COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc., For a Certificate of Public Convenience and Necessity for Dry Bottom Ash Conversion of the East Bend Generating Station	))))	Case No. 2016-00268

APPLICATION OF DUKE ENERGY KENTUCKY, INC., CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

Now comes Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company), pursuant to KRS 278.020 and 807 KAR 5:001 Section 15, and requests that the Kentucky Public Service Commission (Commission) grant a Certificate of Public Convenience and Necessity (CPCN) for the construction of a dry bottom ash conversion at its coal-fired East Bend Generating Station (East Bend).

Emerging environmental regulations, such as the U.S. Environmental Protection Agency's (U.S. EPA) recently published Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR Final Rule)[1] and recently published Steam Electric Effluent Limitations Guidelines (ELG Final Rule),[2] directly affect the handling of ash at coal-fired generating stations. Although both the CCR Final Rule and the ELG Final Rule will affect how ash is handled at East Bend, the more immediate effect on ash handling stems from the ELG Final Rule that became effective January 4, 2016. The ELG Final Rule sets new or additional requirements

[1] *Available at* https://www.federalregister.gov/articles/2015/04/17/2015-00257/hazardous-and-solid-waste-management-system-disposal-of-coal-combustion-residuals-from-electric (Last accessed July 5, 2016).). The CCR Final Rule was published in the Federal Register on April 17, 2015.

[2] *Available at* https://www.epa.gov/eg/steam-electric-power-generating-effluent-guidelines-2015-final-rule (last accessed July 5, 2016). The ELG final rule was published in the Federal Register on November 3, 2015.

for wastewater streams from several processes and byproducts at steam electric generating plants. Some of these wastewater streams are generated at East Bend, including but not limited to bottom ash wastewaters. The ELG Final Rule and CCR Final Rule will require the Company to take action to achieve compliance that includes conversion of the existing wet bottom ash system to a dry ash handling system. As part of converting to dry bottom ash handling, new wastewater treatment systems must be installed and the existing East Bend ash pond (Pond) can no longer be used as an ash transport water treatment system. The Company will eventually close and/or convert the Pond in accordance with the CCR Final Rule, but additional analysis is necessary to determine the exact nature of the Pond's future. Nonetheless, Duke Energy Kentucky must take action now to maintain compliance and to continue to operate East Bend. Duke Energy Kentucky has determined that in order to comply with the ELG Final Rule, the Company must convert East Bend to a complete dry ash disposal system and take action to redirect bottom ash transport water. This conversion process must be completed by April 2018, in order to ensure enough time to guarantee compliance with the bottom ash transport water discharge prohibitions in the ELG Final Rule.[3] In order to complete the necessary conversions in time for compliance and so to align the construction work with currently scheduled maintenance outages and avoid additional outages, Duke Energy Kentucky needs to begin construction of the dry bottom ash conversion as soon as possible, and begin procurement in early 2017.

Introduction

1. Duke Energy Kentucky is a Kentucky corporation with its principal office and principal place of business at 139 East Fourth Street Cincinnati, Ohio 45202. The Company's local office in Kentucky is Duke Energy Envision Center, 4580 Olympic Boulevard, Erlanger,

[3] This application for a CPCN solely addresses the dry ash conversion. CPCNs addressing full compliance with ELG, CCR and likely addressing pond closure will be filed separately once engineering is completed.

Kentucky 41018. The Company further states that its electronic mail address for purposes of this matter is KYfilings@duke-energy.com.

2. Duke Energy Kentucky is a utility engaged in the gas and electric business. Duke Energy Kentucky purchases, sells, stores and transports natural gas in Boone, Bracken, Campbell, Gallatin, Grant, Kenton, and Pendleton Counties, Kentucky. Duke Energy Kentucky also generates electricity, which it distributes and sells in Boone, Campbell, Grant, Kenton, and Pendleton Counties.

3. Pursuant to 807 KAR 5:001, Section 14(2), Duke Energy Kentucky states that it was originally incorporated in the Commonwealth of Kentucky on March 20, 1901, and attests that it is currently in good standing in said Commonwealth.

Background

4. On or about December 5, 2003, in Case No. 2003-00252, the Commission approved Duke Energy Kentucky's acquisition of three generating stations from Duke Energy Ohio: East Bend, Miami Fort Unit 6[4] and Woodsdale. Effective January 1, 2006, Duke Energy Kentucky completed the acquisition of these three generating stations.

5. East Bend includes a single 600 MegaWatt (MW), net capacity, coal-combustion generating unit and is Duke Energy Kentucky's only base load resource in its portfolio. Coal combustion byproducts from East Bend are currently disposed of in an onsite landfill owned and maintained by Duke Energy Kentucky, the East Landfill. Duke Energy Kentucky is in the process of constructing a second, or replacement, onsite landfill that is referred to as the West Landfill.[5] The bottom ash produced at East Bend is currently treated for eventual landfill disposal in the onsite Pond in compliance with the permit by rule requirements set forth in 401

[4] The Miami Fort Unit 6 generator retired effectively May 31, 2015.
[5] Duke Energy Kentucky was granted a CPCN to commence construction of its West Landfill in Case No. 2015-000089.

KAR 45:060, Section 1(4), the Special Waste Disposal Facility Permit No. SW00800006 from the Kentucky Division of Waste Management and the Company's National Pollution Discharge Elimination System (NPDES) Permit.

6. The East Landfill is comprised of approximately 162 acres and has been in place since East Bend was constructed in 1981. The West Landfill, once completed, will consist of approximately 200 acres of lined landfill that is designed to accept approximately 30 years of generator waste from East Bend and other permitted sources only as necessary to properly formulate fixated material from East Bend's scrubber sludge for ultimate disposal.

7. The Pond was commissioned in 1981 and it has a volume of 1,844 acre feet. It is used to separate bottom ash from the water used to convey the ash from the plant before the water is discharged to the Ohio River from the pond under the NPDES permit. The Pond is also used to treat other plant water streams, such as coal pile run-off and landfill leachate, before they are discharged under the NPDES permit. Currently, boiler bottom ash is collected in a wet bottom ash hopper at the base of the boiler and then sluiced to East Bend's Pond.

8. Approximately 80 percent of the ash produced at East Bend is dry fly ash. That material is mixed with the spent scrubber slurry and lime to make a stable material called Poz-O-Tec. The mixture sets up much like concrete when placed in the landfills. The remaining 20 percent is bottom ash treated in the Pond. The presence of the Pond and landfills has permitted Duke Energy Kentucky to manage its costs of providing safe and reliable electric service by eliminating the need to transport to and pay for disposal of the generator waste in commercial landfills.

Emerging Environmental Regulations

9. In April 2009, the U.S. EPA began assessing the integrity of ash dikes nationwide

and began developing regulations to manage CCRs. CCRs primarily include fly ash, bottom ash, and FGD byproducts (typically, calcium sulfate (gypsum) or calcium sulfite) that are destined for disposal. In June 2010, the U.S. EPA proposed a rule containing two options for handling CCRs: (1) as a special waste listed under the Resource Conservation and Recovery Act (RCRA) Subtitle C Hazardous Waste Regulations; and (2) as a solid waste under RCRA Subtitle D Non-Hazardous Waste Regulations. Both options included dam safety requirements and had strict new requirements regarding the handling, disposal, and beneficial use of CCRs except when reused in encapsulated applications (such as ready mix concrete and the production of wallboard).

10. The CCR Final Rule was published as final as a Subtitle D, non-hazardous waste rule on April 17, 2015, and became effective on October 19, 2015. Compliance with some aspects of the CCR Final Rule began within 6-12 months of its enactment, while other actions will be required over the next several years

11. On September 30, 2015, the U.S. EPA finalized a rule revising the regulations for the ELG category. The ELG Final Rule sets the first federal limits on the levels of toxic metals in wastewater that can be discharged from power plants, based on technology improvements in the steam electric power industry over the last three decades. The regulations for the industry were last updated in 1982 and, according to the U.S. EPA, did not adequately address toxic metal discharges. The 1982 regulations focused on settling out particulates rather than treating dissolved pollutants. New technologies for generating electric power and the widespread implementation of air pollution controls over the last 30 years have altered existing wastewater streams or created new wastewater streams at many power plants, particularly coal-fired plants. The 2015 ELG Final Rule addresses these changes in the industry.

12. The EPA made an attempt to integrate the ELG Final Rule with the CCR Final Rule. The CCR Final Rule and ELG Final Rule result in conversions to dry handling of bottom ash; increased use of landfills; the closure of existing wet ash storage ponds; and the addition of alternative wastewater treatment systems across the utility industry.

13. The combination of ELG Final Rule and CCR Final Rule implementation require Duke Energy Kentucky to take compliance actions at East Bend and initiate conversion to dry bottom ash handling processes, installation of balance-of-plant wastewater treatment systems, the closure and repurposing of the active wet ash storage pond over the next several years and otherwise higher operation and maintenance costs for managing CCR under more stringent disposal requirements.

14. The East and West Landfills will continue to be repositories for East Bend's generator waste for purposes of continued operation and environmental compliance for current and emerging regulations involving handling of CCRs.

15. As a result of emerging environmental regulations, specifically, the CCR Final Rule and the ELG Final Rule, Duke Energy Kentucky has determined it will likely close its Pond in compliance with the CCR Final Rule and repurpose or convert it to a new wastewater treatment system. The Company is currently conducting studies and engineering to determine the appropriate and recommended closure and water redirect strategy. A final design and recommendation has not yet been determined at the time of this filing. Under current estimates of CCR and ELG Final Rule Compliance, water redirect activities and Pond closure will likely need to occur prior to April 2019.

16. In order to continue to operate East Bend and to prepare for the inevitable closure work of its Pond, the Company must first address the portion of its ash disposal system that

currently handles and treats the approximately 20 percent of wet bottom ash and convert it into a dry bottom ash treatment and handling system. The result of this conversion is that Duke Energy Kentucky will convert East Bend into a 100 percent dry ash disposal system using its onsite landfills.

17. Duke Energy Kentucky intends to perform the actual conversion construction as part of an extended outage that is currently scheduled for the spring of 2018, so as to complete the conversion in time for the ELG Final Rule compliance date of November 2018. Duke Energy Kentucky is targeting a spring 2018 completion date so to be in compliance well in advance of the ELG Final Rule enforcement date. Because some of the equipment necessary to effect this conversion requires long lead times for fabrication, Duke Energy Kentucky is making its filing now to address the conversion of East Bend to a full dry ash disposal system and to allow sufficient time to procure the necessary components so construction of the conversion can be completed during the spring 2018 outage timeframe.

18. The conversion of the existing wet bottom ash sluicing system will be to a Submerged Flight Conveyer (SFC) bottom ash removing system for dewatering bottom ash, economizer ash, and pyrites. The Company will provide a dewatered bottom ash storage area and truck load out area for trucking the ash to the Landfills for final disposal.

19. The new under-boiler SFC will be installed in the existing boiler building, beneath the current boiler in place of the existing wet bottom ash hoppers. The scope of work will include interconnecting piping for the under-boiler conveyor, existing pyrites hoppers, and dry economizer ash handling. The conversion will also include additional interconnects with the existing plant piping systems for service water and compressed air that is necessary to support the conversion.

20. The existing bottom ash currently being stored in the Pond will be excavated in accordance with existing permits for disposal in the onsite landfills.

21. The dry bottom ash conversion project will not result in wasteful duplication. "Wasteful duplication" is defined as an "excess of capacity over need and an excessive investment in relation to productivity or efficiency and an unnecessary multiplicity of physical properties."[6] The dry bottom ash conversion will result in Duke Energy Kentucky eliminating its existing wet bottom ash storage/disposal process that can no longer be maintained under the CCR Final Rule and ELG Final Rule and replacing it with a dry ash handling system expanding the existing onsite system.

Request for Certificate of Public Convenience and Necessity

22. In accordance with 807 KAR 5:001 Section 12(2)(a)-(i), Duke Energy Kentucky is filing the following information in Exhibit 1, which is incorporated herein and made a part of this Application filed in this proceeding:

Exhibit 1 Page	Description	807 KAR 5:001 Section Reference
	Financial Exhibit	12 (2)
1	Amount and kinds of stock authorized	12(2)(a)
1	Amount and kinds of stock issued and outstanding	12(2)(b)
1	Terms of preference or preferred stock	12(2)(c)
1	Brief description of each mortgage on property of Duke Energy Kentucky	12(2)(d)
2	Amount of bonds authorized and issued and related information	12(2)(e)
2	Notes outstanding and related information	12(2)(f)
2-3	Other indebtedness and related information	12(2)(g)
3-4	Dividend information	12(2)(h)
4-6	Detailed Income Statement and Balance Sheet	12(2)(i)

[6] *See In the Matter Of: Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for a Certificate of Public Convenience and Necessity and Site Compatibility Certificate for the construction of a Combined Cycle Combustion Turbine at the Cane Run Generating Station and the Purchase of Existing Simple Cycle Combustion Turbine Facilities from Bluegrass Generation Company LLC, in Lagrange, Kentucky,* Case No. 2011-00385 at 13-14 (Ky.P.S.C. May 3, 2012).

23. 807 KAR 5:001, Section 15 sets forth the requirements to receive a CPCN:

a. In accordance with Section 15(2)(a), the Application herein describes the facts relied upon to show the dry bottom ash conversion is required by public convenience or necessity and is necessary for the Company to continue to comply with environmental regulations and will allow Duke Energy Kentucky to continue to provide safe, reliable, and reasonably priced retail electric service to customers by not having to procure third-party disposal services for generator waste material.

b. In accordance with Section 15(2)(b), the Company has previously filed with the Commission the applicable franchises from the proper public authorities. In addition, Exhibit 2 of this application includes copies of the environmental permits related to generator waste disposal at East Bend. The Company is also seeking a minor modification to its current Title V air permit due to additional fugitive particulate emissions. A copy of the Company's Application for the minor modification submitted to the Kentucky Division for Air Quality is included as Exhibit 3. Upon information and belief, no additional permits are needed to construct the dry bottom ash conversion of the East Bend waste handling system or to use the existing landfills to dispose of the additional dry ash once the conversion is completed.

c. In accordance with Section 15(2)(c), which requires the Company to provide a full description of the proposed location, route, or routes of the anticipated construction or extension, including a description of the manner in which the facilities will be constructed, the Company states that the dry bottom ash

conversion will be performed at the Company's East Bend Station located in Boone County, Kentucky. Exhibit 4 to this Application contains Duke Energy Kentucky's Project Definition Report for Dry Bottom Ash Conversion prepared by Duke Energy Kentucky's outside engineering consultant (Conversion Report). The Conversion Report is stamped by a professional engineer licensed in the commonwealth of Kentucky and contains a detailed description of the need, construction, design, and location of the project.

d. In accordance with Section 15(2)(d)(1)-(2), requiring maps showing the included "proposed" in paragraph c location or route of the proposed construction or extension and plans and specifications and drawings of the proposed plant, equipment, and facilities, Duke Energy Kentucky respectfully states that Appendix C to the Conversion Report[7] includes an overhead map of the East Bend site showing the proposed location of the construction. Because this construction will be located at Duke Energy Kentucky's own facility, the construction and operation of the dry ash conversion will not compete with any other utilities, persons, or corporations. Additionally, the Conversion Report Appendices C, D, F, and G contain the plans, specifications, and drawings of the dry ash conversion project.

e. In accordance with Section 15(2)(e), the Company states that it proposes to finance the construction through continuing operations and debt instruments, as necessary. In addition, the Company may seek to include this project as part of an overall environmental compliance plan pursuant to KRS 278.183. A final decision in that regard has not yet been reached and the Company will

[7] Exhibit 4

seek Commission approval to implement such a mechanism through a separate filing.

f. In accordance with Section 15(2)(f), the fully loaded estimated cost of construction for the dry as conversion is approximate $23 million including internal Company labor. The estimated ongoing costs of operation once the project is completed is as follows:

- Estimated annual trucking cost of fly ash to the landfill and placement - $480,000 per year;
- Estimated incremental cost to truck dry bottom ash to landfill - $240,000 per year;

- Estimated incremental cost to move bottom ash from the pond to the landfill for constructive use -$240,000 new incremental cost; and
- Estimated equipment maintenance cost (*e.g.,* general maintenance and chain replacements) -$310,000 per year:
    - $300,000 per year incremental O&M cost for equipment to be removed; and
    - $10,000 per year incremental O&M cost over the existing system.

Testimony and Exhibits

24. Additional facts supporting this Application are set forth in the following direct testimonies attached to this Application as Exhibits 5 through 9:

a. Joseph A. Miller Jr., Vice President Central Engineering and Services, provides an overview of the Company's electric generation operations and the ash conversion project;[8]

b. Brandon Delis, Director Generation Strategic Engineering Programs, discusses the analysis, design, plans and specifications, cost estimates, and considerations that lead to the Company's proposal to convert to a dry bottom

[8] Exhibit 5.

ash handling system at East Bend;[9]

c. Daniel Hartman, Lead Engineer, discusses the conversion project construction and ongoing operation of East Bend;[10]

d. Tammy Jett, Principal Environmental Scientist, discusses the environmental regulations necessitating the dry ash conversion project, the permits that enable this project, how the project will comply with these regulations, and the additional work that will need to occur in the near future for East Bend's continued compliance;[11] and

e. William Don Wathen Jr., Director of Rates and Regulatory Strategy Ohio and Kentucky, discusses the estimated impacts to the Company's rates of the ash conversion project.[12]

Requested Relief

25. Duke Energy Kentucky also respectfully requests that the Commission grant the relief requested herein expeditiously so that it may begin construction as soon as possible. Many of the necessary equipment to complete the construction requires long lead times for fabrication. As such, Duke Energy Kentucky respectfully requests the Commission issue an order approving the Company's Application by January 2017 so that the Company has ample time to requisition the needed components and equipment so to timely complete construction.

WHEREFORE, Duke Energy Kentucky respectfully requests that the Commission expeditiously issue an Order grant the necessary CPCN.

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[9] Exhibit 6.
[10] Exhibit 7.
[11] Exhibit 8.
[12] Exhibit 9.

VERIFICATION

STATE OF NORTH CAROLINA)
) SS:
COUNTY OF MECKLENBURG)

The undersigned, Joseph A. Miller Jr., being duly sworn, deposes and states as follows:

1. I am employed by Duke Energy Business Services LLC ("Duke Energy Business Services") as Vice President Central Engineering and Services. Duke Energy Business Services is a service company subsidiary of Duke Energy Corporation ("Duke Energy"), which provides services to Duke Energy and its subsidiaries, including Duke Energy Kentucky, Inc. ("Duke Energy Kentucky" or the "Company").
2. As Vice President of Central Engineering and Services, I have responsibility for and lead the groups responsible for the engineering analysis of capital projects across Duke Energy Corporation's fleet of fossil and hydroelectric generating facilities. My teams' responsibilities also include environmental compliance planning, assessment of new technologies, development of new fossil generation, and continuous emission monitor system maintenance support.
3. I earned a Bachelor's Degree in Mechanical Engineering from Purdue University in 1991 and completed twelve post-graduate level courses in Business Administration at Indiana State University. My career began at Public Service of Indiana in 1991 as a staff engineer at Cayuga Generating Station. Since that time, I have held various positions of increasing responsibility, including Station Manager at Cinergy's East Bend Generating Station and Duke Energy Ohio's Zimmer Generating Station. In October 2010, I was promoted to General Manager of Analytical and Investments Engineering. I was

promoted to General Manager of Strategic Engineering in July 2012, following the merger between Duke Energy and Progress Energy, Inc. In February 2014, I served as Interim Vice President of Central Engineering and Services and I was promoted to my current position as Vice President of Central Engineering and Services in October 2014.

4. I have personal knowledge of the matters set forth in the foregoing Application, and the information contained therein is true and correct to the best of my knowledge, information and belief.

DUKE ENERGY KENTUCKY

By: _____
Joseph A. Miller Jr., Affiant
Vice President Central Engineering and Services,
Duke Energy Business Services, LLC

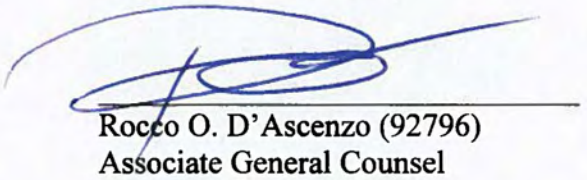
Subscribed and sworn to before me by Joseph A. Miller Jr., Vice President of Central Engineering Services for Duke Energy Business Services on this 28th day of July, 2016.

