



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

VISUAL SITE INSPECTION REPORT - 2016

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

ATC PROJECT NO. 170LF00318

DECEMBER 20, 2016

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



December 20, 2016

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

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Re: Visual Site Inspection Report - 2016

A.B. Brown Generating Station
Type III Restricted Waste Landfill
West Franklin, Indiana
ATC Project No. 170LF00318

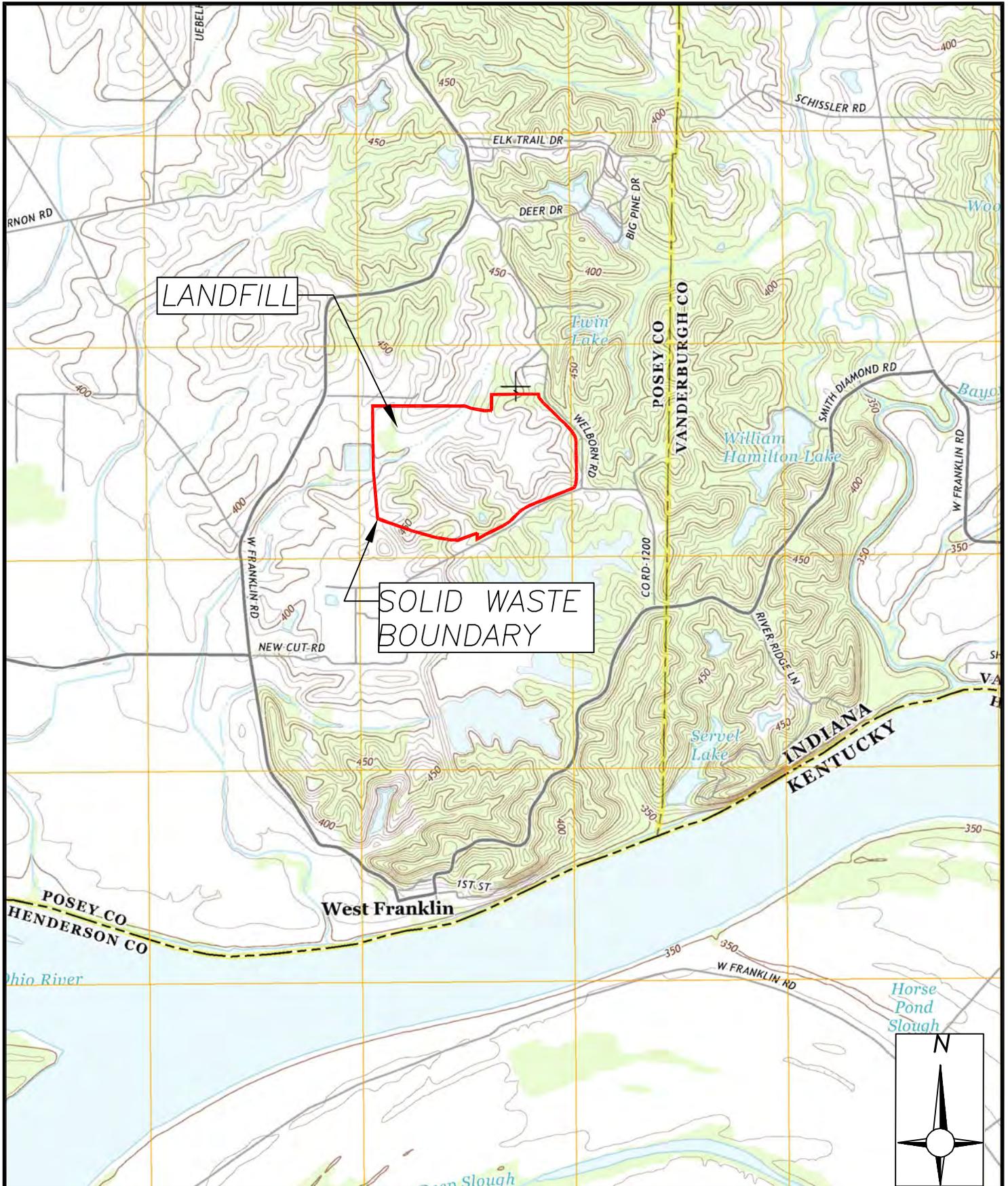
Dear Ms. Scheller:

Submitted herewith is the report of our November 16, 2016 Visual Site Inspection of the Type III Restricted Waste Landfill at the A.B. Brown Generating Station. This visual inspection and report were done 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 surficial 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 guaranty of the future performance/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 Charles Dewes of ATC Group Services LLC (ATC). The weather during the inspection was approximately 60° F and sunny and ground conditions were generally dry from a period of drought. The landfill system features are highlighted on the attached Site Plan in Appendix A.



