



State of Utah

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DIVISION OF SOLID AND
HAZARDOUS WASTE
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Executive Secretary

December 15, 2011

Jeff W. Horrocks
Emery County Commissioner
P.O. Box 907
Castle Dale, Utah 84513

RE: Approval of Class I Landfill Permit

Dear Commissioner Horrocks:

The 30-day public comment period for the Emery County Class I draft permit began on November 8, 2011. The announcement of the public comment period appeared in the Emery County Progress. No comments were received. Accordingly, no changes were made to the draft permit. Enclosed is Permit #9427R2, which expires on December 8, 2021.

If you have any questions, please contact Rob Powers at (801) 536-0255.

Sincerely,

Scott T. Anderson, Executive Secretary
Utah Solid and Hazardous Waste Control Board

Enclosure: Permit

STA/RDP/kk

c: David Cunningham, RN, MSN, Health Officer, Southeastern Utah Health Department
David Ariotti, DEQ District Engineer
Wayde Nielsen, Emery County Road Department Manager

TN201101306

**UTAH SOLID AND HAZARDOUS WASTE CONTROL BOARD
SOLID WASTE PERMIT RENEWAL**

**EMERY COUNTY
CLASS I LANDFILL**

Pursuant to the provisions of the *Utah Solid and Hazardous Waste Act*, Title 19, Chapter 6, Part 1, Utah Code Annotated (UCA) 1953, as amended (the Act) and the *Utah Solid Waste Permitting and Management Rules*, Utah Administrative Code (UAC) R315-301 through 320 adopted thereunder, a Permit is issued to

Emery County as owner and operator

to own, construct, and operate the Emery County Class I landfill located in the Northwest 1/4 of Northeast 1/4 of Section 16, Township 18 south, Range 8 east, Salt Lake Base and Meridian, Emery County, Utah as shown in the Permit Renewal Application that was determined complete on October 26, 2011.

The Permittee is subject to the requirements of UAC R315-301 through 320 and the requirements set forth herein.

All references to UAC R315-301 through 320 are to regulations that are in effect on the date that this Permit becomes effective.

This Permit shall become effective December 15, 2011.

This Permit shall expire at midnight December 15, 2021.

Closure Cost Revision Date: December 15, 2016.

Signed this 15th day of December, 2011.



Scott T. Anderson, Executive Secretary
Utah Solid and Hazardous Waste Control Board

FACILITY OWNER/OPERATOR INFORMATION

LANDFILL NAME: Emery County Class I Landfill

OWNER NAME: Emery County

OWNER ADDRESS: P.O. Box 889
Castle Dale, Utah, 84513

OWNER PHONE NO.: 435-381-5450

TYPE OF PERMIT: Class I Landfill

PERMIT NUMBER: 9427R2

LOCATION: Landfill site is located in Northwest 1/4 of Northeast 1/4 of Section 16, Township 18 south, Range 8 east SLMB; Emery County, Lat. 39° 15' 44", Long. 111° 01' 44"

PERMIT REQUIREMENTS

Permit as used in this document is defined in UAC R315-301-2(55).

The renewal application, Emery County 2011 Landfill Permit-August 17, 2011, as deemed complete on the date shown on the signature page of this Permit and Appendix A which includes the Statement of Basis for The Suspension of Ground Water Monitoring and Liner Requirements and the Statement of Basis for the Alternative Final Cover Design is hereby incorporated by reference into this Solid Waste Permit and shall be referred to as the "Permit Application" throughout this Permit. All representations made in the Permit Application are part of this Permit and are enforceable under UAC R315-301-5(2). The Permit Application shall become part of the operating record of the Landfill. Where differences in wording exist between this Permit and the application, the wording of this Permit supersedes that of the application.

This Permit consists of the signature page, Facility Owner/Operator Information, sections I through V, Appendix A the Statement of Basis for the Suspension of Ground Water Monitoring and Liner Requirements and the Statement of Basis for the Alternative Final Cover Design and the Permit Application as defined above.

The facility as described in this Permit consists of scale house and maintenance shed, maintenance shop, office trailer, green waste storage area, metal recycling area, asbestos disposal cell, MSW disposal cells phases 1-4, dead animal disposal pit.

By this Permit to own and operate, the Permittee is subject to the following conditions.

