



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

L. Scott Baird
Interim Executive Director

DIVISION OF WASTE MANAGEMENT
AND RADIATION CONTROL
Ty L. Howard
Director

October 16, 2019

Thomas Henrie, Site Operations Leader
Materion Natural Resources, Inc., Utah Operations
P.O. Box 815
Delta, UT 84624

RE: DRAFT Permit
Materion Natural Resources Mill Class IIIb Landfill, Millard County

Dear Mr. Henrie:

The Division of Waste Management and Radiation Control has completed its review of the application to renew the Materion Natural Resources Mill Class IIIb Landfill. The application has been determined to be complete.

A draft permit has been prepared and is enclosed for your review. Please review it and notify our office by October 25, 2019 if you have questions or comments. After your review, the Division intends to begin the required 30-day public comment period the week of October 28, 2019. Following the public comment period and resolution of any comments, final action will be taken on the draft permit.

If you have any questions, please call Matt Sullivan at (801) 536-0241.

Sincerely,

T. Allan Moore, Solid Waste Program Manager
Division of Waste Management and Radiation Control

TAM/MBS/kl

(Over)

Enclosure: DRAFT Permit (DSHW-2019-003905)
Attachment #1 (DSHW-2019-003901)
Attachment #2 (DSHW-2019-003902)
Attachment #3 (DSHW-2019-003903)

c: Sue Hilderbrand, MSN, Health Officer, Central Utah Public Health Dept.
Nathan Selin, Environmental Health Director, Central Utah Public Health Dept.
John Chartier, P.E., DEQ District Engineer

DIVISION OF WASTE MANAGEMENT
AND RADIATION CONTROL
SOLID WASTE LANDFILL PERMIT

Materion Natural Resources Mill Class IIIb Landfill

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

Materion Natural Resources
as owner and operator

to own and operate the Materion Natural Resources Mill Class IIIb Landfill located in Millard County, Utah as shown in the Permit Renewal Application that was determined complete on September 30, 2019.

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

All references to R315-301 through 320 of the Utah Administrative Code are to regulations that are in effect on the date that this permit becomes effective.

This Permit shall become effective _____, 2019.

This Permit shall expire at midnight _____, 2029.

Closure Cost Revision Date: _____, 2024.

Signed this _____ day of _____, 2019

Ty L. Howard, Director
Utah Division of Waste Management and Radiation Control

FACILITY OWNER/OPERATOR INFORMATION

LANDFILL NAME: Materion Natural Resources Mill Class IIIb Landfill

OWNER NAME: Materion Natural Resources

OWNER ADDRESS: P.O. Box 815, Delta, Utah 84624

OWNER PHONE NO.: (435) 864-2701

OPERATOR NAME: same as above

OPERATOR ADDRESS: same as above

OPERATOR PHONE NO.: same as above

TYPE OF PERMIT: Class III Landfill

PERMIT NUMBER: 0302R2

LOCATION: Landfill site is located in Township 15 South, Range 5 West, Section 32, SLMB; Millard County, Latitude 39° 28' 22", Longitude: 112° 26' 7".
10 miles north of Delta on Highway 6. The facility is on northwest quarter of the nearby crossroads of Highway 6 and Brush Wellman Road.

PERMIT HISTORY Permit signed **insert date signed**

The term, "Permit," as used in this document is defined in R315-301-2(55) of the Utah Administrative Code. Director as used throughout this permit refers to the Director of the Division of Waste Management and Radiation Control.

The Permit renewal application for Materion Natural Resources Mill Class IIIb was deemed complete on the date shown on the signature page of this Permit. All representations made in the attachments of this permit are enforceable under R315-301-5(2) of the Utah Administrative Code. Where differences in wording exist between this Permit and the attachments, the wording of this Permit supersedes that of the attachments.

This Permit consists of the signature page, Facility Owner/Operator Information section, sections I through V, and all attachments to this Permit.

The facility as described in this Permit consists of a disposal cell north of the milling facility.

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.

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

PERMIT REQUIREMENTS

I. GENERAL COMPLIANCE RESPONSIBILITIES

I.A. General Operation

I.A.1. The Permittee shall operate the landfill in accordance with all applicable requirements of R315-304 of the Utah Administrative Code, 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 Utah Code Ann. § 19-6-101 through 126 and applicable portions of R315-301 through 320 of the Utah Administrative Code 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.

I.B. Acceptable Waste

I.B.1. This Permit is for disposal of nonhazardous industrial waste, as defined in R315-301-2(35) of the Utah Administrative Code, generated by Materion Natural Resources, Delta Mill facility and as described in the Permit Application.

I.B.2. The Permittee is authorized under this Permit to receive asbestos, sludge (for soil covering purposes), and PCB's as defined in R315-315 of the Utah Administrative Code.

I.C. Prohibited Waste

I.C.1. Hazardous waste as defined by R315-1 and R315-2 of the Utah Administrative Code;

I.C.2. PCB's as defined by R315-301-2(53) of the Utah Administrative Code, except PCB's specified by R315-315-7(2)(a) and (c) of the Utah Administrative Code;

I.C.3. Household waste;

I.C.4. Municipal waste;

I.C.5. Special waste except as specified in this Permit;

I.C.6. Commercial waste;

I.C.7. 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; and

I.C.8. Any prohibited waste received and accepted for disposal at the facility shall constitute a violation of this Permit, of Utah Code Ann. § 19-6-101 through 126 and of R315-301 through 320 of the Utah Administrative Code.

I.D. Inspections and Inspection Access

- I.D.1. The Permittee shall allow the Director or an authorized representative, or representatives from the Central Utah Public Health Department, to enter at reasonable times and:
 - I.D.1.a Inspect the landfill or other premises, practices or operations regulated or required under the terms and conditions of this Permit or R315-301 through 320 of the Utah Administrative Code;
 - I.D.1.a.(i) Have access to and copy any records required to be kept under the terms and conditions of this Permit or R315-301 through 320 of the Utah Administrative Code;
 - I.D.1.a.(ii) 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 R315-301 through 320 of the Utah Administrative Code; and
 - I.D.1.a.(iii) Create a record of any inspection by photographic, video, electronic, or any other reasonable means.

I.E. Noncompliance

- I.E.1. If monitoring, inspection, or testing indicates that any permit condition or any applicable rule under R315-301 through 320 of the Utah Administrative Code 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.
- I.E.2. In the event of noncompliance with any permit condition or violation of an applicable rule, the Permittee shall promptly take any 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.
- I.E.3. The Permittee shall:
 - I.E.3.a Document the noncompliance or violation in the daily operating record, on the day the event occurred or the day it was discovered;
 - I.E.3.b Notify the Director of the Utah Division of Waste Management and Radiation Control by telephone within 24 hours, or the next business day following documentation of the event; and
 - I.E.3.c Give written notice of the noncompliance or violation and measures taken to protect human health and the environment within seven days after Director notification.

- I.E.4. Within thirty days after the documentation of the event, the Permittee shall submit to the Director 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 Director may order the Permittee to perform appropriate remedial measures including development of a site remediation plan for approval by the Director.
- I.E.5. 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 R315-301 through 320 of the Utah Administrative Code and this Permit.

I.F. Revocation

- I.F.1. This Permit is subject to revocation if the Permittee fails to comply with any condition of the Permit. The Director will notify the Permittee in writing prior to any proposed revocation action and such action shall be subject to all applicable hearing procedures established under R305-7 of the Utah Administrative Code and the Utah Administrative Procedures Act.

