

**SANDY CREEK ENERGY STATION
COAL COMBUSTION RESIDUAL WASTE MANAGEMENT FACILITY
REGISTRATION APPLICATION
TCEQ REGISTRATION NO. CCR107
McLENNAN COUNTY, TEXAS**

**PART VII
CLOSURE AND POST-CLOSURE CARE PLAN**

Prepared for:

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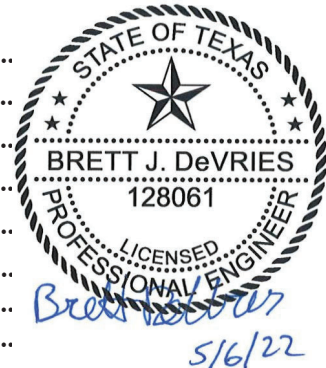
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1 PE CERTIFICATION (40 CFR §257.102(b)(4))



I, Brett DeVries, Ph.D., P.E., hereby certify that this Closure and Post Closure Care Plan for the Sandy Creek Energy Station Coal Combustion Residual Waste Management Facility meets the requirements in 30 TAC §352.1221 [40 CFR §257.102(b)], including demonstrating that the final cover systems meet the performance standards in 40 CFR §257.102(d). This plan was prepared by or under my supervision. I am a duly licensed Professional Engineer under the laws of the State of Texas.

Brett DeVries, Ph.D., P.E.
(printed or typed name)

License number 128061

My license renewal date is 9/30/2023

2 INTRODUCTION

This Closure and Post-Closure Care Plan has been prepared for Sandy Creek Services, LLC (Owner and Operator) of the Sandy Creek Energy Station (Plant) Coal Combustion Residual (CCR) Waste Management Facility (Landfill), located in McLennan County. The Plan has been prepared consistent with Title 30 of the Texas Administrative Code (30 TAC), Chapter 352, Subchapter J, as well as the relevant provisions of Title 40 of the Code of Federal Regulations (40 CFR), Part 257, Subpart D, adopted by reference. The Landfill Completion Plan for the Landfill consists of final contours and drainage features for the completed Landfill, as presented in Drawing IV-4.

The landfill design drawings, including the Landfill Completion Plan and fill cross-sections, are provided in Part IV, related to Landfill Criteria and Design Drawings.

In accordance with §352.1321(c) and Section 4 of the Part V – Site Operating Plan (SOP), this Final Closure and Post-Closure Plan will be placed in the Site Operating Record and the Landfill’s publicly accessible website following submittal to the TCEQ.

3 FINAL COVER SYSTEM

3.1 INTRODUCTION

The final cover system for the Landfill was developed to meet or exceed the requirements of 30 TAC §352.1221 (40 CFR §257.102).

These rules define the procedures and timeframes for implementing closure of the Landfill, including the installation of a final cover system (leaving the waste in-place) designed and constructed to minimize infiltration and erosion. Such a system will include installation of a multi-layer final cover system and surface water drainage system, addressed in Part IV, Appendix IV.C – Run-on and Run-off Control Plan.

3.2 FINAL COVER SYSTEM DESIGN

As depicted on Drawing IV-10 (Part IV), two separate multi-layer final cover systems will be used at the Landfill to provide a low maintenance cover and reduce rainfall percolation through the final cover system, thereby minimizing leachate generation within the Landfill. As depicted on Drawing IV-4, a 3 percent topslope and 3.5(H):1(V) sideslopes are provided to minimize erosion and facilitate drainage of the Landfill.

The final cover systems are designed consistent with §257.102(d)(3) and areas receiving final cover are depicted on Drawing IV-4. A soil-only final cover system will be constructed overlying Cells 1 and 2, which consist of soil-only (Cell 1) and soil-geocomposite (Cell 2) liner systems, as described in Part IV, Appendix IV.A – Leachate Collection and Removal System Plan. A composite final cover system will be constructed over Cell 3, which consist of a composite liner system, as described in Part IV, Appendix IV.A. At the discretion of the Landfill Owner/Operator, a composite final cover may be installed over Cells 1 and/or 2.

Beginning from the surface and working down, the final cover systems will be comprised of the following components:

- Soil-only final cover (overlying Cell 1 and 2):
 - Vegetation (native and/or introduced vegetation);
 - 18-inch-thick vegetative erosion layer, with the upper 6 inches capable of sustaining vegetation; and
 - 18-inch-thick clayey soil infiltration layer ($k \leq 1 \times 10^{-7}$ cm/sec).
- Composite final cover (overlying Cell 3):
 - Vegetation (native and/or introduced vegetation);
 - 18-inch-thick vegetative erosion layer, with the upper 6 inches capable of sustaining vegetation;

- Geocomposite (double-sided);
- 60-mil high-density polyethylene (HDPE) geomembrane, or 40-mil linear low density polyethylene (LLDPE) geomembrane (textured both sides on the sideslopes); and
- 18-inch-thick clayey soil infiltration layer ($k \leq 1 \times 10^{-5}$ cm/sec).

