

ENVIROCARE OF UTAH, INC. OPERATING PROCEDURES MANUAL

PROCEDURE:	<u>BPW-5 11e.(2) Waste Disposal</u>
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FORWARDED:	
<u>[Signature]</u> Site Manager	<u>ACTING</u> Date <u>12-16-96</u>
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CONCURRENCE:	
<u>N/A [Signature]</u>	<u>12/9/96</u> Date
REVIEW:	
<u></u> Corporate Radiation Safety Officer	<u></u> Date
APPROVAL:	
<u></u> Project Manager/Operations Director	<u></u> Date

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BPW-5 11e.(2) WASTE DISPOSAL

A. PURPOSE:

This procedure provides guidelines for proper placement of radioactive waste material into the appropriate 11e.(2) disposal embankment.

B. REFERENCE OR AUTHORITY:

1. 11e.(2) Radioactive Material License SMC-1559, dated ~~11/19/93~~, as amended;
2. Application for 11e.(2) Radioactive Material License SMC-1559, dated ~~12/23/91~~, as amended;
3. Groundwater Quality Discharge Permit # UGW450005, as amended, dated 03/20/92;
4. Envirocare of Utah, Inc. Construction QA/QC Manual, as revised
5. Envirocare of Utah, Inc. Operating Procedures Manual; ~~Construction, as revised QA/QC Manual~~
6. Envirocare of Utah, Inc. Quality Assurance Manual, as revised;
7. Envirocare of Utah Waste Management Plan, as amended.

C. PRECAUTIONS AND LIMITATIONS:

1. Always wear gloves when handling waste material to prevent possible skin contamination.
 2. All workers, other than truck drivers in closed trucks, involved in unloading or disposal of waste from shipments identified as Radiation Areas, as defined in OP Manual BPW-4 C.3, will be; will be required to wear appropriate respiratory protection. For those tasks determined to required the use of respirators, half-face respirators will be provided with a minimum protection factor of 10 against airborne particulates. Full-face respirators will also be provided (if necessary) with a minimum protection factor of 50. ~~involved in unloading or disposal of high activity waste, as defined in OP Manual Procedure BPW-4 C.3, will be required to wear full face respirators providing protection factor of 50.~~
 3. When testing or surveying is performed on an active lift area, the testing personnel must make eye contact with and receive a hand signal from all excavation vehicle operators working the active area.
 4. ~~To prevent w~~Wind dispersal of waste material will be addressed in accordance with Reference 7. ~~a polymer solution will be sprayed bi-weekly on all exposed contaminated cell areas; and on any 11e.(2) Disposal Cells which have been disturbed in the previous two weeks but are not currently active.~~
- ~~a. Each spring after the waste is no longer frozen, but in no case later than March 1, the year's initial application of polymer shall be made.~~

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- b. ~~The year's final application of polymer will be made before November 1 of any calendar year. Application of polymer is not required when the waste remains frozen.~~

5 During periods of high winds (winds in excess of 40 miles per hour), movement and placement of bulk waste material must be shut down.

D. GENERAL INSTRUCTIONS:

1 This procedure applies to the disposal and placement of all waste material in the 11e.(2) embankment at the Envirocare South Clive Disposal Facility.

2 Each lift of waste material shall be given a discrete designation (zone name and lift number) for testing and surveying purposes.

3 Each lift of waste material shall be approved as "placed" upon satisfactory completion of compaction, moisture, and thickness testing requirements.

a. Each lift shall be compacted to 90 percent of a standard Proctor performed for each generator or fill material.

b. A lift shall have a moisture content from zero to 3 percent over optimum based on ASTM standard D698.

c. Waste material is placed in lifts with an uncompacted thickness not exceeding 12 inches.

4 All soil density and moisture tests shall be performed with a licensed nuclear moisture/density gauge or by the sand cone method.

5 To insure proper calibration, a sand cone density test shall be performed jointly with five percent of all nuclear density tests for waste material. Also, an oven-drying test shall be performed jointly with five percent of all nuclear moisture tests.

6 All waste placement in the 11e.(2) embankment will be documented in the Waste Placement Record (EC-0250) by a Quality Control Engineering Technician (or designated alternate) or Quality Assurance personnel.