I. GENERAL COMPLIANCE RESPONSIBILITIES

A. General Operation

The Permittee shall operate the landfill in accordance with all applicable requirements of UAC R315-302 and 303, for a Class I landfill, that are in effect as of the date of this Permit unless otherwise noted in this Permit. Any permit noncompliance or noncompliance with any applicable portions of UCA 19-6-101 through 123 and applicable portions of UAC R315-301 through 320 constitutes a violation of the Permit or applicable statute or rule and is grounds for appropriate enforcement action, permit revocation, modification, or denial of a permit renewal application.

B. Acceptable Waste

This Permit is for the disposal of non-hazardous solid waste that may include:

1. Municipal solid waste;
2. Commercial waste;
3. Industrial waste;
4. Construction/demolition waste;
5. Special waste as allowed by UAC R315-315 and authorized in section III-I of this Permit and limited by this section; and
6. Conditionally exempt small quantity generator hazardous waste as specified in UAC R315-303-4(7)(a)(i)(B) and PCB's as specified by UAC R315-315-7(2).

C. Prohibited Waste

1. Hazardous waste as defined by UAC R315-1 and R315-2;
2. Containers larger than household size (five gallons) holding any liquid, non-containerized material containing free liquids or any waste containing free liquids in containers larger than five gallons; or
3. PCB's as defined by UAC R315-301-2, except as allowed in Section IB (Acceptable Waste) of this Permit.

Any prohibited waste received and accepted for treatment, storage, or disposal at the facility shall constitute a violation of this Permit, of UCA 19-6-101 through 123 and of UAC R315-301 through 320.

D. Inspections and Inspection Access

The Permittee shall allow the Executive Secretary of the Utah Solid and Hazardous Waste Control Board or an authorized representative of the Board, or representatives from the Southeastern Utah District Health Department, to enter at reasonable times and:

1. Inspect the landfill or other premises, practices or operations regulated or required under the terms and conditions of this Permit or UAC R315-301 through 320;
2. Have access to and copy any records required to be kept under the terms and conditions of this Permit or UAC R315-301 through 320;
3. Inspect any loads of waste, treatment facilities or processes, pollution management facilities or processes, or control facilities or processes required under this Permit or regulated under UAC R315-301 through 320; and
4. Create a record of any inspection by photographic, videotape, electronic, or any other reasonable means.

E. Noncompliance

If monitoring, inspection, or testing indicates that any permit condition or any applicable rule under UAC R315-301 through 320 may be or is being violated, the Permittee shall promptly make corrections to the operation or other activities to bring the facility into compliance with all permit conditions or rules.

In the event of any noncompliance with any permit condition or violation of an applicable rule, the Permittee shall promptly take any feasible action reasonably necessary to correct the noncompliance or violation and mitigate any risk to the human health or the environment. Actions may include eliminating the activity causing the noncompliance or violation and containment of any waste or contamination using barriers or access restrictions, placing of warning signs, or permanently closing areas of the facility.

The Permittee shall document the noncompliance or violation in the operating record, on the day the event occurred or the day it was discovered. Permittee shall

notify the Executive Secretary of the Solid and Hazardous Waste Control Board by telephone within 24 hours, or the next business day following documentation of the event. Permittee shall give written notice of the noncompliance or violation and measures taken to protect human health and the environment within seven days of Executive Secretary notification.

Within thirty days of the documentation of the event, the Permittee shall submit to the Executive Secretary a written report describing the nature and extent of the noncompliance or violation and the remedial measures taken or to be taken to protect human health and the environment and to eliminate the noncompliance or violation. Upon receipt and review of the assessment report, the Executive Secretary may order the Permittee to perform appropriate remedial measures including development of a site remediation plan for approval by the Executive Secretary.

In an enforcement action, the Permittee may not claim as a defense that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with UAC R315-301 through 320 and this Permit.

Compliance with this Permit does not constitute a defense to actions brought under any other local, state, or federal laws. This Permit does not exempt the Permittee from obtaining any other local, state or federal permits or approvals required for the facility operation.

The issuance of this Permit does not convey any property rights, other than the rights inherent in this Permit, in either real or personal property, or any exclusive privileges other than those inherent in this Permit. Nor does this Permit authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations including zoning ordinances.

