

ATTACHMENT II-7

CLOSURE PLAN

1. PARTIAL LANDFILL CLOSURE

- a. At no time shall there be more than 450,000 square feet of active (open) waste placement area within the Mixed Waste Landfill Cell (MWLC) footprint.
 - i. Cell footprint with waste that has been either covered with temporary cover, final cover, or a minimum six inches of native soil free of debris shall be excluded from the 450,000 square foot limit.
- b. After an area of the MWLC has reached the maximum height of waste at the shoulder (31.5 feet above the elevation of the clay liner rim) with a horizontal to vertical slope of 5h:1v and the maximum height of waste at the peak (~36 feet above the elevation of the clay liner rim) with a slope up to 50h:1v, temporary cover shall be constructed, followed by final cover construction.
- c. Temporary cover consists of 12 inches of compacted clay.
- d. Final cover includes the temporary cover and all clay, synthetic materials, and rock layers.

2. CLOSURE

All contaminated material in the storage areas shall be removed. The Mixed Waste Facility including the storage areas shall be decontaminated. All contaminated material shall be placed in the MWLC or otherwise managed in accordance with this Attachment. The composite final cover shall be placed on the MWLC. All closure fences, inspection roads, and ditches shall be constructed. During the final closure all tanks and containers shall be decontaminated, then removed from the Mixed Waste Facility or disposed of in a permitted landfill and in accordance with the destination landfill's permit.

- a. At least 180 days prior to the anticipated date of closure, the Permittee shall submit a detailed closure plan and a "Notice of Intent to Close" to the Director for approval. The Notice shall indicate the following:
 - i. that the entire Mixed Waste Facility shall be closed;
 - ii. the anticipated date of closure commencement;
 - iii. a preliminary schedule of closure;

- iv. a general list of items and equipment for decontamination;
 - v. a construction quality assurance manual;
 - vi. closure drawings; and
 - vii. solid waste management unit remedial investigation study report.
- b. The stockpiled overburden from excavation at the site may be used in construction of the MWLC cover.
- c. The final cover shall be installed in accordance with Attachment II-9, *Construction QA/QC Manual* and drawings in Attachment II-11, *Facility Drawings*.
- d. Inspection roads and permanent site drainage, including drainage ditches, shall be constructed.
- e. The retention pond and the run-on/run-off dike shall be removed.
- f. A permanent, six-foot high chain-link fence shall be installed and maintained for a minimum of 30 years.
- g. The entire Mixed Waste Facility shall be radiologically monitored to determine the spread of radiological contamination.
- i. If radiological contamination is detected, soil monitoring for hazardous waste contamination shall be performed.
 - ii. If hazardous waste contamination is found near the boundaries of the Mixed Waste Facility, then a sampling and analysis plan shall be prepared for Director approval.
- h. Soils with hazardous waste contamination shall be removed and disposed within the MWLC or closed as a landfill in accordance with Utah Admin. Code R315-264-310.
- i. Closure certification shall be completed by a qualified, independent, Utah registered professional engineer and submitted to the Director. The certification shall indicate that the closure was completed in accordance with this Attachment.
- j. Land survey work, as required, shall be performed by and certified by a Utah registered land surveyor.

- k. A closure report shall be submitted to the Director and shall contain the following:
 - i. The general requirements;
 - ii. construction quality assurance/quality control activities;
 - iii. index providing location of relevant documentation not specifically included in the report;
 - iv. summary of construction activities;
 - v. results of QA/QC testing and monitoring;
 - vi. As-Built Drawings; and
 - vii. conclusions.

3. CLOSURE PERFORMANCE STANDARDS

- a. The material for disposal shall be placed in accordance with the approved closure plan described in Condition 2.a.
- b. Detection monitoring of air shall be continued for a minimum of one year after closure certification.
- c. Detection monitoring of groundwater shall be continued for a minimum of 30 years after closure certification.
- d. Erosion control and flood protection shall be provided for a minimum of 30 years after closure certification.
- e. The site shall be fenced both during and after construction to restrict public access. Custodial maintenance and surveillance shall be provided.
- f. The Permittee shall provide on or before February 1 of each year, a report to the Director for the preceding calendar year. The report shall summarize post-closure activities as well as the results of testing, monitoring and surveillance activities.

4. COMPOSITE COVER (RADON BARRIER) ELEMENTS OF DESIGN

- a. The MWLC shall be overlain with a composite cover designed and constructed in accordance with Module V, *Disposal in Landfills*, Condition V.C.23.

- b. Water that gets into the drainage layers should be drained off the MWLC into the surface drainage channel (ditch) and shall ultimately be drained from the area.

