



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

VISUAL SITE INSPECTION REPORT – 2018

SOUTHERN INDIANA GAS AND ELECTRIC
A. B. BROWN GENERATING STATION
TYPE III RESTRICTED WASTE LANDFILL
WEST FRANKLIN, IN

ATC PROJECT NO. 170LF00614

January 9, 2019

PREPARED FOR:

SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
dba VECTREN POWER SUPPLY
A.B. BROWN GENERATING STATION
8511 WELBORN ROAD
MOUNT VERNON, IN 47620
ATTENTION: MS. ANGIE SCHELLER



January 9, 2019

Angie Scheller
Southern Indiana Gas and Electric Company
8511 Welborn Road
Mount Vernon, IN 47620

Re: Visual Site Inspection Report – 2018

A.B. Brown Generating Station
Type III Restricted Waste Landfill
West Franklin, Indiana
ATC Project No. 170LF00614

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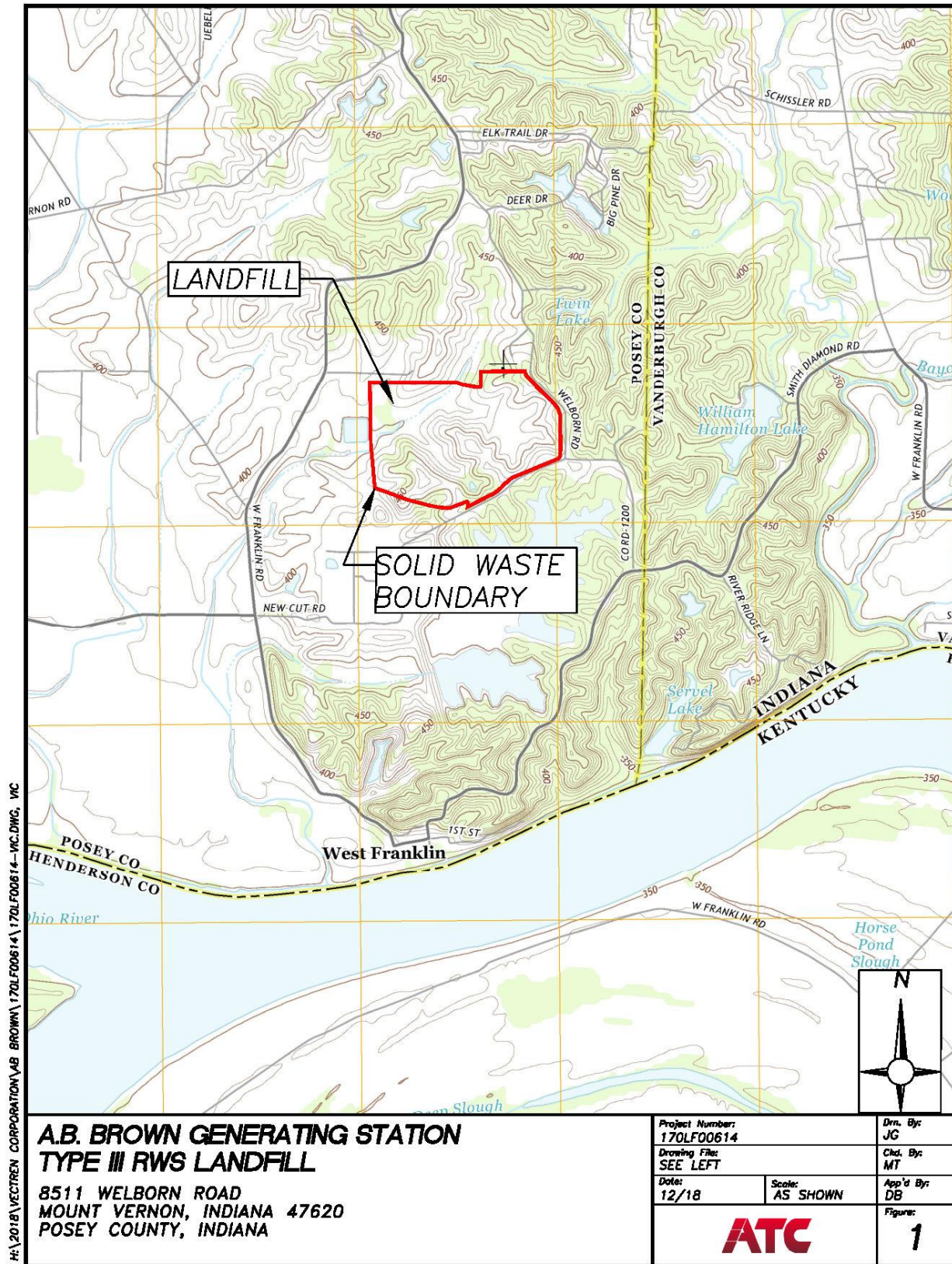
Dear Ms. Scheller:

This report summarizes our November 7, 2018 Visual Site Inspection of the Type III Restricted Waste Landfill at the A.B. Brown Generating Station. The visual inspection and this report were completed in accordance with guidelines established by the Coal Combustion Residuals (CCR) Rule published by the Environmental Protection Agency on April 17, 2015.

The scope of this inspection was limited to an examination of readily observable surface features of the landfill and its appurtenant structures, and a review of information that you provided. Please note that the inspection did not include any test drilling, testing of materials, precise physical measurements of landfill features, detailed calculations to verify slope stability, or other engineering analyses. Although the inspection was conducted by competent personnel in accordance with generally accepted methods for inspecting landfills, it should not be considered as a warranty or guarantee of the future performance and/or safety of the landfill.

The landfill is located within the A.B. Brown Station property in Section 24, Township 7 South, and Range 12 West, about a half mile north of the Ohio River in Posey County, Indiana as highlighted on the West Franklin, IN USGS Quadrangle map, Figure 1 on the following page.

The landfill inspection was completed by Don Bryenton and Mike Thornbrue of ATC Group Services LLC (ATC). The weather during the inspection was sunny with temperatures around 50°F. Ground conditions were relatively dry with remaining moisture from recent rains. The landfill system features are highlighted on the attached Site Plan in Appendix A.



The landfill system was divided into the following components to help organize the inspection and the reporting:

- Landfill Partial Closure Areas (east end and north slope of the landfill);
- Active Landfill Area (west end of the landfill);
- Vertical Expansion Area (top central portion of the landfill);
- Inactive Landfill Area (south slope of the landfill); and
- Landfill Settling Basin.

The approximate limits of each of these areas is noted on Sheet 1 in Appendix A. The following paragraphs include a summary of the observations made during the inspection followed by our recommendations in bold print. Approximate locations of some of the observed features are noted on Sheet 1 in Appendix A.

LANDFILL PARTIAL CLOSURE AREAS – OBSERVATIONS / RECOMMENDATIONS

The final cover in the Top of Landfill Partial Closure Area shown on Sheet 1 in Appendix A covers an area of approximately 28 acres and consists of a 40-mil LLDPE geomembrane overlain with a 16 oz/yd² nonwoven geotextile, 2.5 feet of protective soil, and 0.5 feet of topsoil. The final cover was constructed in stages from 2012 through 2014. Documentation of the completion of closure activities in this area was submitted to the Indiana Department of Environmental Management (IDEM) in three (3) separate reports in 2012, 2013, and 2014.

The final cover in the Landfill Side Slope Partial Closure Area shown on Sheet 1 in Appendix A covers an area of approximately 24.5 acres and consists of a minimum of 24 inches of cohesive soils, covered with 0.5 feet of topsoil. Documentation of the completion of the closure activities along these slopes was submitted to IDEM in 2015.

Items noted during the visual inspection of this area are described in the following list.

- 1) In general, this area is well vegetated and well maintained (Locations 1, 2, 9, 11, and 31). No concerns exist at this time.

Recommendation: None at this time.

- 2) The inlet to a drainage culvert on the east side of the landfill has been blocked by riprap (Location 3). Additionally, the inspection noted minor erosion at the outlet of the same culvert (Location 4).