EVELYN G ROSEMAN NOTARY PUBLIC MECKLENBURG COUNTY, NC

_____
NOTARY PUBLIC

My Commission Expires: Aug 18, 2019

Respectfully submitted,



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CERTIFICATE OF SERVICE

This is to certify that a copy of the foregoing Application of Duke Energy Kentucky, Inc. has been served via overnight mail to the following party on this 28th day of July, 2016.

Rocco O. D'Ascenzo

Rebecca Goodman
Office of the Attorney General
Utility Intervention and Rate Division
1024 Capital Center Drive
Frankfort, Kentucky 40601

FINANCIAL EXHIBIT

(1) Section 12(2)(a) Amount and kinds of stock authorized.

1,000,000 shares of Capital Stock $15 par value amounting to $15,000,000 par value.

(2) Section 12(2)(b) Amount and kinds of stock issued and outstanding.

585,333 shares of Capital Stock $15 par value amounting to $8,779,995 total par value. Total Capital Stock and Additional Paid-in Capital as of May 31, 2016:

Capital Stock and Additional Paid-in Capital
As of May 31, 2016
($ per 1,000)

Capital Stock	$8,780
Premiums thereon	18,839
Total Capital Contributions from Parent (since 2006)	8,594
Contribution from Parent Company for Purchase of Generation Assets	140,061
Total Capital Stock and Additional Paid-in-Capital	$176,274

(3) Section 12(2)(c) Terms of preference or preferred stock, cumulative or participating, or on dividends or assets or otherwise.

There is no preferred stock authorized, issued or outstanding.

(4) Section 12(2)(d) Brief description of each mortgage on property of applicant, giving date of execution, name of mortgagor, name or mortgagee, or trustee, amount of indebtedness authorized to be secured, and the amount of indebtedness actually secured, together with any sinking fund provision.

Duke Energy Kentucky does not have any liabilities secured by a mortgage.

(5) Section 12(2)(e) Amount of bonds authorized, and amount issued, giving the name of the public utility which issued the same, describing each class separately, and giving the date of issue, face value, rate of interest, date of maturity and how secured, together with the amount of interest paid thereon during the last fiscal year.

The Company has four outstanding issues of unsecured senior debentures issued under an Indenture dated December 1, 2004, between itself and Deutsche Bank Trust Company Americas, as Trustee, as supplemented by three Supplemental Indentures. The Indenture allows the Company to issue debt securities in an unlimited amount from time to time. The Debentures issued and outstanding under the Indenture are the following:

Supplemental Indenture	Date of Issue	Principal Amount Authorized and Issued	Principal Amount Outstanding	Rate of Interest	Date of Maturity	Interest Paid Year 2015
1st Supplemental	3/7/2006	50,000,000	0	5.750%	3/10/2016	2,875,000
1st Supplemental	3/7/2006	65,000,000	65,000,000	6.200%	3/10/2036	4,030,000
2nd Supplemental	9/22/2009	100,000,000	100,000,000	4.650%	10/1/2019	4,650,000
3rd Supplemental	1/5/2016	45,000,000	45,000,000	3.420%	1/15/2026	0
3rd Supplemental	1/5/2016	50,000,000	50,000,000	4.450%	1/15/2046	0
			260,000,000			11,555,000

(6) Section 12(2)(f) Each note outstanding, giving date of issue, amount, date of maturity, rate of interest, in whose favor, together with amount of interest paid thereon during the last fiscal year.

Not applicable.

(7) Section 12(2)(g) Other indebtedness, giving same by classes and describing security, if any, with a brief statement of the devolution or assumption of any portion of such indebtedness upon or by person or corporation if the original liability has been transferred, together with amount of interest paid thereon during the last fiscal year.

The Company has two series of Pollution Control Revenue Refunding Bonds issued under a Trust Indenture dated as of August 1, 2006 and a Trust Indenture dated as of December 1, 2008, between the County of Boone, Kentucky and Deutsche Bank National Trust Company as Trustee. The Company's obligation to make payments equal to debt service on the Bonds is evidenced by a Loan Agreement dated as of August 1, 2006 and December 1, 2008 between the County of Boone, Kentucky and Duke Energy Kentucky. The Bonds issued under the Indentures are as follows:

Indenture	Date of Issue	Principal Amount Authorized and Issued	Principal Amount Outstanding	Rate of Interest	Date of Maturity	Interest Paid Year 2015
Series 2010	11/24/2010	26,720,000	26,720,000	0.04%[1]	8/1/2027	9,531
Series 2008A	12/01/2011	50,000,000	50,000,000	1.07% [2]	8/1/2027	536,552
			76,720,000			546,083

[1] The interest rate represents the average floating-rate of interest on the bonds for 2015. The interest rate on the bonds resets every 7 days through an auction process. The variable-rate debt was swapped to a fixed rate of 3.86% for the life of the debt.

[2] The interest rate represents the average floating-rate of interest on the bonds for 2015. The interest rate on the bonds resets on the first day of every month based on 75% of the sum of one month and spread of 1.25%.

The Company has issued and has outstanding as of May 31, 2016 the following capital leases:

Series	Date of Issue	Principal Amount Authorized and Issued	Principal Amount Outstanding	Rate of Interest	Date of Maturity
Erlanger	12/30/2006	2,100,000	916,430	8.634	09/30/2020
2007	12/31/2007	3,066,955	730,232	5.115	12/31/2016
2009	04/21/2009	3,429,432	1,186,730	4.821	04/21/2018
2010	06/18/2010	955,061	431,561	3.330	06/18/2019
		9,551,448	3,264,953		

The Company also has $25,000,000 of money pool borrowings outstanding as of May 31, 2016, which is classified as Long-Term Debt payable to affiliated companies. This obligation, which is short-term by nature, is classified as long-term due to Duke Energy Kentucky's intent and ability to utilize such borrowings as long-term financing.

(8) Section 12(2)(h) Rate and amount of dividends paid during the last five (5) previous fiscal years, and the amount of capital stock on which dividends were paid each year.

DIVIDENDS PER SHARE

Year Ending	Per Share	Total	No. of Shares	Par Value of Stock
December 31, 2011	230.64	135,000,000	585,333	8,779,995
December 31, 2012	17.08	10,000,000	585,333	8,779,995
December 31, 2013	68.34	40,001,000	585,333	8,779,995
December 31, 2014	0.00	0	585,333	8,779,995
December 31, 2015	93.96	55,000,000	585,333	8,779,995

(9) Section 12(2)(i) Detailed Income Statement and Balance Sheet

See the attached pages for the detailed Income Statement for the twelve months ended May 31, 2016 and the detailed Balance Sheet as of May 31, 2016.

DUKE ENERGY KENTUCKY, INC.
CONDENSED STATEMENTS OF OPERATIONS
(Unaudited)
(In thousands)

	Twelve Months Ended May 31 2016	
Operating Revenues		
Electric	339,520	
Gas	84,123	
Total operating revenues	423,643	-
Operating Expenses		
Fuel used in electric generation and purchased power	125,779	
Natural gas purchased	28,466	
Operation, maintenance and other	137,096	
Depreciation and amortization	41,173	
Property and other taxes	13,298	
Goodwill and other impairment charges	-	
Total operating expenses	345,812	-
Gains on Sales of Other Assets and Other, net	4	
Operating Income	77,835	-
Other Income and Expenses, net	1,160	
Interest Expense	14,903	
Income Before Income Taxes	64,092	-
Income Tax Expense	21,745	
Income From Continuing Operations	42,347	-
Income From Discontinued Operations, net of tax	-	
Net Income	42,347	-

DUKE ENERGY KENTUCKY, INC.
Condensed Balance Sheets
(Unaudited)

(in thousands, except share amounts)	May 31, 2016	December 31, 2015
ASSETS		
Current Assets		
Cash and Cash Equivalents	4,807	9,141
Receivables (net of allowancefor doubtful accounts of $131 at May 31, 2016 and $195 at December 31, 2015)	1,842	5,488
Receivables from affiliated companies	8,926	11,499
Notes receivable from affiliated companies	4,542	-
Inventory	43,880	44,141
Regulatory Assets	4,426	8,879
Other	20,682	36,956
Total Current Assets	89,105	116,104
Investments and Other Assets		
Intangibles, net	119	89
Other	5,593	6,359
Total Investments and Other Assets	5,712	6,448
Property, Plant and Equipment		
Cost	2,107,004	2,079,761
Less Accumulated Depreciation and Amortization	(934,555)	(923,578)
Net Property Plant and Equipment	1,172,449	1,156,183
Regulatory Assets and Deferred Debits		
Regulatory Assets	76,481	61,411
Other	297	332
Total Regulatory Assets and Deferred Debits	76,778	61,743
Total Assets	1,344,044	1,340,478
LIABILITIES AND COMMON STOCKHOLDERS' EQUITY		
Current Liabilities		
Accounts Payable	24,967	25,654
Accounts payable to affiliated companies	5,799	14,426
Notes payable to affiliated companies	-	55,743
Taxes Accrued	4,464	10,550
Interest Accrued	3,288	3,343
Current Maturities of Long-Term Debt	51,129	101,519
Regulatory Liabilities	(769)	2,668
Other	21,278	19,260
Total Current Liabilities	110,156	233,163
Long-Term Debt	286,921	192,508
Notes payable to affiliated companies	25,000	25,000
Deferred Credits and Other Liabilities		
Deferred Income Taxes	303,859	289,642
Investment Tax Credit	803	887
Accrued Pension and Other Post-Retirement Benefit Costs	11,608	11,649
Asset Retirement Obligations	102,909	103,500
Regulatory Liabilities	51,863	52,986
Other	26,776	26,711
Total Deferred Credits and Other Liabilities	497,818	485,375
Commitments and Contingencies		
Equity		
Common Stock, $15.00 par value, 1,000,000 shares authorized and 585,333 shares outstanding at May 31, 2016 and December 31, 2015	8,780	8,780
Additional Paid in Capital	167,494	167,494
Retained Earnings	247,875	228,158
Total Equity	424,149	404,432
Total Liabilities and Equity	1,344,044	1,340,478

Kentucky Energy and Environment Cabinet
Department for Environmental Protection
Division of Waste Management

PERMIT

Facility: **Duke Energy East Bend Station Special Waste Disposal Facility**
6293 Beaver Rd
Union, KY 41091

Permittee: **Duke Energy**
139 E 4th St
Cincinnati, OH 45202

Agency Interest: **Duke Energy KY East Bend**
6293 Beaver Rd
Union, KY 41091

The Division has issued the permit under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. This permitted activity or activities are subject to all conditions and operating limitations contained herein. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits, licenses or approvals required by this Division or other state and local agencies.

No deviation from the plans and specifications submitted with your application or any condition specified herein is allowed, unless authorized in writing from the Division. Violation of the terms and conditions specified herein may render this permit null and void. All rights of inspection by representatives of the Division are reserved. Conformance with all applicable Waste Management Regulations is the responsibility of the permittee.

Agency Interest ID #: **176**

Solid Waste Permit #: **SW00800006**

County: **Boone**

Permitted Activities:

Subject Item	Activity	Type	Status
ACTV004	Special Waste Landfill-Coal/00800006	Construction/Operation	Active
ACTV006	Special Waste Landfill-Coal/00800006	Construction	Under construction
ACTV008	Coal Combustion Residuals Surface Impoundment/00800006	Registered Permit-by-Rule	Active

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Acreage Summary:

Waste Disposal Area (in Acres):

Activity	Disposal Area
Coal Combustion Residuals Surface Impoundment	53.40
Special Waste Landfill-Coal	70.00
Special Waste Landfill-Coal	203.70
Total Disposal Area	327.10
Total Permitted Area	363.70

Cost Estimate Summary:

Coverage Type	Cost Estimate	Effective	Comments
Closure	$1,768,471.00	12/08/2008	Additional information can be found under Facility Information and/or Conditions
Post-Closure	$490,591.00	12/08/2008	Additional information can be found under Facility Information and/or Conditions

Financial Assurance Summary:

The owner or operator shall maintain the following financial assurance approved by the Division in compliance with KRS Chapter 224.40-650, KRS Chapter 224.50-862, 401 KAR 45:080, and 401 KAR 48:310:

Instrument Type	Instrument Number	Amount	Date Received	Comments
Corporate Financial Test	0	$2,598,255.00	12/16/2013	

First Operational Permit Effective Date: 07/16/1982 -- ACTV0004, Inert Landfill Activity

Permit Effective Date: 07/16/1992

Permit Expiration Date: Life of Facility

Permit issued: 06/13/2016

Danny Anderson

Danny Anderson, P.E.
Manager, Solid Waste Branch

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Permit Conditions:

Facility Information and/or Conditions
The closure cost estimate for ACTV0004 is $1,768,471.00 and the post-closure estimate is $490,591.00. This estimate was approved on October 4, 2006 under APE20060001.
The closure cost estimate for ACTV0006 is $3,302,474.00 and the post-closure estimate is $499,065.00. This estimate was approved under APE20070004. Financial Assurance shall be provided to and accepted by the Division prior to issuance of an operating permit

Subject Items

ACTV0004 - Special Waste Landfill-Coal

Standard Requirements:

1. General: The owner or operator of a special waste facility shall comply with KRS Chapter 224 and 401 KAR Chapters 30, 40 and 45 for the construction and operation of special waste facilities. [KRS 224.50-760]

2. General: For construction and operation of the special waste landfill, the owner or operator shall comply with KRS Chapter 224.50-760, 401 KAR 45:030, 45:110 and the approved permit application(s). [401 KAR 45:110]

3. General: The owner or operator may only accept waste at the special waste landfill from the sources which are approved per 401 KAR 45:020, Section 2(1)(a), 45:030, Section 8(1)(a), and 45:110. [401 KAR 45:110]

Variances, Alternate Specifications and Special Conditions:

1. Wastestreams: The permittee may accept fly ash from the Beckford Facility, Clermont Co., New Richmond, Ohio. [401 KAR 45:110 Section 3(7)]

2. Wastestreams: The permittee may accept fly ash from the Zimmer Station Facility, Clermont Co., Moscow, Ohio. [401 KAR 45:110 Section 3(7)]

3. Wastestreams: The permittee may accept fly ash from the Miller Brewery Facility, Butler Co., Trenton, Ohio. [401 KAR 45:110 Section 3(7)]

4. Wastestreams: The permittee may accept special waste streams as described in the approved plans and applications from the East Bend Facility, Boone Co., Rabbit Hash, Kentucky. [401 KAR 45:110 Section 3(7)]

5. Wastestreams: The permittee may accept fly ash and dry FGD Waste from the City of Hamilton, Butler Co., Hamilton, Ohio. [401 KAR 45:110 Section 3(7)]

6. Wastestreams: The permittee may accept fly ash, bottom ash, and plastic for truck lining from the Miami Fort facility in Hamilton Co., North Bend, Ohio. [401 KAR 45:110 Section 3(7)]

7. Wastestreams: The permittee may accept gypsum from the Killen Station, Adams Co., Wrightsville, Ohio. [401 KAR 45:110 Section 3(7)]

PERMIT

8. Wastestreams: The Permittee may accept fly ash from the Jefferson Smurfit Facility, Butler Co., Middletown, Ohio. [401 KAR 45:110 Section 3(7)]

9. Wastestreams: The permittee may accept fly ash from Duke Energy Generation Services of St. Bernard, LLC, Butler Co., Cincinnati, Ohio. [401 KAR 45:110 Section 3(7)]

10. General: This Special Waste Landfill, known as the East Special Waste Landfill (ACTV0004), consists of 70 acres of disposal area and 160 acres of total permitted area. [401 KAR 45:110 Section 3(7)]

11. Financial Assurance: The maximum extent of operation includes the area of the landfill identified by an operating permit and for which the final cover Construction Progress Report has not yet been approved by the cabinet. The current maximum extent of operation for this East Special Waste Landfill (ACTV0004) is less than or equal to 55 acres. [401 KAR 45:080]

12. Wastestreams: The permittee may accept fly ash from the Spurlock Station, Mason Co., Maysville, Kentucky. The permittee may accept up to 60,000 tons annually, and additional information may be found in the approved application, APE20120005. [401 KAR 45:110 Section 3(7)]

13. Wastestreams: The permittee may accept fly ash from the Ghent Generating Station, Carroll Co., Ghent, Kentucky. The permittee may accept up to 100,000 tons annually and additional information may be found in the approved application, APE20140004. [401 KAR 45:110 Section 3(7)]

Approved Applications - The owner or operator shall comply with applicable statutes and regulations and the following approved applications:

1. 06-07-82 - First Operational Permit for Inert Landfill (effective on 7-16-82)
2. 04-05-84 - Modification for Inert Landfill
3. 07-15-87 - Renewal for Inert Landfill
4. 03-01-96 - Permit Renewal - conversion to Special Waste (effective date 7-16-92)
5. 07-24-96 - Groundwater Monitoring Plan - LI1MOGW1
6. 01-16-97 - Modification Add/Delete Waste Sources - MOAD1
7. 11-12-97 - Modification Add/Delete Waste Sources - MOAD2
8. 11-27-00 - Modification Add/Delete Waste Sources - MOAD3
9. 11-22-04 - APE20040001 - Minor Modification - Add/Delete Modification
10. 04-05-05 - APE20040005 - Minor Modification - Add/Delete Modification
11. 06-07-05 - AIN20010001 - Groundwater Assessment Plan
12. 07-13-05 - APE20050001 - Minor Modification - Leachate Collection System
13. 12-12-05 - AIN20050001 - Groundwater Assessment Plan - East Landfill
14. 10-04-06 - APE20060001 - Permit Transfer (to Union Light, Heat, and Power Coop)
15. 10-04-06 - APE20060006 - Minor Modification - Change the Active Area from 40 Acres to 55 Acres
16. 12-06-06 - AIN20060001 - Groundwater Assessment Report - East Landfill
17. 02-16-07 - APE20070001 - Construction Progress Report - Cells P-15 & P16
18. 03-20-07 - APE20060007 - Permit Transfer (to Duke Energy Kentucky, Inc.)
19. 08-15-07 - APE20070003 - Minor Modification - Add Source (bottom ash and plastic for truck lining from Miami Fort)
20. 08-15-07 - APE20070007 - Minor Modification previously labeled as APE20070005 - Add Source (Gypsum from Killen Station)
21. 04-14-11 - CMN20100015 - Acceptance Letter Issued, Groundwater Assessment Report Update - Ash

Pond and East Landfill
22. 07-06-12 - APE20120005 - Minor Modification - Add Source (Fly Ash from Spurlock Station)
23. 08-15-12 - AIN20110002 - Groundwater Assessment Report Update - East Landfill
24. 09-22-14 - APE20140004 - Minor Modification - Add Source (Fly Ash from Ghent Generating Station)
25. 05-06-15 - AIN20140003 - Revised Groundwater Assessment Plan - Site-Wide
26. 06-08-15 - AIN20150002 - Groundwater Assessment Report Update - East Landfill

ACTV0006 - Special Waste Landfill-Coal

Standard Requirements:

1. General: The owner or operator of a special waste facility shall comply with KRS Chapter 224 and 401 KAR Chapters 30, 40 and 45 for the construction and operation of special waste facilities. [KRS 224.50-760]

2. General: For construction and operation of the special waste landfill, the owner or operator shall comply with KRS Chapter 224.50-760, 401 KAR 45:030, 45:110 and the approved permit application(s). [401 KAR 45:110]

3. General: The owner or operator may only accept waste at the special waste landfill from the sources which are approved per 401 KAR 45:020, Section 2(1)(a), 45:030, Section 8(1)(a), and 45:110. [401 KAR 45:110]

Variances, Alternate Specifications and Special Conditions:

1. General: This Special Waste Landfill, known as the West Special Waste Landfill (ACTV0006), consists of 203.7 acres of disposal area and total permitted area. [401 KAR 45:110 Section 3(7)]

2. Construction: The Special Waste Landfill - West is authorized for construction activities only. No waste shall be accepted for disposal until after a Construction Progress Report is submitted to and accepted by the Solid Waste Branch. [401 KAR 45:030 Section 9]

3. Construction Requirements: The owner or operator shall proof-roll all sub-subgrade and subgrade areas in accordance with approved applications and permit. All proof-rolls shall be completed using a minimum 100,000 pound loaded four (4) tire scraper with a minimum capacity of 20 cubic yards or approved equivalency. The Solid Waste Branch must be notified at least 48 hours prior to proof-rolling of the final subgrade surface. [401 KAR 45:110 Section 2, 401 KAR 45:140]

Approved Applications - The owner or operator shall comply with applicable statutes and regulations and the following approved applications:

