



## Agreement No. 038-C-06/07-BOS Between the County of El Dorado and Carlton Engineering, Inc.

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**THIS AGREEMENT NO. 038-C-06/07-BOS** made and entered by and between the County of El Dorado, a political subdivision of the State of California (hereinafter referred to as "County"), acting by and through County Service Area No. 10, a lawfully established County Service Area as defined by Government Code Section 25210 et seq., and Carlton Engineering Incorporated, a corporation duly qualified to conduct business in the state of California whose principal place of business is 3883 Ponderosa Road, Shingle Springs, CA 95682 (hereinafter referred to as "Consultant").

### WITNESSETH

**WHEREAS**, County has determined that it is necessary to obtain a Consultant to provide Construction Quality Assurance services; and

**WHEREAS**, Consultant has represented to County that it is experienced and competent to perform the special services required hereunder and County has determined to rely upon such representations; and

**WHEREAS**, it is the intent of the parties hereto that such services are in conformity with all applicable federal, state and local laws; and

**WHEREAS**, County has determined that the provisions of such services provided by Consultant are in the public's best interest, are more economically and feasibly performed by outside independent consultants as well as authorized by El Dorado County Charter, Section 210 (b) (6) and/or Government Code 31000;

**NOW, THEREFORE**, County and Consultant mutually agree as follows:

#### ARTICLE I

**Scope of Services:** Consultant shall perform all professional and technical services and shall make available Consultants own personnel, materials and equipment necessary to perform the services, work, and tasks designated as outlined in Exhibit "A" marked "Scope of Work" incorporated herein and made by reference a part hereof (hereafter the "Work").

#### ARTICLE II

**Location of Work:** The Work is to be performed at the Union Mine Landfill, located at 5700 Union Mine Rd, El Dorado, CA.

### **ARTICLE III**

**Standards for Work:** Consultant will strive to perform services in a manner consistent with that level of care and skill ordinarily exercised by other members of the Consultant's profession currently practicing in the same locality and under similar conditions. No other representation, express or implied, is included or intended in this agreement, or in any report, opinion, document, or other instrument of service.

### **ARTICLE IV**

**Term:** This Agreement shall become effective when fully executed by both parties hereto and shall expire on October 1<sup>st</sup>, 2007.

### **ARTICLE V**

#### **Compensation for Services:**

- A. For services provided herein, County agrees to pay Consultant by tasks, upon receipt of itemized invoices detailing a description of work performed. Payments shall be made within forty-five (45) days following County's receipt and approval of invoices. For the purposes hereof, the billing shall be in accordance with Exhibit "A" marked "Scope of Work."
- B. The total payment under this Agreement to Consultant **SHALL NOT EXCEED Seventy Six Thousand Three Hundred Seventy Five Dollars and NO Cents (\$76,375.00).**

### **ARTICLE VI**

**Consultant Reporting:** Reports on Services rendered by Consultant shall be submitted to County in the format, and under the conditions, outlined in the "Work."

### **ARTICLE VII**

**Deliverables:** Deliverables will be specified by the County for each individual assignment, and specific task assignments and work requirements will be specifically identified on a task-by-task basis. Failure to submit requested deliverables shall be grounds for termination of the Agreement, as provided in Article XIII.

### **ARTICLE VIII**

**Ownership of Data:** Upon completion or earlier termination of all work under this Agreement, ownership and title to all reports, documents, plans, (including digitized plans) specifications and estimates produced as part of this Agreement will automatically be vested in the County and no further Agreement will be necessary to transfer ownership to the County. The Consultant shall furnish the County all necessary copies of data needed to complete the review and approval process. Any reuse of such materials shall be done at the sole risk of the County.

### **ARTICLE IX**

**Changes to Agreement:** This Agreement may be amended by mutual consent of the parties hereto. Said amendments shall become effective only when in writing and fully executed by duly authorized officers of the parties hereto. There shall be no change in the Consultant's Administrator or sub consultants without prior written approval by the County's Administrator.

## **ARTICLE X**

**Consultant to County:** It is understood that the services provided under this Agreement shall be prepared in and with cooperation from County and its staff or its designated agent.

