



**ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING**

**A.B. BROWN GENERATING STATION
TYPE III RESTRICTED WASTE LANDFILL**

CLOSURE PLAN

ATC PROJECT NO. 170LF00265

OCTOBER 7, 2016

PREPARED FOR:

VECTREN CORPORATION
A.B. BROWN GENERATING STATION
8511 WELBORN ROAD
MOUNT VERNON, INDIANA 47620
ATTENTION: MS. LISA MESSINGER



October 7, 2016

Ms. Lisa Messinger
Director of Environmental Affairs
1 Vectren Square
Evansville, IN 47702

ATC Group Services LLC

7988 Centerpoint Dr.
Suite 100
Indianapolis, IN 46256

Phone +1 317 849 4990
Fax +1 317 849 4278

www.atcgroupservices.com

Re: Closure Plan
A.B. Brown Generating Station
Type III Restricted Waste Landfill
Mount Vernon, Indiana
ATC Project No. 170LF00265

Dear Ms. Messinger:

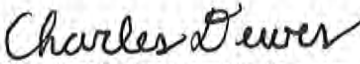
ATC Group Services LLC (ATC) is pleased to present the following Closure Plan for the A.B. Brown Generating Station Type III Restricted Waste Landfill. Contained herein is a copy of the report which summarizes the compliance of the landfill closure plan with requirements of 40 C.F.R. Part 257, Subpart D.

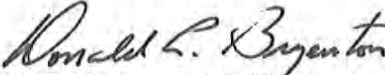
A summary of the landfill final cover system, engineering design measures, narrative of closure activities, an approximate timeline for closure, and engineering certification are included with this plan.

We appreciate the opportunity to assist you with this project. If you have any questions concerning information contained in this report, please do not hesitate to call either of the undersigned at 317.849.4990.

Sincerely,

ATC Group Services LLC


Charles P. Dewes, E.I.
Project Engineer


Donald Bryenton, P.E.
Principal Engineer

Copies: (4) Lisa Messinger

Prepared for:

SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
dba VECTREN POWER SUPPLY, INC

A.B. BROWN GENERATING STATION
TYPE III RESTRICTED WASTE LANDFILL

CLOSURE PLAN

A.B. Brown Generating Station
8511 Welborn Road
Mount Vernon, Indiana 47620

OCTOBER 7, 2016

Prepared by:



7988 Centerpoint Drive, Suite 100
Indianapolis, Indiana 46256

ENGINEERING CERTIFICATION

I, Donald L. Bryenton, being a registered Professional Engineer of the State of Indiana, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this Closure Plan dated October 7, 2016 was conducted in accordance with the requirements of 40 C.F.R. § 257.102, is true and correct, and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE:

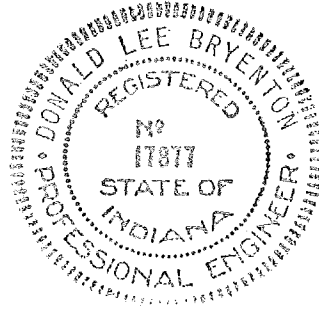
Donald L. Bryenton

DATE:

10/7/16

ADDRESS:

ATC Group Services LLC
7988 Centerpoint Drive, Suite 100
Indianapolis, Indiana 46256



I. INTRODUCTION

The A.B. Brown Generating Station (A.B. Brown) Type III Restricted Waste Landfill is located near West Franklin in Posey County, Indiana (Figure 1). The CCR Landfill Unit was initially permitted in 1979 and received an expansion permit from Indiana Department of Environmental Management (IDEM) on March 17, 1992. The facility permit FP 65-07 allows for the disposal of specific CCR materials into the landfill unit. The total permitted Solid Waste Boundary area approved by IDEM is approximately 128.1 acres. A total of 52.3 acres of the landfill have received closure certification from IDEM.