The provisions of this Permit are severable. If any provision of this Permit is held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this Permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

F. Revocation

This Permit is subject to revocation if any condition of this Permit is not being met. The Permittee shall be notified in writing prior to any proposed revocation action and such action shall be subject to all applicable hearing procedures established under UAC R315-12 and the *Utah Administrative Procedures Act*.

As part of the revocation the Executive Secretary shall exercise the option to require payment of funds under the financial assurance mechanism held by the Executive Secretary.

G. Attachment Incorporation

Attachments to the Permit Application are incorporated by reference into this Permit and are enforceable conditions of this Permit, as are documents incorporated by reference into the attachments. Language in this Permit supersedes any conflicting language in the attachments or documents incorporated into the attachments.

II. DESIGN AND CONSTRUCTION

A. Design and Construction

The Permittee shall notify the Executive Secretary of any proposed incremental closure, placement of any part of the final, or placement of the full final cover. Construction of any portion of the final cover shall be considered as a separate construction event and shall be approved separately from any other construction or expansion of the landfill. Design approval shall be received from the Executive Secretary prior to construction and shall be accompanied by a Construction Quality Control and Construction Quality Assurance (CQC/CQA) Plan, for each construction season where incremental or final closure is performed.

A qualified independent third party shall perform the quality assurance function on cover components and other testing as required by the approved CQC/CQA Plan. The results shall be submitted as part of the as-built drawings to the Executive Secretary

All engineering drawings submitted to the Executive Secretary shall be stamped and approved by a professional engineer with a current registration in Utah.

B. Run-On Control

Drainage channels and diversions shall be constructed as specified in the Permit Application and maintained at all times to effectively prevent runoff from the surrounding area from entering the landfill.

C. Alternative Design

This facility has demonstrated through geologic, hydrogeologic, climatic, waste stream, and other factors that the landfill will not contaminate ground water and is

approved for the alternative design as outlined in the Permit Application. Any contamination of ground water resulting from operation of the landfill may result in the revocation of this alternative design approval. The basis for approval of the alternative design is found in the "Alternative Design Statement of Basis" found in Appendix A of this Permit.

III. LANDFILL OPERATION

A. Operations Plan

The Operations Plan included in the Permit Application shall be kept onsite at the landfill or at the location designated in section III-K of this Permit. The landfill shall be operated in accordance with the operations plan. If necessary, the facility owner may modify the Operations Plan, provided that the modification meets all of the requirements of UAC R315-301 through 320, is as protective of human health and the environment as that approved in the Permit Application, and is approved by the Executive Secretary as a minor modification under UAC R315-311-2(1)(a)(xiii). Any modification to the Operations Plan shall be noted in the operating record.

Any modification to the Operations Plan shall be submitted to the Executive Secretary for approval and is considered a minor permit modification in compliance with UAC R315-311-2(1)(a)(xiii) unless the Executive Secretary determines the change should be subject to public comment under UAC R315-311-2(1)(b).

B. Security

The Permittee shall operate the Landfill so that unauthorized entry to the facility is restricted. All facility gates and other access routes shall be locked during the time the landfill is closed. At least two persons employed by Emery County shall be at the landfill during all hours that the landfill is open. Fencing and any other access controls as shown in the Permit Application shall be constructed to prevent access of persons or livestock by other routes.

C. Training

Permittee shall provide training for on-site personnel in landfill operation, including waste load inspection, hazardous waste identification, and personal safety and protection.

D. Burning of Waste

Intentional burning of solid waste is prohibited and is a violation of UAC R315-303-4(2)(b). The burning of material when meeting the requirements of UAC R307-202-5 is allowed in a segregated area within the landfill site. All accidental fires shall be extinguished as soon as reasonably possible.

E. Daily Cover

The solid waste received at the landfill shall be completely covered at the end of each working day with a minimum of six inches of earthen material.

An alternative daily cover material may be used when the material and operation meets the requirements of UAC R315-303-4(4)(b) through (d) or when the alternative daily cover meets the requirement of UAC R315-303-4(4)(e).