Appropriate field survey controls will be implemented to control the final lift of waste as well as the successive soil layers of the final cover system (see Part V - SOP, Section 2.6.2). If the Landfill has in-place intermediate cover at the time of final cover construction, the top 6 inches of intermediate cover may be incorporated into the 18-inch infiltration layer provided the in-place soil meets the requirements of the infiltration layer, as defined in Section 3.3.1.2. The infiltration layer will be a clayey soil, placed and compacted under controlled moisture-density conditions with appropriate compaction equipment. A geomembrane liner (40-mil LLDPE or 60-mil HDPE) will be placed over the infiltration layer (composite final cover only). The erosion layer will be placed directly over the infiltration layer (soil-only final cover) or drainage geocomposite (composite final cover) for final cover areas. The surface of the erosion layer will be seeded or sodded immediately following placement of the final cover to establish a vegetative cover and minimize erosion. Vegetation will be established such that sufficient coverage of native and introduced vegetation is achieved.

3.3 FINAL COVER QUALITY CONTROL PLAN

Testing and evaluation of the final cover system materials and components prior to construction and during construction will be performed under the supervision of a geotechnical professional (GP), as defined in Part IV, Appendix IV.B – Liner Construction Quality Assurance (CQA) Plan, Section 1.2. Additionally, a qualified CQA Monitor will perform construction quality assurance and quality control (CQA/CQC) observation and testing under the direct supervision of the GP. A Final Cover System Evaluation Report (FCSER) will be developed and placed in the Site Operating Record in accordance with Section 3.4. The following subsections describe the CQA/CQC testing methods, frequencies, and material specifications that will be required for the 18-inch infiltration layer, geomembrane (if applicable), geocomposite (if applicable), and 18-inch erosion layer. Unless specifically stated, the subsections below describe CQA/CQC procedures for the soil-only and composite final covers.

3.3.1 Infiltration Layer Testing

3.3.1.1 Pre-Construction Testing

Prior to construction, pre-construction testing will be performed for the soil materials that are selected for the infiltration layer. The soil materials used in the final cover will be obtained from in-situ soil strata, which will be stockpiled during excavation of Landfill disposal areas or other onsite borrow source(s). Representative samples from all sources will be subject to the minimum pre-construction testing schedule per Table 3-1.

Soil types on the property are predominantly clay. A soil classification will be used as a guide for identifying soils with the minimum material specifications. Typically, clays and silts (i.e., CH, CL, M) are ideal for construction of the infiltration layer; however, these soils are not required provided the recompacted soil samples comply with the following minimum material specifications: Plasticity Index (PI) ≥ 15 ; liquid limit (LL) ≥ 30 ; percent passing No. 200 sieve ≥ 30 ; particle size ≤ 1 inch; and hydraulic conductivity (k) $\leq 1 \times 10^{-7}$ cm/sec.

Table 3-1 Infiltration Layer Soil Material Pre-Construction Testing Schedule

TEST	METHOD USED	FREQUENCY
Soil Classifications: USCS	ASTM D2487	1 per soil type / minimum 1 per borrow source
Particle-Size Sieve Analysis	ASTM D422 or D1140	
Atterberg Limits	ASTM D4318	
Moisture/Density Relationship (Moisture Content)	ASTM D698	
Hydraulic Conductivity ⁽¹⁾	ASTM D5084 ⁽²⁾⁽³⁾	1 per Moisture-Density Relationship

1. Field testing of permeability (in accordance with ASTM D5093) is optional, and may be replaced by laboratory testing.
2. Testing procedures in Appendix VII of the Corps of Engineers Manual EM 1110-2-1906, November 30, 1970, Laboratory Soils Testing, may be used as an alternative method.
3. Permeability tests will be conducted with tap water or 0.05N solution of CaSO₄. Distilled water will not be allowed.

3.3.1.2 Construction Testing

Construction quality assurance for the infiltration layer will consist of both laboratory and field testing, as specified in Table 3-2. Quality assurance laboratory testing (sieve analysis, Atterberg limits, and hydraulic conductivity) will be conducted on representative samples of the constructed infiltration layer. The following tests will be performed to verify that the infiltration layer complies with the specification provided herein.

Table 3-2 Infiltration Layer Construction Testing Schedule

TEST	METHOD	MINIMUM FREQUENCY
Field Moisture/Density Test	ASTM D1556, D2167, or D6938	1 per 16,000 ft ² per 6-inch lift ⁽¹⁾
Sieve Analysis	ASTM D422 or D1140	1 per 200,000 ft ² per 6-inch lift ⁽²⁾
Atterberg Limits	ASTM D4318	
Hydraulic Conductivity ^{(3) (4)}	ASTM D5084 or CoE EM 1110-2-1906	1 per 200,000 ft ² per 6-inch lift
Thickness	Survey	1 per 10,000 ft ² ⁽⁵⁾

1. A minimum of three tests must be conducted for each 6-inch lift, regardless of cover area.
2. A minimum of one test must be conducted for each lift, regardless of cover area.
3. Testing will be conducted on undisturbed samples.
4. Permeability tests will be run using tap water or a 0.05N solution of CaSO₄. Distilled water will not be allowed.
5. A minimum of two reference points are required.

The GP will verify passing permeability test results (i.e., $k < 1 \times 10^{-7}$ cm/s), conducted at a frequency of no less than one test per surface acre of final cover. All laboratory permeability tests conducted will be uniformly distributed over the area. The infiltration layer will be placed and compacted in 6-inch lifts. At a minimum, the infiltration layer will be compacted to 95 percent of the maximum dry density and moisture content of 0 to +4% above optimum, as determined by ASTM D698.

Failing quality assurance tests on the constructed infiltration layer will be addressed consistent with Part IV, Appendix IV.B – Liner Construction Quality Control (CQA) Plan, Section 3.5, related to Procedures for Addressing Failing Tests. The results of both passing and failing tests will be recorded and documented within the FCSER.