I.G. Attachment Incorporation

- I.G.1. 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

II.A. Design and Construction

- II.A.1. All future landfill cells shall be constructed and designed according to construction plans approved by the Director.
- II.A.2. The Permittee shall notify the Director upon completion of construction of any landfill cells or run-on and run-off diversion systems. No landfill cells or run-on and run-off diversion system may be used until construction is approved by the Director and this permit modified.
- II.A.3. The Permittee shall notify the Director of the completion of construction of any final cover system and shall provide all necessary documentation and shall apply for approval of the construction from the Director and modification of this permit.
- II.A.4. If ground water is encountered during excavation of the landfill, the Director shall be notified immediately, and an alternative construction design developed and submitted for approval.

II.B. Run-On Control

- II.B.1. The Permittee shall construct and maintain drainage channels and diversions as specified in Attachment 1 and shall maintain them at all times to effectively prevent runoff from the surrounding area from entering the landfill.

III. LANDFILL OPERATION

III.A. Operations Plan

- III.A.1. The Permittee shall keep the Operations Plan included in Attachment 2 on site at the landfill or at the location designated in section III-H of this Permit. The Permittee shall operate the landfill in accordance with the operations plan. If necessary, the Permittee may modify the Operations Plan, provided that the modification meets all of the requirements of R315-301 through 320 of the Utah Administrative Code, is as protective of human health and the environment as the Operations Plan approved as part of this Permit, and is approved by the Director as a permit modification under R315-311-2(1) of the Utah Administrative Code. The Permittee shall note any modification to the Operations Plan in the daily operating record.
- III.A.2. The Permittee shall submit any modification to the Operations Plan to the Director for approval.

III.B. Security

- III.B.1. The Permittee shall operate the Landfill so that unauthorized entry to the facility is restricted. The Permittee shall:
 - III.B.1.a Lock all facility gates and other access routes during the time the landfill is closed.
 - III.B.1.b Have at least one person employed by the Permittee at the landfill during all hours that the landfill is open.
 - III.B.1.c Construct all fencing and any other access controls as shown in Attachment 2 to prevent access by persons or livestock by other routes.

III.C. Training

- III.C.1. The Permittee shall provide training for on-site personnel in landfill operation, including waste load inspection, hazardous waste identification, and personal safety and protection.

III.D. Burning of Waste

- III.D.1. Intentional burning of solid waste is prohibited and is a violation of R315-303-4(2)(b) of the Utah Administrative Code.
- III.D.2. The permittee shall extinguish all accidental fires as soon as reasonably possible.

III.E. Cover

- III.E.1. The Permittee shall cover the waste as necessary to prevent fires and to control vectors, blowing litter, odor, scavenging, and fugitive dust. The Permittee shall cover wastes that are capable of attracting or providing food for vectors, materials that may become windblown litter, or fine materials that may become fugitive dust with a minimum of six inches of earth at the end of the working day in which the wastes are received. The Permittee may use an alternative cover material when the material and operation meets the requirements of R315-303-4(4)(b) through (e) of the Utah Administrative Code.
- III.E.2. The Permittee shall use a minimum of six inches of earthen cover no less than once each month for all wastes received at the landfill. This cover shall consist of soil; no alternative may be used.
- III.E.3. The Permittee shall record in the daily operating record and the operator shall certify, at the end of each day of operation when soil or an alternative cover is placed, the amount and type of cover placed and the area receiving cover.

III.F. Waste Inspections

- III.F.1. 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. The Permittee shall conduct a complete waste inspection at a minimum frequency of 1 % of incoming loads, but no less than one complete inspection per day. The Permittee shall select the loads to be inspected on a random basis.
- III.F.2. The Permittee shall inspect all loads suspected or known to have one or more containers capable of holding more than five gallons of liquid to ensure that each container is empty.
- III.F.3. The Permittee shall inspect all loads that the Permittee suspect may contain a waste not allowed for disposal at the landfill.
- III.F.4. The Permittee shall conduct complete random inspections as follows:
 - III.F.4.a The Permittee shall conduct the random waste inspection at the working face or an area designated by the Permittee.
 - III.F.4.b The Permittee shall direct that loads subjected to complete inspection be unloaded at the designated area;
 - III.F.4.c Loads shall be spread by equipment or by hand tools;
 - III.F.4.d Personnel trained in hazardous waste recognition and recognition of other unacceptable waste shall conduct a visual inspection of the waste; and
 - III.F.4.e The personnel conducting the inspection shall record the results of the inspection on a waste inspection form as found in Attachment 2. The Permittee shall place the form in the daily operating record at the end of the operating day.
 - III.F.4.f The Permittee or the waste transporter shall properly dispose of any waste found that is not acceptable at the facility at an approved disposal site for the waste type and handle the waste according to the rules covering the waste type.

III.G. Self-Inspections

III.G.1. 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. The Permittee shall complete these general inspections no less than quarterly and shall cover the following areas: Waste placement, compaction, cover; fences and access controls; roads; run-on/run-off controls; final and intermediate cover; litter controls; and records. The Permittee shall place a record of the inspections in the daily operating record on the day of the inspection. The Permittee shall correct the problems identified in the inspections in a timely manner and document the corrective actions in the daily operating record.

III.H. Recordkeeping

III.H.1. The Permittee shall maintain and keep on file at the Delta Mill office, a daily operating record and other general records of landfill operation as required by R315-302-2(3) of the Utah Administrative Code. 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. The Daily operating record shall consist of the following two types of documents:

III.H.1.a Records related to the daily landfill operation or periodic events including:

III.H.1.a.(i) 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;

III.H.1.a.(ii) Major deviations from the approved plan of operation recorded at the end of the operating day the deviation occurred;

III.H.1.a.(iii) Results of monitoring required by this Permit recorded in the daily operating record on the day of the event or the day the information is received;

III.H.1.a.(iv) 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.

III.H.1.b Records of a general nature including:

III.H.1.b.(i) A copy of this Permit, including all attachments;

III.H.1.b.(ii) Results of inspections conducted by representatives of the Director of the Division of Waste Management and Radiation Control, and of representatives of the local Health Department, when forwarded to the Permittee;

III.H.1.b.(iii) Closure and Post-closure care plans; and

III.H.1.b.(iv) Records of employee training.

III.I. Reporting

III.I.1. The Permittee shall prepare and submit to the Director an Annual Report as required by R315-302-2(4) of the Utah Administrative Code. 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.

III.J. Roads

III.J.1. The Permittee shall improve and maintain 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.

III.K. Litter Control

III.K.1. Litter resulting from operations of the landfill shall be minimized. In addition to the litter control plans found in Attachment 2, the Permittee shall implement the following procedures when high wind conditions are present:

III.K.1.a Reduce the size of the tipping face;

III.K.1.b Reduce the number of vehicles allowed to discharge at the tipping face at one time;

III.K.1.c Orient vehicles to reduce wind effects on unloading and waste compaction;

III.K.1.d Reconfigure tipping face to reduce wind effect;

III.K.1.e Use portable and permanent wind fencing as needed; and

III.K.1.f Should high winds present a situation that the windblown litter cannot be controlled, the Permittee shall cease operations of the landfill until the winds diminish.

III.L. Disposal of Special Wastes

III.L.1. The Permittee shall handle and dispose of special wastes identified in section I.B. Acceptable Waste and in accordance with R315-315 of the Utah Administrative Code.

IV. **CLOSURE REQUIREMENTS**

IV.A. Closure

IV.A.1. Final cover of the landfill shall be as shown in Attachment 3. The final cover shall meet, at a minimum, the standard design for closure as specified in R315-305-5(5)(b) of the Utah Administrative Code.

IV.B. Title Recording

IV.B.1. The Permittee shall meet the requirements of R315-302-2(6) of the Utah Administrative Code by recording a notice with the Millard 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. The Permittee shall provide the Director the notice as recorded.