7 Wastes from shipments identified as Radiation Areas, as defined in Reference 5, BPW-4 C.3, ^{Low 12} that are placed in the disposal cell must be covered with low activity waste or six inches of clean fill after final compaction if that portion of the lift will be inactive for more than 10 working days. ~~High Activity Waste, as defined in OP Manual Procedure BPW-4 C.3, placed in the disposal cell must be covered with low activity waste or four inches or more of clean fill after final compaction in order to~~

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~~reduce gamma exposures to workers on subsequent lifts, unless the subsequent lifts are also high activity waste (reference 1).~~

8. Wastes placed within 10 feet of the top or sides of the disposal cell must not exceed an average of 500 pCi/g of ^{226}Ra or ^{230}Th and must not exceed 1,000 pCi/g for those isotopes in any shipment in order to prevent radon emissions at the surface of the radon barrier from exceeding 20 pCi/m²/s. ~~High Activity Wastes, as defined in OP Manual Procedure BPW-4 C-3, will not be placed closer than 10 feet from the top or sides of a disposal cell to prevent high radon emissions.~~

9. No shipment with average concentrations exceeding 500 pCi/g of ^{226}Ra or ^{230}Th will be placed within 2 feet of the top or sides of the cell. An approved model for radon emanation will be run after completion of the upper lifts and before placement of the radon barrier to confirm that any layering of wastes with average concentrations of more than 500 pCi/g per lift will meet the design criterion for radon release at the surface of the completed cell.

10. Any movement of waste material after it has been placed must be documented by the Quality Control (QC) Officer or QC Engineering Technician on the QC Daily Construction Report and Lift Approval Form must be assigned a new zone specification and lift number. The change of location coordinates will be recorded in the Waste Placement Record.

11. A minimum of four classification tests will be conducted each year waste is placed. At least two classification tests shall be performed for each large generator (a generator disposing of 50,000 cubic yards or more). If there is a change of material for a large generator, a new classification will be performed.

12. All debris placed within a lift must be uniformly distributed throughout the lift. It should be distributed so that adequate space is provided for fill between the debris to enable compaction according to the guidelines given in D.3 above.

13. A lift shall not contain more than ten percent by volume of non-compactable debris (unless in the form of stone, concrete or solid metal). Non-compactable debris is defined as any waste material that:

- a. Has a gradation that will not pass through a four inch grizzly; and,
- b. Has a density less than 70 pounds per cubic foot dry weight.

14. Non-compactable debris in the form of stone, concrete or solid metal may be placed up to 25 percent by volume of a lift if the debris is placed to minimize any void space in the lift.

15. A lift may not consist of more than a total of 25 percent by volume of any type of non-compactable debris (Reference 4).

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16. Debris shall not be placed in the outermost two feet of the disposal embankment. Debris-free material is defined as: a) material which contains less than one percent debris volume, and b) debris where the maximum volume of any individual piece is less than or equal to 0.1 cubic foot.

17. Waste material shall only be placed in winter only when the required moisture and compaction requirements, as listed in D.3 above, can be met. For waste placement purposes, winter is defined as November 1 to March 1. To assure compliance of with this requirement:

- a. On November 1, decrease density and moisture lot size to 750 cubic yards.
- b. On December 1, and continuing to March 1, decrease density and moisture lot size to 500 cubic yards.

18. No frozen material shall be placed within 24 inches of the clay liner. Frozen material is defined as material which cannot meet the compaction requirements (as listed in D.3) because of frozen water mixed within the material.

19. After October 1 of any given year, placement of waste in any defined zone shall be stopped when two consecutive compaction tests fail due to frozen material. The first "unapproved" lift shall be defined as "winter blanket."

- a. Winter blanket can be temporarily managed in piles up to ten feet on the embankment.
- b. Winter blanket cannot be placed on slopes steeper than 5H:1V.
- c. If waste stored as winter blanket is classified as high activity waste, as defined in Reference 5, OP-Manual BPW-4 C.3, it must be covered with low activity waste or six inches of clean fill material to reduce gamma exposure and radon emissions.
- d. All winter blanket shall be placed to final specifications within 90 days after spring start-up, and in no case later than June 1.

20. Prior to placing another generator's waste on top of waste from another generator whose laboratory tests have not yet been received, the top of the lift will be surveyed at a minimum rate of one survey point for every 800 square feet of lift.

21. When new lifts are placed next to old lifts, at least 3 feet; (measured horizontally;) shall be removed from the outer edge of the old lift. In addition to the density testing of the lift, an average of one density test per three lifts shall be performed at the old/new lift interfaces.

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22. When waste material is to be placed and the work area is covered with snow, the snow must be removed prior to placement.

E. OPERATING INSTRUCTIONS:

1. A QC Engineering Technician directs the contractor to have waste transported to an appropriate embankment location (with the concurrence of the Site Manager) upon obtaining approval for placement from the Site Manager or Shipping and Receiving Manager (SRM) ~~ARGS~~.

2. When receiving material to be placed directly in the cell, a QC Engineering Technician (or qualified designated alternate) shall visually inspect the shipment, calculate the percentage of debris, and record on the Lift Approval Form ~~Daily Construction Report~~ the amount of fill required to meet the volume ratios specified in D.103 through D.125 above. If the debris volume cannot be determined visually, or if the calculated debris volume is close to the specified limits, the RSR will be consulted for the manifested volume.

3. The contractor is directed to uniformly distribute the waste in the designated cell area to a thickness not exceeding 12 inches, uncompacted, ~~uncompacted~~.