It is further agreed that in all matters pertaining to this Agreement, Consultant shall act as Consultant only to County, or its designated agent, and shall not act as Consultant to any other individual or entity affected by this Agreement nor provide information in any manner to any party outside of this Agreement that would conflict with Consultant's responsibilities to County during term hereof.

## **ARTICLE XI**

**Assignment and Delegation:** Consultant is engaged by County for its unique qualifications and skills as well as those of their personnel. Consultant shall not subcontract, delegate, or assign services to be provided, in whole or in part, to any other person or entity without prior written consent of County.

## **ARTICLE XII**

**Independent Consultant/Liability:** Consultant is, and shall be at all times, deemed independent and shall be wholly responsible for the manner in which it performs services required by terms of this Agreement. Consultant exclusively assumes responsibility for acts of its employees, associates, and sub consultants, if any are authorized herein, as they relate to services to be provided under this Agreement during the course and scope of their employment.

Consultant shall be responsible for performing the work under this Agreement in a safe, professional, skillful and a workmanlike manner and shall be liable for its own negligence and negligent acts of its employees and sub consultants. County shall have no right of control over the manner in which work is to be done and shall, therefore, not be charged with responsibility of preventing risk to Consultant or its employees or sub consultants.

## **ARTICLE XIII**

**Fiscal Considerations:** The parties to this Agreement recognize and acknowledge that County is a political subdivision of the State of California. As such, El Dorado County is subject to the provisions of Article XVI, Section 18 of the California Constitution and other similar fiscal and procurement laws and regulations and may not expend funds for products; equipment or services not budgeted in a given fiscal year. It is further understood that in the normal course of County business, County will adopt a proposed budget prior to a given fiscal year, but that the final adoption of a budget does not occur until after the beginning of the fiscal year.

Notwithstanding any other provision of this Agreement to the contrary, County shall give notice of cancellation of this Agreement in the event of adoption of a proposed budget that does not provide for funds for the services, products, or equipment subject herein. Such notice shall become effective upon the adoption of a final budget, which does not provide funding for this Agreement. Upon the effective date of such notice, this Agreement shall be automatically terminated and County released from any further liability hereunder.

In addition to the above, should the Board of Supervisors during the course of a given year for financial reasons reduce, or order a reduction, in the budget for any County department

for which services were agreed to be performed, pursuant to this paragraph in the sole discretion of the County, this Agreement may be deemed to be canceled in its entirety subject to payment for services performed prior to cancellation.

#### **ARTICLE XIV**

##### **Default, Termination, and Cancellation:**

- A. Default: Upon the occurrence of any default of the provisions of this Agreement, a party shall give written notice of said default to the party in default (notice). If the party in default does not cure the default within ten (10) days of the date of notice (time to cure), then such party shall be in default. The time to cure may be extended in the discretion of the party giving notice. Any extension of time to cure must be in writing, prepared by the party in default for signature by the party giving notice and must specify the reason(s) for the extension and the date in which the extension of time of to cure expires.

Notice given under this section shall specify the alleged default and the applicable Agreement provision and shall demand that the party in default perform the provisions of this Agreement within the applicable period. No such notice shall be deemed a termination of this Agreement unless the party giving notice so elects in this notice, or the party giving notice so elects in a subsequent written notice after the time to cure has expired.

- B. Bankruptcy: This Agreement, at the option of the County, shall be terminable in the case of bankruptcy, voluntary or involuntary, or insolvency of Consultant.
- C. Ceasing Performance: County may terminate this Agreement in the event Consultant ceases to operate as a business, or otherwise becomes unable to substantially perform any term or condition of this Agreement.
- D. Termination or Cancellation without Cause: County may terminate this Agreement in whole or in part seven (7) calendar days upon written notice by County for any reason. If such prior termination is effected, County will pay for satisfactory services rendered prior to the effective dates as set forth in the Notice of Termination provided to Consultant, and for such other services, which County may agree to in writing as necessary for Agreement resolution. In no event, however, shall County be obligated to pay more than the total amount of the Agreement. Upon receipt of a Notice of Termination, Consultant shall promptly discontinue all services affected, as of the effective date of termination set forth in such Notice of Termination, unless the notice directs otherwise. In the event of termination for default, County reserves the right to take over and complete the work by Agreement or by any other means.