IV.C. Post-Closure Care

IV.C.1. The Permittee shall perform post-closure care at the closed landfill in accordance with the Post-Closure Care Plan contained in the Permit Application. Post-closure care as shown in Attachment 3 shall continue until all waste disposal sites at the landfill have stabilized and the finding of R315-302-3(7)(c) of the Utah Administrative Code is made.

IV.D. Financial Assurance

IV.D.1. The Permittee shall keep in effect and active the currently approved financial assurance mechanism or another approved mechanism that meets the requirements of R315-309 of the Utah Administrative Code and is approved by the Director to cover the costs of closure and post-closure care at the landfill. The Permittee shall adequately fund and maintain the financial assurance mechanism(s) to provide for the cost of closure at any stage or phase or anytime during the life of the landfill or the permit life, whichever is shorter.

IV.E. Financial Assurance Annual Update

IV.E.1. The Permittee shall submit an annual revision of closure and post-closure costs for inflation and financial assurance funding as required by R315-309-2(2) of the Utah Administrative Code, to the Director as part of the annual report.

IV.F. Closure Cost and Post-Closure Cost Revision

IV.F.1. 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 and any time the facility is expanded, any time a new cell is constructed, or any time a cell is expanded.

V. ADMINISTRATIVE REQUIREMENTS

V.A. Permit Modification

V.A.1. Modifications to this Permit may be made upon application by the Permittee or by the Director following the procedures specified in R315-311-2 of the Utah Administrative Code. The Permittee shall be given written notice of any permit modification initiated by the Director.

V.A.2. Permit Transfer

V.A.2.a This Permit may be transferred to a new permittee or new permittees by complying with the permit transfer provisions specified in R315-310-11 of the Utah Administrative Code.

V.B. Expansion

V.B.1. This Permit is for the operation of a Class IIIb Landfill 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 Director. The plans and specifications shall be approved by the Director prior to construction.

V.B.2. 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 R315-310 of the Utah Administrative Code.

V.B.3. Any addition to the list of acceptable waste in Section I-B shall require submittal of all necessary information to the Director and the approval of the Director.

V.C. Expiration

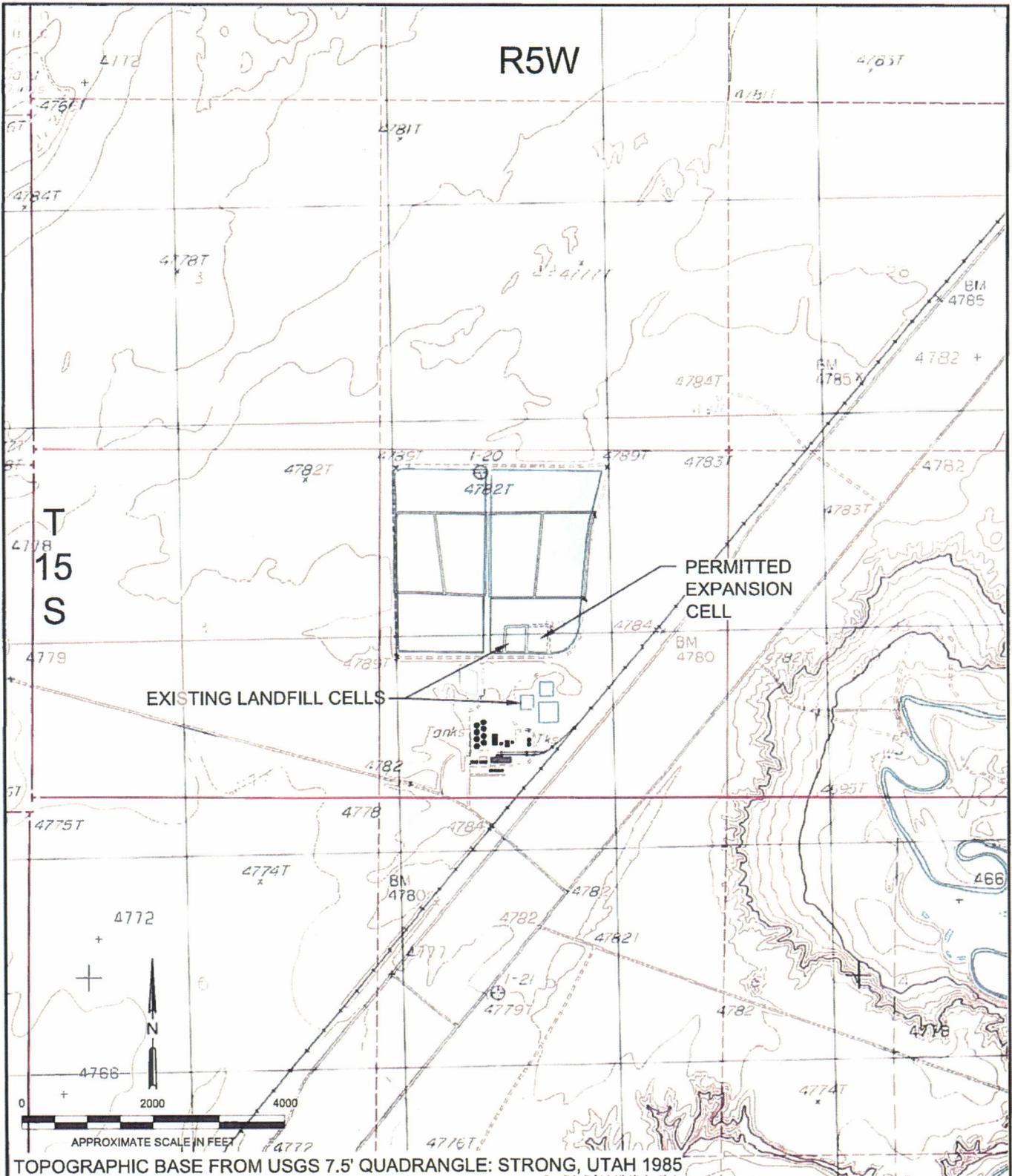
V.C.1. If the Permittee desires to continue operating this landfill after the expiration date of this Permit, the Permittee shall submit an application for permit renewal at least six months prior to the expiration date, as shown on the signature (cover) page of this Permit. If the Permittee timely submits a permit renewal application and the permit renewal is not complete by the expiration date, this Permit shall continue in force until renewal is completed or denied.