1. Apply standard daily cover (min. 6 inches of soil) at least once per week, primarily to serve as a firebreak.
2. Apply standard daily cover any time the daily cover will be exposed for greater than 24 hours (normally this occurs once per week and also satisfies Condition "a" above).
3. Apply standard daily cover when weather conditions (e.g., wind, rain, etc.) prevent proper use of alternate daily cover.
4. Record alternative daily cover use dates in the facility daily operating log.
5. Permission to use alternative daily cover may be rescinded or amended if the requirements to prevent blowing debris, minimize access to the waste by vectors, minimize the threat of fires at the open face, minimize odors, or shed precipitation are not met, or if necessary to prevent nuisance conditions or adverse impacts to human health and or the environment.

F. Ground Water Monitoring

For the reasons outlined in Attachment A "Statement of Basis," attached to this Permit, the ground water monitoring requirement for the Emery County Class I landfill has been waived in accordance with R315-308-1(3). Any contamination of ground water resulting from operation of the landfill shall result in the revocation of this waiver.

G. Gas Monitoring

The Permittee shall monitor explosive gases at the landfill in accordance with the Gas Monitoring Plan contained in the Permit Application and shall otherwise meet the requirements of UAC R315-303-3(5). If necessary, the Permittee/s may modify the Gas Monitoring Plan, provided that the modification meets all of the requirements of UAC R315-301 through 320 and is as protective of human health and the environment as that approved in the Permit Application, and is approved by the Executive Secretary as a minor modification under UAC R315-311-2(1). Any modification to the Gas Monitoring Plan shall be noted in the operating record.

If the concentrations of explosive gases at any of the facility structures, at the property boundary, or beyond the property boundary ever exceed the standards set in UAC R315-303-2(2)(a), the Permittee shall immediately take all necessary steps to ensure protection of human health and notify the Executive Secretary. Within seven days of detection, place in the operating record the explosive gas levels detected and a description of the immediate steps taken to protect human health. Implement a remediation plan that meets the requirements of UAC R315-303-3(5)(b) and shall submit the plan to, and receive approval from, the Executive Secretary prior to implementation.

H. Waste Inspections

The Permittee shall visually inspect incoming waste loads to verify that no wastes other than those allowed by this permit are disposed in the landfill. A complete waste inspection shall be conducted at a minimum frequency of 1 % of incoming loads.

All loads suspected or known to have one or more containers capable of holding more than five gallons of liquid shall be inspected to ensure that each container is empty.

All loads that the operator suspects may contain a waste not allowed for disposal at the landfill shall be inspected.

Complete random inspections shall be conducted as follows:

1. The operator shall conduct the random waste inspection at the working face or an area designated by the operator.
2. Loads subjected to complete inspection shall be unloaded at the designated area;
3. Loads shall be spread by equipment or by hand tools;

4. A visual inspection of the waste shall be conducted by personnel trained in hazardous waste recognition and recognition of other unacceptable waste; and
5. The inspection shall be recorded on the waste inspection form in the Permit Application. The form shall be placed in the operating record at the end of the operating day.

I. Disposal of Special Wastes

If loads of incinerator ash is accepted for disposal it shall be transported in such a manner to prevent leakage or the release of fugitive dust. The ash shall be completely covered with a minimum of six inches of material, or use other methods or material, if necessary, to control fugitive dust. Ash may be used for daily cover when its use does not create human health and environmental hazard.

Animal carcasses may be disposed in the landfill working face and shall be covered with other solid waste or earth by the end of the operating day in which they are received. Alternatively, animal carcasses may be disposed in a special trench or pit prepared for the acceptance of dead animals. If a special trench is used, animals placed in the trench shall be covered with six inches of earth by the end of each operating day.

Asbestos waste shall be handled and disposed in accordance with UAC-315-315-2.

J. Self Inspections

The Permittee shall inspect the facility to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of wastes or contaminated materials to the environment or create a threat to human health or the environment. These general inspections shall be completed no less than quarterly and shall cover the following areas: Waste placement, cover; fences and access controls; roads; run-on/run-off controls; final and intermediate cover; litter controls; and records. A record of the inspections shall be placed in the daily operating record on the day of the inspection. Areas needing correction, as noted on the inspection report, shall be corrected in a timely manner. The corrective actions shall be documented in the daily operating record.

K. Recordkeeping

The Permittee shall maintain and keep on file at the landfill office, a daily operating record and other general records of landfill operation as required by UAC R315-302-2(3). The landfill operator, or other designated personnel, shall date and sign the daily operating record at the end of each operating day. Each record to be kept shall contain the signature of the appropriate operator or personnel and the date signed.