1. 12-08-2008 - APE20070004 - New Special Waste Activity - West Special Waste Landfill
2. 03-09-2011 - APE20100002 - Groundwater Monitoring Plan Modification - West Special Waste Landfill
3. 02-28-2012 - APE20110004 - Construction Progress Report - Floodplain Area Filling (2.1 acres)
4. 07-06-2012 - APE20120005 - Minor Modification - Add Source (Fly Ash from Spurlock Station)
5. 09-22-2014 - APE20140004 - Minor Modification - Add Source (Fly Ash from Ghent Generating Station)
6. 11-18-2015 - APE20150007 - Minor Modification - Updated Attachment 41 Construction Quality Control Plan
7. 06-13-2016 - APE20150008 - Minor Modification - Sediment Pond and Surface Water Controls

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

ACTV0008 - Coal Combustion Residuals Surface Impoundment

Variances, Alternate Specifications and Special Conditions:

1. General: The Coal Combustion Residuals Surface Impoundment has been upgraded from a Permit-by-Rule to a Registered Permit-by-Rule in accordance with the requirements of 401 KAR 45:060. [401 KAR 30:031, 401 KAR 45:060 Section 2]

2. General: The owner or operator of a special waste facility shall comply with KRS Chapter 224 and 401 KAR Chapters 30, 40 and 45 for the construction, operation, maintenance, and closure of special waste facilities. [KRS 224.50-760]

Approved Applications - The owner or operator shall comply with applicable statutes and regulations and the following approved applications:

1. 10-04-06 - APE20060001 - Permit Transfer (to Union Light, Heat, and Power Coop)
2. 03-20-07 - APE20060007 - Permit Transfer (to Duke Energy Kentucky, Inc.)
3. 08-15-07 - AIN20070001 - Groundwater Assessment Plan - Ash Pond
4. 07-16-10 - AIN20080001 - Groundwater Assessment Report - Ash Pond
5. 04-14-11 - CMN20100015 - Acceptance Letter Issued, Groundwater Assessment Report Update - Ash Pond and East Landfill
6. 08-15-12 - AIN20110001 - Groundwater Assessment Report Update - Ash Pond
7. 05-06-15 - AIN20140003 - Revised Groundwater Assessment Plan - Site-Wide
8. 06-08-15 - AIN20150001 - Groundwater Assessment Report Update - Ash Pond

Financial Assurance

ACTV0001 - Financial Assurance

The following is a history of the financial assurance for this facility:

1. 07-10-1987 - SB# B80-201654, $83,000.00
2. 07-06-1992 - SB# B80-201654, $539,900.00
3. 09-05-2001 - SB# B80-201654, $564,102.00
4. 09-16-2002 - SB# B80-201654, $577,534.00
5. 10-23-2003 - Financial Test, $2,120,500.00
6. 10-31-2003 - SB# B80-201654 released
7. 05-15-2006 - Financial Test, $2,259,062.00
8. 05-31-2007 - Financial Test, $2,324,575.00
9. 07-30-2007 - Financial Test, $2,324,575.00
10. 09-26-2011 - Financial Test, $2,522,049.00
11. 12-16-2013 - Financial Test, $2,598,255.00

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Monitoring Conditions

GSTR0001 - Groundwater Monitoring - SW: Groundwater Monitoring Group - East Special Waste Landfill

Group Members: STRC0001 - Well MW-1; STRC0002 - Well MW-3; STRC0003 - Well MW-4; STRC0004 - Well MW-5; STRC0005 - Well MW-6; STRC0006 - Well MW-6D

Standard Requirements:

1. The owner or operator shall satisfy the requirements of 401 KAR 45:160 for all wastes and waste constituents contained in the site or facility. [401 KAR 45:160 Section 1]

2. The permittee shall monitor for other parameters as required by the cabinet. [401 KAR 45:160 Section 8(2)(c)]

3. The owner or operator shall monitor groundwater on the approved schedule at each approved groundwater monitoring location in accordance with 401 KAR 45:160, the permit, and the approved plans. A table summarizing the parameters to be monitored, their respective limits and monitoring frequency is included herein. [401 KAR 45:160, 401 KAR 45:140 Section 1(1)]

4. The owner or operator shall conduct statistical analysis of the groundwater data in accordance with 401 KAR 45:160 Section 6 and the approved applications. The statistical test chosen shall be conducted separately for each parameter in each well for each monitoring event. The results shall be maintained as part of the facility record throughout the operating and post-closure life of the facility. [401 KAR 45:160 Section 6, 401 KAR 45:140 Section 1(1)]

5. The groundwater analytical data and statistical analysis shall be submitted on forms provided by the cabinet, within sixty (60) days after sampling or 15 days of the completion of statistical analysis, whichever is sooner. [401 KAR 45:160 Section 4]

6. Groundwater monitoring wells shall be constructed and maintained in accordance with 401 KAR 45:160 Section 3, the permit, and the approved plans. [401 KAR 45:160 Section 3, 401 KAR 45:140 Section 1(1)]

7. No monitoring well construction, maintenance, or abandonment may be conducted without prior approval by the Division of Waste Management. [401 KAR 45:140 Section 1(1)]

8. Only a Kentucky Certified Monitoring Well Driller may construct or abandon monitoring wells. [401 KAR 6:320]

9. If the analysis of groundwater sample results indicates contamination (i.e., a statistical or MCL exceedence) as specified in 401 KAR 45:160 Section 5, the owner or operator shall notify the cabinet within (forty-eight) 48 hours of receiving the results and shall arrange to split samples no later than ten (10) days from the receipt of the results. [401 KAR 45:160 Section 5]

10. The owner or operator shall be required to prepare and submit a groundwater contamination assessment plan if laboratory analyses of one (1) or more public or private water supplies or monitoring wells at the site shows the presence of one (1) or more parameters above the maximum contaminant level (MCL) as specified in

401 KAR 30:031 or a statistically significant increase over background levels for parameters that have no MCL. [401 KAR 45:160 Section 5]

11. The owner or operator shall provide alternate water supplies to all affected parties within twenty-four (24) hours of notification of the cabinet that sample results indicate contamination of a drinking water supply if it has been determined that the special waste site or facility is the probable source of the contamination. [401 KAR 45:160 Section 3]

12. If required by the cabinet, groundwater contamination assessment and corrective action shall be performed in full compliance with all provisions of 401 KAR 45:160 Section 5. [401 KAR 45:160 Section 5]

13. The owner or operator shall provide the division a minimum of five (5) working days advance notice for all groundwater monitoring well construction and abandonment activities. [401 KAR 40:020 Section 2(4)]

GSTR0003 - Groundwater Monitoring - SW: Assessment Well Group

Group Members: STRC0003 - Well MW-4; STRC0023 - Well P-4; STRC0024 - Well P-5; STRC0025 - Well P-6; STRC0026 - Well P-7; STRC0027 - Well P-8; STRC0028 - Well P-9; STRC0030 - Well MW-5D (Assessment); STRC0031 - Well MW-8D (Assessment); STRC0032 - Well MW-7 (Assessment); STRC0039 - Well MW-04D; STRC0040 - Well MW-09; STRC0041 - Well MW-10

Standard Requirements:

1. Groundwater monitoring wells shall be constructed and maintained in accordance with 401 KAR 45:160 Section 3, the permit, and the approved plans. [401 KAR 45:160 Section 3, 401 KAR 45:140 Section 1(1)]

2. No monitoring well construction, maintenance, or abandonment may be conducted without prior approval by the Division of Waste Management. [401 KAR 45:140 Section 1(1)]

3. Only a Kentucky Certified Monitoring Well Driller may construct or abandon monitoring wells. [401 KAR 6:320]

4. The owner or operator shall provide the division a minimum of five (5) working days advance notice for all groundwater monitoring well construction and abandonment activities. [401 KAR 40:020 Section 2(4)]

Variances, Alternate Specifications and Special Conditions:

1. The permittee shall monitor these wells for assessment purposes in accordance with the approved groundwater assessment plan. [401 KAR 45:140 Section 1(1)]

PERMIT

GSTR0005 - Groundwater Monitoring - SW: Groundwater Observation Well Group - West Special Waste Landfill

Group Members: STRC0033 - Well OW-105; STRC0034 - Well OW-106; STRC0035 - Well OW-104; STRC0036 - Well OW-103; STRC0037 - Well OW-102; STRC0038 - Well OW-101

Standard Requirements:

1. Groundwater monitoring wells shall be constructed and maintained in accordance with 401 KAR 45:160 Section 3, the permit, and the approved plans. [401 KAR 45:160 Section 3, 401 KAR 45:140 Section 1(1)]

2. No monitoring well construction, maintenance, or abandonment may be conducted without prior approval by the Division of Waste Management. [401 KAR 45:140 Section 1(1)]

3. Only a Kentucky Certified Monitoring Well Driller may construct or abandon monitoring wells. [401 KAR 6:320]

4. The owner or operator shall provide the division a minimum of five (5) working days advance notice for all groundwater monitoring well construction and abandonment activities. [401 KAR 40:020 Section 2(4)]

Variances, Alternate Specifications and Special Conditions:

1. The permittee shall monitor these wells for assessment purposes in accordance with the approved groundwater assessment plan. [401 KAR 45:140 Section 1(1)]

GSTR0006 - Groundwater Monitoring - SW: Groundwater Monitoring Group - West Special Waste Landfill - Wells Proposed for Construction

Group Members: STRC0046 - Well MW-205 (Proposed); STRC0047 - Well MW-206 (Proposed); STRC0048 - Well MW-207 (Proposed)

Standard Requirements:

1. Groundwater monitoring wells shall be constructed and maintained in accordance with 401 KAR 45:160 Section 3, the permit, and the approved plans. [401 KAR 45:160 Section 3, 401 KAR 45:140 Section 1(1)]

2. No monitoring well construction, maintenance, or abandonment may be conducted without prior approval by the Division of Waste Management. [401 KAR 45:140 Section 1(1)]

3. Only a Kentucky Certified Monitoring Well Driller may construct or abandon monitoring wells. [401 KAR 6:320]

4. The owner or operator shall provide the division a minimum of five (5) working days advance notice for all groundwater monitoring well construction and abandonment activities. [401 KAR 40:020 Section 2(4)]

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Variances, Alternate Specifications and Special Conditions:

1. The permittee shall construct these wells in accordance with the approved plan. Upon completion of well construction, the permittee shall submit a monitoring well construction progress report to the Division of Waste Management for review. [401 KAR 45:140 Section 1(1)]

GSTR0008 - Groundwater Monitoring - SW: Groundwater Monitoring Group - West Special Waste Landfill

Group Members: STRC0051 - Well MW-201; STRC0052 - Well MW-202; STRC0053 - Well MW-204; STRC0054 - Well MW-208; STRC0055 - Well MW-203

Standard Requirements:

1. The owner or operator shall satisfy the requirements of 401 KAR 45:160 for all wastes and waste constituents contained in the site or facility. [401 KAR 45:160 Section 1]

2. The permittee shall monitor for other parameters as required by the cabinet. [401 KAR 45:160 Section 8(2)(c)]

3. The owner or operator shall monitor groundwater on the approved schedule at each approved groundwater monitoring location in accordance with 401 KAR 45:160, the permit, and the approved plans. A table summarizing the parameters to be monitored, their respective limits and monitoring frequency is included herein. [401 KAR 45:160, 401 KAR 45:140 Section 1(1)]

4. The owner or operator shall conduct statistical analysis of the groundwater data in accordance with 401 KAR 45:160 Section 6 and the approved applications. The statistical test chosen shall be conducted separately for each parameter in each well for each monitoring event. The results shall be maintained as part of the facility record throughout the operating and post-closure life of the facility. [401 KAR 45:160 Section 6, 401 KAR 45:140 Section 1(1)]

5. The groundwater analytical data and statistical analysis shall be submitted on forms provided by the cabinet, within sixty (60) days after sampling or 15 days of the completion of statistical analysis, whichever is sooner. [401 KAR 45:160 Section 4]

6. Groundwater monitoring wells shall be constructed and maintained in accordance with 401 KAR 45:160 Section 3, the permit, and the approved plans. [401 KAR 45:160 Section 3, 401 KAR 45:140 Section 1(1)]

7. No monitoring well construction, maintenance, or abandonment may be conducted without prior approval by the Division of Waste Management. [401 KAR 45:140 Section 1(1)]

8. Only a Kentucky Certified Monitoring Well Driller may construct or abandon monitoring wells. [401 KAR 6:320]

9. If the analysis of groundwater sample results indicates contamination (i.e., a statistical or MCL exceedence) as specified in 401 KAR 45:160 Section 5, the owner or operator shall notify the cabinet within (forty-eight) 48 hours of receiving the results and shall arrange to split samples no later than ten (10) days from the receipt of the results. [401 KAR 45:160 Section 5]

10. The owner or operator shall be required to prepare and submit a groundwater contamination assessment plan if laboratory analyses of one (1) or more public or private water supplies or monitoring wells at the site shows the presence of one (1) or more parameters above the maximum contaminant level (MCL) as specified in 401 KAR 30:031 or a statistically significant increase over background levels for parameters that have no MCL. [401 KAR 45:160 Section 5]

11. The owner or operator shall provide alternate water supplies to all affected parties within twenty-four (24) hours of notification of the cabinet that sample results indicate contamination of a drinking water supply if it has been determined that the special waste site or facility is the probable source of the contamination. [401 KAR 45:160 Section 3]

12. If required by the cabinet, groundwater contamination assessment and corrective action shall be performed in full compliance with all provisions of 401 KAR 45:160 Section 5. [401 KAR 45:160 Section 5]

13. The owner or operator shall provide the division a minimum of five (5) working days advance notice for all groundwater monitoring well construction and abandonment activities. [401 KAR 40:020 Section 2(4)]

GSTR0009 - Groundwater Monitoring - SW: Groundwater Assessment Well Group - Site-Wide

Group Members: AIOO0176 –

Variances, Alternate Specifications and Special Conditions:

1. Groundwater Characterization: The groundwater assessment characterization list for the facility shall include the following parameters in accordance with 401 KAR 45:160 Section 7(2) and 40 CFR 257 Appendix III and Appendix IV: Antimony, Arsenic, Barium, Beryllium, Bicarbonate, Boron, Cadmium, Calcium, Carbonate, Chemical Oxygen Demand, Chloride, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Lithium, Magnesium, Mercury, Molybdenum, Nickel, pH, Potassium, Radium 226 and 228 Combined, Selenium, Sodium, Specific Conductance, Sulfate, Thallium, Total Dissolved Solids, Total Organic Carbon, and Zinc. [401 KAR 45:140 Section 2]

GMNP0001 - Surface Water Monitoring - SW: Surface Water Monitoring Group - East Special Waste Landfill

Group Members: MNPT0001 - Downstream Point SW-017

Standard Requirements:

1. The owner or operator shall monitor surface water in accordance with 401 KAR 45:160 Section 9 and the approved surface water monitoring plan. A table summarizing the parameters to be monitored, their respective limits and the monitoring frequency is included herein. [401 KAR 45:160 Section 9]

2. Surface water corrective action shall be completed by the owner or operator as necessary to comply with 401 KAR 30:031. [401 KAR 45:160 Section 9, 401 KAR 30:031 Section 4]

3. Surface water analytical data shall be submitted in the compliance monitoring reports with all other permit-required environmental monitoring results. [401 KAR 45:160 Section 9]

Variances, Alternate Specifications and Special Conditions:

1. The owner or operator shall monitor surface water in accordance with 401 KAR 45:160 Section 9 and the approved surface water monitoring plan. A table summarizing the parameters to be monitored and the monitoring frequency is included herein. [401 KAR 45:160 Section 9]

GMNP0002 - Surface Water Monitoring - SW: Surface Water Monitoring Group - West Special Waste Landfill

Group Members: MNPT0002 - Mon. Pt. SWMP-1; MNPT0003 - Mon. Pt. SWMP-2; MNPT0004 - Mon. Pt. SWMP-3

Variances, Alternate Specifications and Special Conditions:

1. The permittee shall characterize these surface water monitoring points prior to the emplacement of waste in the West Special Waste Landfill, and monitor them in accordance with the approved plan upon issuance of the operating permit for the West Special Waste Landfill. [401 KAR 45:160 Section 9]

Groundwater Monitoring Limits:

Subject Item	CAS Number	Parameter	Frequency	Lower Limit	Upper Limit	Units	Statistical Limit	Report Only
GSTR0001	07440-39-3	Barium, Total (as Ba)	semiannually		2.0	mg/L		
GSTR0001		Boron, Total Recoverable	semiannually			mg/L	Yes	
GSTR0001	07440-70-2	Calcium	semiannually			mg/L	Yes	
GSTR0001		Carbon, Total Organic	semiannually			mg/L	Yes	
GSTR0001		Chemical Oxygen Demand (COD)	semiannually			mg/L	Yes	
GSTR0001	16887-00-6	Chloride	semiannually			mg/L	Yes	
GSTR0001	07440-47-3	Chromium	semiannually		0.1	mg/L		
GSTR0001		Copper, Dissolved (as Cu)	semiannually		1.3	mg/L		
GSTR0001	16984-48-8	Fluoride	semiannually		4.0	mg/L		
GSTR0001		Groundwater Elevation	semiannually			feet above mean sea level based on a USGS datum		Yes
GSTR0001	00000-19-8	Manganese, Total (as Mn)	semiannually			mg/L	Yes	
GSTR0001		Solids, Total Dissolved	semiannually			mg/L	Yes	
GSTR0001		Solids, Total Suspended (TSS)	semiannually			mg/L	Yes	
GSTR0001		Specific Conductance	semiannually			umho/cm	Yes	
GSTR0001	14808-79-8	Sulfate	semiannually			mg/L	Yes	
GSTR0001		Temperature, Water Deg. Fahrenheit	semiannually			degrees Fahrenheit		Yes
GSTR0001		pH	semiannually			standard units	Yes	
GSTR0008	07440-39-3	Barium, Total (as Ba)	semiannually		2.0	mg/L		
GSTR0008		Boron, Total Recoverable	semiannually			mg/L	Yes	
GSTR0008	07440-70-2	Calcium	semiannually			mg/L	Yes	
GSTR0008		Carbon, Total Organic	semiannually			mg/L	Yes	
GSTR0008		Chemical Oxygen Demand (COD)	semiannually			mg/L	Yes	
GSTR0008	16887-00-6	Chloride	semiannually			mg/L	Yes	
GSTR0008	07440-47-3	Chromium	semiannually		0.1	mg/L		
GSTR0008		Copper, Dissolved (as Cu)	semiannually		1.3	mg/L		
GSTR0008	16984-48-8	Fluoride	semiannually		4.0	mg/L		

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Subject Item	CAS Number	Parameter	Frequency	Lower Limit	Upper Limit	Units	Statistical Limit	Report Only
GSTR0008		Groundwater Elevation	semiannually			feet above mean sea level based on a USGS datum		Yes
GSTR0008	00000-19-8	Manganese, Total (as Mn)	semiannually			mg/L	Yes	
GSTR0008		Solids, Total Dissolved	semiannually			mg/L	Yes	
GSTR0008		Solids, Total Suspended (TSS)	semiannually			mg/L	Yes	
GSTR0008		Specific Conductance	semiannually			umho/cm	Yes	
GSTR0008	14808-79-8	Sulfate	semiannually			mg/L	Yes	
GSTR0008		Temperature, Water Deg. Fahrenheit	semiannually			degrees Fahrenheit		Yes
GSTR0008		pH	semiannually			standard units	Yes	

Surface Water Monitoring Limits:

Subject Item	CAS Number	Parameter	Frequency	Lower Limit	Upper Limit	Units	Statistical Limit	Report Only
GMNP0001		Carbon, Total Organic	once every six months			mg/L		Yes
GMNP0001		Chemical Oxygen Demand (COD)	once every six months			mg/L		Yes
GMNP0001	16887-00-6	Chloride	once every six months			mg/L		Yes
GMNP0001	07439-89-6	Iron, Total (as Fe)	once every six months			mg/L		Yes
GMNP0001	07440-23-5	Sodium	once every six months			mg/L		Yes
GMNP0001		Solids, Total Dissolved	once every six months			mg/L		Yes
GMNP0001		Solids, Total Suspended (TSS)	once every six months			mg/L		Yes

Permit Number: SW00800006 Agency Interest ID: 176

PERMIT

Subject Item	CAS Number	Parameter	Frequency	Lower Limit	Upper Limit	Units	Statistical Limit	Report Only
GMNP0001		Specific Conductance	once every six months			umho/cm		Yes
GMNP0001	14808-79-8	Sulfate	once every six months			mg/L		Yes
GMNP0001		Total Solids	once every six months			mg/L		Yes
GMNP0001		pH	once every six months			standard units		Yes

Commonwealth of Kentucky
Energy and Environment Cabinet
Department for Environmental Protection

Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601
(502) 564-3999
http://www.air.ky.gov/

PERMIT APPLICATION

The completion of this form is required under Regulations 401 KAR 52:020, 52:030, and 52:040 pursuant to KRS 224. Applications are incomplete unless accompanied by copies of all plans, specifications, and drawings requested herein. Failure to supply information required or deemed necessary by the division to enable it to act upon the application shall result in denial of the permit and ensuing administrative and legal action. Applications shall be submitted in triplicate.