4. A ~~qualified~~ QC Engineering Technician (or designated alternate) (~~or designated alternate~~) performs a thickness test as follows:

- a. Calculate the approximate area of the lift; document it on the Lift Approval Form; and sketch the lift area on the Lift Approval Form.
- b. Divide the lift into lots (during construction season 1 lot = a minimum ~~maximum~~ of 10,000 square feet).
- c. Generate two random numbers from 0 to 1 for each lot using a calculator that has a random numbers function, random numbers table or another approved method. Multiply one random number by the approximate north-south dimension of the lot, and the other random number by the approximate east-west dimension of the lot as measured in feet. These are the coordinates for the test to be performed. Record these this locations on the Lift Approval Form.
- d. Dig a hole and measure the loose lift thickness with a ruler, tape measure, or other measuring device with a minimum of tenths of foot accuracy markings. Measure this thickness from the bottom of the hole to the bottom of a straight edge laid across the top of the hole or survey the lift. ~~The lift may also be surveyed to measure the thickness.~~

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- e. Approve the lot for thickness if the resulting measurement is less than 12 inches. Document this approval on the Lift Approval Form.
 - f. If the thickness is greater than 12 inches, repeat step 4.d above at four points (north, east, south, and west) approximately ten feet from the original measurement.
 - 1) Average the five measurements together.
 - 2) Approve the lift for thickness if the resulting average is less than 12 inches. Rework the lot if the average is greater than 12 inches. Repeat steps E.4.c through e. noted above.
5. A QC Engineering Technician releases the lift area to the contractor to work (compact) the waste material to achieve the required moisture and compaction limits listed in D.3 above. Upon judgment/judgement of satisfactory working of the material, a QC Technician (or designated alternate) with certified completion of eight hours of Nuclear Moisture/Density Gauge training shall:
- a. Identify the number of lots in the lift using the area and thickness calculated in E.4 above (1 lot = 1,000 cubic yards).
 - b. Generate random numbers for the in-place moisture/density test coordinates following the same process as for the thickness measurement described in E.4.c above.
 - c. Carefully prepare the testing site for the nuclear gauge/gage test to assure a high probability of accuracy.
 - d. Measure the moisture and density of the material using the nuclear moisture/density gauge/gage.
 - e. Approve the lift if the compaction and the moisture content meet the requirements given in D.3 above, and document approval on the Lift Approval Form.
 - f. If the lift does not meet compaction or moisture requirements, direct the contractor to re-work the material and repeat step E.5 in its entirety.
6. Density tests will also be performed at the old/new lift interfaces at an average of one density test per three lifts, as follows:

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- a. Generate a random number for each lift which has an old/new lift interface. If the random number generated is 0.65 or greater, a moisture/density test is required on the lift interface.
 - b. Generate a random number for each lift interface to determine the location of the test to be performed. Multiply the random number by the approximate length of the interface. This is the coordinate location for the test.
 - c. Approve lots which meet compaction requirements as described in D.3 above.
 - d. Re-work and re-test lots not meeting the compaction requirements as described in E.5D.3 above.
7. For waste material placed in the 11e.(2) embankment as winter blanket, the QC Officer (or designated alternate) shall:
- a. Document the elevation of the last approved lift (before winter blanket material was applied) on the Lift Approval Form ~~Daily Construction Report~~.
 - b. Identify the generator of the waste on the Lift Approval Form ~~Daily Construction Report~~.
 - c. Survey each zone where blanket is placed and document the approximate thickness of the blanket.
 - d. Calculate bi-monthly the total volume of waste classified as winter blanket or as storage and also waste on the LARW storage pads to assure limitations given in Reference 1D-16-e above are not exceeded.
 - e. During Spring Start-Up:
 - 1) ~~Divide~~ Divide all exposed winter blanket into lots-5,000 square foot lots in area lots;
 - 2) ~~Conduct~~ Conduct moisture/density and thickness tests on the bottom 12 inch lift, following steps E.4 and E.5 above (except for the noted lot size);
 - 3) ~~Continue~~ Continue performing steps E.4 and E.5 above for each successive lift:

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*-----If a lift fails a density test, perform three additional density tests on the lift, following step E.5 above and approve the lift if all three tests have satisfactory results;

*-----If a lift continues to exhibit unsatisfactory test results, it is considered a failing lift and all material placed above the failing lift must be removed. Re-compact the material of the failing lift and conduct moisture/density tests on the lift following step E.5 above. Re-work the material above the failing lift and repeat steps E.3 through 5 until all winter blanket material is placed (Reference 4).