Any penetrations required for obtaining laboratory samples will be repaired by backfilling the hole with bentonite chips or 50/50 powdered/granulated bentonite/soil/sand mixture hand-tamped into place. If the penetration is in the upper lift of soil, the upper 2 inches will be backfilled with clayey soil, which will be hand-tamped sufficiently to blend the backfill into the adjacent soil lift.

The lift thicknesses of the infiltration layer will be verified by settlement plates or surveying methods. The verification points, for record purposes, will be on grid such that there exists a minimum of one verification point per 10,000 square feet. A minimum of 2 reference points are required for verification. The selected grid will be the same for both beginning and finished elevations of the infiltration layer, so that minimum thickness can be calculated and verified. All elevation calculations necessary for thickness determination will be included as part of the supporting documentation in the FCSER.

3.3.2 Geomembrane Testing

3.3.2.1 Manufacturer Quality Control Testing

A geomembrane (40-mil LLDPE or 60-mil HDPE) will be installed in the composite final cover over the completed infiltration layer. Prior to the installation of the geomembrane in the composite

final cover system, the manufacturer or installer will provide the GP with quality control certificates signed by a responsible party employed by the manufacturer. Each quality control certificate will include roll identification numbers, testing procedures, and results of quality control tests. The quality control tests will be performed in accordance with project-specific testing methods and subject to one test per 100,000 square feet of material or a minimum of one test per resin lot, whichever is greater.

All geomembrane properties must meet the minimum values set forth in the most recent version of Geosynthetic Research Institute (GRI) standard GM-13 for 60-mil HDPE, or GM-17 for LLDPE. The GP will review the test results prior to acceptance of the geomembrane to assure that the certified minimum properties meet specified values.

3.3.2.2 Conformance Testing

Conformance testing shall be performed by a third-party independent laboratory. Conformance testing methods and frequencies will be performed in accordance with Table 3-3.

Table 3-3 Geomembrane Conformance Testing

TEST	METHOD	MINIMUM FREQUENCY
Thickness (laboratory)	ASTM D5994	1 per 100,000 ft ² and every resin lot
Density	ASTM D1505 or D792	
Carbon black content	ASTM D1603	
Carbon black dispersion	ASTM D5596	
Tensile properties ⁽¹⁾	ASTM D638, Type IV	

1. 2-inch initial gauge length assumed for elongation at break at 2.0 in/min.

3.3.3 Installation Monitoring and Testing

Upon delivery of geosynthetic material, the CQA Monitor will observe that the materials are handled and stored in accordance with manufacturer’s recommendations.

Field seaming of the geomembrane will be performed in strict accordance with methods approved by the manufacturer. This usually includes fusion welding or extrusion welding. Tack welds (if used) will use heat only. No double-sided tape, glue, or other method will be permitted when extrusion or fusion welding is used for bonding.

Each day prior to commencing field seaming, trial seams will be made on pieces of geomembrane material to verify that conditions are adequate for production seaming. Each trial test seam will be at least 3 feet long by 1-foot wide. Four adjoining one-inch wide specimens will be die-cut from the test seam sample. Two specimens will be tested in the field for shear and two for peel.

The failure criteria are the same as that for destructive seam testing as described below. The test specimens must exhibit a Film Tear Bond (FTB). If one test seam fails, the trial seam will be repeated. If this trial seam fails, then 2 more trial seams must be constructed and tested. This

process must continue and no welding can begin for the machine or welder until all test seams are passing. Additional trial seams will be made for all of the following:

- At the beginning of each seaming period for each seaming apparatus used that day (the beginning of each seaming period is considered to be morning, and immediately after a break);
- Each occurrence of significantly different environmental conditions (i.e., temperature, humidity, dust, etc.);
- Any time the machine is turned off for more than 30 minutes.

Both the welder and the machine must be tested for extrusion welding. Only the machine needs to be tested according to the above schedule for fusion welding. Each individual seamer will make at least one test seam each day he/she actually performs seaming.

3.3.4 Non-Destructive Testing

Continuous, non-destructive testing will be performed on all seams by the installer. Air pressure testing on dual-track fusion welds and vacuum-box testing for extrusion welds are the only acceptable methods. Leaks must be isolated and repaired by the following procedures:

1. Air-Pressure Testing (GRI GM6) - The ends of the air channel of the dual-track fusion weld must be sealed and pressured to approximately 30 psi, if possible. The air pump must then be shut off and the air pressure observed after five (5) minutes. A loss of less than 4 psi is acceptable if it is determined that the air channel is not blocked between the sealed ends. A loss of 4 psi or more indicates the presence of a seam leak that must then be isolated and repaired by following the procedures described under “Seam Failure Repairs and Retesting.” The GP or his/her qualified representatives must observe and record all pressure gauge readings.
2. Vacuum-Box Testing (ASTM D4437) - A suction value of approximately 3 to 5 inches of gauge vacuum must be applied to all extrusion welded seams that can be tested in this manner. Examples of extrusion welded seams that do not easily lend themselves to vacuum testing would be around boots, appurtenances, etc. The seam must be observed for leaks at least ten seconds while subjected to this vacuum. The GP or his/her qualified representative must observe 100 percent of this testing.