Permit Attachments

Attachment #1 – Landfill Design

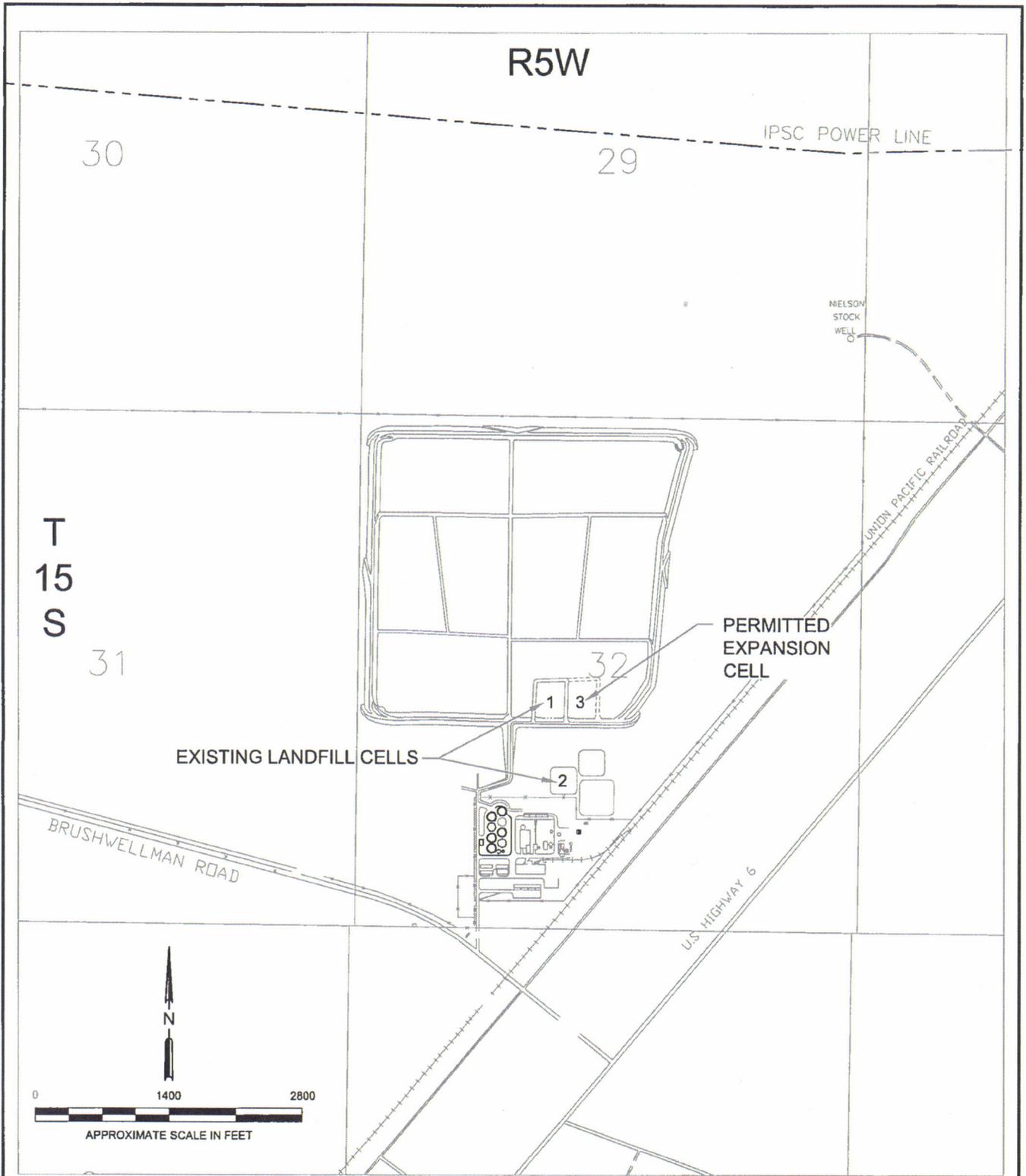
Attachment #2 – Plan of Operation

Attachment #3 – Closure & Post-Closure Care

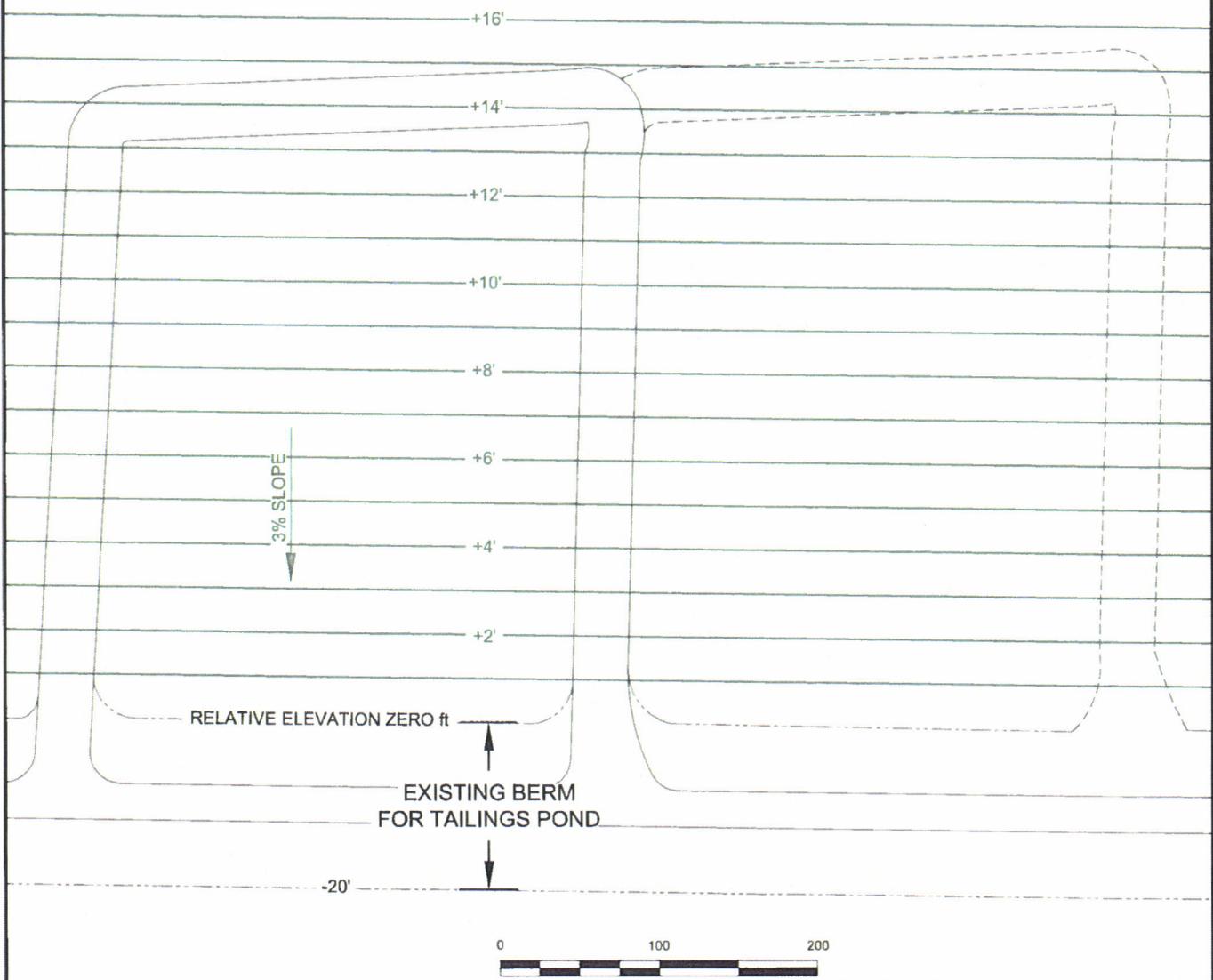
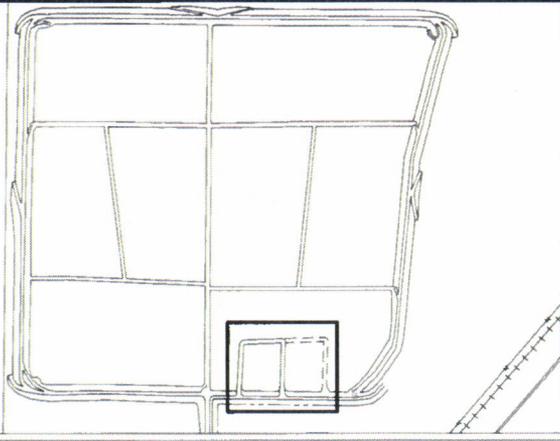


TOPOGRAPHIC BASE FROM USGS 7.5' QUADRANGLE: STRONG, UTAH 1985

	FOR: MATERION NATURAL RESOURCES		LANDFILL LOCATION		FIGURE: 1
	JOB NUMBER: JOB NUMBER	DRAWN BY: CCL	CHECKED BY: KK	APPROVED BY: DB	DATE: 1/9/2019



	FOR: MATERION NATURAL RESOURCES		LANDFILL CELLS		FIGURE: 2
	JOB NUMBER: JOB NUMBER	DRAWN BY: CCL	CHECKED BY: KK	APPROVED BY: DB	DATE: 1/9/2019



FOR:
MATERION NATURAL RESOURCES

FINAL COVER TOPOGRAPHY

FIGURE:
3

JOB NUMBER:
JOB NUMBER

DRAWN BY:
CCL

CHECKED BY:
KK

APPROVED BY:
DB

DATE:
1/9/2019

2.8 General Training and Safety Plan

Please refer to **Attachment 4** for Materion's general site safety plan addendum as it relates to the landfill at the Delta mill facility.