8. As a part of Spring Start-Up, test the last approved lift of each specified zone in the 11e.(2) embankment that was not protected by six inches of clay compacted to a field permeability of 1×10^{-6} , 12 inches of loose clay, or two feet of winter blanket during the winter season. For zones where a lift fails the compaction requirements:

- a. Divide all the exposed waste in that zone into lots of 10,000 square foot lots in size lots;
- b. Dig down 12 inches into the lift and conduct in-place moisture/density tests at a rate of one test per lot, following step E.5 above.
 - 1)-----If a lot fails a test, perform three additional density tests on the lot following step E.5 above;
 - 2)-----If a lot continues to exhibit unsatisfactory test results, continue to test each successively lower 12 inch lift until a lift with satisfactory test results is found; then Remove and re-work all the material which was placed above the passing lift following steps E.3 through E.5 of this procedure.

F. QUALITY CONTROL:

1. QC Process Control Checks:
 - a. All QC documentation must be reviewed and approved by the Quality Assurance Officer (or designated alternate) prior to final lift placement approval.
 - b. A daily inspection of all embankment cell areas should be performed to look for plastic and other items which may easily become airborne; Any such material found should be returned to the appropriate cell area.

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- c. The QA Officer (or designated alternate) Department shall observe a minimum of five percent of the tests performed by the QC personnel to ensure that the test and observations are being performed and recorded correctly.
2. Sample Control: -A soil sample is obtained from the site of the nuclear moisture/density tests performed for verification of the testing results. -This verification is performed by the oven-dry method.
3. Data Control:
 - a. All density, moisture, and proctor records shall be maintained in the QC Engineering Files at the South Clive Site with a copy maintained at Corporate Headquarters in accordance with Reference 4.
 - b. The Quality Assurance Daily Report shall be maintained in the QA Files at both the South Clive Site and at Corporate Headquarters.
 - c. The "Zone Summary Drawing" must be up-dated semi-annually to reflect the changes in the landfill area.
4. Audit Requirements:
 - ~~b~~ a. Semi-annually Quarterly; The Envirocare Waste Placement Record shall be audited by the QA Officer (or designate alternate) Department to assure all waste received and disposed of has disposal date, zone specification, and lift number.
 - ~~cb~~ Quarterly; The Polymer Record (EC-1850) shall be reviewed by the Radiation Safety Officer (or designated alternate) to assure bi-weekly application.

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A. PURPOSE: This procedure provides guidelines for proper placement of radioactive waste material into the appropriate 11e.(2) disposal embankment.

B. REFERENCE OR AUTHORITY:

1. 11e.(2) Radioactive Material License SMC-1559, dated 11/19/93;
2. Application for 11e.(2) Radioactive Material License SMC-1559, dated 12/23/91, as amended;
3. Groundwater Quality Discharge Permit #UGW450005, dated 03/20/92;
4. Construction QA/QC Manual.

C. PRECAUTIONS AND LIMITATIONS:

1. Always wear gloves when handling waste material to prevent possible skin contamination.
2. All workers, other than truck drivers in closed trucks, involved in unloading or disposal of high activity waste, as defined in OP Manual Procedure BPW-4 C.3, will be required to wear full-face respirators providing protection factor of 50.
3. When testing or surveying is performed on an active lift area, the testing personnel must make eye contact with and receive a hand signal from all excavation vehicle operators working the active area.
4. To prevent wind dispersal of waste material, a polymer solution will be sprayed bi-weekly on all exposed contaminated cell areas, and on any 11e.(2) Disposal Cells which have been disturbed in the previous two weeks but are not currently active.
 - a. Each spring after the waste is no longer frozen, but in no case later than March 1, the year's initial application of polymer shall be made.
 - b. The year's final application of polymer will be made before November 1 of any calendar year. Application of polymer is not required when the waste remains frozen.
5. During periods of high winds (winds in excess of 40 miles per hour), movement and placement of waste material must be shut down.

D. GENERAL INSTRUCTIONS:

1. This procedure applies to the disposal and placement of all waste material in the 11e.(2) embankment at the Envirocare South Clive Disposal Facility.

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2. Each lift of waste material shall be given a discrete designation (zone name and lift number) for testing and surveying purposes.
3. Each lift of waste material shall be approved as "placed" upon satisfactory completion of compaction, moisture, and thickness testing requirements.
 - a. Each lift shall be compacted to 90 percent of a standard Proctor performed for each generator or fill material.
 - b. A lift shall have a moisture content from zero to 3 percent over optimum.
 - c. Waste material is placed in lifts with an uncompacted thickness not exceeding 12 inches.
4. All soil density and moisture test shall be performed with a licensed nuclear moisture/density gauge or by the sand cone method.
5. To insure proper calibration, a sand cone density test shall be performed jointly with five percent of all nuclear density for waste material. Also, an oven-drying test shall be performed jointly with five percent of all nuclear moisture tests.
6. All waste placement in the 11e.(2) embankment will be documented in the Waste Placement Record (EC-0250) by a Quality Control Engineering Technician (or designated alternate).
7. High Activity Waste, as defined in OP Manual Procedure BPW-4 C.3, placed in the disposal cell must be covered with low activity waste or six inches or more of clean fill after final compaction in order to reduce gamma exposures to workers on subsequent lifts, unless the subsequent lifts are also high activity waste (reference 1).
8. High Activity Wastes, as defined in OP Manual Procedure BPW-4 C.3, will not be placed closer than 10 feet from the top or sides of a disposal cell to prevent high radon emissions.
9. Any movement of waste material after it has been placed must be documented by the Quality Control (QC) Officer in the QC Daily Construction Report and must be assigned a new zone specification and lift number. The change of location coordinates will be recorded in the Waste Placement Record.
10. A minimum of four classification tests will be conducted each year waste is placed. At least two classification tests shall be performed for each large generator (a generator disposing of 50,000 cubic yards or more). If there is a change of material for a large generator, a new classification will be performed.