3.3.5 Destructive Seam Testing

Destructive seam testing will be performed in accordance with ASTM D6392. Destructive samples will be taken at a minimum of one strategic location for every 1,000 linear feet of seaming or major fraction thereof. The total footage of individual repairs of leaks of more than 10 feet in seaming length and individual repairs of more than 10 feet in seaming length for failed seams must also be counted and destructively tested using the same frequency of testing described above. At a minimum, a destructive test must be done for each welding machine used for seaming or repairs. A sufficient amount of the seam must be removed in order to conduct field testing, independent laboratory testing, and archiving of enough material in order to retest the seam, if necessary. Field

testing will include at least 2 peel test specimens. Destructive seam-testing locations will be cap-stripped and the cap completely seamed by extrusion welding to the geomembrane. Capped sections will be non-destructively tested. Additional destructive test samples may be taken if deemed necessary by the GP or his/her qualified representative.

All field-tested specimens from a destructive-test location must be passing in both shear and peel for the seam to be considered as passing. Field tested specimens, are determined as passing if the specimen tested in peel fails in FTB and all test specimens meet the criteria listed in the Table 3-4. The independent laboratory testing must confirm these field results. The minimum passing criteria for independent laboratory testing are all three of the following:

- Five of five specimens tested in the peel mode must fail in FTB.
- Five of five specimens from each peel and shear determination must meet the minimum specified value in Table 3-4.
- All five specimens from each peel and shear determination must should meet the minimum percent elongation at break value in Table 3-4.

The above criteria apply to both tracks from each dual-track fusion welded seam before it is considered as passing. It should be noted that geomembrane manufacturers may have differing values for their geomembrane sheets and therefore, the specific values are not meant to be minimum or maximum values as construction materials and specifications may vary between manufacturers and throughout the life of the site. Consequently, the manufacturer’s sheet-strength values must be provided in order to determine if the test results are passing.

Table 3-4 Geomembrane Seam Strength

Property	Qualifier	Unit	Specified Value		Test
			60-mil HDPE	40-mil LLDPE	
Shear Strength	Min.	lb/in	120	60	ASTM D6392
Shear Elongation at Break	Min.	%	50	50	
Peel Strength:					ASTM D6392
Fusion	Min	lb/in	91	50	
Extrusion	Min.	lb/in	78	44	

3.3.6 Seam Failure Delineation

In the event failing tests are obtained at a destructive test location, new destructive test samples will be obtained, a minimum of 10 feet in either direction of the failing test. If one, but not both, of the additional tests fail, further additional destructive testing will be required until passing tests are obtained at both ends of the original destructive test location. A cap will be required for the areas subject to destructive testing, and testing of the cap will be placed in accordance with Section 3.3.7. If more than two failing destructive test locations are observed for a single seam, the CQA Monitor will have the alternative of requiring the entire seam be removed, and a new seam welded.

In the event more than one failing destructive test are observed for a single welding apparatus, new (passing) trial welds will be required prior to resuming geomembrane welding or seaming with the apparatus.

3.3.7 Seam Failure Repairs and Retesting

Any portion of the geomembrane with a detected flaw, or which fails a nondestructive or destructive test, or where destructive tests were cut, or where nondestructive tests left cuts or holes, must be repaired. The CQA Monitor will locate and record all repairs on the repair log. Repair techniques include the following:

- Patching - used to repair holes, tears, large panel defects, undispersed raw materials, contamination by foreign matter, and destructive sample locations.
- Extrusion - used to repair small defects in the panels and seams. In general, this procedure should be used for defects less than 3/8-inch in the largest dimension.
- Capping - used to repair failed welds or to cover seams where welds or bonded sections cannot be nondestructively tested.
- Removal - used to replace areas with large defects where the preceding methods are not appropriate. Also used to remove excess material (wrinkles, fishmouths, intersections, etc.) from the installed geomembrane. Areas of removal shall be patched or capped.

For any repair method, the following provisions will be satisfied:

- Surfaces of the geomembrane which are to be repaired using extrusion methods will be ground no more than one hour prior to the repair;
- All surface will be clean and dry at the time of repair;
- Patches or caps will extend at least 6 inches beyond the edge of the defect, and all corners of patches will be rounded with a radius of approximately 3 inches or more;
- All repairs will be nondestructively tested as previously described; and
- All seaming equipment, personnel, and operation procedures used in repair work will meet the same requirements as for new seaming operations.

The GP or his/her qualified representative will observe all destructive and non-destructive testing of repairs and will record the number of each repair, type, date and test outcome. Repairs that pass the non-destructive tests will be taken as an indication of an adequate repair. Repairs more than 150 feet long will also be required to have a destructive test performed. Repairs that fail the initial retest will be redone and retested until a passing test results. All work and testing of repairs will be fully documented in a repair log.

3.3.8 Wrinkles

During placement of cover materials over the geomembrane, temperature changes or creep can cause wrinkles to develop in the geomembrane. Wrinkles which can fold over must be repaired either by cutting out the excess material or, if possible, by allowing the liner to contract by temperature reduction. In no case can material be placed over the geomembrane which could result in the membrane folding. The CQA Monitor must monitor the geomembrane for wrinkles and notify the Contractor if wrinkles are being covered by soil. The CQA Monitor is then responsible for documenting corrective action to remove the wrinkles.

3.3.9 Folded Material

All folded geomembrane must be removed. Remnant folds evident after deployment of the roll which are due to manufacturing process are acceptable.