DEP7007AI
Administrative Information
Enter if known
AFS Plant ID#
Agency Use Only
Date Received
Log#
Permit#

1) APPLICATION INFORMATION

Note: The applicant must be the owner or operator. (The owner/operator may be individual(s) or a corporation.)

Name: Duke Energy Kentucky Inc., East Bend Station

Title: _____ Phone: (513) 287-2356

Mailing Address: (If applicant is an individual) / Company: 139 East Fourth Street, Mail Code EM740

Street or P.O. Box: _____

City: Cincinnati State: OH Zip Code: 45202

Is the applicant (check one): ☐ Owner ☐ Operator ☒ Owner & Operator ☐ Corporation/LLC* ☐ LP**

* If the applicant is a Corporation or a Limited Liability Corporation, submit a copy of the current Certificate of Authority from the Kentucky Secretary of State.

** If the applicant is a Limited Partnership, submit a copy of the current Certificate of Limited Partnership from the Kentucky Secretary of State.

Person to contact for technical information relating to application:

Name: Andrew Roebel

Title: Senior Environmental Specialist Phone: (513) 287-2356

2) OPERATOR INFORMATION

Note: The applicant must be the owner or operator. (The owner/operator may be individual(s) or a corporation.)

Name: Same as Applicant

Title: _____ Phone: _____

Mailing Address: Company _____

Street or P.O. Box: _____

City: _____ State: _____ Zip Code: _____

DEP7007AI
(Continued)

3) TYPE OF PERMIT APPLICATION

For new sources that currently *do not* hold *any* air quality permits in Kentucky and are required to obtain a permit prior to construction pursuant to 401 KAR 52:020, 52:030, or 52:040.

☐ Initial Operating Permit (the permit will authorize both construction and operation of the new source)

Type of Source (*Check all that apply*): ☐ Major ☐ Conditional Major ☐ Synthetic Minor ☐ Minor

For existing sources that do not have a source-wide Operating Permit required by 401 KAR 52:020, 52:030, or 52:040.

Type of Source (*Check all that apply*): ☐ Major ☐ Conditional Major ☐ Synthetic Minor ☐ Minor

(*Check one only*)
☐ Initial Source-wide Operating Permit ☐ Modification of Existing Facilities at Existing Plant
☐ Construction of New Facilities at Existing Plant
☐ Other (explain) _____

For existing sources that currently have a source-wide Operating Permit.

Type of Source (*Check all that apply*): ☒ Major ☐ Conditional Major ☐ Synthetic Minor ☐ Minor

Current Operating Permit # V-12-023

☐ **Administrative Revision** (describe type of revision requested, e.g. name change): _____

☐ **Permit Renewal** ☐ **Significant Revision** ☒ **Minor Revision**

☐ Addition of New Facilities ☐ Modification of Existing Facilities

For all construction and modification requiring a permit pursuant to 401 KAR 52:020, 52:030, or 52:040.

Proposed Date for Start of Construction or Modification: _____

Proposed date for Operation Start-up: _____

4) SOURCE INFORMATION

Source Name: Duke Energy Kentucky Inc., East Bend Station

Source Street Address: Kentucky Route 338

City: Rabbit Hash **Zip Code:** 40191-0142 **County:** Boone

Primary Standard Industrial Classification (SIC) Category: Electric Power Generation **Primary SIC #:** 4931

Property Area (Acres or Square Feet): 1777 acres **Number of Employees:** 160 (approx.)

Description of Area Surrounding Source (*check one*):
☐ Commercial Area ☐ Residential Area ☐ Industrial Area ☐ Industrial Park ☒ Rural Area ☐ Urban Area

Approximate Distance to Nearest Residence or Commercial Property: 2200 feet (estimated)

UTM or Standard Location Coordinates: (*Include topographical map showing property boundaries*)

UTM Coordinates:	Zone 16		Horizontal (km)	686.67	Vertical (km)	4308.35	
Standard Coordinates:	Latitude	____	Degrees	____	Minutes	____	Seconds
	Longitude	____	Degrees	____	Minutes	____	Seconds

DEP7007AI
(Continued)

4) SOURCE INFROMATION (CONTINUED)

Is any part of the source located on federal land? ☐ Yes ☒ No

What other environmental permits or registrations does this source currently hold in Kentucky?

Title V Air Quality Permit No. V-12-023, Title IV Acid Rain Permit, KPDES Permit No. KY0040444

What other environmental permits or registrations does this source need to obtain in Kentucky?

5) OTHER REQUIRED INFORMATION

Indicate the type(s) and number of forms attached as part of this application.

___	DEP7007A	Indirect Heat Exchanger, Turbine, Internal Combustion Engine	___	DEP7007R Emission Reduction Credit
___	DEP7007B	Manufacturing or Processing Operations	___	DEP7007S Service Stations
___	DEP7007C	Incinerators & Waste Burners	___	DEP7007T Metal Plating & Surface Treatment Operations
___	DEP7007F	Episode Standby Plan	1	DEP7007V Applicable Requirements & Compliance Activities
___	DEP7007J	Volatile Liquid Storage	___	DEP7007Y Good Engineering Practice (GEP) Stack Height Determination
___	DEP7007K	Surface Coating or Printing Operations	___	DEP7007AA Compliance Schedule for Noncomplying Emission Units
1	DEP7007L	Concrete, Asphalt, Coal, Aggregate, Feed, Corn, Flour, Grain, & Fertilizer	___	DEP7007BB Certified Progress Report
___	DEP7007M	Metal Cleaning Degreasers	___	DEP7007CC Compliance Certification
3	DEP7007N	Emissions, Stacks, and Controls Information	___	DEP7007DD Insignificant Activities
___	DEP7007P	Perchloroethylene Dry Cleaning Systems		

Check other attachments that are part of this application.

	Required Data		Supplemental Data
☐	Map or Drawing Showing Location	☐	Stack Test Report
☐	Process Flow Diagram and Description	☐	Certificate of Authority from the Secretary of State (for Corporations and Limited Liability Companies)
☐	Site Plan Showing Stack Data and Locations	☐	Certificate of Limited Partnership from the Secretary of State (for Limited Partnerships)
☐	Emission Calculation Sheets	☐	Claim of Confidentiality (See 400 KAR 1:060)
☐	Material Safety Data Sheets (MSDS)	☒	Other (Specify)Suggested draft permit, change description

Indicate if you expect to emit, in any amount, hazardous or toxic materials or compounds or such materials into the atmosphere from any operation or process at this location.

☐	Pollutants regulated under 401 KAR 57:002 (NESHAP)	☒	Pollutants listed in 401 KAR 63:060 (HAPS)
☒	Pollutants listed in 40 CFR 68 Subpart F [112(r) pollutants]	☐	Other

Has your company filed an emergency response plan with local and/or state and federal officials outlining the measures that would be implemented to mitigate an emergency release?

☒ Yes ☐ No

Check whether your company is seeking coverage under a permit shield. If "Yes" is checked, applicable requirements must be identified on Form DEP7007V. Identify any non-applicable requirements for which you are seeking permit shield coverage on a separate attachment to the application.

☐ Yes ☒ No ☐ A list of non-applicable requirements is attached

DEP7007AI (Continued)

6) OWNER INFORMATION

Note: If the applicant is the owner, write "same as applicant" on the name line.

Name: Same as Applicant

Title: _____ **Phone:** _____

Mailing Address: _____
Company

Street or P.O. Box: _____

City: _____ **State:** ____ **Zip Code:** _____

List names of owners and officers of your company who have an interest in the company of 5% or more.

Name	Position (owner, partner, president, CEO, treasurer, etc.)
None	

(attach another sheet if necessary)

7) SIGNATURE BLOCK

I, the undersigned, hereby certify under penalty of law, that I am a responsible official, and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

BY: Gary Cook
(Authorized Signature)

7-15-16
(Date)

Gary L. Cook
(Typed or Printed Name of Signatory)

GM II – Regulated Stations
(Title of Signatory)

Project Definition Report
Duke Energy
Dry Bottom Ash Conversion Project
East Bend Generation Station

prepared for

DUKE ENERGY.

June 2016

Project No. 88669

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

INDEX AND CERTIFICATION

Duke Energy
East Bend Generation Station
Dry Bottom Ash Conversion Project
Project Definition Report
Project No. 88669

Report Index

06/30/16 09:50

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1 EXECUTIVE SUMMARY

Duke Energy (Duke or Owner) operates the East Bend Generation Station in Boone County, Kentucky. East Bend Station consists of a single operating coal-fired unit: Unit 2 is a 648 MW pulverized coal fired unit built in 1981.

East Bend Station will be subject to complying with the Environmental Protection Agency's (EPA's) rule for Coal Combustion Residual (CCR) storage and disposal and Effluent Limitation Guidelines (ELGs). Duke has retained Burns & McDonnell (BMcD or Engineer) to assist in developing the scope, design, schedule and cost estimates to bring East Bend Station into compliance with the CCR rule and ELGs. The scope of this CPCN includes the following:

- Conversion of the existing "wet" bottom ash sluicing system to a Submerged Flight Conveyor (SFC) bottom ash removal system. This includes addition of a new under-boiler SFC and associated systems.

1.1 PURPOSE

The purpose of this report is to document the design basis and scope established in the project development phase. The report provides the contracting approach, schedule, and cost estimates of the project based on the documents contained herein.

1.2 GENERAL DESIGN

The recommended plant modifications were developed after a review and evaluation of the CCR rule promulgated on April 17, 2015 and the ELG regulations promulgated on November 3, 2015. Additionally, the recommendations were developed in collaboration with Duke Energy project and plant personnel. Recommended modifications include the following:

- Dry Bottom Ash: Demolish the existing bottom ash sluicing system and install a new under-boiler submerged flight conveyor (SFC) for dewatering bottom ash, economizer ash, and pyrites. Provide a dewatered bottom ash storage area and truck load out area for trucking to the landfill for final disposal.

1.3 PROJECT EXECUTION APPROACH

A Certificate of Public Convenience and Necessity (CPCN) is required for this project. The duration of the CPCN permitting process is significant as equipment cannot be awarded and construction cannot commence until the CPCN permit is approved.

The selected contracting strategy for the Project is a multiple prime contract approach. Under this approach, engineered equipment and material will be procured from manufacturers specializing in the specific item. Construction will be performed by a limited number of contractors capable of self-performing most of the work included in the construction scope. Lump sum construction contracts are planned for the project. This approach provides the following benefits:

- Facilitates early award of major equipment procurements to allow detailed design engineering to proceed expeditiously and equipment to be fabricated to meet the Project schedule.
- Minimizes site interface issues by limiting the number of site contractors, while allowing work to be started as soon as engineering is completed and permit approvals are received.
- Offers the greatest flexibility for Duke to be involved in key decisions regarding design.
- Results in cost savings to Duke while minimizing Owner's risks.

In the multiple contract approach, Duke and BMcD work together to procure the construction and major equipment contracts. The procurement of the long lead time equipment such as the under-boiler submerged flight conveyor (SFCs) and electrical equipment is necessary early in the project to support detailed design and facilitate timely delivery. The contracting approach includes five equipment/material contracts, one furnish and erect contracts, four construction contracts, and five construction services contracts as referenced in Section 4.0 of this Report. The equipment contracts allow engineering to be completed prior to issuing construction drawings to reduce construction costs and schedule durations. Equipment contracts also allow Duke to reduce the cost of subcontractor markup that would be carried in the construction contracts for an alternative approach in which the equipment would be included as subcontracts within those construction contracts. In addition, this approach allows Duke more input into the equipment selection for the project and provides more control of the quality of materials purchased.

Prior to equipment procurement, BMcD will assist Duke in applying for CPCN.

1.4 SCHEDULE

A Level 3 project schedule was prepared and is discussed in Section 5.0 and is included in Appendix J. The project schedule is driven by the need to comply with CCR and ELG regulations. The suggested preliminary schedule is based on a detailed engineering start date in early/mid 2016 and substantial completion of the SFC in May 2018. An outage will be required to accomplish the majority of the work associated with SFC. East Bend has a 10 week outage scheduled for spring of 2018. The outage dependent SFC work is planned to be performed during this outage.

1.5 COST ESTIMATE

The estimated capital cost for the East Bend Dry Bottom Ash Project is presented in Appendix K. The estimate is based on the capital cost basis and assumptions described in Section 6.0. Labor was assumed to be union labor for the cost estimate. The project estimate includes 10% project contingency and 5% Owner's contingency. The Appendix K cost estimate was transmitted separate from the PDR report.

* * * * *

2 INTRODUCTION

2.1 PROJECT BACKGROUND

Duke Energy retained BMcD to develop the project definition report and design the following plant upgrades, as part of Duke's plan to achieve compliance with the new Coal Combustion Residual (CCR) regulations and Effluent Limitation Guidelines (ELGs):

- Bottom Ash (BA) conversion from wet to dry (SFC): Dewatering of bottom ash, economizer ash, and pyrites in an under-boiler SFC system. SFC system to be designed and furnished by United Conveyor Corporation (UCC).

2.2 PROJECT DEFINITION REPORT (PDR)

The project definition report includes the design basis and scope for the following new facilities based on preliminary evaluations:

- Dry bottom ash equipment.

The scope for these new facilities was based on the following items:

- Design basis.
- Arrangements.
- Associated site improvements.
- New foundations and structures.
- Mechanical interconnects and systems.
- Power supply and electrical systems.
- Controls integration.

The project definition report also includes the following project controls basis:

- Contracting approach.
- Engineering and construction schedule.
- Preliminary capital cost estimate.

2.3 OBJECTIVES

The Project Definition Report objective is to define the design scopes of major components of the project and provide adequate information to support the following activities:

- Establish design basis for major equipment and technology to be used.
- Establish design configurations.
- Development of a preferred contracting approach.

- Preparation of a project schedule.
- Project cost estimate.

2.4 LIMITATIONS AND QUALIFICATIONS

Estimates and projections prepared by Burns & McDonnell relating to schedules, performance, construction costs, and operating and maintenance costs are based on our experience, qualifications and judgment as a professional consultant. Since Burns & McDonnell has no control over weather, cost and availability of labor, material and equipment, labor productivity, construction contractor's procedures and methods, unavoidable delays, construction contractor's method of determining prices, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding and market conditions or other factors affecting such estimates or projections, Burns & McDonnell does not guarantee that actual rates, costs, performance, schedules, etc., will not vary from the estimates and projections prepared by Burns & McDonnell.

2.5 TECHNOLOGY ALTERNATIVE SCREENING SUMMARY

Preliminary design and an assessment of the scope of systems and equipment was performed for the following environmental requirements that need to be met for the Project:

2.5.1 Screening Process

A screening process was completed to evaluate potential combinations of technologies that were considered feasible to provide the performance required and that also were in operation at other facilities with sufficient experience to confirm their viability for long term successful operation. Qualifying technologies were screened by performing a differential economic analysis to identify the potential differences in the capital and life cycle costs for each technology.

Several technologies were evaluated for the environmental requirements. The technologies considered included pneumatic conveying, remote submerged drag chain conveyor, and local underboiler submerged drag chain conveyor.

2.6 SELECTED ALTERNATIVE

All of the environmental control equipment options listed above were evaluated to have the capacity to meet the environmental requirements.

A screening level economic analysis of all of the compliance options was performed to determine the differential capital and life cycle cost of each option. The underboiler submerged drag chain was estimated to have the lowest capital cost of all of the options and was selected by Duke as the preferred option to proceed with for the project. The selected option includes demolition of the existing bottom ash handling equipment, a new submerged flight conveyor (SFC) for bottom ash handling, and new dry flight conveyors (DFCs) to convey economizer ash to the new SFC.

* * * * *

3 PROJECT SCOPE & DESIGN INFORMATION

3.1. Bottom Ash Dewatering System

3.1.1. Siting

The new under-boiler SFC will be installed in the existing boiler building, beneath the existing boiler, in place of the existing wet bottom ash hoppers.

3.1.2. Design Basis

The Design Basis document for the Dry Bottom Ash (SFC) System is included in the Program-wide Design Manual. The East Bend conveyor is an under-boiler conveyor, as opposed to the program remote submerged flight conveyors; however, the Program design basis document shall be followed where applicable.

3.1.3. Scope

The SFC facility scope includes the equipment and buildings defined in Appendix D - Equipment List. Site improvements, foundations and structures, mechanical interconnects and systems, electrical power supply and controls integration scope is defined below.

3.1.4. Arrangement

Refer to Appendix C for the site arrangement showing the SFC equipment arrangement drawings.

3.1.5. Site Improvements

The SFC equipment will be located in the Unit 2 boiler building.

Design of the loading area will provide adequate space (minimum 100 feet beyond the bunker) for removal of ash from the bunker, front end loader working space and truck loading.

SFC systems will use existing electrical equipment where possible.

Existing site access roads will be utilized to access the bottom ash stack out bunker. The existing roads will be improved for the ash-haul truck traffic. Refer to drawings included in Appendix C for additional details.

3.1.6. Foundations and Structures

Foundation design will be based on a site geotechnical report prepared by a geotechnical engineering firm retained by Duke Energy. Foundations will be pile supported mat foundations based on available geotechnical information from the site.

Foundations will be supplied where required for additional conveyor support, where existing boiler building slab is insufficient. A foundation and bunker will also be provided for the bottom ash stack out area.

A 100 feet concrete approach area will be required adjacent to the bottom ash storage area for front end loader backup and truck traffic.

New piping required for the SFC system will utilize existing steel for pipe routing where it is possible and supplemental steel will be added for support piping where there is no existing steel.

A pre-engineered Air Receiver Building will be provided to house the relocated air receivers, air dryers, and CO_2 systems that will be relocated to make room for the under-boiler conveyor.

3.1.7. Mechanical Interconnect and Systems

Interconnecting piping is based on Appendix F – P&IDs and pipe route plans. Scope will include interconnecting piping for the under-boiler conveyor, existing pyrites hoppers, and dry economizer ash handling. It will also include additional interconnects with existing plant piping systems required to support the new facility.

The existing wet bottom ash hoppers and wet economizer ash hopper will be demolished and replaced by the new under-boiler SFC and dry flight conveyors (DFCs), respectively. Existing soot blowing air receivers, soot blowing air dryers, and CARDOX system will need to be relocated to provide the new SFC a path out of the building. This equipment, and associated piping, will be relocated to a new pre-engineered building to the southeast of its existing location, outside the boiler building. Instrument air for the SFC will be taken from the existing boiler building compressed air system (pending instrument air usage study). Service water will be taken from the existing service water system inside the boiler building.

3.1.8. Power Supply and Electrical Systems

The power supply for the under-boiler SFC equipment will be from existing spare breakers in FGD 4.16kV Switchgear 24SR-1 & 24SR-2 located in the FGD 4.16 kV Switchgear Room. These breakers will feed two station service transformers at the new Air Receiver Building. The transformers will step the voltage down to 480 Volts, and feed two new 480 Volt Motor Control Centers which will be located in an electrical room of the Air Receiver Building. Refer to Appendix G - Electrical One lines.

3.1.9. Control Integration

The SFC will be controlled by the plant DCS. Spare I/O or additional cards will be added to the existing DCS cabinets to control the breakers in the FGD 4.16 kV Switchgear Room that will feed the new Air Receiver Building.

New DCS controller and cabinets will be installed in the new Air Receiver Building. All of the I/O for the bottom ash dewatering equipment will be wired to this location. The new controller will be tied back to the existing Ovation network.

Overall the SFC system will contain about 300 hardwired DCS I/O points.

* * * * *

4 CONTRACTING APPROACH

4.1 GENERAL APPROACH

The contracting approach used as a basis for the Project cost estimate was a multiple contract approach. As shown in Table 4.1, the contracts were broken into three major categories; Equipment contracts, Furnish and Erect contracts, and Construction contracts. The Equipment contracts were setup in recognition of long lead time items that will need to be ordered early in the project to support the schedule and are not impacted by the selection of other contractors.

To assist the reader in understanding the coordination of work between the multiple contracts, this Section provides detailed information on the coordination of responsibilities for design, fabrication, delivery, receipt & protection, foundations, piping, wiring, erection, commissioning and startup interfaces. Appendix I provides a division of responsibility (DOR) matrix identifying the Duke and BMcD responsible for equipment and construction contracts.