3.0 ENGINEERING REPORT – PLANS, SPECIFICATIONS, AND CALCULATIONS

3.1 Cell, Cover, and Final Cover Design

The landfill has been created using the cell method of filling. Waste is deposited as needed, approximately one cubic yard every two days. The working face of the active cell (Cell 1) has ranged from approximately five to 20 feet tall by 50 feet wide. Cell 2 and Cell 3 are inactive. Cell 3 is adjacent to Cell 1 within the tailings pond and is a similar size (note that Cell 3 remains in conceptual status as it has yet to be physically installed). Cell 2 is located outside the tailings pond footprint and is smaller than Cell 1 and Cell 3; all cells are of a similar design.

Materion plans to close the landfill at the mill facility in a manner that will meet all requirements of R315-305-5(5)(b). As part of the tailings pond facility, the cover design is part of the closure plan for the tailings pond currently on file with the Utah Department of Environmental Quality (UDEQ), Division of Water Quality (DWQ). The waste contained in the landfill is already covered in place and leveled as waste is added. This practice will continue. The final filled area will be covered with at least the minimum required cap: two feet of soil, including six inches of topsoil. The final cap will be contoured such that the grade is greater than 2 percent and less than 33 percent and will be revegetated with native vegetation or a suitable alternative approved by the Executive Secretary for other similar operations. The final cover topography is shown in **Figure 3**. Any deviation from this plan will be submitted in advance to the Executive Secretary and the UDEQ, Division of Waste Management and Radiation Control (DWMRC) for consideration and approval.

3.2 Run-On and Run-Off Control Systems

Details of the tailings pond design and operation are discussed in the Ground Water Discharge Permit (**Attachment 1**). Operations under the permit conditions meet or exceed this rule. Because Cell 1 and Cell 3 are part of the tailings pond system that is completely raised and enclosed. There is no potential for run-on from a 25-year storm event, and there is more than adequate capacity to contain any run-off from a 25-year storm event. Cell 2 of the landfill is located in an area which was previously designed to contain any run-off from a 25-year storm event. There is no potential for run-on into Cell 2.

4.0 CLOSURE PLAN

Materion will notify the Millard County Recorder to file proof of closure as outlined in R315-302-2(6) within 60 days after certification of closure.

2.0 PLAN OF OPERATION

2.1 Construction Schedule

This renewal application is for an existing landfill. No facility expansion is being requested.

2.2 Onsite Waste Handling Procedures

Waste handling at the mill facility consists of the waste being moved to the landfill cell by forklift, truck, or hand carry. A log is kept of the type of waste placed in the landfill. See **Attachment 2** for a copy of the log sheet. Cover consists of wet clay material from the tailings pond (tailings slime) for Cell 1 and Cell 3. Soil cover would be used for Cell 2 once activated. The entire site is secured with fencing, locked gates, and a security-manned entrance to control access.

2.3 Inspections and Monitoring

Operational monitoring of the tailings pond occurs daily. The monitoring identifies any problems or potential hazards to human health or the environment due to that facility. Inspections are designed to monitor discharge, and to prevent malfunction, deterioration, or operator error. Because Cell 1 and Cell 3 of the landfill are located within the tailings pond, the active cell may be included in the daily inspection, or, at a minimum, inspected quarterly. A copy of the inspection form is provided in **Attachment 3**.

2.4 Contingency Plans

2.4.1 Fire or Explosion

The allowed waste stream does not include any flammable materials. Some combustible material (paper, cardboard, wood, etc.) may exist; however, a fire or explosion in the landfill area is unlikely. The area is

served by the local fire department, and equipment is located onsite to move soil for fire suppression, if necessary.

2.4.2 Groundwater Contamination

According to R315-304-5(1)(a), this is not applicable to Class III landfills; however, since there is a current Groundwater Discharge Permit in place, corrective actions in the event of groundwater contamination are addressed therein. **Figure 1** shows the location of the landfill cells relative to the entire tailings pond system and mill facility. Per the groundwater discharge permit, a system of monitoring wells is in place to detect any potential impact to groundwater. In addition, it has been demonstrated that a natural clay aquitard underlies the tailings pond, and effectively prevents impacts to groundwater from the landfill or the tailings pond to reach the drinking water aquifer. See **Attachment 1**.

2.4.3 Fugitive Dust

Fugitive dust is controlled by posted speed limits and moisture content of the road base, along with rip rap on tailings pond roads. Native seeds were planted to stabilize outside of the tailings pond dike. The facility's Title V Air Quality Permit (No. 2700001004) regulates emissions. Cover is applied to the landfill and consists of tailings slimes that are damp in nature for Cells 1 and 3. Soil cover will be used for Cell 2 once this cell is activated.

2.4.4 Wind-Blown Litter

This landfill does not accept office waste materials and is thus not required to supply a litter control plan for light-weight, wind-blown materials.

2.4.5 Alternative Waste Handling

Because of the relatively slow waste generation rate, in the event the landfill is unable to accept waste, a large waste receptacle can be used until the onsite landfill is either able to accept the waste, or until another onsite location is determined.

2.5 Equipment Maintenance

Details of the mound water recovery system associated with the tailings pond are discussed in the Ground Water Discharge Permit (**Attachment 1**).

2.6 Regulated Hazardous or PCB Containing Waste Exclusion

All hazardous waste generated at the mill facility is handled in accordance with all federal, state, and local laws and transported for disposal offsite to approved, permitted facilities. Employees are trained to identify and classify waste according to its hazard class. An active hazardous waste management plan is in place. There are no PCB containing wastes on site.

2.7 Control of Disease Vectors

The waste materials in the landfill are not attractive to disease vectors nor do they support vector habitats; therefore, no special method to control disease vectors is necessary. However, the cover of six inches is sufficient to control disease vectors. Although wastewater and leachate is pumped into the tailings pond, the area where the landfill is located is protected from this water, and no water is pumped into the landfill section.

2.8 General Training and Safety Plan

Please refer to **Attachment 4** for Materion's general site safety plan addendum as it relates to the landfill at the Delta mill facility.

3.0 ENGINEERING REPORT – PLANS, SPECIFICATIONS, AND CALCULATIONS

3.1 Cell, Cover, and Final Cover Design

The landfill has been created using the cell method of filling. Waste is deposited as needed, approximately one cubic yard every two days. The working face of the active cell (Cell 1) has ranged from approximately five to 20 feet tall by 50 feet wide. Cell 2 and Cell 3 are inactive. Cell 3 is adjacent to Cell 1 within the tailings pond and is a similar size (note that Cell 3 remains in conceptual status as it has yet to be physically installed). Cell 2 is located outside the tailings pond footprint and is smaller than Cell 1 and Cell 3; all cells are of a similar design.

Materion plans to close the landfill at the mill facility in a manner that will meet all requirements of R315-305-5(5)(b). As part of the tailings pond facility, the cover design is part of the closure plan for the tailings pond currently on file with the Utah Department of Environmental Quality (UDEQ), Division of Water Quality (DWQ). The waste contained in the landfill is already covered in place and leveled as waste is added. This practice will continue. The final filled area will be covered with at least the minimum required cap: two feet of soil, including six inches of topsoil. The final cap will be contoured such that the grade is greater than 2 percent and less than 33 percent and will be revegetated with native vegetation or a suitable alternative approved by the Executive Secretary for other similar operations. The final cover topography is shown in **Figure 3**. Any deviation from this plan will be submitted in advance to the Executive Secretary and the UDEQ, Division of Waste Management and Radiation Control (DWMRC) for consideration and approval.