Recommendation: Remove riprap as needed to allow water to flow into the culvert on the upstream side of the culvert and add riprap to the downstream side to control erosion.

- 3) A sinkhole has developed above a culvert outlet on the east slope of the Partial Closure Area indicating a joint failure (Location 5). Additionally, the inspection noted erosion along perimeter of outlet splash pad.

Recommendation: Excavate the culvert to expose the failed joint. If the joint connection appears to be intact, reset the joint and add an Agri Drain Pipe Strap, or an equivalent. If the joint or the pipe segment has been damaged beyond repair, replace the pipe segment and add an Agri Drain Pipe Strap, or an equivalent, to reinforce the joint. Also, remove the eroded soil from the perimeter of the splash pad and add additional riprap to prevent future erosion.

- 4) On the north side of the Top of the Landfill Partial Closure Area, two (2) drop inlets have become clogged with vegetation debris (Locations 6 and 7).

Recommendation: Remove grass clippings and vegetation debris to restore the original condition.

- 5) A seep is present on the north slope near the east end of the landfill. A trench has been excavated in the area to collect the seep water and convey it in pipes to the Capital Pond. It is our understanding that the flow rate varies seasonally and that the peak rate continues to decrease following the construction of the composite final cover across the top of the east end of the landfill (Location 8).

Recommendation: Continue to collect and convey the seep water to the Capital Pond.

- 6) On the north slope of the Landfill Partial Closure Area, several of the riprap channels have become overgrown with vegetation along edges of the stone reducing the flow into the channels (Location 10).

Recommendation: Trim vegetation at the edges of channels at regular intervals to maintain open flow conditions.

- 7) On the north slope of the Landfill Partial Closure Area, flow from the outlet of a down-drain culvert is causing erosion and undercutting at the opening of a riprap channel (Location 12).

Recommendation: Add riprap to the outlet of the culvert to reduce the flow velocity and monitor the opening of the channel for further erosion.

- 8) On the north slope of the Landfill Partial Closure Area, an HDPE pipe has been installed from the active fill operations in the Vertical Expansion Area to Manhole #11.5 (Locations 13, 15, 16, 21, and 28). At the time of the inspection, there were no erosion or sediment controls installed upstream of the pipe inlet (Locations 17 and 18) allowing filter cake sediment to flow directly into the pipe and into the stormwater management system outside of the Solid Waste Boundary. As a result, Manhole #11.5 accumulated a significant volume of sediment (Location 14). Based on the presence of filter cake sediment on the outside of Manhole 11.5 and erosion at the base of Manhole 11.5, it also appears that the manhole recently overtopped allowing filter cake to discharge to the perimeter ditch (Location 13). At the time of this inspection, there was no evidence to indicate migration of waste beyond the property boundary.

Recommendation: Add sufficient erosion and sediment controls upstream of the pipe inlet to prevent filter cake from migrating outside the Solid Waste Boundary. Alternatively, reroute stormwater flows to the west into the Active Landfill Area.

- 9) A sediment control pond surrounded by silt fence was constructed to the west of the inlet to the HDPE pipe discussed in Item 8 (Location 18). It appears that the sediment pond was recently overtopped leaving the fence in poor condition and allowing filter cake to flow west as indicated by filter cake in the grass (Location 19). The filter cake flowed west until it reached a culvert under a roadway that was partially clogged with vegetation (Location 20). The culvert flows under the roadway and outlets on the north slope of the Landfill Partial Closure Area (Location 22) causing erosion of the roadside drainage channel. The filter cake also appears to have migrated to the culvert outlet/riprap channel at Location 23. The flow through the culvert to the north slope of the Landfill Partial Closure Area creates another path for filter cake to migrate outside the Solid Waste Boundary. At the time of this inspection, there was no evidence to indicate migration of waste beyond the property boundary.