5. EROSION BARRIER- ELEMENTS OF DESIGN

- a. The top of the MWLC shall be covered with rock having a minimum mean diameter of one-and-one-quarter-inch at a slope greater than or equal to 50h:1v, and the side slopes shall be covered with rock having a minimum mean diameter of four-and-one-half-inches at a slope less than or equal to 5h:1v.
- b. Underlying both top and side slope layers shall be a filter zone, six-inches thick, having a mean diameter slightly larger than one-and-one-half-inches.
- c. The rock layer shall be an erosion barrier designed to provide protection for the 1-hour Probable Maximum Precipitation (PMP) event. A PMP event is defined as the maximum precipitation that could occur from the most severe combination of meteorological conditions that are reasonably possible in a region.
- d. The rock layer shall be constructed to protect the MWLC from wind erosion, and shall discourage plant root intrusions and burrowing animals.

6. SITE DRAINAGE - ELEMENTS OF DESIGN

- a. Drainage ditches shall be located around the base of the MWLC and shall direct the flow into the natural drainage pattern south and west of the site. The ditches shall have triangular cross sections with side slopes constructed and maintained no steeper than 5h:1v.
- b. Attachment II-11, *Facility Drawings*, shows the cross-section of the ditches and roadway designed for any MWLC at the Clive Facility.

7. STRUCTURAL STABILITY - ELEMENTS OF DESIGN

- a. To protect the MWLC from the effects of water erosion, the MWLC slopes shall be limited to 5h:1v. The top of the MWLC shall be convex with gentle 50h:1v slopes to promote drainage.
- b. To ensure that the MWLC can withstand water erosion during the design life, the surfaces of the radon barrier shall be graded and the corners rounded, and the entire MWLC radon barrier shall be covered with a rock erosion barrier.
- c. To protect against the erosive effects of a PMP, the side slopes of the embankment shall be covered with a 1.5 foot thick layer of graded rock material.

- d. The rock layer shall be constructed to provide protection against wind erosion.
- e. Seismic (static and dynamic) analyses have been performed on the embankment design.

8. MAXIMUM WASTE INVENTORY

- a. The MWLC shall have capacities as defined in Table V-I of Module V, *Disposal in Landfills*.
- b. The maximum quantity of waste in storage at the site, untreated or awaiting disposal (including thermal desorption condensate), shall not exceed 6,500 cubic yards. Waste in storage is inclusive of all waste outside of permitted disposal areas. This limit includes waste that is generated both on site and off site and includes materials that when declared a waste would become an untreated hazardous waste, such as water within the surface impoundment, decontamination water within the 90-day tank at the wash bay, and laboratory chemicals.
 - i. Untreated waste quantities shall be managed to reflect cost estimates for treatment. A formula shall be used wherein,

X = Quantity of TD Condensate

Y = Quantity of untreated waste for treatment at Clive
(Clive Treatment; cubic yards)

UC = Unit Cost for Condensate Incineration (\$/cubic yard)

TUC = Treatment Unit Cost for Clive Treatment (\$/cubic yard)

ASR = Analytical Sample Ratio = 2% of Treatment Waste cubic yards
(samples/cubic yard)

ASC = Analytical Sample Cost (\$/sample)

IA = Indirect Adder for Treatment Wastes

TD IA = Indirect Adder for Condensate

The Condensate Cost Equation is:

$$\text{Total TD Condensate Treatment Cost} = (X)(UC) (TD IA)$$

The Treatment Waste Cost Equation is:

$$\text{Total Clive Treatment Cost} = ((Y)(TUC + (ASR)(ASC)))(IA)$$

The Total Untreated Waste Cost Equation combines the previous two equations:

$$\text{Total} = (X)(UC) \text{ TD IA} + ((Y)(TUC + (ASR)(ASC)))(IA)$$

- ii. The Permittee shall determine the required quantity of untreated waste types and keep records of these calculations in the Operating Record.
- c. The Permittee shall maintain a reserved capacity in the MWLC in accordance with the volume listed in Attachment II-7-3, *Reserve Capacity Calculations*. This volume includes equipment, demolition debris, soils, etc.