#### **ARTICLE XV**

**Notice to Parties:** All notices to be given by the parties hereto shall be in writing and served by depositing same in the United States Post Office, postage prepaid and registered. Notices to County shall be in duplicate and addressed as follows:

County of El Dorado  
Environmental Management Department

Attn: Gerri Silva, Director  
2850 Fairlane Ct.  
Placerville, CA 95667

or to such other location as the County directs.

Notices to Consultant shall be addressed as follows:

Carlton Engineering, Inc.  
Attn: David Jermstad  
3883 Ponderosa Road  
Shingle Springs, CA 95682

#### **ARTICLE XVI**

**Indemnity:** To the fullest extent allowed by law, CONSULTANT shall defend, indemnify, and hold harmless the COUNTY and its officers, agents, employees and representatives from and against any and all claims, actions, losses, injuries, damages or expenses of every name, kind, and description, including litigation costs and reasonable attorney's fees incurred, brought for or on account of, injury to or death of any person, including but not limited to workers, County employees, and the public, or damage to property, which arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of CONSULTANT, its officers, agents, employees, volunteers, representatives, contractors and subcontractors. This duty of CONSULTANT includes the duty of defense, inclusive of that set forth in California Civil Code Section 2778. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of any claim arising out of the activities under this Agreement.

#### **ARTICLE XVII**

**Insurance:** Consultant shall provide proof of a policy of insurance satisfactory to the El Dorado County Risk Manager and documentation evidencing that Consultant maintains insurance that meets the following requirements:

- A. Full Worker's Compensation and Employer Liability Insurance covering all employees of Consultant as required by law in the State of California.
- B. Commercial General Liability Insurance of not less than One Million Dollars (\$1,000,000) combined a single limit per occurrence for bodily injury and property damage.
- C. Automobile Liability Insurance of not less than One Million Dollars (\$1,000,000) is required in the event motor vehicles are used by the Consultant in the performance of the Agreement.
- D. In the event Consultant is a licensed professional, and is performing professional services under this Agreement, professional liability (for example, malpractice insurance) is required with a limit of liability of not less than One Million Dollars

(\$1,000,000) per occurrence.

- E. Consultant shall furnish a certificate of insurance satisfactory to the El Dorado County Risk Manager as evidence that the insurance required above is being maintained.
- F. The insurance will be issued by an insurance company acceptable to the Risk Management Division, or be provided through a partial or total self-insurance likewise acceptable to the Risk Management Division.
- G. Consultant agrees that the insurance required above shall be in effect at all times during the term of this Agreement. In the event said insurance coverage expires at any time or times during the term of this Agreement, Consultant agrees to provide at least thirty (30) days prior to a said expiration date, a new certificate of insurance evidencing insurance coverage as provided for herein for not less than the remainder of a term of the Agreement, or for a period of not less than one (1) year. New certificates of insurance are subject to the approval of the Risk Management Division and Consultant agrees that no work or services shall be performed prior to the giving of such approval. In the event the Consultant fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Agreement upon the occurrence of such events.
- H. The certificate of insurance must include the following provisions stating that:
  - 1. The insurer will not cancel the insures coverage without thirty (30) days prior written notice to County, and;
  - 2. The County of El Dorado, its officers, officials, employees, and volunteers are included as additionally insured, but only insofar as the operations under this Agreement is concerned. This provision shall apply to all liability policies except workers' compensation and professional liability insurance policies.
- I. The Consultant's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.
- J. Any deductibles or self-insured retention must be declared to and approved by the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as respects the County, its officers, officials, employees, and volunteers; or the Consultant shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.
- K. Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees, or volunteers.
- L. The insurance companies shall have no recourse against the County of El Dorado, its officers and employees or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

- M. Consultants' obligations shall not be limited by the foregoing insurance requirements and shall survive expiration of this Agreement.
- N. In the event Consultant cannot provide an occurrence policy, Consultant shall provide insurance covering claims made as a result of performance of this Agreement for not less than three (3) years following completion of performance of this Agreement.
- O. Certificates of insurance shall meet such additional standards as may be determined by the contracting County Department either independently or in consultation with the Risk Management Division, as essential for protection of the County.