3.3.10 Bridging or Induced Tension

Bridging or Induced Tension: Bridging is defined as areas where the geomembrane is not in contact with the subgrade due to a void in the subgrade or the sheet is pulled in tension so as to span over depressions in the subgrade. Areas likely to promote bridging, i.e. trenches, toe of slopes, etc., shall be loaded with sandbags after deployment and after seaming. Induced tension is stress introduced into the geomembrane during installation or covering. These areas will likely result in bridging. Areas with excessive bridging shall be identified and repaired by either of the following methods:

1. The geomembrane shall be cut by the Contractor, so the tension is relieved and the geomembrane conforms to the subgrade contours. The cut geomembrane shall be repaired and tested according to the Contract Documents regarding repairs and testing.
2. The geomembrane shall be cut by the Contractor, and subgrade material shall be added and placed, in accordance with the contract specifications, so as bring the geomembrane in contact with the subgrade. The cut geomembrane shall be repaired and tested according to the Contract Documents regarding repairs and testing.

3.3.11 Anchor Trench

An anchor trench will be constructed on the topdeck of the Landfill where the leading edge(s) of the geomembrane will not be needed for future tie-in for expansion into the next final cover area. The anchor trench backfill material will be placed as outlined in the technical specifications. Care will be taken when backfilling and compaction to prevent damage to the underlying geomembrane. Slightly rounded corners will be provided in anchor trenches where the geomembrane enters the trench as to avoid sharp bends in the geomembrane.

The geomembrane anchor trench will be left open until seaming is completed. Expansion and contraction of the geomembrane should be accounted for in the final cover placement. The anchor trench will be filled in the morning when temperatures are coolest to reduce bridging of the geomembrane.

The anchor trench backfill material will be placed in uniform lifts compacted to at least 90 percent of standard Proctor (ASTM D 698) density at a moisture content ranging from -2 to +4 percent of optimum. Compaction density and moisture of the anchor trench backfill will be visually verified by the CQA Monitor. Specific density and moisture testing of in-place anchor trench backfill will be at the discretion of the CQA Monitor.

3.3.12 Geocomposite and Erosion Layer Testing

When placing overlying material on the geomembrane in the composite final cover, every effort must be made to minimize wrinkle development and stress imparted to the geomembrane, as described in Section 3.3.8. If possible, cover should be placed during the coolest weather available. Small wrinkles should be isolated and covered as quickly as possible to prevent their growth. In no case will the geomembrane be allowed to fold over on itself.

3.3.12.1 Geocomposite

A double-sided geocomposite will be installed over the geomembrane in the composite final cover system only. The geocomposite will conform to the material and performance properties specified by the GP, consistent with project construction plans and technical specifications. The geocomposite transmissivity shall meet or exceed a transmissivity of 3.7×10^{-4} m²/sec at a gradients of 0.28 (see Part IV, Appendix IV.A, Attachment IV.A1 – Leachate Generation Model Narrative) and the non-woven geotextile heat-bonded to the geonet shall comply with the minimum material properties presented in the calculations provided in Part IV, Appendix IV.A, Attachment IV.A2. The drainage geocomposite manufacturer (or supplier), will conduct the tests methods presented in Table 3-5 and certify that all materials delivered comply with project specifications. The material certifications shall be reviewed by the GP and approved for the project prior to acceptance of any of the material.

Table 3-5 Manufacturer’s Testing Schedule for Geocomposite

PRODUCT	TEST	METHOD	MINIMUM FREQUENCY
Resin	Density	ASTM D1505 or D792	1 per batch and every resin lot
	Melt Flow Index	ASTM D1238	
Geonet	Density	ASTM D1505 or D792	1 per 100,000 ft ² and every resin lot
	Mass/Area	ASTM D1603	
	Thickness	ASTM D5199	
Geotextile	Mass/Area	ASTM D5261	1 per 100,000 ft ² and every resin lot
	Grab Tensile Strength	ASTM D4632	
	Trapezoidal Tear Strength	ASTM D4533	
	Apparent Opening Size	ASTM D4751	
	Permittivity	ASTM D4491	
Geocomposite	Transmissivity	ASTM D4716	One test per product type

Installation of the geocomposite will be conducted in accordance with Section 5.4 of Part IV, Appendix IV.B, specifically related to surface preparation, placement, and repairs.

3.3.12.2 Erosion Layer

The erosion layer will consist of a 18-inch-thick soil layer, with the top 6 inches capable of sustaining vegetation in accordance with §257.102(d)(3)(i)(c). The required thickness of the layer will be verified by settlement plates or survey methods on an established grid system with not less than one verification point per 10,000 square feet of surface area. A minimum of two verification points are required. The selected grid will be the same for both beginning and finished elevations of the erosion layer, so that minimum thickness can be calculated and verified. All elevation calculations necessary for thickness determination will be included as part of the supporting documentation in the FCSER.

The erosion layer does not require compaction control; however, it should be stable for construction traffic. When applicable, the erosion layer will be deployed in “fingers” along the geomembrane or geocomposite to control the amount of slack and minimize wrinkles and/or folds. Soil cover will generally be placed in an up-slope direction on sideslopes so that stress imparted to the geocomposite and geomembrane (if applicable) is minimized. Care will be exercised in placement of the erosion layer so as not to shift, wrinkle or damage any underlying geosynthetic layers, and the placement methods will be documented.

3.4 FINAL COVER SYSTEM EVALUATION REPORT

Upon completion of each area of final cover construction and evaluation, the GP will prepare a FCSER, prepared in accordance with this Plan. This report will be placed in the Site Operating Record for the life of the site.

Each FCSER will include a discussion of the construction of the final cover elements, a cover placement map which shows the covered area that was constructed and areas covered by all previous FCSERs with the dates of placing in the Site Operating Record. The map will depict a grid system, graphic scale, and north arrow. The FCSER will be signed and sealed by the GP performing the evaluation and a Responsible Official for the Plant.