1. The daily operating record shall include the following items:
 - a. The number of loads of waste and the weights or estimates of weights or volume of waste received each day of operation and recorded at the end of each operating day;
 - b. Major deviations from the approved plan of operation recorded at the end of the operating day the deviation occurred;
 - c. Results of other monitoring required by this Permit recorded in the operating record on the day of the event or the day the information is received;
 - d. Records of all inspections conducted by the Permittee, results of the inspections, and corrective actions taken shall be recorded in the record on the day of the event.
2. The general record of landfill operations shall include the following items:
 - a. A copy of this Permit including the Permit Application;
 - b. Results of inspections conducted by representatives of the Utah Solid and Hazardous Waste Control Board and/or representatives of the Southeastern Utah District Health Department, when forwarded to the Permittee;
 - c. Closure and Post-closure care plans;
 - d. Records of employee training; and
 - e. Results of landfill gas monitoring.

L. Reporting

The Permittee shall prepare and submit, to the Executive Secretary, an Annual Report as required in UAC R315-302-2(4). The Annual Report shall include: the

period covered by the report, the annual quantity of waste received, an annual update of the financial assurance mechanism and all training programs completed.

M. Roads

All access roads within the landfill boundary that are used for transporting waste to the landfill for disposal shall be improved and maintained as necessary to assure safe and reliable all-weather access to the disposal area.

IV. CLOSURE REQUIREMENTS

A. Closure

Final cover of the landfill shall be as shown in the Permit Application. The final cover shall meet, at a minimum, the standard design for closure as specified in the UAC (R315-303-3(4)) plus sufficient cover soil or equivalent material to protect the low permeability layer from the effects of frost, desiccation, and root penetration. A quality assurance plan for construction of the final landfill cover shall be submitted to the Executive Secretary, and approval of the plan shall be received from the Executive Secretary prior to construction of any part of the final cover at the landfill. A qualified person not affiliated with the landfill owner/operator shall perform permeability testing on the recompacted clay placed as part of the final cover.

B. Title Recording

The Permittee shall meet the requirements of UAC R315-302-2(6) by recording a notice with the Emery County Recorder as part of the record of title that the property has been used as a landfill. The notice shall include waste disposal locations and types of waste disposed.

C. Post-Closure Care

Post-closure care at the closed landfill shall be done in accordance with the Post-Closure Care Plan contained in the Permit Application. Post-closure care shall continue until all waste disposal sites at the landfill have stabilized and the finding of UAC R315-302-3(7)(c) is made.

D. Financial Assurance

The Permittee shall keep in effect and active the currently approved financial assurance mechanism or another approved mechanism that meets the

requirements of UAC R315-309 to cover the costs of closure and post-closure care at the landfill. The financial assurance mechanism(s) shall be adequately maintained to provide for the cost of closure and post-closure care at any stage or phase or anytime during the life of the landfill or the permit life, whichever is shorter.

If a trust fund is used add the following.

With each annual revision of the closure and post-closure care cost estimate, the annual payments to be made to the trust fund shall be determined by the following formula:

$$NP=[CE-CV]/Y$$

where NP is the next payment, CE is the current cost estimate for closure and post-closure care (updated for inflation or other changes), CV is the current value of the trust fund, and Y is the number of years remaining in the pay-in period.

With each annual revision of the closure and post-closure care cost estimate, the approved financial assurance mechanism shall be updated to reflect the current cost estimates.

E. Financial Assurance Annual Update

An annual revision of closure and post-closure costs for inflation and financial assurance funding as required by R315-309-2(2), shall be submitted to the Executive Secretary as part of the annual report.

F. Closure Cost and Post-Closure Cost Revision

The Permittee shall submit a complete revision of the closure and post-closure cost estimates by the Closure Cost Revision Date listed on the signature page of this Permit any time the facility is expanded, any time a new cell is constructed, or any time a cell is expanded.

V. ADMINISTRATIVE REQUIREMENTS

A. Permit Modification

Modifications to this Permit may be made upon application by the Permittee or by the Executive Secretary. The Permittee shall be given written notice of any permit modification initiated by the Executive Secretary.

B. Permit Transfer

This Permit may be transferred to a new permittee or new permittees by meeting the requirements of the permit transfer provisions specified in UAC R315-310-11.