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A.B. BROWN GENERATING STATION TYPE III RWS LANDFILL

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

Project Number:
170lf00271

Drawing File:
SEE LEFT

Date:
8/16

Scale:
AS SHOWN

Drn. By:
WS

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

- Top of Landfill Areas with Partial Closure Completed (east end);
- Landfill Side Slopes with Partial Closure Completed;
- Inactive Areas (generally top central portion of landfill);
- Active Areas (generally the west end of the landfill);
- Sedimentation Basin; and
- Capital Pond.

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.

Due to an extended dry period in southwest Indiana, the vegetative cover across much of the landfill showed signs of stress. Despite this temporary situation, the vegetative cover was generally in good condition with only isolated problem areas as noted in the following sections.

TOP OF LANDFILL PARTIAL CLOSURE AREAS – OBSERVATIONS / RECOMMENDATIONS

The final cover in this approximately 28 acre area consists of a 40 mil LLDPE geomembrane overlain with a 16 oz/sy nonwoven geotextile, 2.5 ft of protective soil and 0.5 ft 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 separate reports in 2012, 2013 and 2014. 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. Some isolated areas with sparse vegetation were noted.

Recommendation: Overseed and fertilize the areas of sparse vegetation as part of the ongoing maintenance program.

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.

LANDFILL SIDESLOPE PARTIAL CLOSURE AREAS – OBSERVATIONS / RECOMMENDATIONS

The final cover on the perimeter slopes noted on Sheet 1 in Appendix A consists of a minimum of 24 inches of cohesive soils, covered with 0.5 ft of topsoil. The approximate limits of the 24.5 acre closed portion of the slopes is noted on Sheet 1 in Appendix A. 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) Vegetation cover of the side slopes and perimeter ditches is generally good.

Recommendation: None at this time.

- 2) Several surface depressions/erosion features have formed in areas both adjacent to riprap downchute channels, along the flow line of the diversion berms and over downrain pipes. One such depression, located on the north side of the landfill, west of the north-south haul road on the backside of the upper level berm is approximately 6-feet long, 3-feet wide, and 2-feet deep.

Recommendation: Fill depressions and either revegetate or apply additional riprap as needed. Monitor the repaired areas for the redevelopment of the depressions.

- 3) The perimeter ditch on the south and east sides of the east partial closure area is generally well vegetated. Some maintenance work was being performed at the time of this inspection to fill in minor erosion gullies and seed areas of sparse vegetation.

Recommendation: Complete ongoing maintenance work.

- 4) Undercutting and erosion gully formation alongside one outlet pipe drainage structure near the base of the landfill in the vicinity of the perimeter ditch on the east side of the landfill.

Recommendation: Backfill erosion gullies and add additional riprap protection to prevent further erosion.

- 5) The downrain pipes and the riprap lined downchutes on the north side of the landfill are generally in good condition. A collar connecting two segments of one of the downrain pipes has separated, causing the pipe ends to also separate.

Recommendation: Repair the pipe segment to properly direct outlet flow.

- 6) 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 decreased following the construction of the composite final cover across the top of the east end of the landfill. Early in the fall of 2016 a hay bale diversion berm was replaced upstream of the trench to divert potential overland runoff from intermingling with seep waters. New stormwater diversion controls were also installed. Both measures will allow for improved assessment of the volume of water that is actually seepage.

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

- 7) Toe drain Riser Pipe #8, located on the north edge of the landfill adjacent to the perimeter ditch, is cracked and was seeping at the time of this inspection. Additionally, some seepage was noted along the north side of Manhole #12. Further, the water level in other manholes located upstream of these two locations appeared to be higher than normal. The facility was made aware of these issues at the time of inspection and arrangements were immediately made to remove the apparent blockage and flush the toe drain lines. Based on correspondence from the facility following the inspection, it appears that the blockage has

been removed, the toe drain is flowing and the seepage noted at Riser Pipe #8 and Manhole # 12 has ceased.

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

- 8) Salt residue is present in the base of the ditch on the north side of the landfill and at the base of the slope on the south side of the landfill. It appears that these salts are associated with the seeps described in Items 6 and 7.

Recommendation: Perform regular maintenance on the toe drain system on the north side and modify the grades in the inactive area adjacent to the south seeps to minimize the ponding of seepage in the ditches.

- 9) Rodent and animal burrows were noted at isolated locations within the limits of the partial closure area.

Recommendation: Repair animal burrows and implement an animal control program.

- 10) There are seeps discharging from several locations on the south slope that collect in the valley (bowl) area. This includes seeps noted within the riprap lined downchute. The combined flow rate at the time of this visual inspection was estimated to be approximately 1 gpm. Standing water was noted at the toe of the slope and the area is generally covered with phragmites. At the time of this inspection, construction was in progress to modify an existing piping system to convey the seep water to the sedimentation basin. It is our understanding that the standing water noted at the toe of slope will be eliminated once that project has been completed.