#### **ARTICLE XVIII**

**Interest of Public Official:** No official or employee of County who exercises any functions or responsibilities in review or approval of services to be provided by Consultant under this Agreement shall participate in or attempt to influence any decision relating to this Agreement which affects personal interest or interest of any corporation, partnership, or association in which he/she is directly or indirectly interested; nor shall any such official or employee of County have any interest, direct or indirect, in this Agreement or the proceeds thereof.

#### **ARTICLE XIX**

**Interest of Consultant:** Consultant covenants that Consultant presently has no personal interest or financial interest, and shall not acquire same in any manner or degree in either: 1) any other Agreement connected with or directly affected by the services to be performed by this Agreement; or, 2) any other entities connected with or directly affected by the services to be performed by this Agreement. Consultant further covenants that in the performance of this Agreement no person having any such interest shall be employed by Consultant.

#### **ARTICLE XX**

**Withholding (Form 730):** In accordance with changes in Internal Revenue Law, OASDI (Old Age, Survivors, & Disability Insurance) and income taxes may be withheld from any payments made under terms of this Agreement if Consultant falls under "Contract-Employee" category as determined by County prior to execution of Agreement.

#### **ARTICLE XXI**

**California Residency (Form 590):** All independent Consultants providing services to the County must file a State of California Form 590, certifying their California residency or, in the case of a corporation, certifying that they have a permanent place of business in California. The Consultant will be required to submit a Form 590 prior to execution of an Agreement or County shall withhold seven (7) percent of each payment made to the Consultant during the term of the Agreement. This requirement applies to any agreement/contract exceeding \$1,500.00.

**ARTICLE XXII**

**Tax Payer Identification Number (Form W-9):** All independent Consultants or Corporations providing services to the County must file a Department of the Treasury Internal Revenue Service Form W-9, certifying their Taxpayer Identification Number.

**ARTICLE XXIII**

**California Forum and Law:** Any dispute resolution action arising out of this Agreement, including, but not limited to, litigation, mediation, or arbitration, shall be brought in El Dorado County, California, and shall be resolved in accordance with the laws of the State of California. Consultant waives any removal rights it might have under Code of Civil Procedure Section 394.

**ARTICLE XXIV**

**Administrator:** The County Officer or employee with responsibility for administering this Agreement is Greg Stanton, Environmental Health Manager, or his successor.

**ARTICLE XXV**

**Authorized Signatures:** The parties to this Agreement represent that the undersigned individuals executing this Agreement on their respective behalf are fully authorized to do so by law or other appropriate instrument and to bind upon said parties to the obligations set forth herein.

**ARTICLE XXVI**

**Partial Invalidity:** If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

**ARTICLE XXVII**

**Venue:** Any dispute resolution action arising out of this Agreement, including, but not limited to, litigation, mediation or arbitration, shall be brought in El Dorado County, California, and shall be resolved in accordance with the laws of the State of California. Consultant waives any removal rights it might have under Code of Civil Procedure Section 394.

**ARTICLE XXVIII**

**Confidentiality:** Consultant shall maintain the confidentiality and privileged nature of all records together with any knowledge therein acquired, in accordance with all applicable State and Federal laws and regulations, as they may now exist or may hereafter be amended or changed. Consultant, and all Consultants staff, employees and representatives, shall not use or disclose, directly or indirectly at any time, any said confidential information, other than to the County Environmental Management Department for the purpose of, and in the performance of the Agreement. This confidentiality agreement shall survive after the expiration or termination of this Agreement.



**ARTICLE XXIX**

**Licenses:** Consultant warrants and represents that he/she holds a valid Civil Engineers License, No. C55037, and a valid Engineering Geologist License, No. 1727 issued by the State of California and that his/her licenses are in good standing. A copy of the licenses must be provided with this Agreement.

**ARTICLE XXX**

**County Business License:** It is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Code Section 5.08.070.

**ARTICLE XXXI**

**Entire Agreement:** This document and the documents referred to herein or exhibit(s) hereto is the entire Agreement between the parties and they incorporate or supersede all prior written or oral Agreements or understandings.