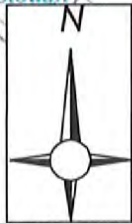
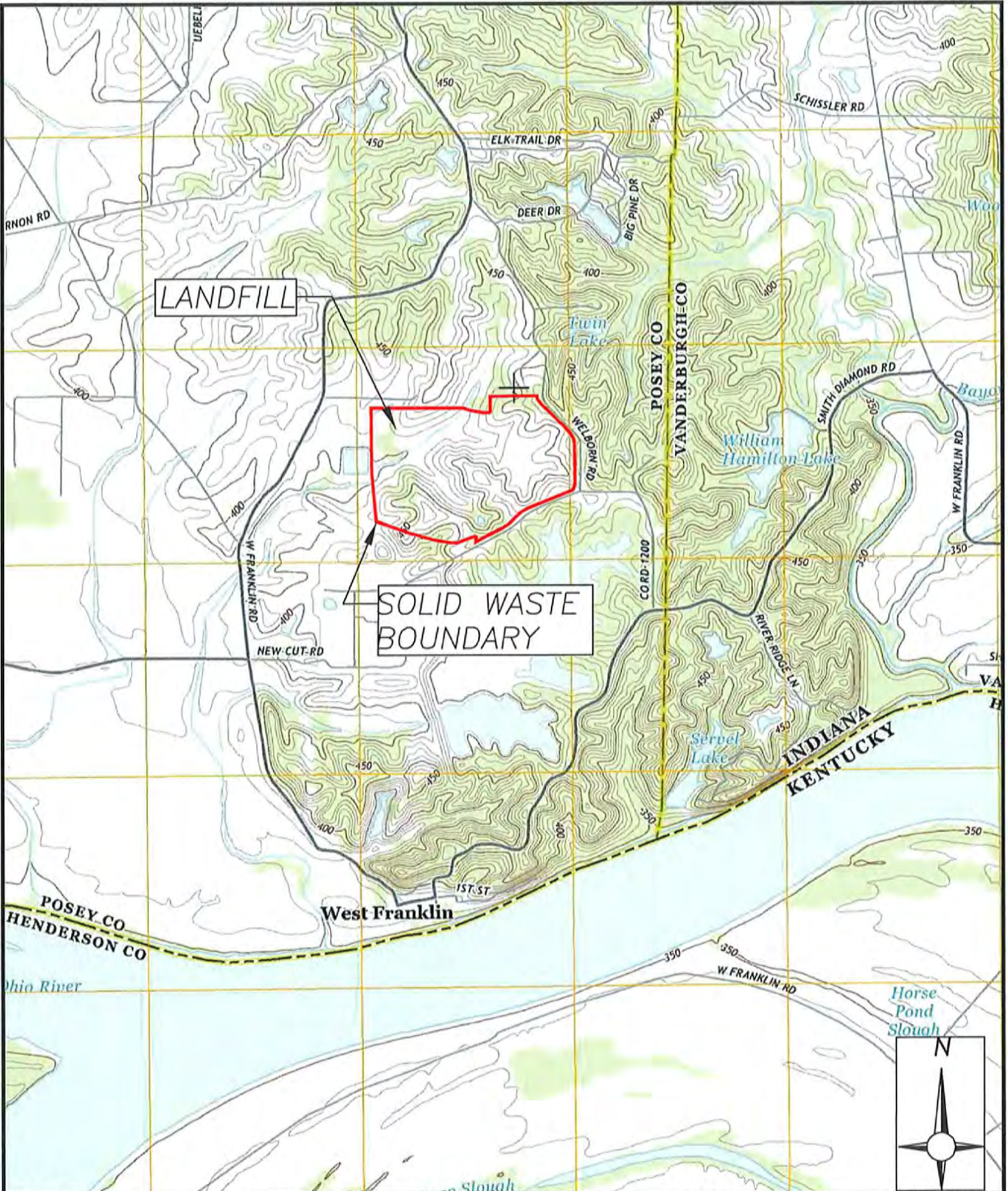
This Closure Plan meets requirements set forth by 40 C.F.R. Part 257, Subpart D and is consistent with the requirements of 40 C.F.R. § 257.192 (b) and 257.102(d) for closure of coal combustion residuals landfills which states that a CCR Unit must be closed in a manner that will:

- (i) Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquid into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;
- (ii) Preclude the probability of future impoundment of water, sediment, or slurry;
- (iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;
- (iv) Minimize the need for further maintenance of the CCR unit; and
- (v) Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The following table summarizes the documentation required within the CCR rule and the sections of the plan that specifically respond to those sections.

<u>Report Section</u>	<u>Title</u>	<u>CCR Rule Reference</u>
II.	Method of Closure	§257.102 (b)(1)(i); §257.102 (b)(1)(iii)
III.	Final Cover	§257.102 (b)(1)(iii); §257.102 (d)(3)
IV.	Run-Off Controls	§257.102 (b)(1)(iii); §257.102 (d)(1)
V.	CCR Maximum Inventory	§257.102 (b)(1)(iv)
VI.	Largest Final Cover Area	§257.102 (b)(1)(v)
VII.	Closure Schedule	§257.102 (b)(1)(vi)

H:\2016\VECTREN CORPORATION\AB BROWN\170\F00271-VC-2016.DWG, HP5500



**A.B. BROWN GENERATING STATION
TYPE III RWS LANDFILL**

8511 WELBORN ROAD
MOUNT VERNON, INDIANA 47620
POSEY COUNTY, INDIANA

Project Number: 170f00271		Drn. By: WS
Drawing File: SEE LEFT		Ckd. By: CD
Date: 8/16	Scale: AS SHOWN	App'd By:
ATC		Figure: 1

II. METHOD OF CLOSURE

The purpose of the Closure Plan is to outline the steps necessary to close the landfill consistent with recognized and generally accepted good engineering practices. The A.B. Brown Landfill will follow the closure-in-place method. The closure will be achieved by placing CCR materials generated at A.B. Brown, into the landfill to establish final grades consistent with the permit conditions issued by IDEM.