4.2 CONTRACT LIST

The following is the list of contracts that were used as a basis for this cost estimate:

Table 4.1 List of Contracts

Equipment Contracts	
5.2190	Miscellaneous Pumps
5.2631	Dry Bottom Ash Equipment
5.5330	480V Motor Control Centers
5.6110	DCS
5.6210	Instruments
Furnish and Erect Contracts	
5.4310	Pre-Engineered Buildings
Construction Contracts	
5.8140	Site Finishing
5.8210	Piling
5.8220	Site Preparation and Foundations
5.8320	Mechanical/Electrical Construction
Construction Services Contracts	
5.9010	Subsurface Investigation
5.9020	Surveying
5.9030	Underground Utility Investigation
5.9210	Civil / Structural Testing
5.9250	Electrical Testing

4.3 INTERFACE SCHEDULE

The following table identifies the interfaces between contracts to identify the responsibilities of each contract to assure equipment foundations, receipt, installation, piping and wiring are properly accounted for on each contract.

Table 4.2 Contracts Interfaces

Contract		Contract Interfaces				
No.	Description	RCVD BY	INST BY	FDNS BY	PIPE BY	WIRE BY
Equipment Contracts						
5.2190	Miscellaneous Pumps	5.8320	5.8320	5.8220	5.8320	5.8320
5.2631	Dry Bottom Ash Equipment	5.8320	5.8320	5.8220	5.8320	5.8320
5.5330	480V Motor Control Centers	5.8320	5.8320	5.8220	NA	5.8320
5.6110	DCS	5.8320	5.8320	5.8220	NA	5.8320
5.6210	Instruments	5.8320	5.8320	5.8220	5.8320	5.8320
Furnish and Erect Contracts						
5.4310	Pre-Engineered Buildings	5.4310	5.4310	5.8220	NA	NA
Construction Contracts						
5.8140	Site Finishing	5.8140	5.8140	NA	NA	NA
5.8210	Piling	5.8210	5.8210	NA	NA	NA
5.8220	Site Preparation and Foundations	5.8220	5.8220	5.8220	NA	NA
5.8320	Mechanical/Electrical Construction	5.8320	5.8320	5.8220	5.8320	5.8320
Construction Services Contracts						
5.9010	Subsurface Investigation	5.9010	5.9010	NA	NA	NA
5.9020	Surveying	5.9020	5.9020	NA	NA	NA
5.9030	Underground Utility Investigation	5.9030	5.9030	NA	NA	NA
5.9210	Civil / Structural Testing	5.9210	5.9210	NA	NA	NA
5.9250	Electrical Testing	5.9250	5.9250	NA	NA	NA

Legend:
RCVD BY – Receiving Contractor
INST BY – Installation Contractor
FDNS BY – Foundations Contractor
PIPE BY – Piping Installation Contractor
WIRE BY – Electrical Construction Contractor

4.4 CONTRACT SCOPES

4.4.1 General

The following scope descriptions itemize the general content of the contracts that are currently contemplated. The "Contract Interfaces" identify responsibilities for site work, foundations, receipt of equipment and materials, construction/erection, and special interfaces to assist the reader in understanding

the coordination of work. Assumptions have been made in preparing the scope description listing of items.

The Engineer will prepare drawings and specifications for use as the technical portion of the work package documents for equipment and construction packages. Work packages are indicated as the deliverables and will be issued to the constructor. General guidelines are as follows:

4.4.2 Underground Utilities

The scope of the contracts is based on an engineering sequence to permit design and construction of underground utilities early in the construction sequence. This approach allows completion of trenching and excavation activities earlier to permit better access and coordination of contractors or construction crafts. Storm water drains, underground electrical utilities, and grounding will be included in Contract 5.8220 – Site Preparation and Foundations. Contract 5.9030 – Underground Utility Investigation, will be issued to positively locate underground obstructions entering the perimeter of each work location prior to underground utility construction.

4.4.3 Piping and Instrumentation

Mechanical equipment, piping, and instrumentation furnished by equipment contracts will be received and installed by Contract 5.8320 – Mechanical/Electrical Construction. Contract 5.8320 – Mechanical/Electrical Construction will furnish and install piping, valves, and pipe supports not supplied under the equipment contracts.

4.4.4 Wiring

Electrical equipment furnished by equipment contracts will be erected and installed by Contract 5.8320 – Mechanical/Electrical Construction. The supply and installation of electrical commodities including cable tray, conduit, cable, etc. are included in Contract 5.8320 – Mechanical/Electrical Construction. Wiring for lighting/convenience outlets, HVAC and communication system is also included in the Contract 5.8320 – Mechanical/Electrical Construction.

4.4.5 DCS

The Engineer will prepare I/O lists, drawings, specifications for the technical portion of the DCS. The DCS technical documents will be used to purchase the DCS from Emerson. Engineer will coordinate with the DCS supplier and Duke to integrate the new control system components into the plant DCS.

4.4.6 Instrument Calibration

All instruments will be factory calibrated, unless otherwise noted. Contract 5.9250 – Electrical Testing will perform subsequent calibration if required. In general, instruments will be provided with equipment contracts with the exception of balance of plant instrumentation which will be purchased separately.

4.4.7 Electrical Testing

Contract 5.8320 – Mechanical/Electrical Construction will perform specified testing for electrical equipment and wire testing. Contract 5.9250 – Electrical Testing will perform additional testing including phase rotation checks, programming and checkout of protective relays, and pre-energization equipment checks. Manufacturer's field services procured through equipment contracts will provide technical direction for equipment testing. Contract 5.8320 will provide support labor for use during testing activities.

4.4.8 Start-Up

Owner and Engineer will provide start-up coordination with Owner providing operating personnel. Contractors provide the construction labor and superintendents required to place equipment and systems into operation. Manufacturer's field services are furnished through equipment contracts to provide technical direction for equipment start-up.

4.5 CONTRACT SCOPE SUMMARIES

A description of each equipment contract, furnish and erect contract, and construction contract is included in Appendix H. This appendix contains detailed descriptions of each contract along with an itemized list of the scope in each contract.

* * * * *

5 SCHEDULE

5.1 CRITICAL MILESTONES

The current schedule is based on a full notice to proceed on engineering for the East Bend Station CCR/ELG Project in October 2015, SFC complete in May 2018. Several key Project milestones will need to be accomplished to meet the overall schedule for the project. A list of suggested important milestones as indicated on the Level 3 project schedule included with this report are listed in Table 5.1.

Table 5.1 Suggested Project Key Milestone Dates

Milestone	Date
SFC Vendor LNTP	December 2015
Engineering Full Notice to Proceed	October 2015
Begin Detailed Design	February 2016
Issue Project Definition Report	April 2016
CPCN Permit Application Submittal	June 2016
CPCN Permit Approval	December 2016
Pre-Engineered Building Contract Award	December 2016
Mechanical/Electrical Construction Contract Award	March 2017
SFC Equipment Deliveries Start	September 2017
SFC in Service	May 2018

The schedule is dependent on project approvals and a variety of other influences, in particular the Certificate of Public Convenience and Necessity (CPCN) permit approval. Contracts cannot be awarded and construction cannot begin until the CPCN permit approval is received.

5.2 PROJECT SCHEDULE

A Level 3 project schedule is included in Appendix J.

The schedules are based on early procurement of the long lead major plant equipment which includes but is not limited to the dry bottom ash equipment. Vendor submittals are required from each equipment contractor which will support the detailed design of infrastructure (foundations, piping, wiring, instrumentation, etc.) required for installation of this equipment. Sufficient time has been included in the schedule for the SFC construction to allow Engineer to perform the detailed design to obtain competitive, lump sum bids for mechanical/electrical construction.

* * * * *

6 COST ESTIMATE

6.1 GENERAL

An initial capital cost estimate for the proposed East Bend Station Dry Bottom Ash Project has been completed and will be issued in a separate submittal. The SFC project estimate is broken down as follows:

6.2 BASIS AND ASSUMPTIONS

The following describes the methodology used in the development of the East Bend Station Dry Bottom Ash Project cost estimate.

- The estimate is based on the assumptions and scope of supply indicated in this document and the project assumptions in Section 3.0. An electrical load study has not been developed for the Project. An instrument air study has not been developed for the project, but it is assumed that sufficient instrument air exists in the existing plant air system to support the new facilities. Design parameters and scope typically defined by these studies are estimated based on information provided by Duke, preliminary calculations, and BMcD experience.
- Major Equipment vendor pricing was received for the following items:
  - Under-Boiler SFC Equipment - UCC
- Balance of Plant Equipment: BMcD utilized in-house information from similar projects to develop the estimate.
- Construction Estimates: BMcD used recent in-house pricing information and industry standard pricing for construction commodities and indirect costs.
- Labor rates: Labor rates and productivity factors were developed based on BMcD in-house information and contractor budgetary bids.

6.2.1 Capital Cost Estimate Scope

A project scope description for the cost estimate is included in Section 3.0. These descriptions along with the drawings and lists included in the Appendices define the scope included in the cost estimate.

6.2.2 Major Capital Cost Estimate Assumptions

Several major assumptions were used in developing the capital cost estimate. These assumptions include the following:

- Commercial operation of the equipment is assumed to be the dates defined in Table 5-1.
- Labor is assumed union labor and available without excessive hourly incentives or incentive packages.

- A 15% mark-up (overhead and fee) is included on both materials and labor for subcontracted work.
- Escalation is assumed to average 3% per year for materials and 3% per year for labor.
- Contingency is included at 10% for project definition contingency and 5% for Owner contingency.
- Cost for Builder's Risk Insurance was based on 0.45% of the direct costs.
- No sales tax was included.
- No financing fees or interest during construction was included.

6.2.3 Major Commercial Terms

The following lists the major commercial terms assumed in developing the cost estimates. Minor assumptions are either self-evident in the data or have an insignificant effect on the estimated project capital costs.

- Project is assumed to be performed with multiple prime contracts for the construction work as defined in Section 4.0 – Contracting Approach. Major equipment identified in Section 3.0 and minor equipment items (piping specialties, small-bore piping, wiring and other construction commodities) are expected to be included in the construction contracts.
- Project will include multiple equipment procurement contracts as defined in Section 4.0 – Contracting Approach.
- Project will be executed with durations similar to those shown on the project schedule with the objective of achieving the project milestone dates. It is assumed the project will be executed with a schedule sufficient to minimize overtime. A 50-hour workweek was assumed as a means of providing an incentive to attract labor. This includes 40 hours of straight time and 10 hours of overtime for all normal construction periods. A two shift 60-hour workweek was assumed for the under-boiler conveyor installation during the outage. A 60-hour workweek was assumed during commissioning and start-up. No additional overtime is included to accommodate a compressed work schedule. Estimate assumes suitable area for Contractor laydown, trailers and parking is available on site.
- A performance bond is included for all subcontract work at the rate of 1.0% of the estimated project direct costs (100% bond).
- Sales tax on permanent materials and equipment supply is not included.

6.3 ECONOMIC CONDITIONS CONSIDERATIONS

An estimate for escalation of project costs has been included in the capital cost estimate. Escalation of construction labor, materials, and indirects was estimated based on 3% annually throughout the project. This estimate of escalation is based upon the average increase in craft labor costs for the United States. Escalation of equipment and materials was included in the project estimate at a rate of 3% per year.

6.4 CONTINGENCY

A project estimate contingency of 10% of the overall project costs is included in the project cost. It is included to cover accuracy of pricing and commodity estimates for the defined project scope. This contingency is not intended to cover changes in the general project scope (i.e. addition of buildings, addition of redundant equipment, addition of systems, etc.) nor major shifts in market conditions that could result in significant increases in contractor margins, major shortages of qualified labor, significant increases in escalation, or major changes in the cost of money (interest rate on loans).

On top of this, an additional project definition contingency or Owner contingency should be added to cover general project scope additions required for the final CCR/ELG regulations. Based upon the amount of preliminary design and project definition completed, BMcD recommends a 5% contingency to cover such potential changes.

The overall level of contingency is expected to be adequate to cover normal deviations in pricing and normal deviations in the assumptions used to develop the project costs; however, the contingency is likely not adequate to cover significant deviations from the project assumptions or major changes in market conditions. Deviations that may cause the project costs to exceed the estimated costs inclusive of contingency include excessive inflation (>3%), extreme shortage of qualified labor, extreme shortage of qualified construction contractors, change in contracting approach, and other similar changes. Such changes may be reflective of a moderate to high amount of new power plant or industrial plant construction or plant environmental retrofits.

6.5 SUMMARY COST ESTIMATE

The capital cost estimate developed for the East Bend Dry Bottom Ash Project is contained in Appendix K.

6.6 SUMMARY COST ITEM DESCRIPTION

The cost estimate is based on the multiple contracting approach defined in Section 4.0 – Contracting Approach. Additional mark up costs have been included for equipment, labor and material assumed subcontracted.

The contracting approach was developed concurrently with the cost estimate.

6.6.1 Mechanical & Electrical Equipment

The equipment supply includes the procurement of all major equipment. The equipment installation includes the receiving, initial inspection, and erection of all equipment. Installation of vendor pipe supplied with the equipment is included with the equipment scope.

6.6.2 Civil

The civil scope of work includes site preparation along with construction laydown areas and craft parking. The civil scope of work also includes digging the trenches for all underground piping and electrical duct bank. Site finishes such as stone and asphalt are included. Estimate assumes waste spoils disposed on-site.

6.6.3 Deep Foundations, Concrete

The foundation scope of work includes piling, structural excavation and backfill as well as concrete work. The quantities include concrete for all equipment foundations, building slabs, stair and door pads, stoops etc. This scope also includes the structural excavation and backfill required for foundation installation.

6.6.4 Structural Steel & Misc. Metals

The structural steel scope of work includes structural supporting steel and pipe rack steel. Pre-engineered building steel is included in the architectural scope. Miscellaneous metals such as platforming, grating and handrail are included.

6.6.5 Architectural & HVAC

The architectural scope of work includes the supply and installation of pre-engineered buildings and siding/roofing of miscellaneous structures. This also includes the supply and installation of primary and secondary framing, walls, plumbing, building insulation, windows, doors, flashing, gutters, and building finishes. HVAC equipment supply and installation is included as necessary. Fire Protection/detection is included. Enclosure and building power, lighting, and communication are included in this scope section of the estimate.

6.6.6 Painting & Coatings

The painting scope of work currently includes touch up painting as well as chemical resistant coatings. The painting and interior finishes of the buildings are included in the architectural scope and shall be per Duke Standards. All structural steel is estimated to be galvanized. Pipe is to be supplied shop primed with costs included for field touchup and labeling.

6.6.7 Piping

The piping scope of work includes underground and above ground piping supply and installation. The piping scope covers purchase of pipe, fittings, flanges, valves, specials, bolt-up kits, supports and pre-fabricated pipe not furnished by equipment suppliers. The piping scope of work does not include underground pipe trenches (civil scope), heat trace (electrical scope), insulation (insulation scope), and cathodic protection (mechanical scope), touch up painting (painting) or pipe labeling (painting). The piping scope of work does include hydro-testing and applicable non-destructive evaluation (NDE).

6.6.8 Insulation

The insulation scope of work includes furnish and installation of thermal, personnel protection, and freeze protection insulation and cladding. This includes purchased or vendor provided equipment and piping insulation required. The insulation scope does not include any soundproofing insulation or building insulation. Building insulation is included with the architectural scope.

6.6.9 Electrical

The electrical scope of work includes the supply and installation of underground and above ground wiring, conduit, cable, and tray. The electrical scope also includes the supply and installation of the smaller transformers, panelboards, heat trace, security systems, communications systems, lightning protection, and grounding. Temporary construction power system installation is included in the electrical scope as well. Duct bank excavation, concrete, and backfill construction is included in the civil scope of work.

6.6.10 Instrumentation & Controls

The instrumentation scope of work includes supply of equipment non-vendor supplied instruments and installation of all loose shipped instruments as well as stands, tubing, calibration costs. Installation utilizes a mixed crew mix of electrical and mechanical craft. DCS equipment included in the major equipment section.

6.6.11 Miscellaneous Direct Scope

There are many miscellaneous scope items included as well. These include underground investigation, pilot trenching, survey, construction testing, heavy construction equipment, heavy haul, and craft startup support labor. Scaffolding costs are included in the wage rate buildup by craft.

6.6.12 Indirect Scope

Indirect scope includes construction management, engineering, startup & commissioning as well as escalation, warranty, bond, and insurance costs. The construction management estimate is based on a

preliminary staffing plan and project execution schedule. The engineering estimate is based on a labored task item buildup of required design information to support the project. The startup estimate is based on the execution schedule as well as estimated costs for tasks such as first fills, plant checkout and training support. Warranty costs have been included for the implementation and coordination of warranty claims. Bonds for applicable subcontractors and vendors have been included. No costs have been included for additional BWM project securities such as LOC (letter of credit) or parent guarantees.

6.6.13 Owner Costs

Owner costs include preliminary geotechnical reporting and pile testing performed during the project development stage. Owner contingency is included.

6.7 LIMITATIONS AND QUALIFICATIONS

Estimates and projections prepared by Burns & McDonnell relating to schedules, performance, construction costs, and operating and maintenance costs are based on our experience, qualifications, and judgment as a professional consultant. Since Burns & McDonnell has no control over weather, cost and availability of labor, material and equipment, labor productivity, construction contractor's procedures and methods, unavoidable delays, construction contractor's method of determining prices, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding and market conditions or other factors affecting such estimates or projections, Burns & McDonnell does not guarantee that actual rates, costs, performance, schedules, etc., will not vary from the estimates and projections prepared by Burns & McDonnell.