**REQUESTING DEPARTMENT CONCURRENCE:**

By: \_\_\_\_\_

Gerri Silva, M.S., REHS

Environmental Management Department Director

Dated: \_\_\_\_\_

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first below written.

- - COUNTY OF EL DORADO - -

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Chair  
Board of Supervisors

ATTEST:

Cindy Keck, Clerk of the  
Board of Supervisors

Dated: \_\_\_\_\_

By: \_\_\_\_\_

- - CONSULTANT - -

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
David Jermstad, Vice President  
Carlton Engineering, Inc.

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Corporate Secretary  
Carlton Engineering, Inc.

# **EXHIBIT "A"**

## **SCOPE OF WORK**

## SCOPE OF SERVICES

The following is Carlton's scope of services for the three tasks identified as Final Cover, Geosynthetics for the Final Cover and Vegetative Cover.

### **Final Cover (Earthwork Foundation Layer)**

**\$15,925**

Carlton will provide a Construction Quality Assurance (CQA) Officer and CQA Monitor during earthwork activities associated with preparation of the existing foundation layer. It is Carlton's understanding that the site contains 1 foot of clay overlaid with 1 foot of intermediate soil cover. The existing foundation layer will be cleared and grubbed, scarified, moisture conditioned and compacted to 90% of modified Proctor density. Carlton will conduct density/moisture testing of the upper six inches of foundation material. In addition, Carlton will perform preconstruction and construction testing for material evaluation as outlined in Tables C-1 through C-4 of the Construction Quality Assurance Plan, dated March 2006.

- The existing foundation layer consists of 1 foot of clay overlaid by 1 foot of intermediate soil cover.
- Earthwork consists of clearing and grubbing, scarifying, and moisture conditioning the foundation layer and compacting the upper 6-inches.
- Testing to be completed in accordance with Tables C-1 through C-4 of the CQA Plan.
- Carlton will provide test results and daily inspection/field reports to the Design Engineer for certification.
- Only the upper 6-inches will be tested for density/moisture (90% of the modified Proctor density).

### **Final Cover (Geosynthetics)**

**\$30,619**

Carlton will provide a CQA Officer and CQA Monitor to support Mr. Larry Camp during installation of the 60-mil LLDPE liner and geocomposite drainage net. Carlton will perform conformance quality assurance as outlined in Tables C-5 and C-6 of the Construction Quality Assurance Plan, dated March 2006.

- Testing to be completed in accordance with Tables C-5 and C-6 of the CQA Plan.
- Carlton will provide test results and daily inspection/field reports to Mr. Larry Camp for certification of the liner and drainage net.

**Vegetative Cover****\$9,805**

Carlton will provide a CQA Officer and CQA Monitor during earthwork activities associated with placement of the vegetative cover. Carlton understands the vegetative layer will be 1 foot in thickness.

- Testing to be completed in accordance with Tables C-1 through C-4 of the CQA Plan.
- Carlton will provide test results and daily inspection/field reports to Design Engineer for certification of the vegetative layer.
- Carlton's services will not be needed during seeding activities.
- Carlton assumes the vegetative layer will take 1 week to construct.

**Additional Services:****\$20,025**

Survey: As part of quality assurance, Carlton has included surveying services. Surveying services include surveying the top of the certified foundation layer prior to the placement of the geosynthetics and surveying the top of the certified vegetative layer to confirm the 1 foot thickness of the vegetative layer. In addition, survey services include surveying the completed surface drainage features of the final cover.

- Survey of the foundation layer and vegetative layer will be on 50 foot grids.
- One day scoped for survey of the final surface drainage features.
- Survey of seams for panel layout is not included (however can be included from direction of the County)

Pipe Boots and Drainage Features: Carlton has included 4 days for a CQA monitor for oversight of the pipe boot/gas vent construction and construction of the cap surface drainage features.

- Carlton will provide daily inspection/field reports and associated documentation to Design Engineer for certification of the surface drainage features and pipe boots/gas vents.