The report will contain a narrative describing the work performed and the testing procedures performed prior to and during construction, record drawings, and results of field and laboratory testing. The FCSER will include the following:

- All field and laboratory test documentation for infiltration layer soils, including test and sample locations plotted on plan view drawings representing each 6 inch lift;
- Geomembrane manufacturer’s certifications (for the composite final cover only), documentation of all manufacturer’s and independent testing, geomembrane seaming and repair logs, seam testing results, and a site map showing locations of panels, repairs, and tests;
- Geocomposite manufacturer’s certification and testing documentation (for the composite final cover only); and
- Survey or other documentation for the thickness of the infiltration layer and erosion layer.

4 CLOSURE PROCEDURES

4.1 SEQUENCE OF FINAL COVER PLACEMENT

Final cover will be placed throughout the active life of the Landfill. Therefore, the sequence of final cover placement will ultimately be governed by having a sufficient area or number of cells or subcells constructed to allow the Landfill Owner/Operator to construct the aerial fill portion of the Landfill up to the design final grades. The largest area requiring final cover at any time during the Landfill's active life is described in Section 4.2.1. The final cover placement procedures listed below will be followed until all areas have been closed.

- Survey controls will be implemented during waste placement to control the filling of waste to the bottom of intermediate cover layer elevations.
- No later than the date of closure initiation, a notice of intent to close the Landfill or portion thereof will be prepared, submitted to the TCEQ, and placed in the Site Operating Record. The notification will include a certification by a qualified professional engineer that the design of the final cover system meets the requirements of §257.102(d)(3).
- The final cover system layers will be constructed at the appropriate time following placement of the final lift of waste. Installation and testing of the various components of the final cover system will be performed in accordance with Section 3.3 of this Plan.
- A FCSER will be prepared by an independent registered professional engineer, as described in Section 3.4, which will include a closure completion certification. This FCSER will be submitted for TCEQ approval, certifying that the final cover has been constructed in accordance with this Plan and requirements of §257.102(d).
- The FCSER, including closure completion certification, will be placed in the Site Operating Record, and the notification placed on the Landfill's publicly accessible website in accordance with Section 4 of the SOP, and the inspection checklist will be updated to reflect final cover placement.
- Prior to closure completion certification approval by the TCEQ, a financial assurance mechanism must be in place consistent with §352.1101(b).
- Following final closure of the Landfill, the following will be completed:
 - Equipment that has come in contact with CCR during active operations or closure activities will be cleaned prior to demobilizing the equipment from the Landfill or placing it into service for post-closure activities.
 - A notation will be recorded on the deed indicating that: (i) the property has been used for CCR disposal; and (ii) the use of the property is restricted under the post-closure care requirements of §257.104(d)(1)(iii). A notification stating that the notation has been recorded in the McLennan County Deed Records will be placed in the Site Operating Record and submitted to the TCEQ.

Note, the placement of final cover does not represent closure of a portion of the Landfill. Requirements for final closure of the Landfill are discussed in Section 5 of this Plan. In addition, post-closure care activities will not begin until the entire Landfill has been closed as discussed in Section 4.

4.2 CLOSURE DURING ACTIVE LIFE

As described above, the final cover will be constructed as fill areas achieve the design final contours. Should closure of the Landfill become necessary at any time during the active life of the Landfill, the following steps will be taken:

- Engineering plans will be developed to address site closure at the time of discontinued waste filling.
- The final waste received will be placed and properly compacted.
- Excavations (if any) will be graded to drain to the elevations shown in the closure engineering plans, and the site will be graded to promote runoff and prevent ponding.
- Consistent with the closure engineering plans, sections of the Landfill that are above-grade will be regraded and reshaped, as needed, to provide the proper slope for positive drainage, consistent with closure engineering plans.
- The final cover system will be constructed in accordance with this Plan and closure engineering plans.
- Following application of final cover, the Landfill will be seeded or sodded with appropriate vegetation to minimize erosion.
- Consistent with the closure engineering plans and with Part IV, Appendix IV.C – Run-on and Run-off Control Plan, remaining unconstructed portions of the surface water drainage system will be constructed to minimize erosion.
- A closure certification will be prepared by an independent registered professional engineer and a notification submitted to TCEQ as stated in Section 5 of this Plan.
- All proper notices and documentation will be filed with the appropriate agencies.

4.2.1 Estimate of Maximum Inventory of Waste Ever On Site

Consistent with §257.102(b)(1)(iv), the estimate of maximum inventory of waste (defined as waste and intermediate cover) ever on site over the active life of the Landfill is 19,986,382 cubic yards (based upon volumes computed within Cells 1 through 3 from bottom of liner and top of final grade elevations, less liner and final cover thicknesses).

4.2.2 Estimate of Largest Area Ever Requiring Final Cover

In accordance with §257.102(b)(1)(v), the largest area ever requiring final cover at any time during the Landfill's active life is estimated to be approximately 34.0 acres. The estimated largest area requiring final cover includes the cells that were constructed prior to or during the time of preparing this Registration Application, including Cells 1 and 2 and a portion of Cell 3 (inclusive of Subcells 3A through 3D). If the Landfill is expanded in the future (e.g., Subcell 3E constructed), then this Plan will be amended consistent with Section 10.

In addition, the entire 149.3 acres within the Landfill Registration Boundary will also be administratively closed.