3.2 Run-On and Run-Off Control Systems

Details of the tailings pond design and operation are discussed in the Ground Water Discharge Permit (**Attachment 1**). Operations under the permit conditions meet or exceed this rule. Because Cell 1 and Cell 3 are part of the tailings pond system that is completely raised and enclosed. There is no potential for run-on from a 25-year storm event, and there is more than adequate capacity to contain any run-off from a 25-year storm event. Cell 2 of the landfill is located in an area which was previously designed to contain any run-off from a 25-year storm event. There is no potential for run-on into Cell 2.

4.0 CLOSURE PLAN

Materion will notify the Millard County Recorder to file proof of closure as outlined in R315-302-2(6) within 60 days after certification of closure.

Landfill Inspection Form

**General Training and Site Safety Plan Addendum
for Landfill Operations**

General Training and Site Safety Plan
Addendum for Landfill Operations

This plan was developed for the safety of landfill operators and operations at the Brush Resources, Inc. Mill Site, in accordance with Utah Department of Environmental Quality Administrative Code R315-302-2(2)(n).

Training will include the following topics:

- 1.0 Applicability
- 2.0 Frequency
- 3.0 Information and Awareness
- 4.0 Equipment Operation
- 5.0 Emergency Procedures and Notification

1.0 Applicability

- A. All landfill operators must have received the general site safety training prior to receiving this training. (Note: During monthly safety meetings, waste identification and disposal methods are discussed).
- B. All landfill operators will receive this training in addition to the general site safety training.
- C. New or transferred employees who have landfill responsibilities will receive this training prior to working at the landfill.
- D. A new or transferred employee who has not received this training may work at the landfill under the direct supervision of a trained landfill operator under: a) temporary or emergency conditions, or b) up to a period of 90 days, starting with the day the new or transferred employee began working at the landfill.

2.0 Frequency

- A. All applicable employees will receive this training on an annual basis, or when significant changes occur at the landfill.

3.0 Information and Awareness

Training will include:

- A. A review of the landfill permit conditions.
- B. A list of acceptable and unacceptable waste for the landfill.
- C. Guidelines for maintaining the landfill, (fill, cover, inspections, etc.)
- D. Proper record keeping of wastes received.
- E. Unacceptable waste procedures (discussed in the monthly safety meetings).
- F. Alternative waste disposal in the event that the landfill is unavailable.

Brush Resources, Inc.

Delta Mill

- 4.0 The Safety Officer or their designee will determine that all landfill operators are trained in the proper operation of all landfill equipment.
- 5.0 All landfill operators will be trained on proper landfill emergency notification procedures. Emergency procedures and/or contact numbers will be made available to all landfill operators.

2.8 General Training and Safety Plan

Please refer to **Attachment 4** for Materion's general site safety plan addendum as it relates to the landfill at the Delta mill facility.

3.0 ENGINEERING REPORT – PLANS, SPECIFICATIONS, AND CALCULATIONS

3.1 Cell, Cover, and Final Cover Design

The landfill has been created using the cell method of filling. Waste is deposited as needed, approximately one cubic yard every two days. The working face of the active cell (Cell 1) has ranged from approximately five to 20 feet tall by 50 feet wide. Cell 2 and Cell 3 are inactive. Cell 3 is adjacent to Cell 1 within the tailings pond and is a similar size (note that Cell 3 remains in conceptual status as it has yet to be physically installed). Cell 2 is located outside the tailings pond footprint and is smaller than Cell 1 and Cell 3; all cells are of a similar design.

Materion plans to close the landfill at the mill facility in a manner that will meet all requirements of R315-305-5(5)(b). As part of the tailings pond facility, the cover design is part of the closure plan for the tailings pond currently on file with the Utah Department of Environmental Quality (UDEQ), Division of Water Quality (DWQ). The waste contained in the landfill is already covered in place and leveled as waste is added. This practice will continue. The final filled area will be covered with at least the minimum required cap: two feet of soil, including six inches of topsoil. The final cap will be contoured such that the grade is greater than 2 percent and less than 33 percent and will be revegetated with native vegetation or a suitable alternative approved by the Executive Secretary for other similar operations. The final cover topography is shown in **Figure 3**. Any deviation from this plan will be submitted in advance to the Executive Secretary and the UDEQ, Division of Waste Management and Radiation Control (DWMRC) for consideration and approval.

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4.0 CLOSURE PLAN

Materion will notify the Millard County Recorder to file proof of closure as outlined in R315-302-2(6) within 60 days after certification of closure.

4.1 Methods, Procedures, and Processes

All materials disposed of within the existing Class IIIb landfill have been and will continue to be within the acceptable waste constituents of an industrial, non-hazardous landfill. The landfill accepts only non-hazardous waste that is generated on site. As noted, the waste consists of obsolete equipment, pallets, emptied, appropriately rinsed drums, and other industrial debris generated during plant operations. No other wastes are accepted; therefore, this landfill is not a commercial landfill, and no other areas are served. On average, approximately one cubic yard of the described waste stream is disposed of at the landfill every two days.

4.1.1 Maintenance and Control

Access to the facility is restricted through plant security and property fencing. Signs are posted indicating authorized personnel only are allowed on the access roads leading into the plant. Office waste is not accepted into the landfill; therefore, there is a small amount of material present that is susceptible to wind dispersal. This potential is minimized by the application of cover.

After cessation of operations at the beryllium mill, the landfill will be closed with an application of intermediate cover and a complete inspection of the surface will be performed. Cleanup of the site will be performed concurrently. All remaining visible litter and debris in the immediate vicinity will be placed in the final lift of the landfill unit. At that time, the final cover will be applied. A thorough closure inspection shall consist of observations for erosion, sloping, drainage, surface leachate, and run-on. Areas requiring repairs/modifications will be documented on the Landfill Inspection Form (**Attachment 3**). Necessary modifications will be made using appropriate compacted materials as required.

4.1.1.1 Escape of Air Pollutants and Gases

The waste stream of this industrial waste landfill has little or no amounts of putrescible materials, and the decomposition of the organic wastes are expected to be minimal. Due to the limited moisture at the site and the absence of putrescible materials in the waste stream, minimal methane gas generation is anticipated. Vector, dust, and odors are effectively controlled, so they are not a nuisance or hazard to health, safety, or property. None of the waste is flammable. Combustible waste may exist; however, a fire or explosion in the landfill area is unlikely. The area is served by the local fire department, and equipment is located onsite to move soil for fire suppression, if necessary.

4.1.1.2 Control of Run-Off

Run-off from the landfill is not expected to occur due to the bermed design of each cell. After closure, the absorption and evapotranspiration by the vegetation layer and the absence of any appreciable run-on will ensure the control of run-off. Once the vegetation layer growth is established, most storm events will not result in significant direct run-off from the landfill surface area. Significant percolation through the cover layer is unlikely, thus leachate or seepage from the landfill is expected to be minimal.

4.1.2 Final Facility Topography

Refer to **Attachment 1**.

4.1.3 Drainage Plan

Refer to **Attachment 1**.

4.1.4 Composition of Cover

The final cover system will be made of the intermediate compacted cover, compacted soil layer, and vegetation layer. The material used for final cover will be placed on top of 12 inches of graded, compacted, intermediate cover. The soil layer material will be compacted and will be composed of clayey silt-sand mixture with a low permeability. The soil layer will be no less than six inches of compacted soil and will come from onsite sources. These two layers total 18 inches of compacted soil, which will serve to minimize infiltration. A vegetation layer of no less than six inches will then be applied. The vegetation layer will be of an organic composition that will support native or compatible plant life. The final cover depth will be no less than 24 inches.