**Table C-1  
Test Methods  
Union Mine Disposal Site**

Test Type	Testing Method
Compaction (Modified Proctor)	ASTM D1557: Density relations of soils and soil-aggregate mixtures using 10.0 lb (4.54-kg) hammer and 18-inch (457-mm) drop.
Particle Size	ASTM D422: Particle size analysis of soils.  ASTM D1140: Amount of materials in soils finer than the No. 200 (75- $\mu$ m) sieve.
Classification (Soil Type)	ASTM D2487: Classification of soils for engineering purposes.
Atterberg Limit	ASTM D4318: Liquid limit, plastic limit, and plasticity index of soils.
Hydraulic Conductivity	ASTM D5084 (at 90% & 95% max. density): Permeability of clay soils.
Confirmation Moisture	ASTM D2216: Laboratory determination of water (moisture) content of soil.  ASTM D4643: Determination of water (moisture) content of soil by the microwave method.
Confirmation Density	ASTM D1556: Density of soil and soil aggregate in-place by sand cone method. or ASTM D2937: Density of soil in-place by the drive cylinder method
Field Description (Soil Type)	ASTM D2488: Standard practice for description and identification of soils (visual-manual procedure).
In-situ Density and Moisture	ASTM D2922: Density of soil and soil aggregate in-place by nuclear gage methods.
pH	ASTM D4972: Determine pH of soil.

Table C-2  
 Minimum Preconstruction Testing Frequency for Material Evaluation  
 Union Mine Disposal Site

TESTS							
Components	Compaction (ASTM D1557)	Particle Size (ASTM D422)	Classification (ASTM D2487)	Atterberg Limit (ASTM D4318)	Hydraulic Conductivity (ASTM D5084)	Moisture Content (ASTM D2216)	pH (ASTM D4972)
Foundation Layer	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	--	--	--	--
Vegetative Layer	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	--	--	--	1 per material <sup>a</sup> type, minimum of 2 tests
Anchor Trench Backfill	1 per material type	1 per material type	1 per material type	--	--	1 per material type	--
Earthfill	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	1 per material type, minimum of 2 tests	--	--	--	--

<sup>a</sup> The acceptance criteria for the vegetative cover layer is a pH of 6.0 to 7.5.

Table C-3  
 Minimum Construction Testing Frequency for Construction Quality Evaluation  
 Union Mine Disposal Site

TESTS							
Components	In-Situ Density and Moisture (ASTM D2922 and 3017)	Particle Size (ASTM D422)	Field Description (ASTM D2488)	Atterberg Limit (ASTM D4318)	Hydraulic Conductivity (ASTM D5084)	Confirmation Moisture (ASTM D2216)	Confirmation Density (ASTM D2937)
Foundation Layer	1 per 1,000 yd <sup>3</sup> (minimum of 4 tests per day)	1 per 5,000 yd <sup>3</sup>	Continuous, 1 per 5,000 yd <sup>3</sup>	--	--	Continuous, 1 per 5,000 yd <sup>3</sup>	1 per 5,000 yd <sup>3</sup>
Vegetative Cover Layer	--	1 per 5,000 yd <sup>3</sup>	1 per 5,000 yd <sup>3</sup>	--	--	Continuous, 1 per 5,000 yd <sup>3</sup>	--
Anchor Trench Backfill	1 per 500 yd <sup>3</sup>	1 per 1,000 yd <sup>3</sup>	--	--	--	Continuous, 1 per 5,000 yd <sup>3</sup>	--
Earthfill	1 per 1,000 yd <sup>3</sup> (minimum of 4 tests per day)	1 per 5,000 yd <sup>3</sup>	Continuous, 1 per 5,000 yd <sup>3</sup>	--	--	--	1 per 5,000 yd <sup>3</sup>



**Table C-4  
Placement and Compaction Requirements  
Union Mine Disposal Site**

<b>Component</b>	<b>Minimum Relative Compaction (% of Max. Dry Density per ASTM D1557)</b>	<b>Moisture Content (% of Opt. M.C. per ASTM D1557)</b>	<b>Compacted Lift Thickness (inches)</b>
Foundation Layer	90	±2	6
Vegetated Layer	--	--	12
Anchor Trench Backfill	90	±2	6
Earthfill	90-95	±2	8 <sup>a</sup>

<sup>a</sup>Uncompacted lift thickness.

