet the design specification. Annual gradation testing will permit DOE to gauge the rate of weathering and to demonstrate that the size of the rock remains sufficient to meet the design specification.

Equipment

- 8-inch diameter sieve stack, including: 4-inch opening, 2½-inch opening, and 1½-inch opening.
- 2-foot by 2-foot wire mesh with 25 equally spaced intersections at 4-inch centers.
- white paint with ¼-inch wide brush.

Procedure

1) Determine 10 random locations systematically distributed across the west face. All distances are measured in feet from the top of the side slope on the south end of the disposal cell.
    - determine 10 pairs of random numbers between 0.0 and 1.0.
    - the first number of the pair is the longitudinal number (*x*), the second is the transverse number (*y*); enter numbers into the following Table and perform the computations indicated. For example; to determine the location of sample number (3), multiply the first random number, (*x*), by 100 and add 200 to the product, then multiply the second random number, (*y*), by 270. Enter these results in the table columns on the far right.

2) Locate each sample location on the side slope with a wire flag.

3) Place the wire mesh at the sample location. Orient the mesh perpendicular to the slope with the southwest corner adjacent to the wire flag.

4) Paint a white dot on each stone lying directly beneath a wire intersection.

Table 1. Sample locations for stone dimension determination

sample number	random numbers pairs (x,y)		multiplier		sample locations	
	longitudinal (x)	transverse (y)	longitudinal (ft)	transverse (ft)	longitudinal distance from south end (ft)	transverse distance from top slope (ft)
1			$100x$	$270y$		
2			$100x + 100$	$270y$		
3			$100x + 200$	$270y$		
4			$100x + 300$	$270y$		
5			$100x + 400$	$270y$		
6			$100x + 500$	$270y$		
7			$100x + 600$	$270y$		
8			$100x + 700$	$255y$		
9			$100x + 800$	$215y$		
10			$100x + 900$	$130y$		

5) Remove the mesh, and pass each marked stone through the sieve stack until the stone is retained on a sieve.

6) Record the number of stones retained on each sieve on a copy of the attached form, verify that the total number of stones equals 25.

7) Replace sampled stones within the 2-foot by 2-foot sample location.

Data reduction procedure

At each sample location determine the stone size corresponding to the sample point D_{50} according to the following procedure:

1) Determine the percent retained on each of the three sieves by using equation (1):

$$R_i = \frac{N_i}{A} \times 100 \qquad (1)$$

where: R_i = percent retained on sieve I,
N_i = number of stones retained on sieve I,
A = total number of stones sampled (25),
I = sieve size, i.e. 4-inch, 2½-inch, and 1½-inch.

For example, when 5 stones are retained in the 4-inch sieve;

$$R_{4\text{-}inch} = \frac{5}{25} \times 100 = 20\%$$

2) Determine the percent passing each sieve size by subtracting the sum of percentages retained from 100 as shown in equation (2):

$$P_i = (100 - \Sigma R_i) \qquad (2)$$

where: P_i = percent passing sieve I,
R_i = previously defined.

For example:

when $R_{4\text{-}inch}$ = 30% and $R_{2½\text{-}inch}$ = 35%;

$$P_{2½\text{-}inch} = 100 - (30 + 35) = 35\%$$

3) Determine D_{50} as the size where 50 percent of the stones are smaller. Compute D_{50} by linear interpolation (proportioning). The following equation illustrates this process:

$$D_{50} = S_{i+} - \frac{(P_{i+} - 50) \times (S_{i+} - S_{i-})}{(P_{i+} - P_{i-})} \tag{3}$$

where: D_{60} (inch) = size for which 50 percent of the stones are smaller,
S_{i+} (inch) = sieve size that more than 50 percent passes,
S_{i-} (inch) = sieve size that less than 50 percent passes,
P_{i+} = percentage passing greater than 50,
P_{i-} = percentage passing less than 50.

For example:

when $P_{4\text{-}inch}$ = 70%, $P_{2\frac{1}{2}\text{-}inch}$ = 35%, S_{i+} = 4-inch, and S_{i-} = 2½-inch;

$$D_{50}\ (inch) = 4\text{-}inch - \frac{(70 - 50) \times (4\text{-}inch - 2\tfrac{1}{2}\text{-}inch)}{(70 - 35)} = 3.1\ inch$$

4) Determine and report the mean ($\bar{x}$) of the in situ slope D_{50} by using data collected from all ten sample locations by using equation (4):

$$\bar{x} = \frac{\sum_{j=1}^{10} x_j}{10} \tag{4}$$

where: $\bar{x}$ = mean in situ slope D_{50},
x = computed sample location D_{50},
j = sample location counter from 1 to 10.

Lakeview, Oregon
Type-B Riprap Gradation Monitoring

Sample location number	number of stones retained			
	4-inch	2½-inch	1½-inch	total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				