* * * * *

Appendices

Appendix A

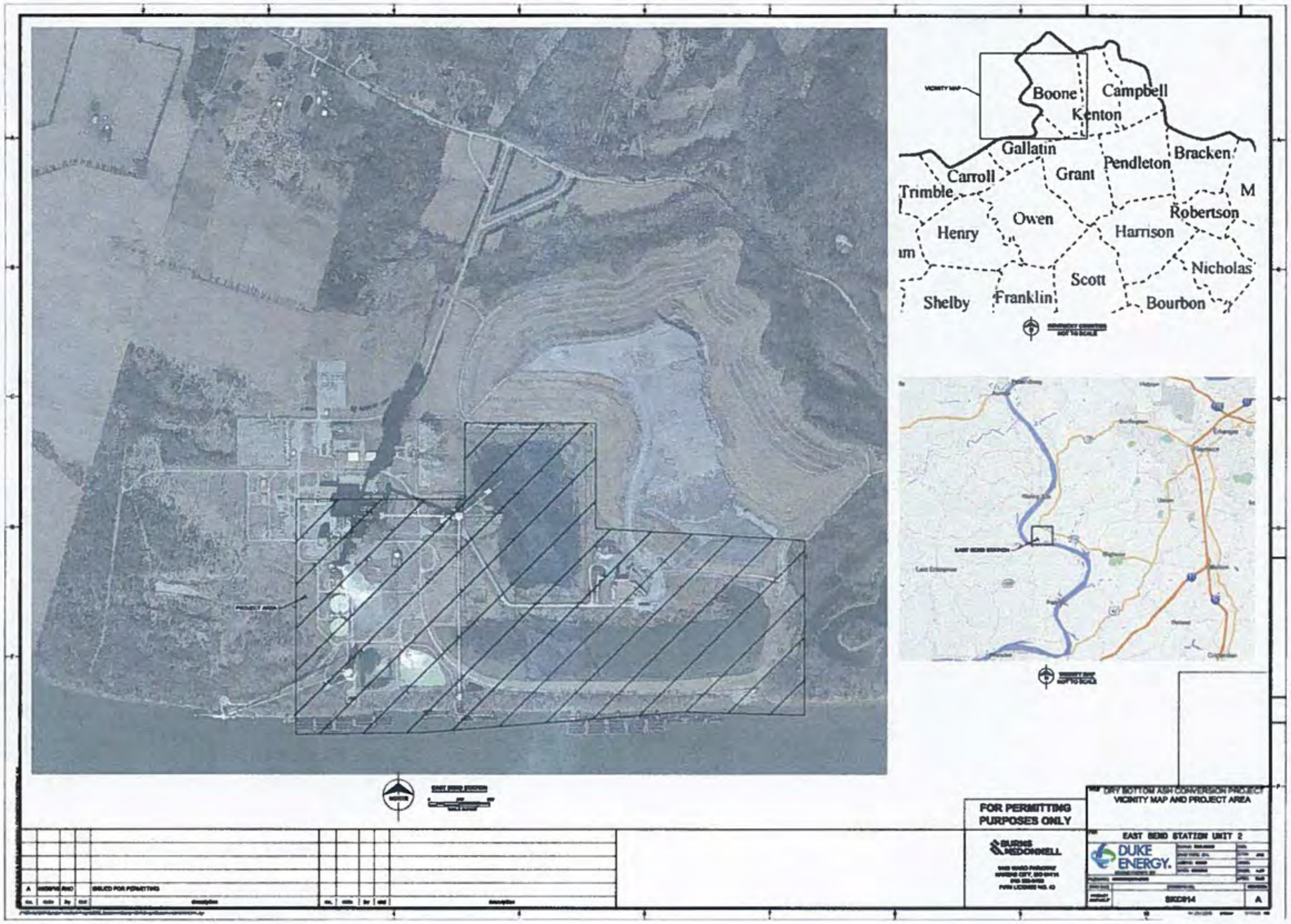
Not Used

Appendix B

Not Used

Appendix C

Site and General Arrangements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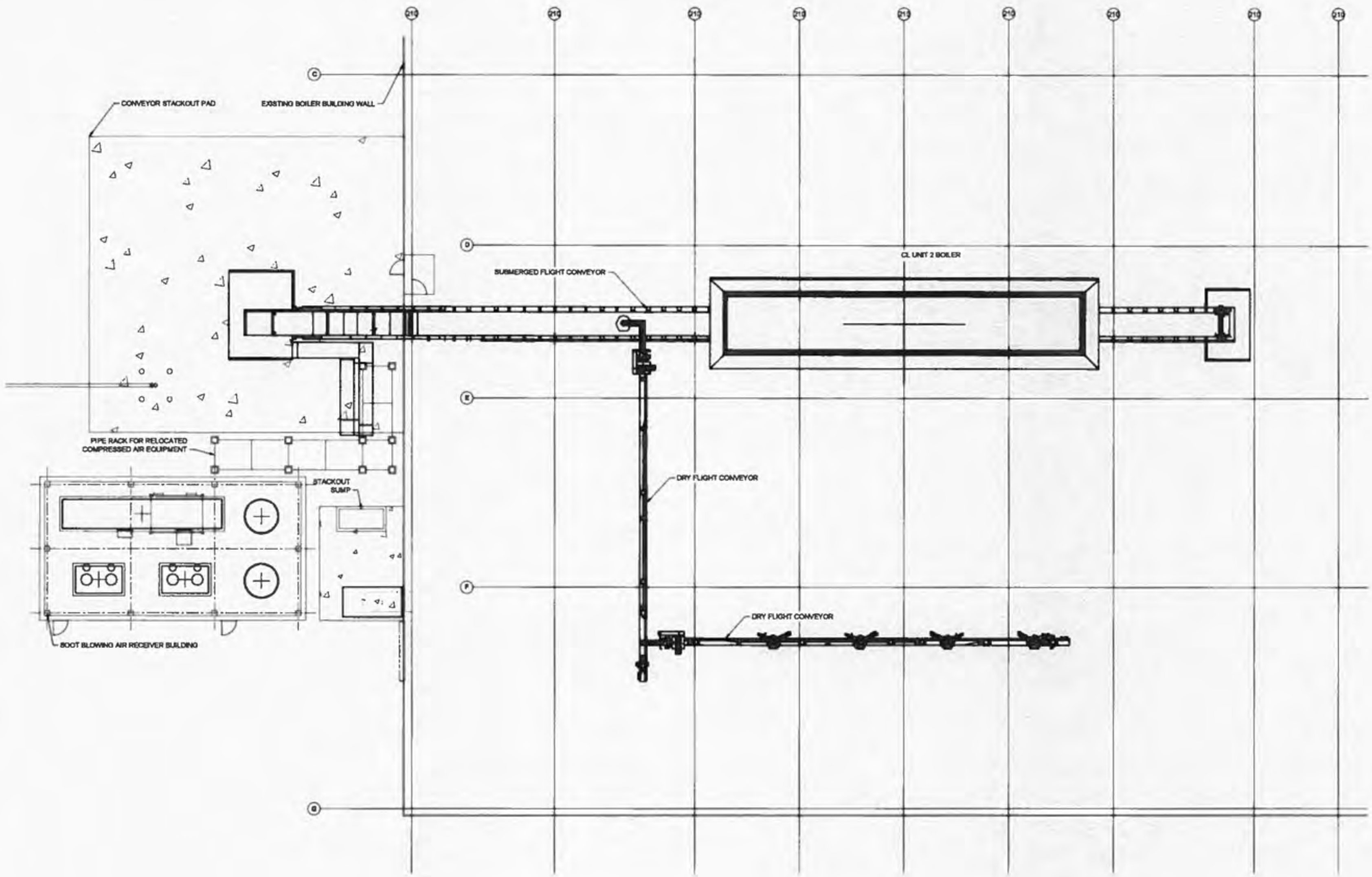
Campbell
Kenton
Gallatin
Carroll
Grant
Pendleton
Bracken
Trimble
M
Owen
Robertson
Henry
Harrison
Nicholas
Scott
Shelby
Franklin
Bourbon
FOR PERMITTING PURPOSES ONLY
BURNS & McDONNELL
DRY BOTTOM ASH CONVERSION PROJECT
VICINITY MAP AND PROJECT AREA
EAST BEND STATION UNIT 2
DUKE ENERGY.
A



PLAN VIEW

NORTH

FOR PERMITTING PURPOSES ONLY

no.	date	by	ck'd	description
A	8/24/16	TLB	-	ISSUED WITH FINAL PROJECT DEFINITION REPORT

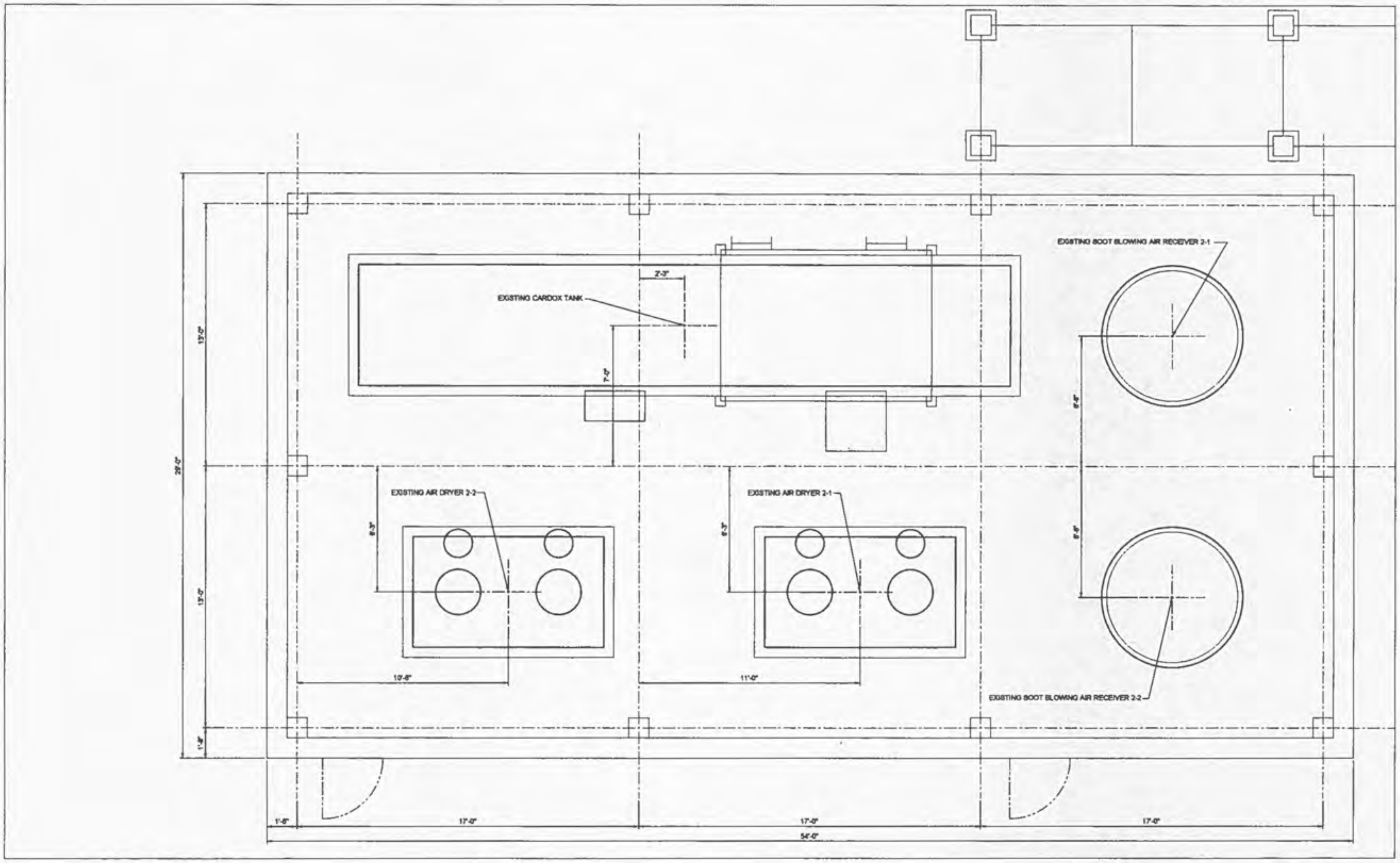
BURNS & McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

TITLE
DRY BOTTOM ASH CONVERSION PROJECT
GENERAL ARRANGEMENT
DRY BOTTOM ASH PLAN

FOR
EAST BEND STATION UNIT 2

DUKE ENERGY
BOONE COUNTY, KY

DWG SIZE	ARCH E1	DRAWING NO. SKM003	REVISION A
DES:	TLB	DFTR:	TLB
ENGR:	PDD		



FOR PERMITTING PURPOSES ONLY

TITLE

DRY BOTTOM ASH CONVERSION PROJECT
GENERAL ARRANGEMENT
SOOT BLOWING AIR RECEIVER BLDG

FOR

EAST BEND STATION UNIT 2

DUKE ENERGY
BOONE COUNTY, KY

BURNS & McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

SCALE: 1/2" = 1'-0"	DES: TLS
DWG TYPE:	DFTR: TLS
JOB NO:	CHKD:
DATE:	ENGR: PDD
FILENAME:	APPD:

DWG SIZE	DRAWING NO.	REVISION
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no.	date	by	ckd	description
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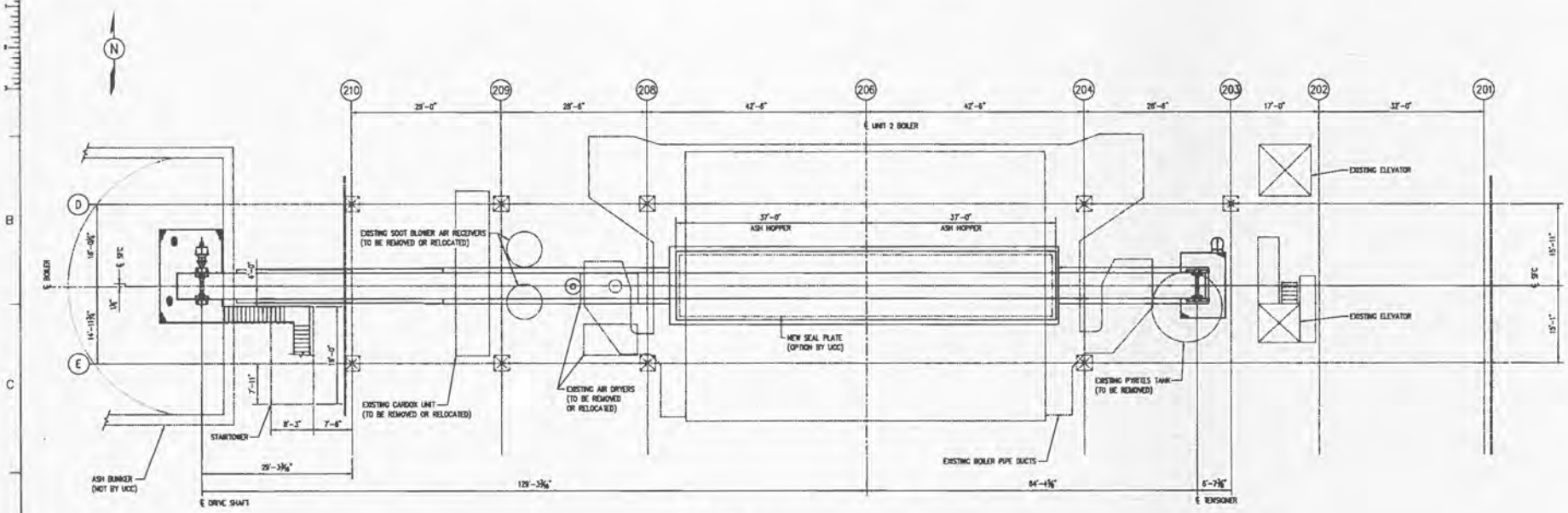
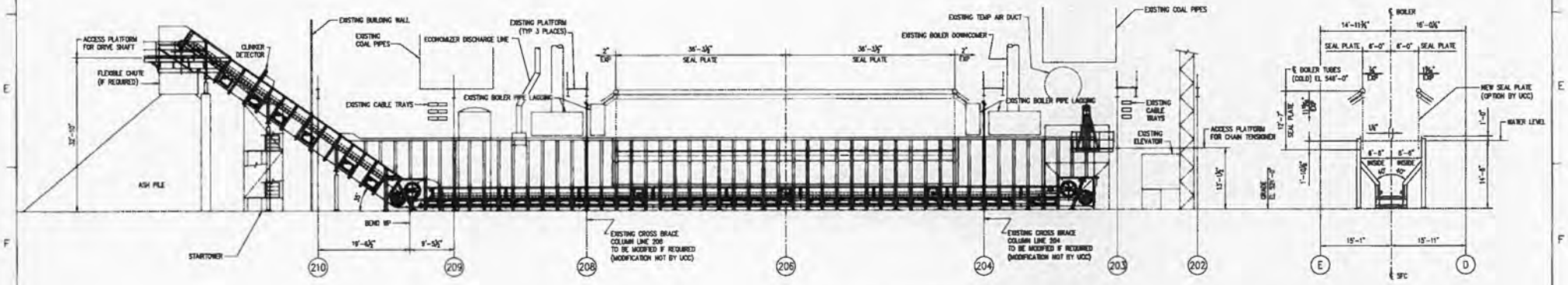


PLAN VIEW



SOUTH ELEVATION

NOTE:
SIZE, PRESSURE & EXPANSION OF BOILER IS PER UCC DRAWING 527-55197-1 ISSUED 7/11/1977

ALL DIMENSIONS ARE PRELIMINARY & SUBJECT TO CHANGE UPON FINAL DESIGN.

REVISION	DESCRIPTION	DATE	DRAWN	CHKD
B	ISSUED FOR PERMITTING	5/27/16	CMD	RJH
A	ISSUED FOR COMMENTS	5/27/16	CMD	RJH

SCALE	CONTRACT NUMBER	SUBSYSTEM	DRAWING SIZE
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DRAWING TITLE: GENERAL ARRANGEMENT OF BOTTOM ASH HANDLING SYSTEM MAX TYPE SFC MODEL 150X UNIT 2

PLANT NAME: DUKE ENERGY EAST BEND STATION UNION, KENTUCKY

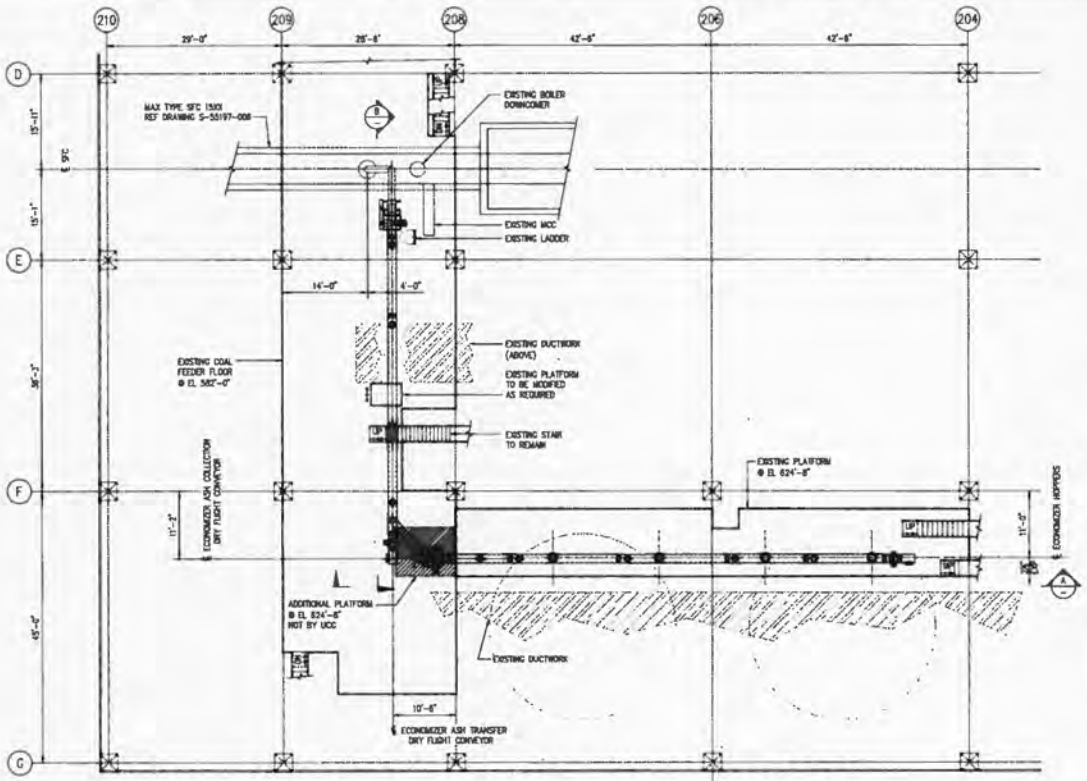
UNITED CONVEYOR CORPORATION
2100 NORMAN DRIVE WEST
WAUKEGAN, ILLINOIS 60085

DRAWING NUMBER: S-55197-006

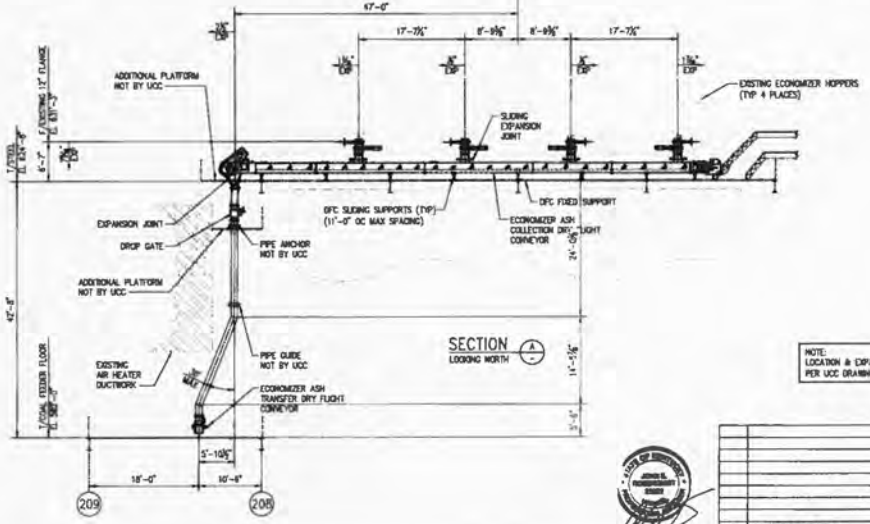
REVISION: B

6/27/2016

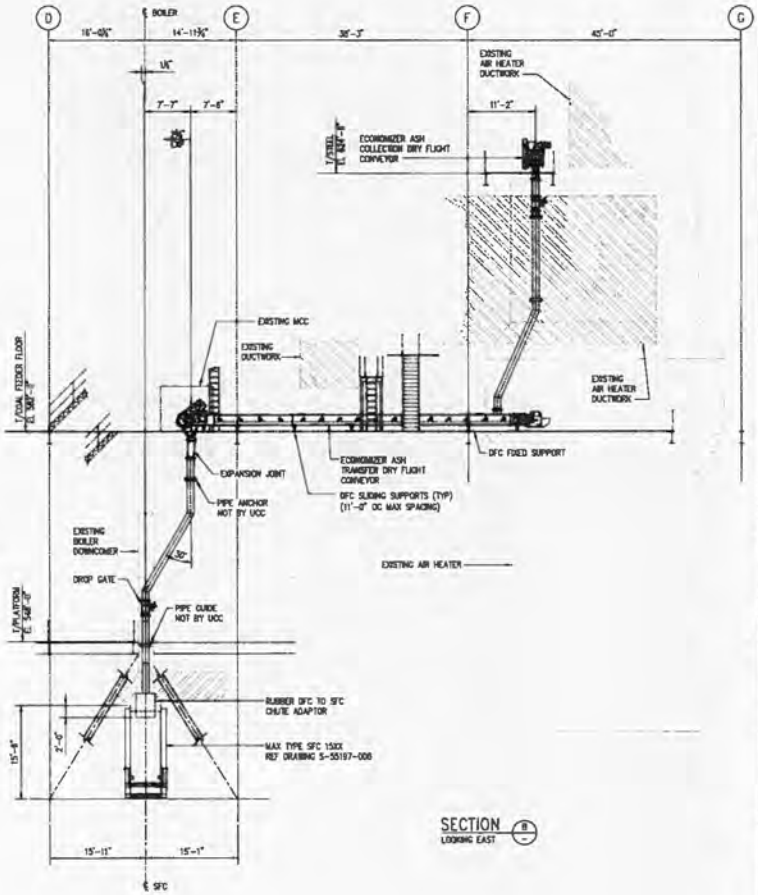
H:\STRUCTURAL\PROJECTS\55197\55197-10\DRAWINGS\S-55197-006.DWG



PLAN VIEW



SECTION (A) LOOKING NORTH



SECTION (B) LOOKING EAST

NOTE:
LOCATION & EXPANSION OF ECONOMIZER HOPPERS IS PER UCC DRAWING 510-55197-8 ISSUED 6/17/1977.