C. Expansion

This Permit is for a Class I Landfill. The permitted landfill shall operate according to the design and Operation Plan described and explained in the Permit Application. Any expansion of the current footprint designated in the description contained in the Permit Application, but within the property boundaries designated in the Permit Application, shall require submittal of plans and specifications to the Executive Secretary. The plans and specifications shall be approved by the Executive Secretary prior to construction.

Any expansion of the landfill facility beyond the property boundaries designated in the description contained in the Permit Application shall require submittal of a new permit application in accordance with the requirements of UAC R315-310.

Any addition to the acceptable wastes described in Section 1B shall require submittal of all necessary information to the Executive Secretary and the approval of the Executive Secretary. Acceptance for PCB bulk product waste under UAC R315-315-7(3)(b) can only be done after submittal of the required information to the Executive Secretary and modification of Section IC of this Permit.

D. Expiration

Application for permit renewal shall be made at least six months prior to the expiration date, as shown on the signature (cover) page of this Permit. If a timely renewal application is made and the permit renewal is not complete by the expiration date, this Permit shall continue in force until renewal is completed or denied.

Attachment A

STATEMENT OF BASIS
for the
SUSPENSION OF GROUND WATER MONITORING
AND LINER REQUIREMENTS
for the
EMERY COUNTY CLASS I LANDFILL

Background

The Utah Solid Waste Permitting and Management Rules (Rules) require municipal landfills, which receive over 20 tons of solid waste per day, to have a ground water monitoring system and to have disposal cells designed with a composite liner with a leachate collection system. However, these requirements may be suspended by the executive secretary of the Solid and Hazardous Waste Control Board if a demonstration can be made that meets the conditions of Section R315-308-1 and Section R315-303-4(3) of the Rules.

Section R315-308-1. Ground Water Monitoring Requirements

(3) Ground water monitoring requirements may be suspended by the Executive Secretary if the owner or operator of a solid waste disposal facility can demonstrate that there is no potential for migration of hazardous constituents from the facility to the ground water during the active life of the facility and the post-closure care period. This demonstration must be certified by a qualified ground water scientist and approved by the Executive Secretary, and must be based upon:

- (a) site specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport; and
- (b) contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and the environment.

Section R315-303-4(3(c)). Equivalent Design

- (i) The owner or operator may use, as approved by the Executive Secretary, alternative design, operating practices, and location characteristics which will minimize the migration of solid waste constituents or leachate into the ground or surface water which are at least as effective as the liners of Subsections R315-303-4(3)(a) or (b);
- (ii) The owner or operator must demonstrate that the standard of Subsection R315-303-3(1) can be met. The demonstration must be approved by the Executive Secretary, and must be based upon:
 - (A) the hydrogeologic characteristics of the facility and the surrounding land;
 - (B) the climatic factors of the area;
 - (C) the volume and physical and chemical characteristics of the leachate; and
 - (D) predictions of contaminant fate and transport in the subsurface that maximize contaminant migration and consider impacts on human health and the environment;

Emery County originally was granted an exemption from ground water monitoring and liners as

part of the June 1998 landfill permit. Currently, Emery County, as part of the permit renewal process, has requested in the Emery County 2011 Landfill Permit August 18, 2011, the exemption be continued. The geologic and climatic conditions have not changed at the site.

The Emery County Class I Landfill is located in Section 16, Township 18 South, Rand 8 East, Salt Lake Base and Meridian, Approximately 3 miles north of Castle Dale, Utah. The Landfill may accept non-hazardous waste, including municipal, commercial, industrial, and special non-hazardous wastes.

Following is a summary of the information that was submitted in support of the request.

Climatic Conditions

The climate in the area of the landfill is semi-arid, the seasons are well defined, and there is a fairly wide daily range in temperature. The average annual precipitation is 7.5 inches. Most of the precipitation occurs from July through October as thunder storms. Normal mean temperature ranges from 21.7 degrees F in January to 71.7 degrees F in July. The maximum recorded temperature is 103 degrees F, while the record minimum temperature reported is 35 degrees F below zero. Evapotranspiration averages 48 inches per year.

Landfill Design and Operation

Surface water is diverted away from the landfill by a series of ditches, roads, and berms designed to protect the landfill units from run-on water from a 25 year storm event.