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11. All debris placed within a lift must be uniformly distributed throughout the lift. It should be distributed so that adequate space is provided for fill between the debris to enable compaction according to the guidelines given in D.3 above.

12. A lift shall not contain more than ten percent by volume of non-compactible debris (unless in the form of stone, concrete or solid metal). Non-compactible debris is defined as any waste material that:

- a. Has a gradation that will not pass through a four inch grizzly; and,
- b. Has a density less than 70 pounds per cubic foot dry weight.

13. Non-compactible debris in the form of stone, concrete or solid metal may be placed up to 25 percent by volume of a lift if the debris is placed to minimize any void space in the lift.

14. A lift may not consist of more than a total of 25 percent by volume of any type non-compactible debris (reference 4).

15. Debris shall not be placed in the outermost two feet of the disposal embankment. Debris-free material is defined as: a) material which contains less than one percent debris volume, and b) debris where the maximum volume of any individual piece is less than or equal to 0.1 cubic foot.

16. Waste material shall only be placed in winter when the required moisture and compaction requirements, as listed in D.3 above, can be met. For waste placement purposes, winter is defined as November 1 to March 1. To assure compliance of this requirement:

- a. On November 1, decrease density and moisture lot size to 750 cubic yards.
- b. On December 1, and continuing to March 1, decrease density and moisture lot size to 500 cubic yards.

17. No frozen material shall be placed within 24 inches of the clay liner. Frozen material is defined as material which cannot meet the compaction requirements (as listed in D.3) because of frozen water mixed within the material.

18. After October 1 of any given year, placement of waste in any defined zone shall be stopped when two consecutive compaction tests fail due to frozen material. The first "unapproved" lift shall be defined as "winter blanket."

- a. Winter blanket can be temporarily managed in piles up to ten feet on the embankment.
- b. Winter blanket cannot be placed on slopes steeper than 5H:1V.

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- c. If waste stored as winter blanket is classified as high activity waste, as defined in OP Manual BPW-4 C.3, it must be covered with low activity waste or six inches of clean fill material to reduce gamma exposure and radon emissions.
 - d. All winter blanket shall be placed to final specifications within 90 days after spring start-up, and in no case later than June 1.
19. Prior to placing another generator's waste on top of waste from another generator whose laboratory tests have not yet been received, the top of the lift will be surveyed at a minimum rate of one survey point for every 800 square feet of lift.
20. When new lifts are placed next to old lifts, at least 3 feet, measured horizontally, shall be removed from the outer edge of the old lift. In addition to the density testing of the lift, an average of one density test per three lifts shall be performed at the old/new-lift interfaces.
21. When waste material is to be placed and the work area is covered with snow, the snow must be removed prior to placement.

E. OPERATING INSTRUCTIONS:

1. A QC Engineering Technician directs the contractor to have waste transported to an appropriate embankment location (with the concurrence of the Site Manager) upon obtaining approval for placement from the Site Manager or ARCS.
2. When receiving material to be placed directly in the cell, a QC Engineering Technician (or designated alternate) shall visually inspect the shipment, calculate the percentage of debris, and record on the Daily Construction Report the amount of fill required to meet the volume ratios specified in D.10 through D.12 above. If the debris volume cannot be determined visually, or if the calculated debris volume is close to the specified limits, the RSR will be consulted for the manifested volume.
3. The contractor is directed to uniformly distribute the waste in the designated cell area to a thickness not exceeding 12 inches, uncompacted.
4. A QC Engineering Technician (or designated alternate) performs a thickness test as follows:
 - a. Calculate the approximate area of the lift, document it on the Lift Approval Form, and sketch the lift area on the Lift Approval Form.
 - b. Divide the lift into lots (during construction season 1 lot = a maximum of 10,000 square feet).