ALL DIMENSIONS ARE PRELIMINARY & SUBJECT TO CHANGE UPON FINAL DESIGN.

REVISION	DESCRIPTION	DATE	DSGN	CHKD	APPD	APPD
B	ISSUED FOR PERMITTING	9/27/16	CMB	RLM	AJL	DATE
A	ISSUED FOR COMMENTS	3/27/16	CMB	RLM	AJL	DATE

SCALE	CONTRACT NUMBER	SUBSYSTEM	DRAWING SIZE
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DRAWING TITLE: GENERAL ARRANGEMENT OF ECONOMIZER ASH HANDLING SYSTEM 11" DRY FLIGHT CONVEYOR UNIT 2

PLANT NAME: DUKE ENERGY EAST BEND STATION UNION, KENTUCKY

UNITED CONVEYOR CORPORATION
2100 NORMAN DRIVE WEST
WAUKEGAN, ILLINOIS 60085

DRAWING NUMBER: S-55197-007

REVISION: B

6/7/2016

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Appendix D
Equipment List

BURNS McDONNELL

Equipment List - DBA

Duke Energy
East Bend
Project Number: 88669
Rev: A
PRELIMINARY - NOT FOR CONSTRUCTION

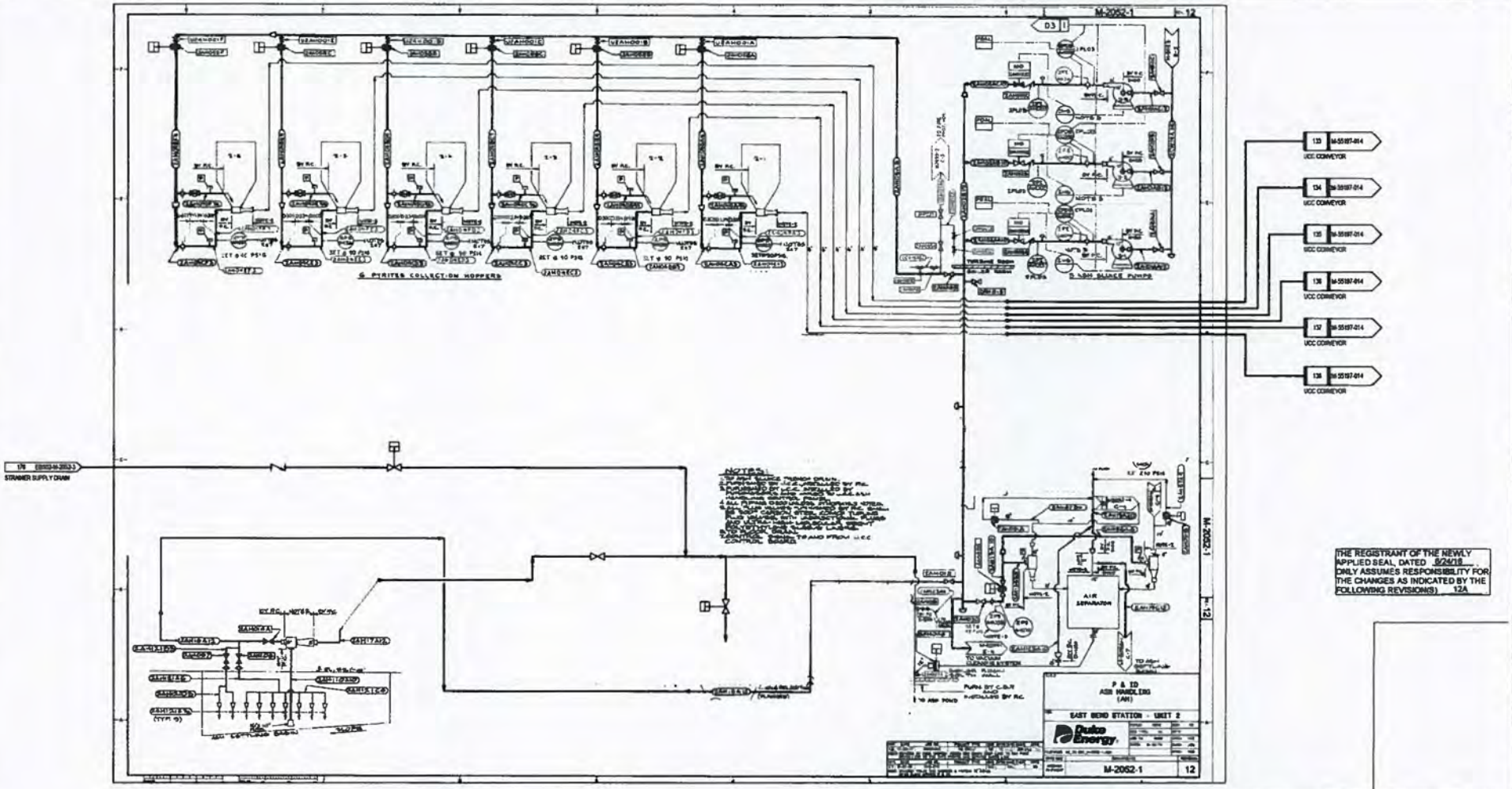
Item	Equipment Name/Description	Qty	Supplied by	Installed by	Skid Mtd	Motor Rating / Rated Load	Rating Units	Driver	Rated Voltage (VAC)	Full Load Current (note 1)	Location	General Arrangement (note 1)	Revision
	Bottom Ash Conversion Equipment Package	1				-	-	-			Boiler		
1	Underboiler Drag Chain Conveyor	1	5.2631	5.8320		-	-	-	-		Boiler		
2	UDCC Local Control Station	1	5.2631	5.8320	Skid	-	-	-	120		Boiler		
3	UDCC Jog Station Panel	1	5.2631	5.8320	Skid	-	-	-	120		Boiler		
4	UDCC Hydraulic Power Unit	1	5.2631	5.8320	HPU Skid Mtd	75	HP	Direct	480		Boiler		
5	UDCC HPU Oil Heater	1	5.2631	5.8320	HPU Skid Mtd	1.4	kW	n/a	120		Boiler		
6	New Pyrites Sluice Piping	LOT	5.2631	5.8320							Boiler		
7	New BA Cooling Water Piping	LOT	5.2631	5.8320							Boiler		
8	New Conveyor Overflow Piping	LOT	5.2631	5.8320							Boiler		
9	New Chain Spray Piping	LOT	5.2631	5.8320							Boiler		
10	(1) Lot Actuated Valves	LOT	5.2631	5.8320							Boiler		
11	Stackout Pad Sump Pump	2	5.2631	5.8320		15	HP	Direct	480		Boiler		
12	New Piping From Closed Cooling Water to HPU Oil Cooler	200'	5.8320	5.8320							Boiler		
13	New Piping From Service Water to SFC Makeup	200'	5.8320	5.8320							Boiler		
14	New Piping From Service Water to Conveyor Chain Spray Connection	200'	5.8320	5.8320							Boiler		

Appendix E

Not Used

Appendix F

P&IDs and Piping Plans



THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 9/24/18 ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 12A

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
12A	09/24/18	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
ASH HANDLING

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
DWG TYPE: ML	DFTR:
JOB NO: 86669	CHKD:
DATE:	ENGR:
FILENAME: 086694-2052-1.pid	APPD:

DWG SIZE	DRAWING NO.	REVISION
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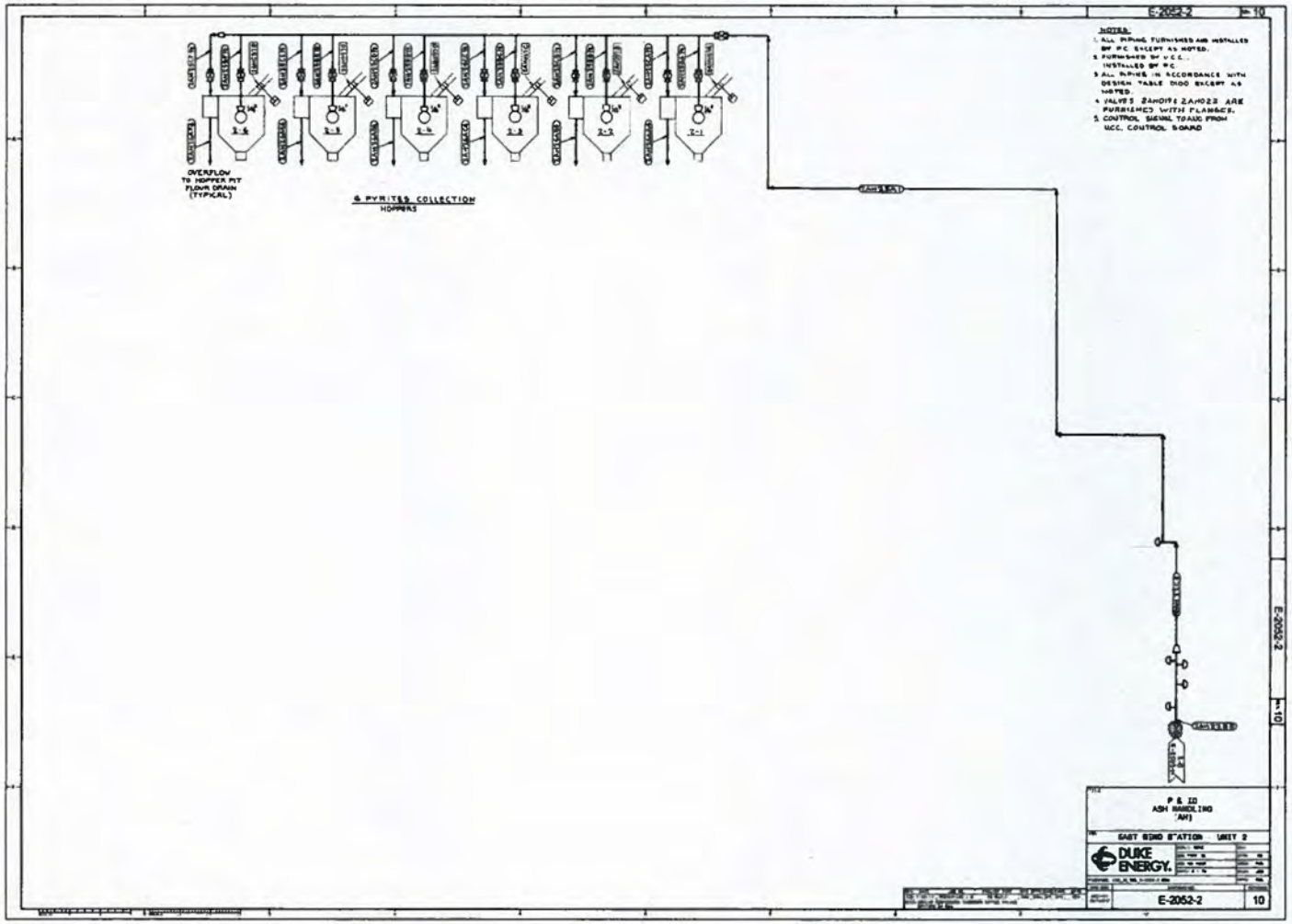

THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 9/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S): 10A

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
10A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
ASH HANDLING

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
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DATE:	ENGR:
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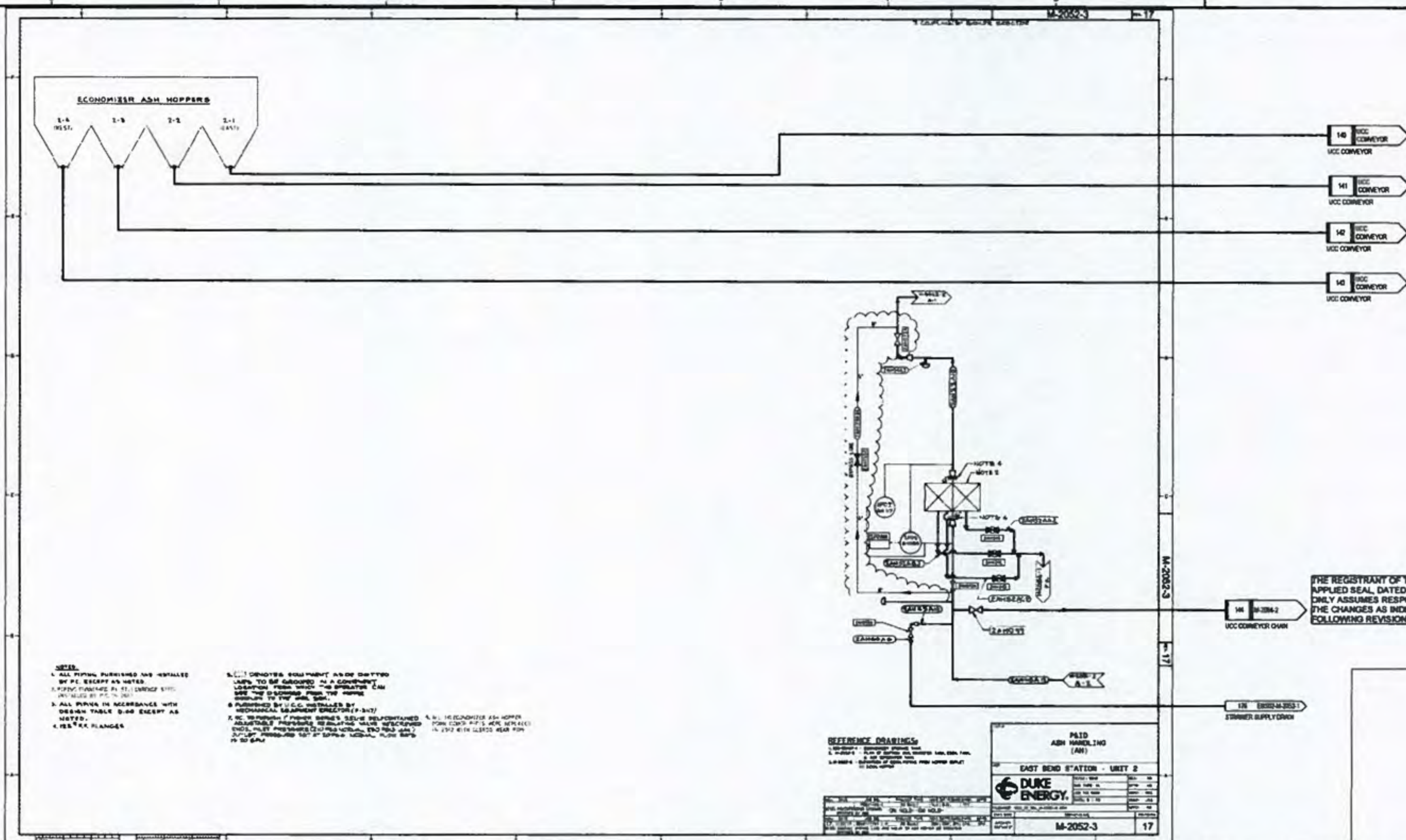

THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 8/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 17A.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
17A	08/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE	DRY BOTTOM ASH CONVERSION PROJECT PROCESS & INSTRUMENTATION DIAGRAM ASH HANDLING
FOR	EAST BEND STATION (UNIT 2)
DUKE ENERGY	SCALE: NTS DWG TYPE: ML JOB NO: 88669 DATE:
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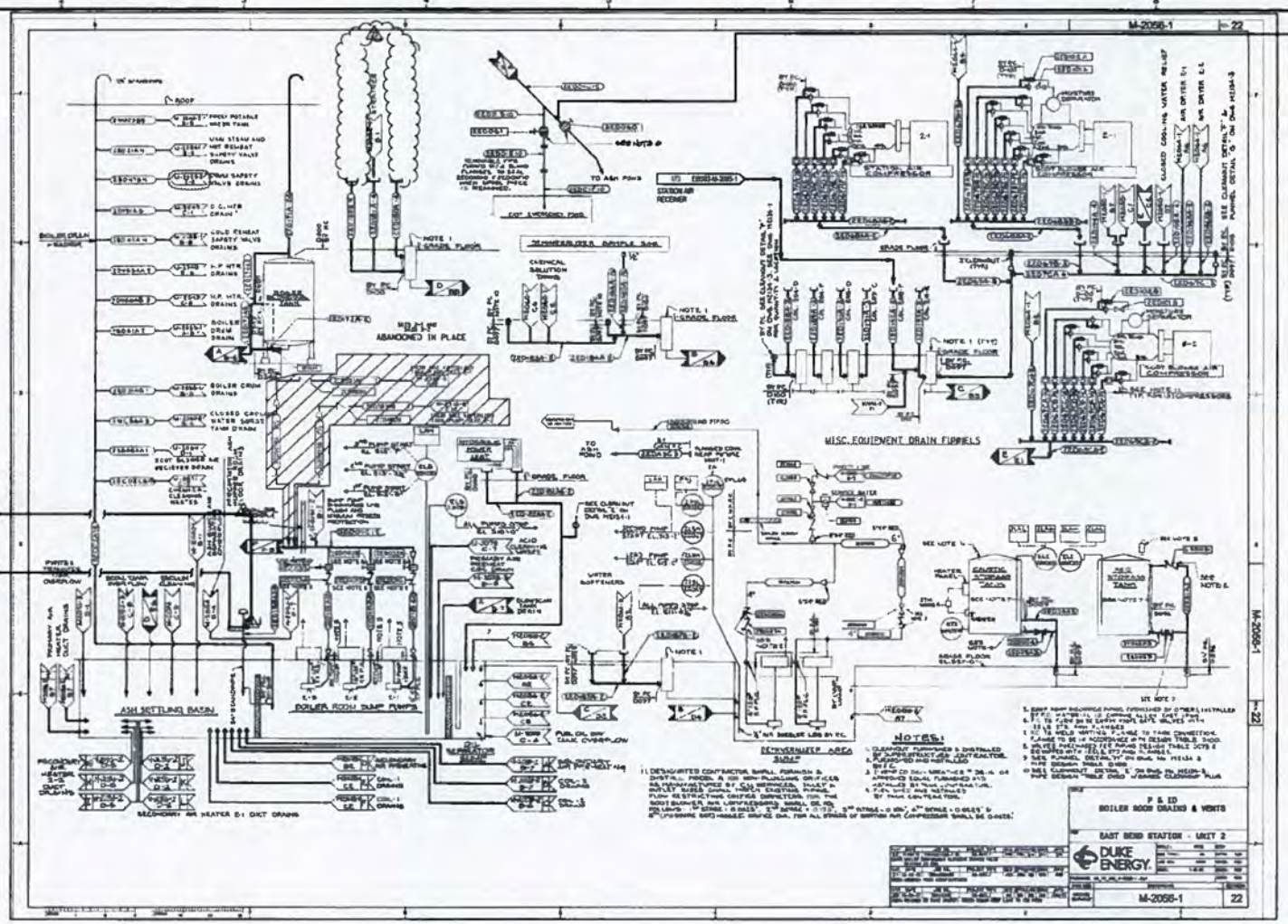
REVISION	17



THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 8/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 22A

FOR PERMITTING PURPOSES ONLY

no.	date	by	chd	description	description	no.	date	by	chd
22A	08/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
BOILER ROOM DRAINS & VENTS