5 CLOSURE SCHEDULE

5.1 FINAL CLOSURE REQUIREMENTS

The Landfill will be closed in an orderly fashion, consistent with §352.1221 (§257.102 and §257.104), while implementing the following steps:

- No later than the date of closure initiation, a notice of intent to close the Landfill or portion thereof will be prepared, submitted to the TCEQ, and placed in the Site Operating Record. The notification will include a certification by a qualified professional engineer that the design of the final cover system meets the requirements of §257.102(d)(3).
- Final closure activities will commence at the Landfill no later than 30 days after the date the Landfill receives the known final receipt of wastes, in accordance with §257.102(e)(1). If there is a reasonable likelihood that the Landfill will receive additional waste in the foreseeable future, final closure activities will commence no later than two years after the most recent receipt of wastes.
- Final closure activities of the Landfill will be completed in accordance with this Plan within six months of commencing closure activities, in accordance with §257.102(f)(1).
- Within 30 days of completion of final closure activities at the Landfill, a notification of closure will be submitted to the TCEQ, placed in the Site Operating Record, and placed on a publicly accessible website in accordance with Section 4 of the SOP. The inspection checklist will be updated to reflect final cover placement. In addition, a notation will be recorded on the deed indicating that: (i) the property has been used for CCR disposal; and (ii) the use of the property is restricted under the post-closure care requirements as provided by §257.104(d)(1)(iii). The notification will state that the above mentioned notation has been recorded in the McLennan County Deed Records.

5.2 PROVISIONS FOR EXTENDING CLOSURE TIMEFRAMES

Consistent with §257.102(e)(2)(ii), closure activities will commence no later than two years after the most recent receipt of wastes. Two-year time extensions to commence closure may be obtained by developing written documentation if there is a reasonable likelihood that the Landfill will receive additional waste in the foreseeable future. At a minimum, the documentation will provide information specified in §257.102(e)(2)(ii)(A) and (B). The time extension(s) will be submitted to the TCEQ, placed in the Site Operating Record, and placed on the Landfill's publicly accessible website in accordance with Section 4 of the SOP prior to the end of any two-year period.

Consistent with §257.102(f)(1), final closure activities of the Landfill will be completed in accordance with this Plan within six months of commencing closure activities. One-year time extensions for completing closure may be obtained by developing a demonstration that it is not feasible to complete closure within the required timeframe specified in §257.102(f)(1); and includes the statement specified in §257.102(f)(2)(iii), and signed by a Responsible Official for the Plant. No more than a total of two one-year extensions will be obtained for the Landfill. The time extension(s) will be submitted to the TCEQ, placed in the Site Operating Record, and placed

on the Landfill's publicly accessible website in accordance with Section 4 of the SOP prior to the end of any two-year period.

6 POST-CLOSURE CARE ACTIVITIES

6.1 MONITORING AND MAINTENANCE

In accordance with §257.104, post-closure care requirements, including monitoring and maintenance, will commence upon completion of final closure requirements set forth in Sections 2 through 5 of this Plan. Post-closure care monitoring and maintenance will continue for a period of 30 years in accordance with §257.104(c)(1) unless the Landfill is operating under assessment monitoring in accordance with §257.95 at the end of the post-closure care period. Post-closure care monitoring and maintenance will consist, at a minimum, of the following requirements to be carried out by the Landfill Owner/Operator, in accordance with §257.104(b):

- Inspections of the Landfill cover, run-on and run-off drainage system, and leachate collection and removal system (LCRS) will be conducted monthly in accordance with Section 3 of the SOP and Table 6.1 of this Plan. As a result of these inspections the following maintenance or remediation activities will be performed:
 - Conduct maintenance and/or remediation activities, as a result of inspections, in order to maintain the integrity and effectiveness of the final cover, site vegetation, run-on and run-off drainage system, and LCRS.
 - Maintain adequate vegetation coverage on the final cover to minimize erosion.
 - Maintain surface water run-on and run-off controls in order to minimize the erosion of the final cover system.
 - Correct the effects of settlement, subsidence, ponded water, erosion, or other events or failures determined to be detrimental to the integrity of the closed Landfill.
- Maintain and operate the LCRS in accordance with Part IV, Appendix IV.A – Leachate Collection and Removal System Plan. The Landfill Owner/Operator reserves the right to submit a demonstration to the TCEQ at the appropriate time that leachate will no longer pose a threat to human health, the environment, or property. If the demonstration is approved by the TCEQ, the Landfill Owner/Operator may be allowed to discontinue the maintenance and operation of the LCRS. Following the discontinuation of maintenance and operation of the LCRS or completion of the post-closure care period, the leachate evaporation pond will be decommissioned by disposing of the geomembrane and protective cover soil at an authorized facility. It is assumed that leachate will be evaporated in the existing leachate evaporation pond and that off-site disposal will not be required following pond decommissioning at the end of post-closure care period.
- Maintain the groundwater monitoring system in accordance with Section 3 of the SOP, Table 6.1 of this Plan, and monitor groundwater in accordance with §257.95 through §257.98 and Part VI, Appendix VI.A - Groundwater Sampling and Analysis Plan. In accordance with Part VI, Appendix VI.A, the minimum monitoring frequency will be semiannually. However, the Landfill Owner/Operator reserves the right to request TCEQ approval of (1) an alternative monitoring frequency, and (2) an alternative list of

parameters to be monitored. Such requests will be based on supporting data available at the time of the request.