Recommendation: Repair and maintain the silt fence in good condition, increase and maintain freeboard in the sediment control pond to prevent overtopping, and install additional erosion and sediment controls downstream of the pond to prevent filter cake from migrating outside the Solid Waste Boundary. Alternatively, reroute stormwater flows into the Active Landfill Area. Additionally, trim the vegetation at the culvert inlet at regular intervals to maintain open flow conditions.

- 10) The inspection noted water ponded in the toe of a diversion berm on the north slope of the Landfill Partial Closure Area (Location 24).

Recommendation: Add soil to the diversion berm and revegetate the area as necessary to maintain flow into the drainage structures.

- 11) The inspection noted erosion in the toe of several diversion berms on the north slope of the Landfill Partial Closure Area (Locations 25 and 26).

Recommendation: Restore the diversion berms as necessary and improve the armoring at the flow lines to prevent erosion.

- 12) The inspection noted seepage around Manhole #12 (Locations 27). Previous inspections have determined that seepage from a manhole may indicate a blockage in the drainage system.

Recommendation: Continue a regular maintenance program of the toe drain lines to minimize the potential for development of blockages.

- 13) The inspection noted recent reseeding in the perimeter ditch north of Manhole #12 (Location 28). The inspection also noted filter cake in a drainage ditch adjacent to a road outside of the Solid Waste Boundary (Location 29). Further discussions with site personnel indicated that recent heavy rains had caused sediment transport of the filter cake into the stormwater management system requiring clean up to remove filter cake, and reseeding of the perimeter ditches. At the time of this inspection, there was no evidence to indicate migration of waste beyond the property boundary.

Recommendation: Remove filter cake from drainage features and improve erosion and sediment controls within active placement areas in the Vertical Expansion Area to prevent migration of filter cake outside of the Solid Waste Boundary and continue proactive maintenance of stormwater controls.

- 14) The top of a slope of the north side of the Active Landfill Area has been graded to flow onto a diversion berm on the north side of the Landfill Partial Closure Area (Location 30) creating another path for filter cake to migrate outside the Solid Waste Boundary.

Recommendation: Add sufficient erosion and sediment controls inlet to the diversion berm to prevent filter cake from migrating outside the Solid Waste Boundary. Alternatively, reroute stormwater flows to the west into the Active Landfill Area.

It was observed that an active erosion repair and seeding program is being followed across the final cover as part of the ongoing maintenance of the area. These practices should continue to be followed.

ACTIVE LANDFILL AREA OBSERVATIONS / RECOMMENDATIONS

The active disposal area generally consists of portions of Cells 16, 17 and 18, which occupy an area of approximately 21 acres. Items noted during the visual inspection of this area are described in the following list.

- 1) The inspection noted a steep cut-slope with a road at the top of the slope on the south end of the east side of the Active Landfill Area (Location 32).

Recommendation: Immediately prohibit use of the road at the top of slope and regrade the area to re-establish safe slopes within the Active Landfill Area. Consider adding traffic control berms to the outside edge of roads at the top of a slope.

- 2) At the northwest corner of Cell 18 at the edge of the haul road, the standing water surface in the cell is only slightly below road elevation indicating a small amount of freeboard (Location 33). During large magnitude storm events the cell may become more susceptible to overtopping.

Recommendation: Maintain a low normal pool elevation inside the cell collection area and continue to monitor elevation rise during storm events. Consider additional drainage from inside the cell or the addition of a soil berm to increase freeboard in this area.

In general, filter cake is well-managed within the Active Landfill Area (Locations 34 and 35).

VERTICAL EXPANSION AREA OBSERVATIONS / RECOMMENDATIONS

The vertical expansion disposal area noted on Sheet 1 in Appendix A generally consists of approximately 18 acres across the top of the central portion of the landfill. This area has not yet been filled to the approved final grades. Additional waste was placed in the area during 2018. Items noted during the visual inspection of this area are described in the following list.

- 1) The condition of vegetation, and soil cover in the undisturbed portions of the Vertical Expansion Area is good (Locations 36 and 37).

Recommendation: None at this time.