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- c. Generate two random numbers for each lot using a calculator that has a random numbers function. Multiply one random number by the approximate north-south dimension of the lot, and the other random number by the approximate east-west dimension of the lot as measured in feet. These are the coordinates for the test to be performed. Record this location on the Lift Approval Form.
- d. Dig a hole and measure the loose lift thickness with a ruler, tape measure, or other measuring device with a minimum of tenths of foot accuracy markings. Measure this thickness from the bottom of the hole to the bottom of a straight edge laid across the top of the hole.
- e. Approve the lot for thickness if the resulting measurement is less than 12 inches. Document this approval on the Lift Approval Form.
- f. If the thickness is greater than 12 inches, repeat step 4.d above at four points (north, east, south, and west) approximately ten feet from the original measurement.
 - 1) average the five measurements together,
 - 2) approve the lift for thickness if the resulting average is less than 12 inches. Rework the lot if the average is greater than 12 inches. Repeat steps E.4.c through e. noted above.

5. A QC Engineering Technician releases the lift area to the contractor to work (compact) the waste material to achieve the required moisture and compaction limits listed in D.3 above. Upon judgement of satisfactory working of the material, a QC Technician (or designated alternate) with certified completion of eight hours of Nuclear Moisture/Density Gage training shall:

- a. Identify the number of lots in the lift using the area and thickness calculated in E.4 above (1 lot = 1,000 cubic yards);
- b. Generate random numbers for the in-place moisture/density test coordinates following the same process as for the thickness measurement described in E.4.c above;
- c. Carefully prepare the testing site for the nuclear gage test to assure a high probability of accuracy;
- d. Measure the moisture and density of the material using the nuclear moisture/density gage;

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- e. Approve the lift if the compaction and the moisture content meet the requirements given in D.3 above, and document approval on the Lift Approval Form;
 - f. If the lift does not meet compaction or moisture requirements, direct the contractor to re-work the material and repeat step E.5 in its entirety.
6. Density tests will also be performed at the old/new lift interfaces at an average of one density test per three lifts, as follows:
- a. Generate a random number for each lift which has an old/new lift interface. If the random number generated is 0.65 or greater, a moisture/density test is required on the lift interface.
 - b. Generate a random number for each lift interface to determine the location of the test to be performed. Multiply the random number by the approximate length of the interface. This is the coordinate location for the test.
 - c. Approve lots which meet compaction requirements as described in D.3 above.
 - d. Re-work and re-test lots not meeting the compaction requirements as described in E.5 above.
7. For waste material placed in the 11e.(2) embankment as winter blanket, the QC Officer (or designated alternate) shall:
- a. Document the elevation of the last approved lift (before winter blanket material was applied) on the Daily Construction Report.
 - b. Identify the generator of the waste in the Daily Construction Report.
 - c. Survey each zone where blanket is placed and document the approximate thickness of the blanket.
 - d. Calculate bi-monthly the total volume of waste classified as winter blanket and also waste on the LARW storage pads to assure limitations given in D.16.c above are not exceeded.
 - e. During Spring Start-Up:
 - 1) divide all exposed winter blanket into 5,000 square foot lots;

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2) conduct moisture/density and thickness tests on the bottom 12 inch lift, following steps E.4 and E.5 above (except for the noted lot size);

3) continue performing steps E.4 and E.5 above for each successive lift:

- if a lift fails a density test, perform three additional density tests on the lift, following step E.5 above and approve the lift if all three tests have satisfactory results;

- if a lift continues to exhibit unsatisfactory test results, it is considered a failing lift and all material placed above the failing lift must be removed. Re-compact the material of the failing lift and conduct moisture/density tests on the lift following step E.5 above. Re-work the material above the failing lift and repeat steps E.3 through 5 until all winter blanket material is placed (reference 4).

8. As a part of Spring Start-Up, test the last approved lift of each specified zone in the 11e.(2) embankment that was not protected by six inches of clay compacted to a field permeability of 1×10^{-6} , 12 inches of loose clay, or two feet of winter blanket during the winter season. For zones where a lift fails the compaction requirements:

- a. Divide all the exposed waste in that zone into 10,000 square foot lots;

- b. Dig down 12 inches into the lift and conduct in-place moisture/density tests at a rate of one test per lot, following step E.5 above.

- 1) if a lot fails a test, perform three additional density tests on the lot following step E.5 above;

- 2) if a lot continues to exhibit unsatisfactory test results, continue to test each successively lower 12 inch lift until a lift with satisfactory test results is found, then remove and re-work all the material which was placed above the passing lift following steps E.3 through E.5 of this procedure.

F. QUALITY CONTROL:

1. All QC documentation must be reviewed and approved by the Quality Assurance Officer (or designated alternate) prior to final lift placement approval.

2. A daily inspection of all embankment cell areas should be performed to look for plastic and other items which may easily become airborne, such material found should be returned to the appropriate cell area.