The CCR Landfill Unit will receive a final cover system which meets the minimum performance criteria outlined in §257.102 (d)(3)(i) which state that:

- (A) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.
- (B) The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.
- (C) The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.
- (D) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

III. FINAL COVER

The IDEM approved final cover system for the remaining portions of the A.B. Brown Landfill consists of a minimum of 2 feet of compacted soil consisting of ML, CL, MH, CH, or OH soils in accordance with the Unified Soil Classification System, or other suitable material approved by the commissioner. The 2 foot compacted soil layer must be overlain by a minimum of 6 inches of topsoil and vegetated.

The IDEM approved final cover system does not specify a maximum hydraulic conductivity for the compacted soil layer. However, as noted above, §257.102 (d)(3)(i)(A) requires the permeability of the final cover be less than or equal to the bottom liner system. The IDEM permit conditions for this facility require a base liner with a permeability equal to or less than 1×10^{-6} cm/sec. Therefore, in accordance with the requirements of §257.102 (d)(3)(i), a minimum of 18 inches of the compacted soil layer of the final cover will be constructed with a permeability equal to or less than 1×10^{-6} cm/sec. As allowed in §257.102 (d)(3)(ii) and if approved by IDEM, the landfill could select an alternative final cover system. This determination will be made at the time the facility commences closure.

Construction quality assurance measures will be completed to ensure measures are taken to ensure that the final cover soil installation is constructed as designed. At the time final closure is completed, a Qualified Professional Engineer will certify that the final cover system meets the requirements of §257.102 (d)(3).

IV. RUN-OFF CONTROLS

As required by IDEM, the final cover system will be constructed with slopes not less than two percent (2%) and not greater than thirty-three percent (33%). A series of stormwater run-off controls will be constructed as part of the final cover system to minimize infiltration and ponding during the post closure period. Diversion berms and either downdrain pipes or riprap downdrain channels will be used to control stormwater runoff.

Spacing of berms has been designed considering the Universal Soil Loss Equation to minimize erosion. Slopes of all stormwater measures efficiently convey run-off away from the final closure area. Perimeter ditches and retention ponds are adequately sized to handle the run-off volume from the 24-hour, 25-year storm event.

V. CCR MAXIMUM INVENTORY

The maximum inventory of CCR materials allowed in the A.B. Brown Type III Restricted Waste Landfill is based on the volume of airspace calculations specified in approved IDEM permits. These volumes are based on a comparison of the top of the base liner system to the bottom of the final cover system. The capacity represents the anticipated maximum inventory over the life of the CCR unit.

Table 1 – CCR Maximum Inventory

<u>CCR Permit</u>	<u>Permitted Waste Volume (CY)</u>
2007 Minor Modification	8,832,666
2012 Minor Modification	+488,300
TOTAL	9,320,966

VI. LARGEST FINAL COVER AREA

Approximately 52.3 acres of the 128.1 acre area inside the permitted solid waste boundary have been certified closed by IDEM. Therefore the largest remaining final cover area will not exceed 75.8 acres.

VII. CLOSURE SCHEDULE

The A.B. Brown Landfill will complete final closure within the generally allowed six (6) month period required under §257.102(e). Additional closure time may be requested by the facility under the allowed extension periods of §257.102(f)(2)(i). The A.B. Brown Generating Station will commence closure no later than 30 days after the date on which the CCR unit either:

- (i) Receives the known final receipt of waste, either CCR or any non-CCR waste stream; or
- (ii) Removes the known final volume of CCR from the CCR unit for the purpose of beneficial use of CCR.

Prior to commencing closure construction, design documents will be prepared. Closure construction design documents will include construction drawings, technical specifications, and construction quality assurance plans. Permits have already been obtained from the state agency, the Indiana Department of Environmental Management (IDEM) for the operation and closure of the landfill. Therefore, no additional permits are anticipated at this time.

Activities which are anticipated as part of the closure process include the following:

- (i) Mobilization of Contractor (within 1 month of last receipt of waste);
- (ii) Preparation of final cover subgrade (0 to 1 month following start of construction);
- (iii) Placement of compacted soil layer (1 to 4 months following start of construction);
- (iv) Placement of topsoil, diversion berms and drainage controls (4 to 5 months following start of construction); and
- (v) Fertilize, seed and mulch final cover area (5 to 6 months following start of construction).