- 2) Water is ponding at the toe of the filter cake slopes (Locations 21 and 38). It appears that water ponded at the toe of the south slope of the Vertical Expansion Area is pumped into a box culvert (Location 39) that discharges into a riprap channel (Location 40) that flows into a sediment pond at the toe of the slope within the Solid Waste Boundary.

Recommendation: Continue to minimize ponded water within the active fill areas.

INACTIVE LANDFILL AREA OBSERVATIONS / RECOMMENDATIONS

The Inactive Landfill Area includes the area south of the landfill within the permitted Solid Waste Boundary shown on Sheet 1 in Appendix A.

- 1) The inspection noted a seep at the toe of the slope adjacent to the riprap channel in the Inactive Landfill Area.

Recommendation: Continue to monitor the area for the presence of salt deposits, filter cake, erosion, or subsidence.

The overall condition is good with well-established and maintained vegetation (Location 42).

LANDFILL SETTLING BASIN OBSERVATIONS / RECOMMENDATIONS

The existing sedimentation basin was constructed in 2015 to receive water that has been in contact with waste in the landfill. The pond has a composite liner across the base and a riprap protective layer. The inlet pipe is located in the southeast corner of the pond while the drop inlet for the outlet to the Capital Pond is located in the northwest corner of the pond. Items noted during the visual inspection of this area are described in the following list.

- 1) The slopes of the Settling Basin are lined with riprap and appeared in satisfactory condition. Also, the pond is maintaining adequate freeboard (Location 43).

Recommendation: Continue to monitor the condition of the pond and perform maintenance as necessary.

- 2) The southeast portion of the pond has accumulated a large volume of sediment that may impair the discharge into the pond (Location 44).

Recommendation: Remove accumulated sediments to maintain the pond capacity. The owner has reported that this action was completed following the site inspection.

- 3) During the inspection, new piping was being installed in the southeast corner of the pond (Location 45). The intent of the new piping is to improve drainage and to prevent the accumulation of sediment in the perimeter drainage channel (Location 46).

Recommendation: Continue with the installation and monitor the system's performance. The owner has reported that this action was completed following the site inspection.

- 4) The inspection noted erosion in the perimeter drainage channels near the northeast corner of the pond (Location 47) and along the west side of the pond (Location 48).

Recommendation: Restore the perimeter drainage channels as necessary and improve the armoring at the flow lines to prevent erosion.

- 5) The inspection noted that the area around the southeast corner of the pond is not graded to drain and is ponding water (Location 49).

Recommendation: Regrade the area as necessary to maintain drainage.

Coal Combustion Residuals Rule Landfill Requirements/Observations

In addition to the general observations and recommendations outlined above, this visual inspection was also performed to address the standards and guidelines required by the CCR Rule established by the Environmental Protection Agency on April 17, 2015. As a result, CCR Landfills are now required to meet the requirements of 40 C.F.R. §257 to conduct annual inspections of the landfill in accordance with 40 C.F.R. §257.84(b). The requirements specified within the CCR Rule and the observations made by Don Bryenton and Mike Thornbrue during the 2018 annual inspection are listed below:

40 C.F.R. §257.84

(b) Annual inspections by a qualified professional engineer.

(1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

The annual inspection of the AB Brown Landfill was conducted by the undersigned professional engineers on November 7, 2018. Prior to the inspection, operating records along with design plans were reviewed by the undersigned.

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

The inspection conducted on November 7, 2018 did not reveal any signs of immanent failure for the landfill. However, there are isolated areas of erosion, seepage, and sparse vegetation that require repair and/or modification as part of the ongoing maintenance of the landfill area. Further, due to the lack of proper sediment control in the active filling operation in the Vertical Expansion Area, filter cake sediment has migrated beyond the solid waste boundary on the north side of the landfill. However, there was no evidence of the migration of waste beyond the property boundary.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the structure since the previous annual inspection;

In general, the following changes in the geometry of the structure were noted during the 2018 visual inspection:

- **In the past year the site continued filling operations in Cells 16, 17 and 18.**
- **New waste was also placed on the center, western and southern portions of the Vertical Expansion Landfill Area.**
- **In 2018, an HDPE pipe was installed on the north slope of the landfill from the Vertical Expansion Area discharging into Manhole #11.5 of the Drainage Piping**

System; however, the lack of adequate erosion and controls are allowing filter cake to migrate outside the Solid Waste Boundary. It should be noted that the migration appears to be contained within the facilities stormwater management system.