Recommendation: Continue to collect water discharging from the seeps and route to the Sedimentation Basin. In general, these seeps are located below the poorly drained portion of the inactive section of the landfill as described in Item # 2 in the following section of this report. Recommendations regarding the poorly drained area are also provided in the following section.

INACTIVE LANDFILL OBSERVATIONS / RECOMMENDATIONS

The inactive 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, although it has been covered with an intermediate soil cover and vegetated until filtercake placement resumes. Items noted during the visual inspection of this area are described in the following list.

- 1) The condition of vegetation, soil cover and downdrains is good.

Recommendation: None at this time.

- 2) The area along the south-facing slope of the inactive portion of the landfill is a relatively flat terrace which transitions to a section of the partial closure slopes described in the previous section.

Recommendation: Monitor this area during wet season conditions. If surface water ponds in this area, modifications should be made to the grades in this area to promote surface water runoff.

- 3) A recently installed PVC drainage pipe wraps around the northwest corner of the active area and discharges to the east. The east facing outlet pipe has no vegetation cover for the outlet receiving area and is subject to erosion.

Recommendation: Supplement the existing straw cover with erosion control mat or riprap to protect the unvegetated soil surface during storm events.

- 4) Portions of the Inactive portion of the landfill had recently been seeded and mulched.

Recommendation: Monitor the newly seeded areas to ensure that an acceptable vegetative cover is established.

ACTIVE LANDFILL 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) Operation of the landfill has extended into the recently completed Cell 18.

Recommendation: Continue to operate in accordance with IDEM permit conditions.

- 2) The erosion gullies and shallow sloughs noted on the west slope of the haul road on the west side of Cell 18 that were observed during the 2015 visual inspection have been repaired. The slope angle has been reduced and the regraded area has been revegetated. Some minor surface erosion was observed in isolated areas.

Recommendation: Continue to monitor/repair the slope for surface erosion until the vegetative cover is well established.

SEDIMENT BASIN OBSERVATIONS / RECOMMENDATIONS

The existing sedimentation basin was constructed in 2015. 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 Capitol 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 upstream slopes of the sediment pond were lined with riprap and appeared in satisfactory condition.

Recommendation: None at this time.

- 2.) Both the inlet pipe and the drop inlet of the primary spillway to the Capital Pond appeared to be functioning properly and were unobstructed.

Recommendation: None at this time.

- 3.) A seep was noted at the ground surface on the west side of the manhole upstream from the sediment basin inlet pipe. Associated seep water has left salt deposits in and around the sedimentation basin perimeter ditch upstream of the rock check dam. It is unclear whether seep water is associated with groundwater or if a leak exists somewhere in the pipe which drains to the manhole before discharging into the sedimentation basin. The source of the seep is above the elevation of the pipe invert inside the manhole therefore the seep does not appear to be associated with a crack in the manhole.

Recommendation: Further investigation of the subsurface condition in and around the manhole and adjoining pipe is recommended. Diversion of seep water to the sedimentation basin for treatment is recommended until the seepage stops.

Coal Combustion Residuals Rule Landfill Requirements/Observations

In addition to the general observations and recommendations outlined in the preceding pages, this visual inspection was also performed to address the standards and guidelines required by the CCR Rule instituted by the Environmental Protection Agency on April 17, 2015. As a result, CCR Landfills are now required 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). Listed below are requirements specified within the CCR Rule and the observations made by Don Bryenton and Charles Dewes during the second annual inspection:

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 engineer on November 16, 2016. 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 16, 2016 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.

(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;

This is the second annual inspection of the Type III Restricted Waste Landfill at the AB Brown Generating Station. In the past year the site completed the construction of Cell 18 South and continued filling operations in Cells 16, 17 and 18.

(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 4,400,000 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, several shallow depressions and erosion gullies were noted on the slopes of the landfill near pipe outlets and adjacent to riprap downchute channels. It is recommended that the depressions and erosion gullies be filled, seeded, and where necessary stabilized with erosion control mats or riprap to prevent the undermining of channel beds and soil cover. Further, low-flow seeps should be monitored and the flow collected and discharged to the Capitol Pond.