9. INVENTORY AND EQUIPMENT DECONTAMINATION

- a. During the closure process the Permittee shall decontaminate all equipment in accordance with Attachment II-1-6, *Leachate, Evaporation, and Decontamination Waste Management Plan*, and the Permittee's Radioactive Material License (UT 2300249) at the time of closure. The following scenarios apply:
 - i. If equipment has been triple rinsed, and is visually clean using reasonably achievable methods, PCB decontaminated in accordance with 40 CFR 761.79, and radiologically decontaminated it may be disposed of in a municipal landfill or salvaged.
 - ii. If equipment has been triple rinsed, and is visually clean using reasonably achievable methods, PCB decontaminated, and does not meet radiological release limits it may be disposed of at the Permittee's Low Level Radioactive Waste Facility or in the MWLC.
 - iii. If equipment does not meet treatment standards or has not been triple rinsed, it shall be treated (if necessary) and disposed within the MWLC.
- b. Portable high pressure water washing systems, and/or portable steam generators shall be used to decontaminate construction equipment, train track rails, unloading ramps, etc. The scenario for extremely difficult decontamination may be remediation by sandblasting for removal of contamination. The radiological limits specified in the Permittee's Radioactive Material License (UT 2300249) shall be achieved prior to releasing equipment from the site.

10. CLOSURE OF CONTAINERS

- a. During the closure process the Permittee shall dispose empty containers according to this Permit or decontaminate containers in accordance with Attachment II-1-6, *Leachate, Evaporation, and Decontamination Waste Management Plan*, and the Permittee's Radioactive Material License (UT 2300249).

11. CLOSURE OF TANKS

- a. All wastes removed from tanks shall be characterized and treated if necessary to meet treatment standards and disposed.
- b. During the closure process the Permittee shall decontaminate all tanks in accordance with Attachment II-1-6, *Leachate, Evaporation, and Decontamination Waste Management Plan*, and the Permittee's Radioactive Material License (UT 2300249) at the time of closure. The disposal scenarios outlined in Condition 9.a then apply.

12. CLOSURE COST CALCULATIONS

- a. The Permittee's entire Facility (including the Mixed Waste Facility, the Low-Level Radioactive Waste Facility, and the 11e.(2) Facility) will be closed concurrently.
 - i. A summary of the entire Facility Closure Costs is provided in Attachment II-7-1, *Overall Facility Closure Cost Summary*. This summary includes individual costs for closure and post-closure of each of the Permittee's Facilities.
 - ii. Detailed descriptions and costs for the closure and post-closure care of the Mixed Waste Facility are provided in Attachment II-7-2, *Closure Cost Estimate - MW Detail*.
 - iii. Closure cost differences between Attachments II-7-1 and II-7-2 may be attributed to calculation rounding errors and the additional costs associated with radiological and other monitoring associated with post-closure years 31-100 (operational monitoring & maintenance and groundwater monitoring).
- b. Closure and post-closure costs for the Mixed Waste Facility shall be based on hiring a third party to conduct these activities (as described in R315-264-142(a)(2) and R315-264-144(a)(1)). Costs may be estimated by one, or a combination of, the following methods:
 - i. operating experience;
 - ii. R.S. Means Heavy Construction Data, current edition;
 - iii. prices of work currently performed at the Permittee's Clive Facility;
 - iv. prices from distributors and contractors; or

- v. costs developed through a competitive process with third-party consultants.
- c. Costs for mobilization, general cleanup, and administration shall be included in the closure cost estimate.
- d. For the Mixed Waste Facility, a total closure amount based on the cost estimate for items in this Attachment is provided in the Grand Totals section of Attachment II-7-1, *Overall Facility Closure Cost Summary*. This total cost summary is exclusive to the Mixed Waste Facility and covers all aspects of closure and post-closure associated with the Mixed Waste Facility.
- e. The closure and post-closure cost estimate shall be adjusted annually for inflation and reported in current year dollars in accordance with R315-264-142(b) and R315-264-144(b).
- f. Closure costs may also be adjusted for facility changes that may raise or lower the estimate.
- g. The closure cost estimate shall be updated and the financial assurance mechanism fully funded prior to any new hazardous waste management unit accepting waste. The update shall be performed for any new unit or when any existing hazardous waste management unit is changed, modified or altered in size in any manner or fashion.

13. FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

- a. The financial assurance mechanism for closure and post-closure shall meet the requirements of those designated in Utah Admin. Code R315-264-140 through -151. In addition, a Standby Trust Agreement shall be executed in accordance with the applicable financial mechanism for the Mixed Waste Landfill Cell.
 - i. The financial assurance mechanism shall be funded for the amount for “MW” in the Grand Totals section of Attachment II-7-1, *Overall Facility Closure Cost Summary*. This amount includes costs for closure of the Facility and for monitoring through the post-closure period.
 - ii. The mechanics of the financial assurance mechanism shall follow the rules in Utah Admin. Code R315-264-140 through R315-264-151, as applicable.

END OF ATTACHMENT II-7