- **In 2018, a new section of pipe was installed to drain into the Landfill Settling Basin.**
- **In 2017, soil amendments were added and isolated areas of sparse vegetation were overseeded to address 2016 observations. The efforts appear to have yielded good results as the 2018 vegetation appears well-established and maintained.**
- **Erosion gullies were repaired with additional soil cover and riprap where needed. Ongoing animal and rodent control programs appear to be yielding good results.**

The measures taken as outlined above have improved the overall condition of this facility.

(ii) The approximate volume of CCR at the time of the inspection;

The approximate volume of CCR within the limits of the 1988 landfill expansion is 4,750,000 cubic yards.

(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and

There were no signs of structural weakness noted within the permitted solid waste boundary at the time of this visual inspection; however, the configuration of the stormwater controls within the Vertical Expansion Area and the Active Landfill Area are allowing filter cake sediment to migrate outside the Solid Waste Boundary into the stormwater management system. Additional erosion and sediment controls should be deployed to prevent migration of filter cake outside of the active fill areas or stormwater from active fill areas should be routed to stormwater containment structures within the Solid Waste Boundary.


(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

None noted at the time of this inspection.

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.

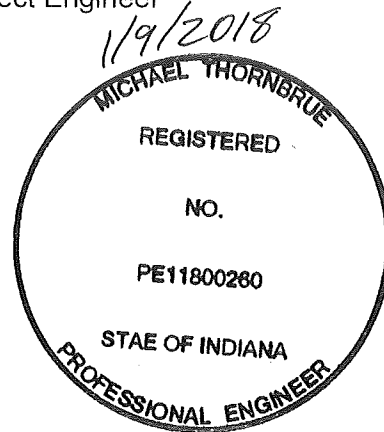
Sincerely,

ATC Group Services LLC


Donald L. Bryenton, P.E.
Principal Engineer


Michael D. Thornbrue, P.E.
Senior Project Engineer

Copies: (3) Angie Scheller – SIGECO
(1) Brandie Rucker – SIGECO
(1) Travis Peay – SIGECO