4.1.4.1 Sloping

The final cap will be contoured such that the grade is greater than two percent and less than 33 percent and will be revegetated with native vegetation or a suitable non-native species approved by the Executive Secretary. Any deviation from this plan will be submitted in advance to the Executive Secretary and the DWMRC for consideration and approval.

4.1.4.2 Landscaping

The waste will be leveled to the extent practicable, covered with a minimum of two feet of soil, and the cover contoured as described above. No vegetation, other than locally introduced and native grasses and woody species identified in this plan will be placed on the landfill.

4.1.4.3 Vegetation

The vegetation layer provides the base for native plants to grow. The layer will be of sufficient organic content and volume such that the landfill's approved seed mixes will have the ability to prosper.

Table 1 – Approved Seed Mix

Common Name	Scientific Name	lbs/acre
Indian Rice Grass, variety <i>nezpar</i>	<i>Orzopsis hymenoides</i>	3.0
Western Wheatgrass variety <i>arriba</i>	<i>Aristovvron smithii</i>	3.0
Crested Wheatgrass variety <i>hycrest</i>	<i>Agrovvron cristatum</i>	2.0
Snake River Wheatgrass variety <i>secar</i>	<i>Afrovvron</i>	2.0
Apar Lewis Flax	<i>Linum lewisii</i>	2.0
Four Wing Saltbrush	<i>Atriplex canescens</i>	2.0
Greasewood		2.0
Alkalai Sacaton	<i>Seorobulos airoides</i>	2.0

The final seed mixes will be a combination of the seeds shown in **Table 1** and will be and planted by the drilling method. Once all three cells have been closed, approximately seven acres will have been seeded at a density of approximately 18 pounds per acre.

4.1.5 Description of Monitoring and Maintenance

Qualified personnel will be located near or around the landfill to supervise continued activities during closure. The closure of the landfill will be concurrent with the landfill's final development. Landfill operations will proceed in a manner that will minimize the working area of the landfill. Once the final intermediate cover is placed and graded, landfill inspections will commence. The Post-Closure Landfill Inspection Form (**Attachment 3**) will be used for the final closure inspection.

4.1.6 Contact Personnel

The following positions and personnel represent Materion's contact list of responsible officials as they pertain to the Delta Mill Landfill operation, closure, and post-closure issues.

Landfill Owner: Materion Natural Resources, Inc.
Operator: Materion Natural Resources, Inc.
Address: P.O. Box 815
Delta, Utah

Contact Person: Thomas Henrie
Phone: (435) 846-2701

4.2 Maximum Portion of Operation

The cell method of land filling is in use at the active landfill cell. Thus, the working face has been limited to the smallest area practical to confine the amount of exposed waste without interfering with effective operation. The maximum working face (surface area) open at any one time has been approximately 20 feet tall and 50 feet wide.

4.3 Maximum Inventory and Estimated Life

Based on the final closure design, original topography, and volume of the final cover, the approximate maximum inventory for the landfill cells is as shown in the following table.

Table 2 – Existing, Remaining, and Total Landfill Volumes

Landfill Cell Volumes in Cubic Yards				
Cell	Maximum Waste Volume	Total Volume Including Cover	Existing Waste Volume	Remaining Waste Volume
Cell 1	112,900	124,170	49,360	63,540
Cell 2	48,400	57,789	0	48,400
Cell 3	44,180	58,700	0	44,180
Total	205,480	240,659	49,360	156,120

Based on the above volumes, a five-year average of the tonnage placed in the landfill (1 cubic yard every two days, 182.5 cubic yards per year, approximately 54.7 tons per year), a remaining waste volume of 63,540 cubic yards in Cell 1, and an estimated amount of cover placed in the landfill annually, the estimated life of the three landfill cells is more than 300 years from the time of this submittal.

4.4 Schedule for Completion

Within 60 days of scheduled completion of the landfill, Materion will notify the DSWRC. Closure activities will commence within 30 days after receipt of the final volume of waste and will be completed within 180 days of the start time. Materion will notify the DSWRC upon completion of closure to schedule the final inspection by regulatory agencies.

4.5 Notification and Review

Within 60 days of certification of closure of the mill facility landfill, Materion will make the proper notification and submittals to the Millard County recorder and provide proof of title filing to the Executive Secretary. With respect to the requirement R315-302-2(6)(b) for public access to records containing

information about solid waste amounts, location, and periods of operation, Materion files annual reports to the DWMRC, as required. These documents are public records and may be obtained by local zoning authorities from either the DWMRC or Materion, upon request.

4.6 Closure Activity Notification

Materion will begin closure activities of the landfill in accordance with the approved closure plan no later than 30 days following the final receipt of waste at the landfill. Closure activities shall be completed within 180 days from their starting time; however, Materion reserves the right for extensions of the deadline for beginning and concluding closure activity. The Executive Secretary will be given written justification for any extension requests. If necessary, fences will be erected to limit service, and signs will be posted at conspicuous locations indicating closure activities have begun. Alternative disposal site locations will be indicated on the closure notice signs.

5.0 POST-CLOSURE CARE PLAN

After the closure plan has been executed, completed, and certified, the following post-closure plan will be implemented. Following closure of the landfill, Materion will conduct the appropriate industrial landfill post-closure care. Materion will provide post-closure activities that will include, at a minimum, monitoring of land and water for a period of 30 years, or as long as the Executive Secretary deems necessary for the facility or unit to become stabilized and to protect human health and environment.

5.1 Maintenance of Final Cover

Facility maintenance and monitoring of land and water constituents will be conducted for a period of 30 years after closure. The landfill cover and surrounding areas will be inspected and repaired by Materion or a Materion contractor on a quarterly basis for the first year, then semi-annually for 29 years thereafter. The Post-Closure Inspection Form is provided as **Attachment 3**.

5.1.1 Repairs

During landfill inspections, if any settlements, subsidence, or erosion areas are found on the cover, they will be promptly backfilled with compatible soil (similar permeability) existing on-site. After final grading, the area will be re-vegetated with the prescribed native seed mix. If there are areas of inherent erosion, it will be documented on the Landfill Inspection Form and addressed by re-grading and placement of appropriate cover material. To prevent integrity breaks in the cover due to mechanical agitation, notices will be posted and access will be limited to inspection, maintenance, and monitoring personnel. Repairs will be made promptly with the appropriate soil, rip rap, or other necessary materials that will protect against the environmental factors thought to have caused the breaches in the cover integrity.

5.1.2 Prevention of Run-on and Run-Off

Because the active cell of the landfill (Cell 1) and planned expansion (Cell 3) are part of the tailings pond system that is completely raised and enclosed, there is no potential for run-on from a 25-year storm event and there is more than adequate capacity to contain any run-off from a 25-year storm event. If, and when, Cell 2 is ever activated, Materion will ensure that it is physically constructed in accordance to the applicable regulations to ensure prevention of run-on and run-off from a 25-year storm event.

5.1.3 Maintenance and Operation of Leachate Collection System

There is a leachate collection system that is part of the Groundwater Discharge Permit (**Attachment 1**).

5.1.4 Monitoring of Surface and Groundwater

Groundwater monitoring for Class IIIb landfills are exempt by R315-304-5(4)(c). Per the groundwater discharge permit, a system of monitoring wells is in place to detect any potential impact to groundwater. In addition, it has been demonstrated that a natural clay aquitard effectively prevents impacts to groundwater from the landfill or the closely studied tailings pond from reaching the drinking water aquifer. Surface water monitoring is not required.