The following operational practices also minimize the amount of water that may contact the solid waste. The active area of the landfill will be limited to the smallest practical size; liquid waste is excluded; all wastes are thoroughly compacted and receive a daily cover of six inches of soil; and the active area periodically receives an intermediate cover of 12 inches of soil. The size and progression of the landfill units will result in the units being brought to the final elevation and covered with a evapotranspiration cap consisting of a minimum 30 inches of earthen material designed as a barrier to prevent moisture from migrating to the waste.

Computer Modeling of Leachate Generation and Infiltration

The volume of leachate produced in the landfill needs to be evaluated to determine the landfills potential impact on ground water. Leachate is the liquid that has passed through or emerged from solid waste and may contain soluble, suspended, miscible, or immiscible materials removed from the waste. This liquid has the potential to migrate to ground water.

Computer modeling is often used to predict the amount of leachate a landfill can be expected to produce. The Hydrologic Evaluation of Landfill Performance (HELP) model was developed to evaluate the hydrologic performance of proposed landfill designs. The model accepts weather,

soil and design data and uses solution techniques that account for the effects of surface storage, snowmelt, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, subsurface drainage, unsaturated vertical drainage, and leakage through soils. Various combinations of layers and materials may be modeled. Results are expressed as monthly, annual, and long term average water budgets. The HELP model has been used to predict leachate production in several Utah landfills. The HELP Model was used to evaluate the Emery County Landfill. Conservative values were chosen for most of the input parameters in the Emery County Landfill model. For example, initial moisture content of the waste is a primary factor in the creation of leachate. Typical moisture contents for municipal solid waste range from 8% to 20% with the average being about 12%. If the initial moisture content of waste is increased, the waste mass will retain a smaller volume of incoming fluids; consequently more leachate would be generated. Initial moisture contents of 17%, 20% and 22.5% were used in the Emery County computer simulations.

Three simulations were conducted with the Emery County Model. The simulations evaluated the landfill after the disposal cell was full and a final cover had been installed. The simulation evaluated a landfill with 18 inches of cover material with a hydrologic conductivity of 1×10^{-5} cm/sec and alternating layers of six inches of daily cover and 36 inches of waste. The total thickness of waste was 24 feet. The simulation predicted the amount of leachate generated during a five year period. All simulations predicted that under this scenario, no leachate would be generated. In addition, the evapotranspiration cover design has been shown to allow less infiltration than the modeled 18 inches of 1×10^{-5} cm/sec cover soil.

The HELP model was also used to evaluate another municipal landfill in Beaver, Utah, which has similar climatic conditions to the Emery County Landfill. In this computer simulation, the landfill design consisted of a disposal cell that was full but did not have a final cover. The cover consisted of just a 6 inch layer of soil. Initial moisture content of the waste was set at 14%. The simulation evaluated a 25 year period and the predicted average annual percolation rate at the base of the landfill was 0.0001 inches per unit area.

HELP model simulations were also run for a municipal landfill with similar climatic conditions in Millard County, Utah. The results of these simulations predicted that much less than 1 inch per unit area per year would be produced.

The results of the above modeling indicate that a minimal amount of leachate, much less than 1 inch per unit area per year is likely to be generated during the life of the Emery County landfill.

Subsurface Conditions

The Emery County landfill is underlain by approximately 3,000 feet of Mancos Shale which is covered with a thin (less than 25 feet) veneer of pediment gravel. The only bedrock unit exposed at the landfill is the Blue Gate Member of the Mancos Shale. The Blue Gate Member is approximately 1,600 feet thick beneath the Emery County landfill and consists of light gray,

bluish gray and gray shale and shaly siltstone. The shale is thin to medium bedded and contains rare, thin silty sandstone beds. The Blue Gate Member's hydrologic characteristics have not been studied in detail because of its limited ability to store or transmit water.

The Blue Gate Member has limited permeability where fractured, but does not transmit nor store significant quantities of ground water. Fracture porosity within the Blue Gate Member decreases with depth. It is estimated that porosity decreases by an order of magnitude for each 200 feet of depth.