Appendices

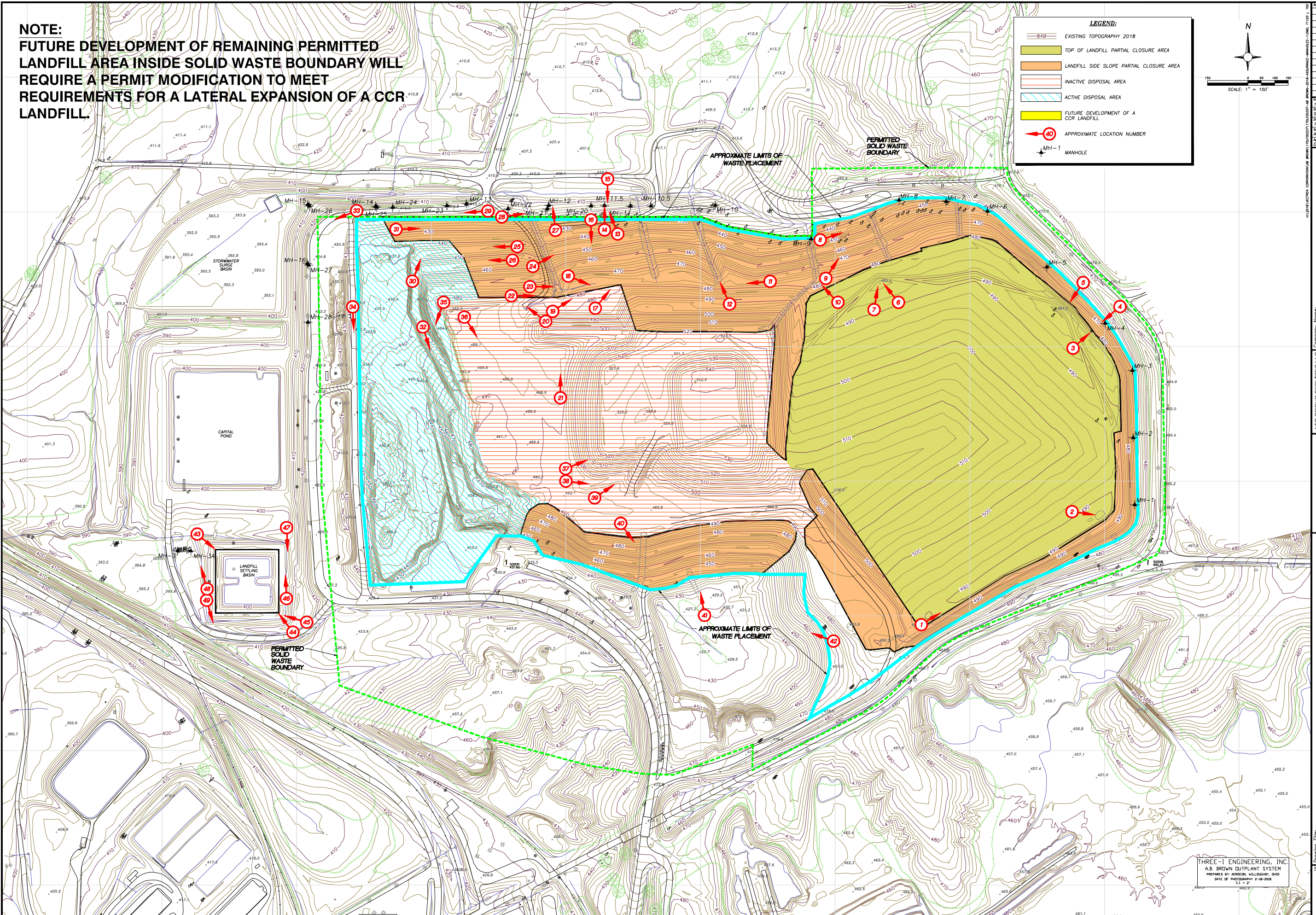
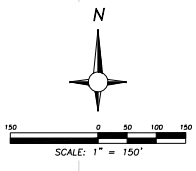
Appendix A: Site Plan

Appendix A: Site Plan

**NOTE:
FUTURE DEVELOPMENT OF REMAINING PERMITTED
LANDFILL AREA INSIDE SOLID WASTE BOUNDARY WILL
REQUIRE A PERMIT MODIFICATION TO MEET
REQUIREMENTS FOR A LATERAL EXPANSION OF A CCR
LANDFILL.**

LEGEND:

- EXISTING TOPOGRAPHY 2018
- TOP OF LANDFILL PARTIAL CLOSURE AREA
- LANDFILL SIDE SLOPE PARTIAL CLOSURE AREA
- INACTIVE DISPOSAL AREA
- ACTIVE DISPOSAL AREA
- FUTURE DEVELOPMENT OF A CCR LANDFILL
- APPROXIMATE LOCATION NUMBER
- MH-1 MANHOLE



Project Number: 170LF00614	Company Name: SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
Drawing Title: SEE LEFT	A.B. BROWN GENERATING STATION
Date: 12/18	WEST FRANKLIN, INDIANA
Scale: AS SHOWN	
App'd By: MT	Checked By: BH
Drawn By: DB	

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ATC

Drawing Title:
**SITE PLAN
TYPE III RESTRICTED WASTE LANDFILL
A.B. BROWN GENERATING STATION**

Sheet:
1

THREE-I ENGINEERING, INC.
A.B. BROWN OUTPLANT SYSTEM
PREPARED BY: AARON WILSON, CIVIL
DATE OF PHOTOGRAPHY: 2-18-2018
CL 11" x 17"