**Table C-5  
Conformance Quality Assurance and Acceptance Criteria  
Linear Low Density Polyethylene Liner Material  
Union Mine Disposal Site**

Property	Test Method	Frequency	Acceptance Criteria
Thickness mils (min.ave.) a. lowest individual 8 of 10 b. lowest individual of any 10	ASTM D5994	per roll	nom. (-5%) -10% -15%
Asperity Height mils (min. ave.)	GM 12	every 2 <sup>nd</sup> roll	10
Density g/ml (max.)	ASTM D1505 ASTM D792	1 per 55,000 ft <sup>2</sup>	0.939
Tensile Properties (1) (min. ave.) a. break strength - lb/in. B. Break elongation - %	ASTM D6693 Type IV	1 per 55,000 ft <sup>2</sup>	90 250
Tear Resistance - lb (min. ave.)	ASTM D1004	1 per 55,000 ft <sup>2</sup>	33 lbs
Puncture Resistance - lb. (Min. Ave.)	ASTM D4833	1 per 55,000 ft <sup>2</sup>	66
Axi-Symmetric Break Resistance Strain - % (min.)	ASTM D5617	per formulation	30
Carbon Black Content - %	ASTM D1603 (2)	1 per 55,000 ft <sup>2</sup>	2.0-3.0
Carbon Black Dispersion	ASTM D5596	1 per 40,000 ft <sup>2</sup>	note (3)
Oxidative Induction Time (OIT) (min. ave.) a. Standard OIT or b. High Pressure OIT	ASTM D3895  ASTM D5885	200,000 lb	100  400
Oven Aging at 85°C a. Standard OIT (min. ave.) - % retained after 90 days or b. High Pressure OIT (min. ave.) - % retained after 90 days	ASTM D5721 ASTM D3895  ASTM D5885	per formulation	35  60

Notes:

- Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction. Break elongation is calculated using a gage length of 2.0 in. At 2.0 in./min.
- Carbon black dispersion (only near spherical agglomerates) for 10 different views: 9 in categories 1 or 2 and 1 in category 3

**Table C-6  
Conformance Quality Assurance and Acceptance Criteria  
Geocomposite Material  
Union Mine Disposal Site**

Property	Test Method	Frequency	Acceptance Criteria
<b>Geocomposite</b>			
Transmissivity, gal/min/ft	ASTM D4716	1 per 540,000 ft <sup>2</sup>	0.48
Ply Adhesion, lb/in	ASTM D7005	1 per 50,000 ft <sup>2</sup>	1.0
<b>Geonet Core</b>			
Transmissivity, gal/min/ft	ASTM D4716	1 per 50,000 ft <sup>2</sup>	9.66
Thickness, mil	ASTM D5199	1 per 50,000 ft <sup>2</sup>	200
Density, g/cm <sup>3</sup>	ASTM D1505	1 per 50,000 ft <sup>2</sup>	0.94
Tensile Strength (MD), lb/in	ASTM D5035	1 per 50,000 ft <sup>2</sup>	45
Carbon Black Content, %	ASTM D1603	1 per 50,000 ft <sup>2</sup>	2.0
<b>Geotextile (prior to lamination)</b>			
Mass per Unit Area, oz/yd <sup>2</sup>	ASTM D5261	1 per 90,000 ft <sup>2</sup>	8
Grab Strength, lb	ASTM D4632	1 per 90,000 ft <sup>2</sup>	220
Puncture Strength, lb	ASTM D4833	1 per 90,000 ft <sup>2</sup>	120
AOS, US sieve (mm)	ASTM D4751	1 per 540,000 ft <sup>2</sup>	80
Permittivity, (sec <sup>-1</sup> )	ASTM D4491	1 per 540,000 ft <sup>2</sup>	1.5
Flow Rate, gpm/ft <sup>2</sup>	ASTM D4491	1 per 540,000 ft <sup>2</sup>	110
UV Resistance, % retained	ASTM D4355 (after 500 hours)	1 per 540,000 ft <sup>2</sup>	70