A test boring was drilled onsite to evaluate the site specific characteristics of the Blue Gate Member of the Mancos Shale beneath the site. The test boring was drilled to a depth of 440 feet below ground level (BGL). Cobbles and boulders of the Pediment Gravel were encountered from the surface to 19 feet BGL. Materials in the remainder of the boring consisted of dark gray to black mudstone shale mixed with blue gray siltstone. A representative hydraulic conductivity for the entire Blue Gate Member of the Mancos Shale is unknown. It is expected that the infiltration rate is between an estimated unsaturated hydraulic conductivity of 10-20 cm/sec and the saturated hydraulic conductivity of 5×10^{-5} cm/sec.

Depth to Ground Water

The one hole drilled at the site, a small amount of vadose zone water was encountered in the drill cuttings at about 140 feet BGL. The drill hole was dry below the vadose zone water and remained dry until 372 feet BGL, where a small quantity of water in fine grained sandstone was encountered. The drilling was continued to 440 feet BGL. The hole sat idle for one hour and forty five minutes, after which 5 gallons of water was removed and a sample taken for analysis. The sample had total dissolved solids (TDS) of 38,400 mg/liter. This amount of dissolved solids is considered very high and would make the water unusable for domestic or agricultural purposes.

Migration of Leachate

Due to the limited amount of leachate generated and the low permeability of the Blue Gate Member, it is estimated that the minimum required travel time for any leachate to reach the ground water table, at a depth of 372 feet BGL, would exceed 4,000 years.

Summary

The current site investigation at the Emery County landfill indicate that there is a diminimus potential for hazardous constituents from the landfill to migrate to the ground water during the projected active life and post-closure care period of the landfill. This conclusion is reached from the following information:

- The landfill is located in a semi-arid climate with an annual rainfall of less than 8 inches.

- The site geology consists of a continuous layer of low permeability shale beneath the site. Depth to ground water at the site is approximately 370 feet BGL.
- The landfill is constructed with water run-on and run-off controls to minimize the amount of water entering the landfill disposal cell.
- The landfills operational practices include the use of a small working face, daily cover, periodic intermediate cover, and excluding liquid waste. All of which will minimize the amount of liquid water that may contact the waste.
- Leachate production modeling simulations indicate that the maximum amount of leachate which reaching the bottom of the landfill will be much less than one inch per year. Migration of the leachate is limited by thickness and low permeability of the shale beneath the site.

The Emery County landfill design, included in the permit application, did not incorporate a bottom landfill liner or ground water monitoring well network. The permit application was reviewed by the Division of Solid and Hazardous Waste and was released for public comment. As part of the Permit #9427R2, ground water monitoring is suspended and an alternative landfill design which excludes the requirements for the installation of a low permeability landfill liner bottom is approved for the Emery County Class I landfill.

STATEMENT OF BASIS
for the
APPROVAL OF THE ALTERNATIVE FINAL COVER DESIGN
for the
EMERY COUNTY CLASS I LANDFILL

Emery County has submitted an evapotranspiration (ET) final cover design for the Emery County Class I landfill. This alternative ET design incorporates the use of a 30 inch thick weathered shale soil derived from the surrounding Mancos Shale outcrops as the final cover.

Landfill closures are designed and constructed to minimize the release of constituents into the environment. This incorporates a design, which minimizes the amount of moisture that can move through the final cover and enter into the waste. Accordingly, the Utah Solid Waste Permitting and Management Rules, R315-303-3(4) states that the standard cover design shall consist of:

a layer to minimize infiltration, consisting of at least 18 inches of compacted soil, or equivalent, with a permeability of 1×10^{-5} cm/sec or less, or equivalent, shall be placed upon the final lifts. and;

The Executive Secretary may approve an alternative final cover design, on a site specific basis, if it can be demonstrated that the alternative final cover design provides equivalent reduction in infiltration as specified as the standard design.

The Emery County 2011 Landfill Permit Application includes analysis of the worst-case climatologic scenario to calculate the storage/loss potential of the proposed 30-inch cover soils. The worst case scenario is represented by the 1980 calendar year which had the most consecutive high amounts of precipitation on record. Daily analysis of the soil storage/loss capacity was determined for a three consecutive 1980 calendar year. The three year analysis indicated no moisture would pass beyond the ET cover soils.

In conclusion, the Executive Secretary finds that the demonstration included in the Emery County Class I Landfill Permit Application demonstrates the alternative final cover design will reduce the infiltration as compared to the standard design. The alternative final cover is approved as part of the landfill permit #9427R2.