



Proactive by Design

GEOTECHNICAL  
ENVIRONMENTAL  
ECOLOGICAL  
WATER  
CONSTRUCTION  
MANAGEMENT

GZA GeoEnvironmental of NY  
535 Washington Street  
11th Floor  
Buffalo, NY 14203  
T: 716.685.2300  
F: 716.685.3629  
www.gza.com



October 14, 2016  
File: 21.0056798.00

Mr. Kevin Schroeder  
Kevin.schroeder@nrgenergy.com  
Dunkirk Power LLC  
106 Point Drive North  
Dunkirk, NY 14048

Re: Existing CCR Landfill Closure Plan  
Van Buren Road  
Pomfret, New York

Dear Mr. Schroeder:

GZA GeoEnvironmental of New York (GZA) presents this landfill closure plan to Dunkirk Power LLC (Dunkirk) for the existing coal combustion residuals (CCR) landfill located at the Dunkirk Power facility in Pomfret, New York (Site). This closure plan is required by the United States Environmental Protection Agencies (USEPAs) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, as presented in the Federal Register Volume 80 No 74 dated April 17, 2015. In accordance with the CCR Rule (40 CFR §257.102(b)), owners/operators of CCR units must prepare a written closure plan that describes the steps necessary to close a CCR unit at any point during the active life of the CCR unit consistent with recognized and generally good engineering practices.

In accordance with §257.102(b)), the closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of section 257.102.

### Site Background

The active CCR landfill cells for the Site are identified as Phase 2, Cells A and B-1. The Site landfill cells identified as Phase 1, Cells A and B (excluding a small portion of the northern Phase I Cells A and B) and the eastern portion of Phase 2, Cell A are already closed and therefore are not addressed in this closure plan. The limits of the active cells included in this closure plan are shown on the attached figure. We note that a constructed cell designated as Phase 2, Cell B-2, located adjacent to the west of Phase 2, Cell B-1, has never received CCR waste and the facility currently has no plans for this cell to receive waste in the future. The unused Cell B-2 leachate collection system is connected to those of the active cells, but Dunkirk Power is planning to disconnect this system from the active cells. This closure plan, therefore, excludes Cell B-2 from the active CCR landfill.



The Dunkirk CCR landfill is currently permitted (ID#9-0658-00021/00008) with the New York State Department of Environmental Conservation (NYSDEC) to accept CCR and other associated wastes generated from the Dunkirk Power facility through May 22, 2021.

Information required by §257.102(b)(i) through (vi) for the required closure plan is as follows.

### **1. Narrative of Closure - §257.102(b)(1)(i)**

The active ash landfill cells (identified as Phase 2 Cells A and B-1) will be closed by leaving the CCR in place and the closure will be performed in accordance with §257.102(d) and will include a final cover system that will comply with its NYSDEC permit specific requirements. The CCR landfill will be closed as described in the following sections.

### **2. CCR Removal and Decontamination – §257.102(b)(1)(ii)**

CCR from the ash landfill Cells A and B-1 will be left in place in accordance with §257.102(d); therefore, CCR removal and decontamination is not applicable for the landfill closure.

### **3. Final Cover Requirements – §257.102(b)(1)(iii)**

As the CCR will remain in place, the active landfill cells will be closed with a final cover system that meets the requirements specified in §257.102(d) and in accordance with the requirements of 6 NYCRR Part 360 and the specific NYSDEC-issued permit.

Specifically, the remaining exposed CCR waste will be graded and compacted in conformance with the NYSDEC permit requirements (side slopes no steeper than 33% (3H:1V)) to allow for appropriate drainage conditions and required stability of the final cover system. As required by the NYSDEC permit and taking into account that the landfill is not anticipated to be filled to its original design capacity, the final cover material requirements will consist of, at a minimum, the following components from top to bottom (i.e., top of waste).

- 6-inches of seeded topsoil
- 12-inches of protective soil material
- Drainage geocomposite layer
- Geomembrane layer

The final closure slopes of the CCR/waste materials area are expected to range between 3% and 25% for a majority of the active cell with the exception of the northern side slope of 3H:1V which will tie into the existing side slopes of the closed portion of Cell A. The flatter slopes will be utilized for upper tiers and intermediate benches or access areas and the steeper slopes will be constructed on the western and southern sides of the final closure. The final grades are expected to be completed using typical construction equipment including low ground pressure bulldozers and smooth and/or sheepfoot



roller/compactors. Dump trucks would be used to deliver clean cover system materials (barrier protection soil and top soil) for placement over the geomembrane cover materials.

An impermeable geomembrane will be installed as part of the final cover system over the final graded CCR. This geomembrane will be welded to the existing cover system membrane of the adjoining closed cells and will also to its geomembrane that comprises its primary drainage layer (located along the western and northern sides of the cells). This membrane cover system will meet the requirements of §257.102(d)(3)(i)(A) through (D) with a system that will essentially encapsulate the ash waste with a low permeability system resulting in minimizing precipitation infiltration, and will aid in reducing the potential for CCR erosion. The membrane cover system will be covered by a 12-inch thick barrier protection soil and a 6-inch thick seeded topsoil that will support a vegetative (i.e., grass) cover.

Because the adjacent expansion Cell B-2 has never received CCR wastes, the cell leachate collection system pipes will have flow re-routed to discharge accumulated clean storm water (i.e., non-CCR water) from the unused cell floor to an approved and permitted discharge location. Therefore, a final cover system will not be required for the expansion Cell B-2.