Table 6.1 Site Inspection and Maintenance Schedule (Post Closure Care Period)

ITEM	TASK	SCHEDULE
Landfill Structure and Slope	Inspect for sloughing, slumping, sliding, surface cracking, sinkholes, excessive slope, toe of slope movement, and vehicle damage. Remedy deficiencies as needed and notify TCEQ as required in Section 3 of the SOP.	Monthly
Final Cover	Inspect for proper placement, thickness, slope, settlement, vegetation, animal burrows, and erosion. Maintenance will be ongoing throughout post-closure care period. Remedy deficiencies as needed.	Monthly
Erosion Control	Inspect the final cover for signs of erosion. Damaged areas will be repaired by restoring cover material, grading, compaction, and/or seeding or sodding.	Monthly
Ponding Water	Inspect Landfill cover for potential ponding water locations. Fill depressions and regrade potential areas as needed.	Monthly
Run-on and Run-off Control Systems	Inspect diversion berms, downchutes, perimeter drainage channels, culverts, detention basin(s) for damage. Remedy deficiencies as needed.	Monthly
Leachate Collection & Removal System	Inspect leachate riser pipes, sump pump/controls, evaporation pond for damage and height of freeboard in the pond and leachate evaporation pond underdrain system for damage or blockage, as applicable. Remedy deficiencies as needed.	Monthly
Groundwater Monitoring System	Inspect groundwater monitoring wells for damage, excess vegetation, and other deficiencies. Remedy deficiencies as needed.	Monthly

6.2 COMPLETION OF POST-CLOSURE CARE PERIOD

In accordance with §352.1241 [§257.104(e)], no later than 60 days following the completion of the post-closure care period, a written notification by a qualified professional engineer verifying that post-closure care has been completed in accordance with this Plan and the Landfill possess no threat to human health, the environment, or property will be placed in the Site Operating Record. The notification will be submitted to the TCEQ for approval and placed on the Landfill’s publically accessible website within 30 days of placing in the Site Operating Record in accordance with Section 4 of the SOP.

The post-closure period will be extended until the TCEQ approves a demonstration that the Landfill poses no threat to human health, the environment, or property. The Landfill Owner/Operator will maintain the financial assurance required in §352.1101(d) (see Part VIII) until the TCEQ post-closure care is no longer required.

7 CONTACT PERSON DURING POST-CLOSURE CARE ACTIVITIES §257.104(D)(1)(II)

In accordance with §257.104(d)(1)(ii), at the time of development of this Registration Application, the following is the contact person for the Landfill during the post-closure care period:

Name and Title: Dana Perry, Business Manager
Address: 2161 Rattlesnake Road
Riesel, Texas 76682
Telephone: (254) 896-4218
Email: dperry@sandycreekservices.com

If the Landfill was closed and required to start post-closure care as of the date of this Registration Application submittal, the Business Manager would be the person to contact during the post-closure period. The person responsible for conducting post-closure activities is subject to change. However, as part of the closure notification, as required by §257.102(h), the contact person will be provided in the notification.

8 POST-CLOSURE LAND USE

8.1 INTENDED USE

There are no currently planned uses for the Landfill after closure. If the closed Landfill is considered for other use(s) in the future, this Plan will be amended in accordance with §257.104(d)(3) and Section 10 of this Plan.

8.2 CONSTRAINTS OF POST-CLOSURE CONSTRUCTION

In accordance with §257.104(d)(1)(iii), the post-closure use will not disturb the integrity of the final cover, liner, or any other components of the containment system or the function of the post-closure monitoring systems unless necessary to comply with the TCEQ regulations. Disturbances to the above mentioned components are allowed, provided that a demonstration that the disturbance to the final cover, liner, or other components of the containment system, including any removal of waste, will not increase the potential threat to human health, environment, or property. The demonstration will be certified by a professional engineer in the state of Texas, will be submitted to the TCEQ, and placed on the Landfill's publically accessible website within 30 days of placing in the Site Operating Record in accordance with Section 4 of the SOP.

9 POST-CLOSURE CARE COST ESTIMATE (§352.1101(B))

A detailed written cost estimate, in current dollars (2021), for the cost of hiring a third party to conduct post-closure care activities for the Landfill, in accordance with this Closure and Post-Closure Care Plan, is provided in Part VIII – Post-Closure Care Cost Estimate and Financial Assurance Mechanism, in accordance with §352.1241. Part VIII also describes procedures for updating the post-closure cost estimate.

10 AMENDMENT OF CLOSURE AND POST-CLOSURE PLAN

In accordance with §257.102(b)(3) and §257.104(d)(3), this Closure and Post-Closure Plan may be amended at any time. Any amendment of this Plan will be submitted in accordance with 30 TAC §305.62, and requires a written certification by a qualified professional engineer that the amendment meets the requirements of §257.102(b) and/or §257.104(d).

When conditions occur that necessitate a change to this Plan, it must be amended within the following timeframes:

- At least 60 days prior to changing the operation of the Landfill in a manner that would substantially affect the activities described in this Plan;
- Within 60 days after an unanticipated event requires the need to revise the activities described in this Plan, if closure or post-closure activities have not yet been initiated for the Landfill; and
- Within 30 days after an unanticipated event requires the need to revise the activities described in this Plan, if closure or post-closure activities are underway.

The written certification will be submitted for approval to the TCEQ in accordance with §305.62, and placed on the Landfill's publically accessible website within 30 days of placing in the Site Operating Record in accordance with Section 4 of the SOP.