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3. Sample Control: A soil sample is obtained from the site of the nuclear moisture/density tests performed for verification of the testing results. This verification is performed by the oven-dry method.
4. Data Control:
 - a. All density, moisture, and proctor records shall be maintained in the QC Engineering Files at the Clive Site with a copy maintained at Corporate Headquarters in accordance with reference 4.
 - b. The Quality Assurance Daily Report shall be maintained in the QA Files at the Clive Site and at Corporate Headquarters.
 - c. The "Zone Summary Drawing" must be up-dated semi-annually to reflect the changes in the landfill area.
5. Audit Requirements:
 - a. The QA Officer (or designated alternate) shall observe a minimum of five percent of the tests performed by the QC personnel to ensure that the test and observations are being performed and recorded correctly.
 - b. Quarterly, the Envirocare Waste Placement Record shall be audited by the QA Officer (or designated alternate) to assure all waste received and disposed of has disposal date, zone specification, and lift number.
 - c. Quarterly, the Polymer Record (EC-1850) shall be reviewed by the Radiation Safety Officer (or designated alternate) to assure bi-weekly application.

BPW-6 11e.(2) WASTE INTERIM STORAGE

A. PURPOSE: To provide guidelines for the storage, inspection and handling of bulk and containerized waste that is not placed directly into the 11e.(2) disposal embankment upon acceptance.

B. REFERENCES OR AUTHORITY:

1. 11e.(2) Radioactive Material License SMC-1559, dated 11/19/93;
2. Application for 11e.(2) Radioactive Material License SMC-1559, dated 12/23/91, as amended;
3. Ground Water Quality Discharge Permit #UGW450005 dated 9/10/93;
4. Construction QA/QC Manual;
5. Waste Management Plan.

C. PRECAUTIONS AND LIMITATIONS:

1. Waste material stored as bulk waste must be stored in the 11e.(2) Disposal Cells area. Waste stored as containerized waste should be in storage on the LARW Container Storage Pad for a minimum tenure, but in no case will storage exceed 180 days. A greater storage period than this limit requires prior written approval from the Executive Secretary of the Division of Radiation Control (DRC).
2. Within 48 hours of waste being unloaded at the Truck Unloading Facility, waste must be moved to the 11e.(2) Disposal Cell or the LARW Container Storage Area. Waste which does not meet waste acceptance criteria may remain in the Truck Unloading Facility until the problem is resolved.
3. Bulk waste at the Rail Car Rollover Facility must be taken to the 11e.(2) Disposal Cell as soon as possible or within 24 hours after the most recent rail car or shipment has been unloaded.
4. Any container discovered to be leaking must be either contained in an overpack drum, placed into approved bulk storage, or properly disposed of in the embankment.
5. Any fluid found in the leak detection observation manhole of the LARW Bulk Storage Pad must be reported to both the Utah Division of Radiation Control and Division of Water Quality within 24 hours of detection. Additionally, a written report must be submitted to the DRC within 5 working days.
6. On a bi-weekly basis, a polymer solution will be sprayed on all bulk waste material stored in the 11e.(2) Disposal Cell Area. The application of polymer will begin each calendar year when the waste is no longer frozen, but in no case later than March 1. The year's final application will be made before November 1 of any calendar year. Each application of polymer will be documented on the forms EC-1825 and EC-1850.

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7. Whenever average wind velocities exceed 40 miles per hour, or upon notice from the Site Manager, Field or Corporate Radiation Safety Officer, all loading, hauling, and dumping of bulk wastes will cease.

D. GENERAL INSTRUCTIONS:

1. This procedure applies to all 11e.(2) waste accepted by Envirocare but not immediately disposed of in the 11e.(2) disposal cell.

2. After a shipment is accepted, it will be managed as either bulk waste or waste in containers.

a. For all Bulk Waste Material placed in storage:

1) The following types of bulk shipments may be received:

- Gondola Rail Cars,
- Dump Truck Loads,
- Intermodals,
- End Dumps.

2) All bulk shipments should have the proper labeling and marking as required by the U.S. Department of Transportation (DOT).

3) Bulk waste may be unloaded directly into the 11e.(2) Disposal Cell, on the Bulk Storage Pad for transfer to the 11e.(2) Disposal Cell, or at the Rail Car Rollover Facility.

4) Before any 11e.(2) bulk waste material is unloaded onto either the LARW Bulk Storage Pad or the Rail Car Rollover Facility, the facility must be clean of all LARW waste material using loaders, brooms, shovels or other appropriate means until the residue of LARW material has been removed from the surface of the facility, as determined by a qualified Radiation Technician.

5) Bulk waste unloaded at the Rail Car Rollover Facility may only be managed one generator at a time.

6) Bulk waste may be stored in the 11e.(2) disposal cells as Winter Storage during winter months (between November 1 and March 1) in accordance with reference 4.