5.1.5 Monitoring of Gases

Because of low moisture content and minimal putrescible waste, generation of gases is not expected, thus monitoring of gases is not applicable.

5.2 Post-Closure Care Statement

Materion will conduct post-closure monitoring and maintenance care as necessary or as directed by the Executive Secretary for a period of 30 years from date of closure. Reduction or extension of the 30-year monitoring and maintenance care period may be negotiated between the Executive Secretary and Materion management.

5.3 Post-Closure Use Statement

Post-closure use is anticipated to be very minimal. Post-closure use will not increase the foreseeable threat to public health.

5.4 Post-Closure Certification

Materion will submit written verification following the closure of a landfill unit and following the completion of post-closure care of a landfill unit. This verification will state the completed activities are in accordance with the requirements of R315-302-3(7)(b).

6.0 FINANCIAL ASSURANCE

6.1 Closure Costs and Calculations

Closure costs for the landfill are located in **Attachment 5**. These costs cover closure of the current active, permitted landfill cell (Cell 1), which is three acres in size. In accordance with R315-309-2, this is the largest area ever requiring a final cover at any time during the active life in accordance with the closure plan. While Cell 2 and Cell 3 are permitted, they would not be used until Cell 1 is closed. As shown in **Attachment 5**, Cell 1 closure cost is estimated at \$103,699.80.

6.2 Post-Closure Costs and Calculations

Post-closure costs for the landfill are also described in **Attachment 5**. The costs for post-closure of the landfill are estimated at \$37,819.08. Post-closure costs primarily include site inspections and recordkeeping.

COST ESTIMATE FOR CLOSURE OF MILL LANDFILL - MATERION NATURAL RESOURCES (4/18/19)						for Maximum Extent	
Updated 4/18/19							
Note: Numbering format follows the DSHW "Preparation of Closure - Post Closure Cost Estimate Guidance"							
The numbered items in the guidance document not shown in this estimate denote they are not applicable.							
	Item	Unit Measure	Cost/Unit	No. Units	Total Cost	Source	Note
2.0	Construction						
2.1	Final Cover System						
2.1.1a	Soil Placement	cu yd	1.53	4840	\$ 7,405.20	Means 2018 - 31 23 16.46 5000	dozer costs-note (b)
2.1.1b	Soil Transportation	cu yd	4.69	4840	\$ 22,699.60	Means 2018 - 31 23 16.50 2100	scraper costs-note (b)
2.2	Completion of Top Cover						
2.2.1	Infiltration Layer						
2.2.1a	Soil Placement	cu yd	1.53	2420	\$ 3,702.60	Means 2018 - 31 23 16.46 5000	dozer costs-note (b)
2.2.1b	Soil Transportation	cu yd	4.69	2420	\$ 11,349.80	Means 2018 - 31 23 16.50 2100	scraper costs-note (b)
2.3	Erosion Layer Placement						
2.3.2	Soil Placement	cu yd	1.53	2420	\$ 3,702.60	Means 2018 - 31 23 16.46 5000	dozer costs-note (b)
2.3.5	Soil Transportation	cu yd	4.69	2420	\$ 11,349.80	Means 2018 - 31 23 16.50 2100	scraper costs-note (b)
2.4	Revegetation						
2.4.1.2.3	Seeding, Fertilize Mulch	acre	1731	3	\$ 5,193.08	Materion mine reclam costs	see note (a)
	Subtotal				\$ 65,402.68		
	10% Contingency				\$ 6,540.27		
	Construction Subtotal				\$ 71,942.94		
CALCULATION OF TOTAL CLOSURE COSTS							
	Construction Total				\$ 71,942.94		
	SUBTOTAL				\$ 71,942.94		
	Development of Plans	2.5% of Subtotal			\$ 1,798.57		
	Contract Administration	3.5% of Subtotal			\$ 2,518.00		
	Administrative Costs for final cover certification & closure notice	3.5% of Subtotal			\$ 2,518.00		
	Project Management	3.5% of Subtotal			\$ 2,518.00		
	Performance Bond	1.0% of Subtotal			\$ 719.43		
	Legal Fees	10% of Subtotal			\$ 7,194.29		
	TOTAL CLOSURE COSTS				\$ 89,209.25		
	Escalation amount by 1.018 per year for 5 years (This closure plan will be reviewed and updated every five years)				\$ 8,323.12	https://deq.utah.gov/division-waste-management-radiation-control Accessed 1/2/2019 10:05 a.m.	
	GRAND TOTAL CLOSURE COSTS				\$ 97,532.37		

COST ESTIMATE FOR POST- CLOSURE OF MILL LANDFILL - MATERION NATURAL RESOURCES (4/18/19)

Updated 4/18/19

Note : Numbering format follows the DSHW "Preparation of Closure - Post Closure Cost Estimate Guidance"

The numbered items in the guidance document not shown in this estimate denote they are not applicable.

	Item	Unit Measure	Cost/Unit	No. Units	Total Cost	Source	Note
1.0	Engineering Costs						
1.2	Site Inspection and Record keeping	hours	97.24	240	\$ 23,336.45		see Note (c)
2.0	Maintenance Costs						
2.1.1c	Soil Replacement	cu yd	4.69	605	\$ 2,837.45	Means 2018 -	scraper costs-note (d)
2.4.4	Vegetation Reseeding	acres	1731	0.75	\$ 1,298.27		see Notes (a) & (e)
	Subtotal				\$ 27,472.17		
	10% Contingency				\$ 2,747.22		
	Post-Closure Care Total				\$ 30,219.39		
	Escalation amount by 1.018 per year for 30 years				\$ 14,302.04		see Closure!G50
	GRAND TOTAL POST CLOSURE COSTS				\$ 44,521.43		
	TOTAL CLOSURE AND POST-CLOSURE COSTS						
	Total Closure Costs				\$ 97,532.37		
	Total Post-Closure Costs				\$ 44,521.43		
	Total Cost				\$ 142,053.80		

FINANCIAL ASSURANCE DOCUMENTATION - MATERION NATURAL RESOURCES

Note (a)	The Materion Mine submitted a reclamation plan to DOGM containing a mulching, seeding, and fertilizing cost/ac of \$1300 in November 2006. The plan was subsequently approved.							
	Cost escalation from 2006 to 2018. Means Cost Index 2006 = 75.1. Means Cost Index 2018 = 100.0.							
		2018	2006	Escalation		2006 Cost	2018 Cost	
		100	75.1	1.33		\$ 1,300	\$ 1,731	

Note (b)	Cover Volumetrics						
		area(acres)	sq yds	depth (in)	depth (yd)	cu yds	
	final cover	3	14520	12	0.3333	4840	
	top cover	3	14520	6	0.1667	2420	
	erosion cover	3	14520	6	0.1667	2420	

Note (c)	Site Inspection and Record keeping							
		hrs/inspect	inspec/yr	# yrs inpect	total hours	\$/hr-labor	\$/hr- truck	\$/hr total
		4	2	30	240	83.20	14.04	97.24
	Labor rate for Outside foreman Means 2018 "Back Cover Page"							
Pickup truck rate - Means 2018 01 54 33 40 7200, hourly operating and rental rates								

Note (d)	Soil Replacement						
	Assume 25% of total acreage at a depth of 6" would have to be replaced. That is, 25% of the initial topsoil would be lost through erosion, etc., and therefore would have to be replaced.						
	area (acres)	sq yds	% replaced	depth (in)	depth (yd)	cu yds	
	3	14520	0.25	6	0.1667	605	

Note (e)	Vegetation Reseeding						
	Assume 25% of total acreage would have to be reseeded. That is, 25% of the initial seeding would fail, and therefore would have to be reseeded.						
						acres	
				area (acres)	% reseeded	resseded	
			3	0.25	0.75		