The cover system for the active cells will be constructed with intermediate sloped benches or terraces that will slow the surface water velocity and direct surface water run off to the appropriate discharge locations (i.e., rip-rap lined down chutes or sheet flow to slope toe) to minimize erosion potential.

Based on the estimated volume of CCR and associated estimated volume of waste remaining to be disposed at the landfill (reportedly about 8,000 cy) as compared to its design capacity, the final grades are estimated to require side slopes of about 4H:1V as compared to 3H:1V allowed by the existing permit. Construction of these flatter slopes will provide more stable slopes and reduce the potential for sloughing or movement of the final cover system during the post closure period.

Based on the size of the active cells and weather conditions, construction of a cover system (including notification, issuance of design and QA/QC Plans and construction) could be completed within a period of about two years from the time of final receipt of CCR and associated wastes.



**4. Maximum CCR Inventory - §257.102(b)(1)(iv)**

For the purposes of this closure plan, the maximum CCR inventory capable of being stored within the active landfill cells (designated as Phase II Cells A and B-1) has been estimated to be greater than the estimated remaining volume of CCR and associated wastes requiring disposal. The table below presents the estimated maximum CCR and associated wastes for the ash landfill and the anticipated remaining volume as determined by the 2015 fill progression survey.

Landfill Cell	Theoretical Volume Capacity (cy)	Total Volume to Date (cy)	Remaining Available Volume (cy)
Phase II Cell A	747,354	719,661	28,361
Phase II Cell B1	449,577	208,544	270,941

cy = cubic yard

**5. Maximum Area Requiring Final Cover – §257.102(b)(1)(v)**

Based on the footprint of the active cells the maximum area requiring a cover system in its current configuration is estimated at approximately 514,000 sf (11.8 acres).

**6. Closure Schedule – §257.102(b)(1)(vi)**

Closure of the Dunkirk facility ash landfill is anticipated to begin when the final receipt of CCR or non-CCR waste stream has been made in accordance with §257.102(e). Prior to commencing closure construction, permit-level design drawings, technical specifications and QA/QC plan documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction-level design drawings, technical specifications, QA/QC plan, and contract bid documents, and required notifications to NYSDEC. The permits required for closure or cover system construction will be evaluated at the time of closure, but are anticipated to include permits from the NYSDEC. A preliminary schedule of anticipated closure activities and associated dates is included below.

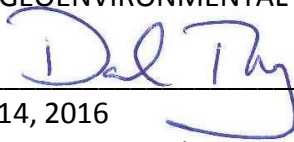
Permit-Level Design	August-September 2029
NYSDEC Review of Permit Level Design	September – October 2029
Response to NYSDEC Comments on Permit Design	November-December 2029
Final Receipt of CCR and Non-CCR Waste Stream	January 2030
Construction-Level Closure Plans, Permits and Contracting	January 2030 to June 2030
Construction of Cover System	July 2030 to October 2030
Landfill Closure Certification Report and NYSDEC Approval	October 2030 to January 2030



**PROFESSIONAL ENGINEER CERTIFICATION**

The undersigned registered professional engineer is familiar with the requirements of §257.102 *Criteria for conducting the closure or retrofit of CCR Units*. The undersigned registered professional engineer attests that this CCR Landfill Closure Plan has been prepared in accordance with good engineering practice, including consideration of applicable state regulatory requirements and meets the requirements of §257.102(b), and that this plan is adequate for the NRG - Dunkirk Power. This certification was prepared as required by §257.102(b)(4).

Name of Professional Engineer: Daniel J. Troy, P.E.  
Company: GZA GEOENVIRONMENTAL OF NEW YORK

Signature: 

Date: October 14, 2016  
PE Registration State: New York  
PE Registration Number: 081139-1



Professional Engineer Seal:

We trust this information satisfies your needs for this project.

Sincerely,

GZA GEOENVIRONMENTAL OF NEW YORK



Daniel J. Troy, P.E.  
Senior Project Manager



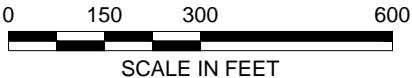
Bart A. Klettke, P.E.  
Principal

Attachments: Figure 1 - Site Plan



**NOTES:**

1. DIGITAL AERIAL PHOTOGRAPHY ADAPTED FROM AN IMAGE DOWNLOADED FROM GOOGLE EARTH PRO.
2. THE SIZE AND LOCATION OF SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.



NO.	ISSUE/DESCRIPTION	BY	DATE

**DUNKIRK POWER CCR LANDFILL  
DUNKIRK, NEW YORK  
LANDFILL CLOSURE PLAN**

**SITE PLAN**

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

PREPARED BY:  
 **GZA GeoEnvironmental of N.Y.**  
 Engineers and Scientists  
 535 WASHINGTON STREET 11th FLOOR  
 BUFFALO, NEW YORK 14203  
 (716) 865-2300

PREPARED FOR:  
**NRG DUNKIRK POWER, LLC**

PROJ MGR: DJT	REVIEWED BY:	CHECKED BY:	FIGURE <b>1</b>
DESIGNED BY:	DRAWN BY: TAK	SCALE: AS SHOWN	
DATE SEPT. 2016	PROJECT NO. 21.0056798.00	REVISION NO.	