(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



Charles P. Dewes, E.I.T., CFM
Project Engineer



Donald L. Bryenton, P.E.
Principal Engineer



Copies: (3) Angie Scheller - 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:

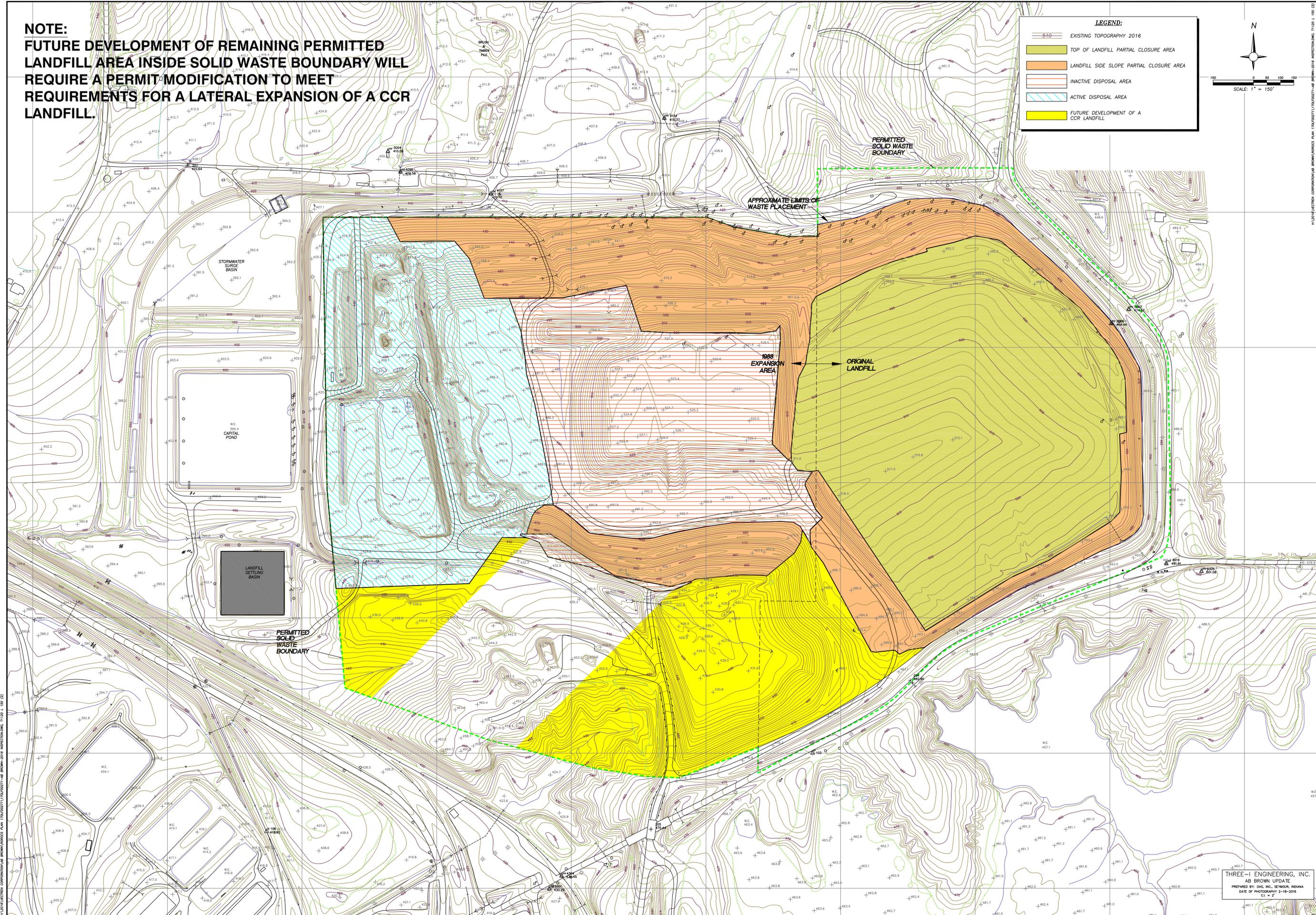
-  EXISTING TOPOGRAPHY 2016
-  TOP OF LANDFILL PARTIAL CLOSURE AREA
-  LANDFILL SIDE SLOPE PARTIAL CLOSURE AREA
-  INACTIVE DISPOSAL AREA
-  ACTIVE DISPOSAL AREA
-  FUTURE DEVELOPMENT OF A CCR LANDFILL

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SCALE: 1" = 150'



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Project Number:	170LFD0271
Drawing File:	SEE LEFT
Date:	9/16
Scale:	AS SHOWN
App'd By:	CD
Chk'd By:	CD
Dr'n By:	CD
Company Name:	SOUTHERN INDIANA GAS AND ELECTRIC COMPANY A.B. BROWN GENERATING STATION WEST FRANKLIN, INDIANA
ATC GROUP SERVICES LLC	7886 CENTERPOINT DR. SUITE 100 INDIANAPOLIS, IN 46256 PHONE +1 317 849 4980 FAX +1 317 849 4276 WWW.ATCGROUPSERVICES.COM
	
Drawing Title:	SITE PLAN A.B. BROWN GENERATING STATION
Sheet:	1

THREE-I ENGINEERING, INC.
AB BROWN UPDATE
PREPARED BY: GAS, INC., SEWOUR, INDIANA
DATE OF PHOTOGRAPHY: 2-18-2016
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