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- 7) Bulk shipments may not be unloaded at the LARW Truck Unloading Facility.
- b. For all Containerized Waste placed in storage:
 - 1) The following types of strong, tight, DOT-approved containers may be received or used to containerize bulk waste:
 - 96 cubic foot B-25 boxes;
 - 48 cubic foot B-12 boxes;
 - 50- and 55-gallon drums;
 - Various sizes of polyethylene bags;
 - Seavans;
 - Other containers approved by the U.S. DOT.
 - 2) All containers must arrive at the site in good condition and must have the proper labeling and marking as required by the U.S. DOT.
 - 3) Containers may be unloaded in the 11e.(2) Disposal Cell, onto LARW Bulk Storage Pad, onto the LARW Container Storage Pad, or onto the LARW Truck Unloading Facility. However, temporary storage is only permitted at the Container Storage Pad.
 - 4) Before any containerized waste material is unloaded or stored at any of the facilities listed in D.2.b.3 above, the facility will be cleaned of all LARW waste material (bulk or containerized) using loaders, brooms, shovels or other appropriate means until the residue of LARW material has been removed from the surface of the facility, as determined by a qualified Radiation Technician.
 - 5) Waste in bags or cardboard boxes may only be stored at the LARW Bulk Storage Pad. They may not be unloaded and managed at the LARW Truck Unloading Facility.
 - 6) All drums will be stored so that they are up off the ground on pallets. Boxes stored in the LARW Container Storage Area will be equipped with bottom runners to prevent contact with the ground surface.
 - 7) Waste containers on the Container Storage Pad must be separated by aisles to allow for inspection. Aisle spacing will consist of at least the following distances:
 - 2 feet between container rows (spacing is between the pallets for drums on pallets);

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- 2 feet between generators;
 - 10 feet between containers and bulk waste;
 - 2 feet from the perimeter of the storage pad.
- 8) Containers holding waste may only be stacked to a maximum height of 10 feet (two B-25 boxes or three B-12 boxes) above the pad surface.
- 9) A row of containers shall be a maximum of two pallets or two boxes wide, provided that the pallets and box skids are placed perpendicular to the aisles to allow inspection of the area beneath the containers.
- 10) Containers will be moved on the LARW Container Storage Pad by means of forklift, dump trucks, flatbed trailers, or other such vehicles. Rock trucks or other heavy equipment that will damage the surface of the Storage Pad will not be allowed on the LARW Container Storage Pad.
- 11) Waste containers will be transported only when it has been assured that the lid or cover is secured and the container in a closed condition.
- 12) Containers will be transported as close to the ground as practical to minimize falling distance in case of an accident. Whenever a container is moved, transportation shall be done in a manner to prevent rupture of the container or release of waste material inside.
3. All waste material stored within the Restricted Area for more than 24 hours shall be identified by identification signs. ID signs must indicate the generator of the waste, the waste stream and the date the waste was stored. If the waste is containerized, the information for identification may be written directly on the container.
4. Monthly inspection shall include visual observation of the integrity of the containers and packages in storage.
5. Written record of all storage area inspections shall be maintained on site for a minimum of three years.

E. OPERATING INSTRUCTIONS:

1. Once an incoming shipment has been accepted, sampled and determined to be unloaded into one of the storage facilities, a Radiation Technician (or designated alternate), or the Contractor's foreman (or designated alternate) shall document on the Form EC-18 the storage area where the shipment is stored.

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2. After the shipment is unloaded in the appropriate area, it shall be marked with an identification sign as described in D.3 above.
3. Monthly, each shipment in storage (or group of shipments if they are bulk material) will then be inspected until it is placed in the appropriate 11e.(2) Disposal Cell. The inspection will be documented on form EC-1200 and kept on file at the Site. The inspection of the LARW Container Storage Pad shall consist of the following:
 - a. Inspect each container for evidence of leaks, corrosion, or deterioration;
 - b. Inspect each container for evidence of excessive rusting;
 - c. Inspect container lids to ensure that they are sealed;
 - d. Visually inspect each container to ensure it has structural integrity (no holes, gaps, or damage from forklifts or other actions);
 - e. Check for adequate aisle spacing as specified in D.2.b.6 above;
 - f. Inspect each container for proper identification as specified in D.3 above;
 - g. Ensure that each generator waste stream is separated and adequately spaced from the other waste streams (as specified in D.2.b.6 above);
 - h. Ensure that only 11e.(2) waste containers are stored on the LARW Container Storage Pad;
 - i. Inform the Site Manager and the Radiation Safety Officer of any inspection items which are not in compliance, updated measures taken to resolve any problems.

F. QUALITY CONTROL:

1. Data Control:

An inspection will be performed and documented of all storage facilities each month.

2. Audit Requirements:

- a. The Clive Site Health Physics Department conducts daily inspections of the LARW Container Storage Pad, the Rail Car Rollover Unloading

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Facility, and the Truck Unloading Facility to ensure the reference 5 requirements are met.

- b. Semi-annually, the QA Officer will coordinate a comprehensive review of the filed shipment records and the monthly waste storage areas inspections to ensure a complete record exists.