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
DWG TYPE: ML	DFTR:
JOB NO: 89899	CHKD:
DATE:	ENGR:
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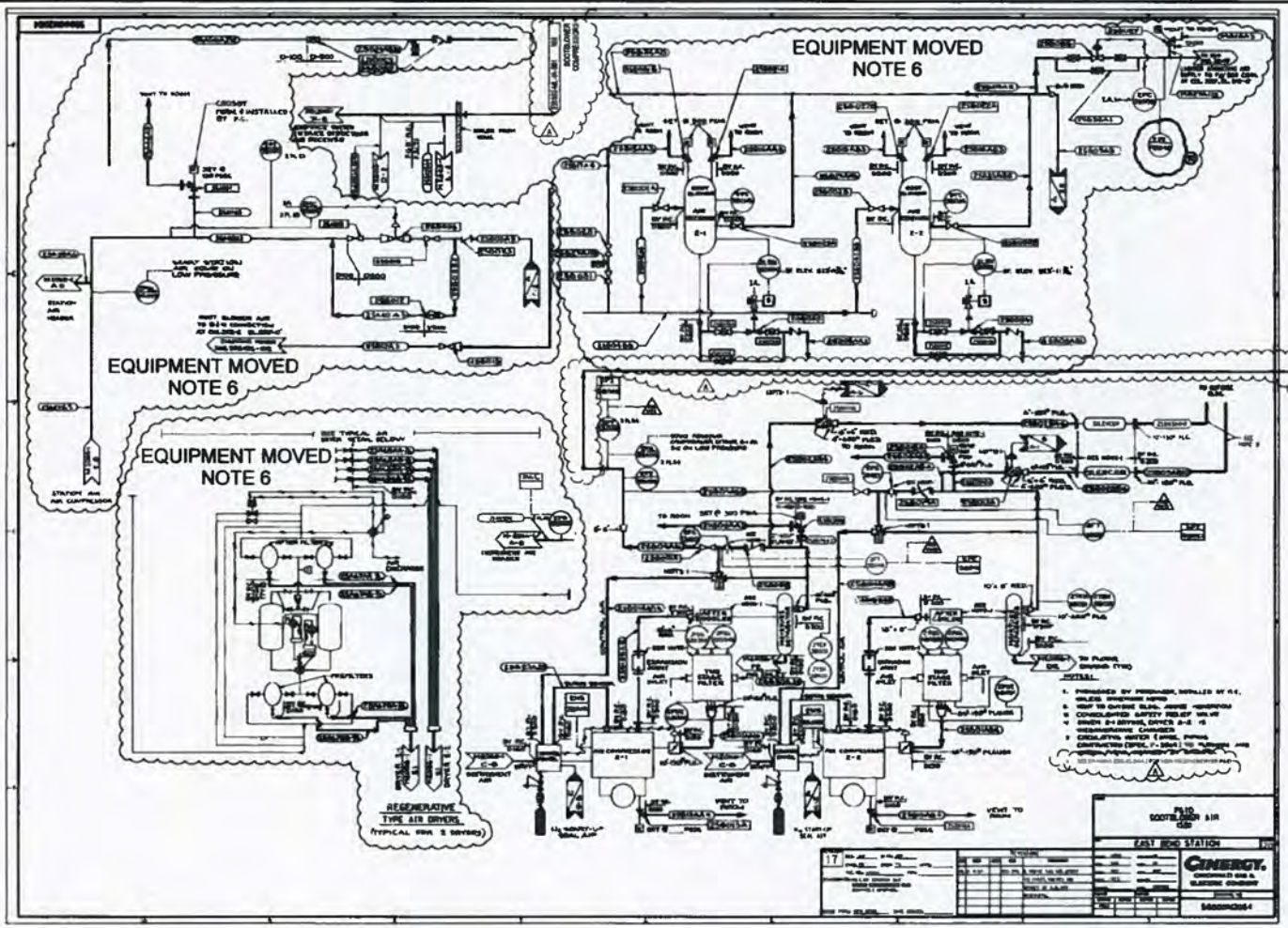


THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 9/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 17A

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
17A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

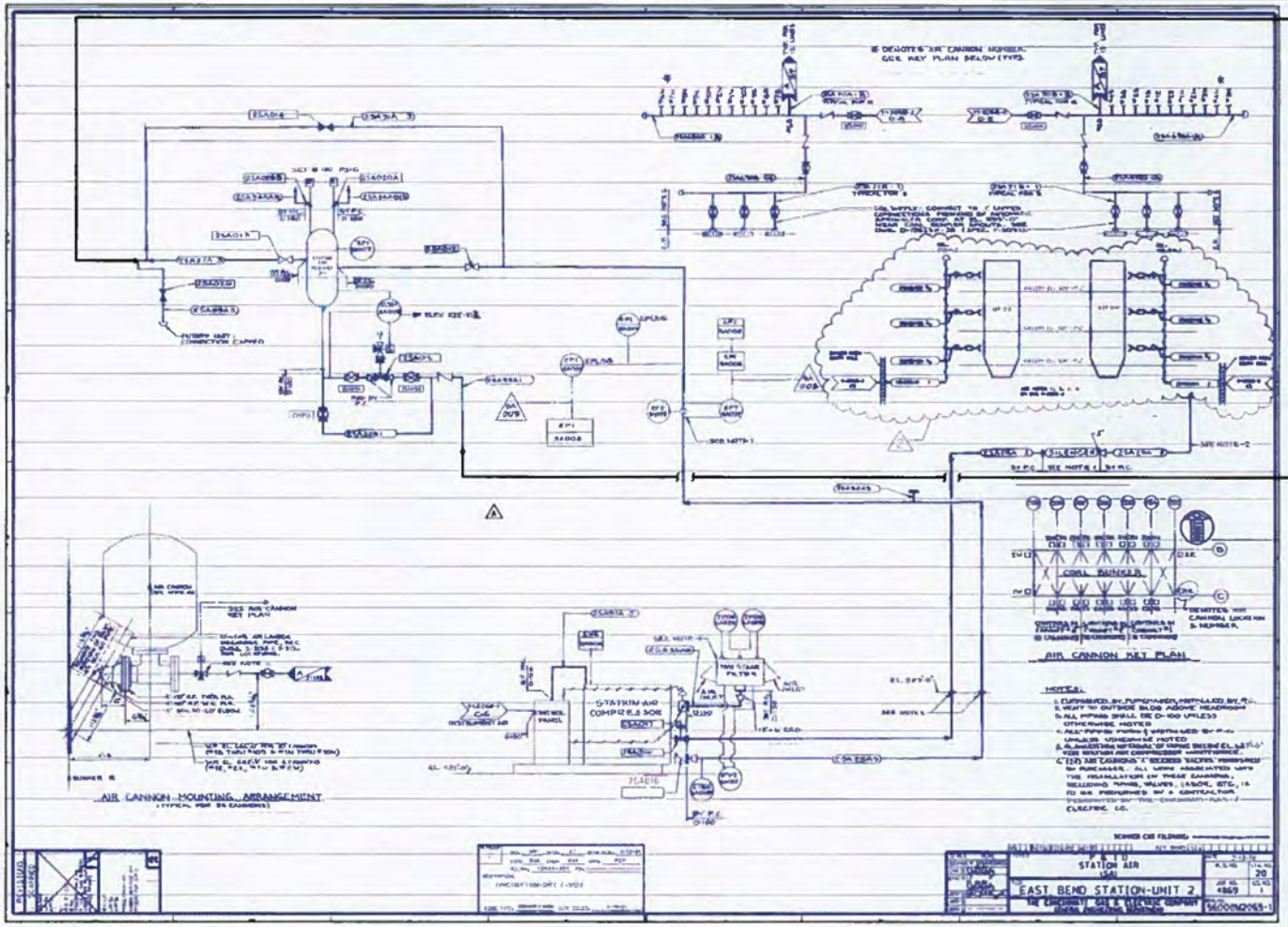
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
SOOTBLOWER AIR

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
DWG TYPE: ML	DFTR:
JOB NO: 68650	CHKD:
DATE:	ENGR:
FILENAME: 68650M-2064.pid	APPD:
DWG SIZE: ANSI D 22"x34"	DRAWING NO.: EBS02-M-2064
	REVISION: 17



THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 6/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 2A

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
2A	06/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE	DRY BOTTOM ASH CONVERSION PROJECT PROCESS & INSTRUMENTATION DIAGRAM STATION AIR
FOR	EAST BEND STATION (UNIT 2)
DUKE ENERGY	SCALE: NTS DES: DWG TYPE: ML DFTR: JOB NO: 86669 CHKD: DATE: ENGR: APPD:
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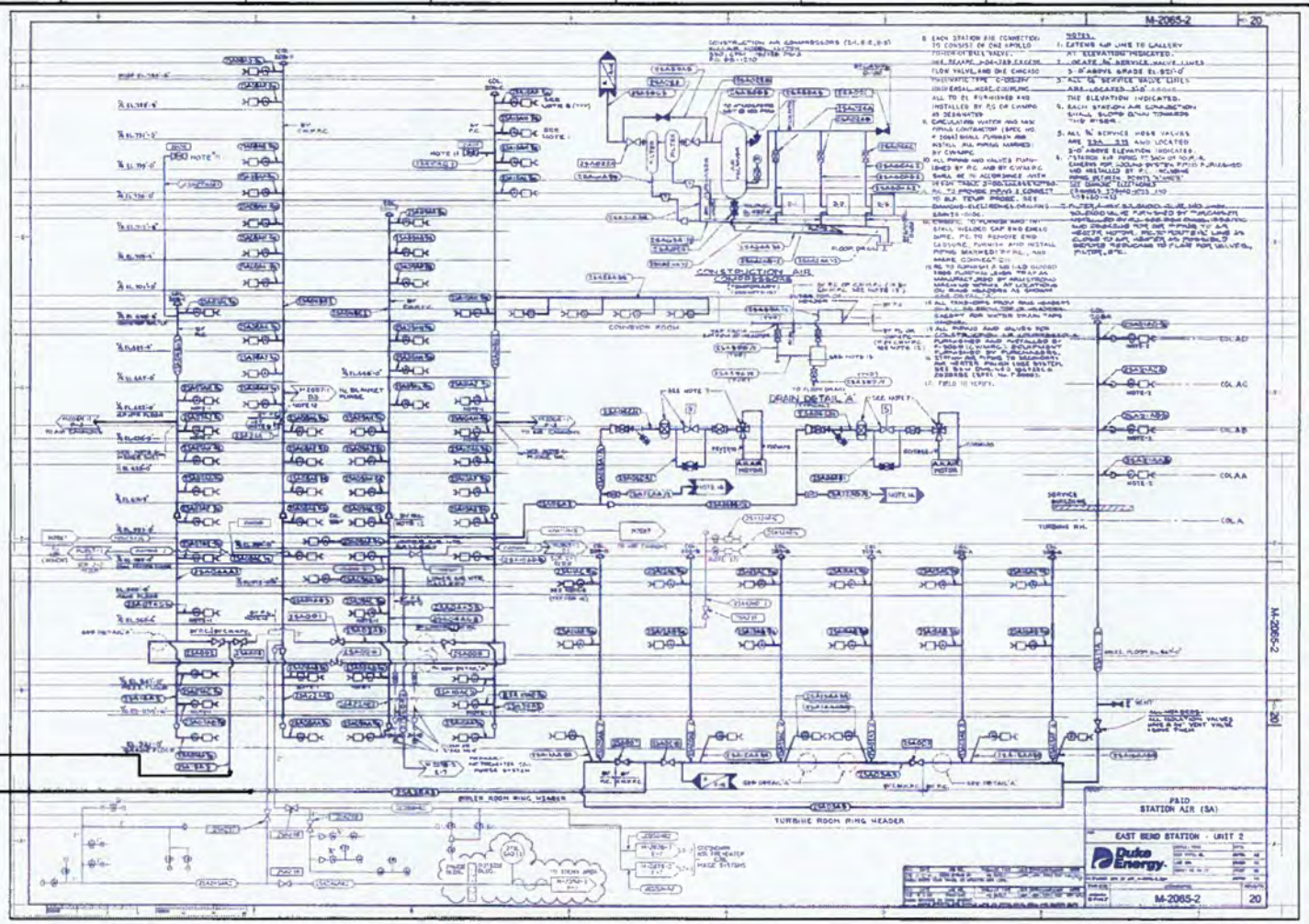
DWG SIZE: ANSI D 22x34"	DRAWING NO.: EBS02-M-2065-1
REVISION	2A



THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 9/24/16, ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 20A

FOR PERMITTING PURPOSES ONLY

no	date	by	ckd	description	description	no	date	by	ckd
20A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
STATION AIR

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
DWG TYPE: ML	DFTR:
JOB NO: 86669	CHKD:
DATE:	ENGR:
FILENAME: 86669M-2065-2.pid	APPD:

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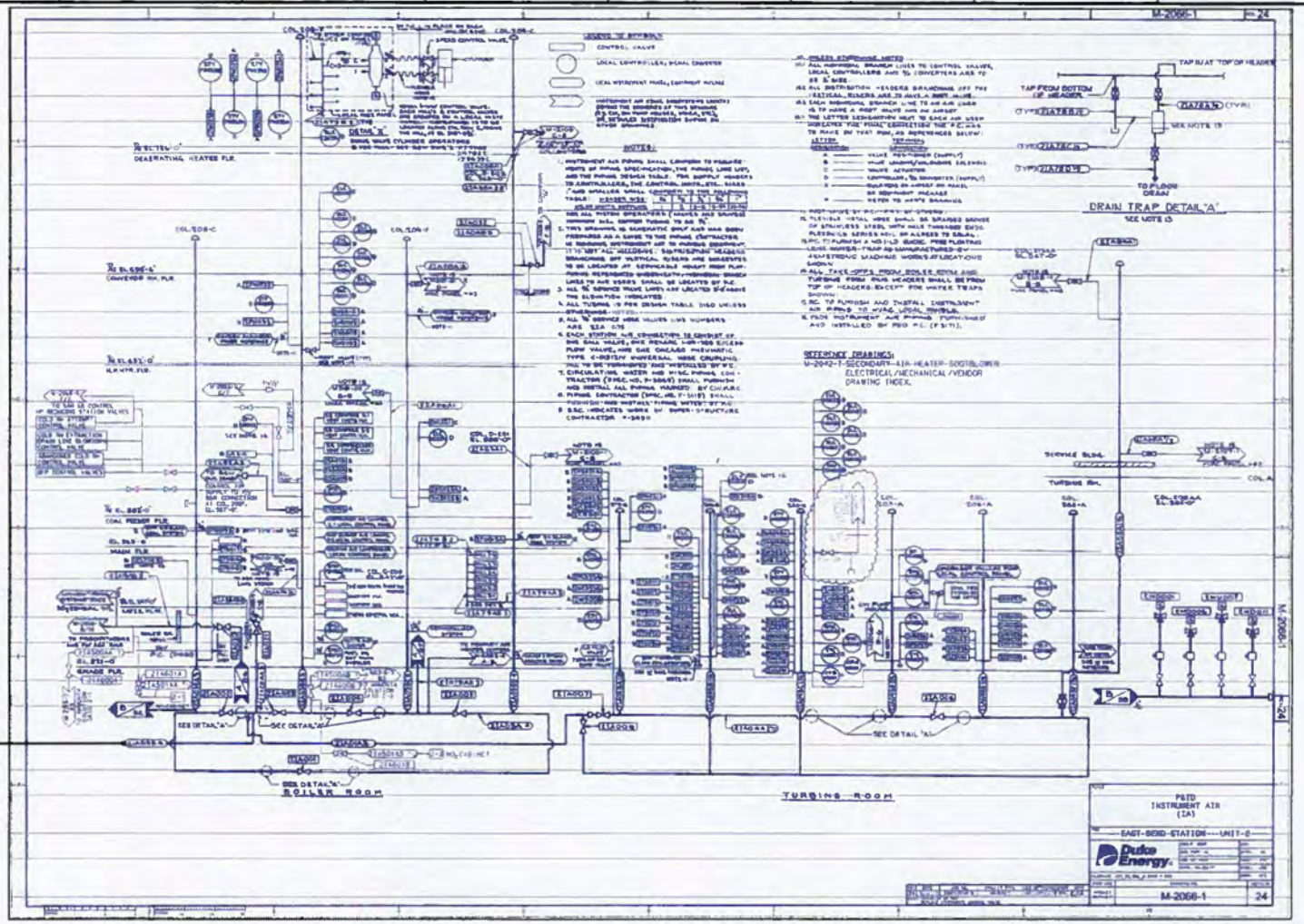

THE REGISTRANT OF THE NEWLY APPLIED SEAL, DATED 9/24/16 ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED BY THE FOLLOWING REVISION(S) 24A

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
24A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
INSTRUMENT AIR

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:	
DWG TYPE: ML	DFTR:	
JOB NO: 88888	CHKD:	
DATE:	ENGR:	
FILENAME: 88888M-2066-1.pid	APPD:	

DWG SIZE	DRAWING NO.	REVISION
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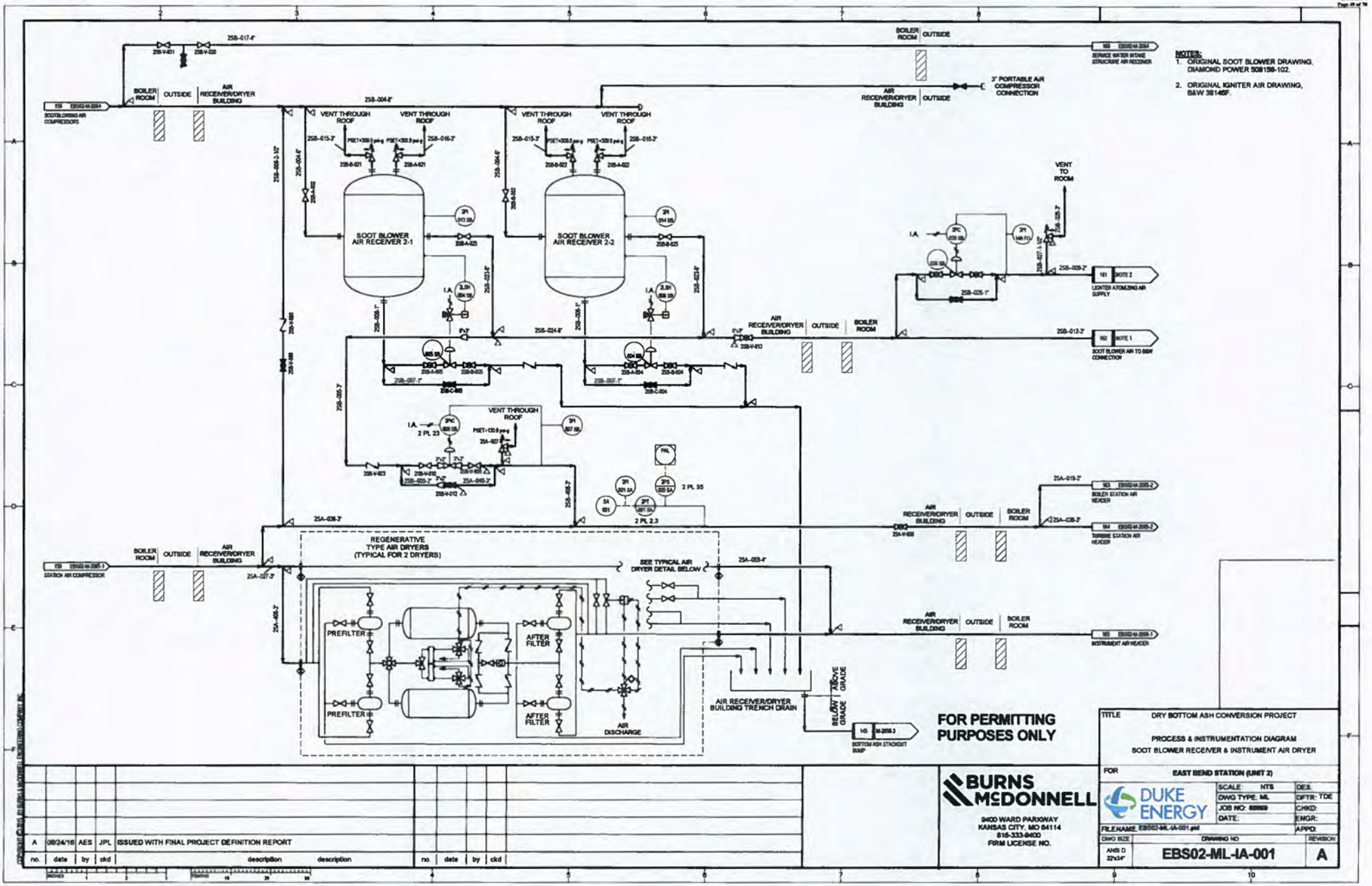

no.	date	by	ckd	description
A	09/24/18	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
SOOT BLOWER RECEIVER & INSTRUMENT AIR DRYER
FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
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JOB NO: 88888	CHKD:
DATE:	ENGR:
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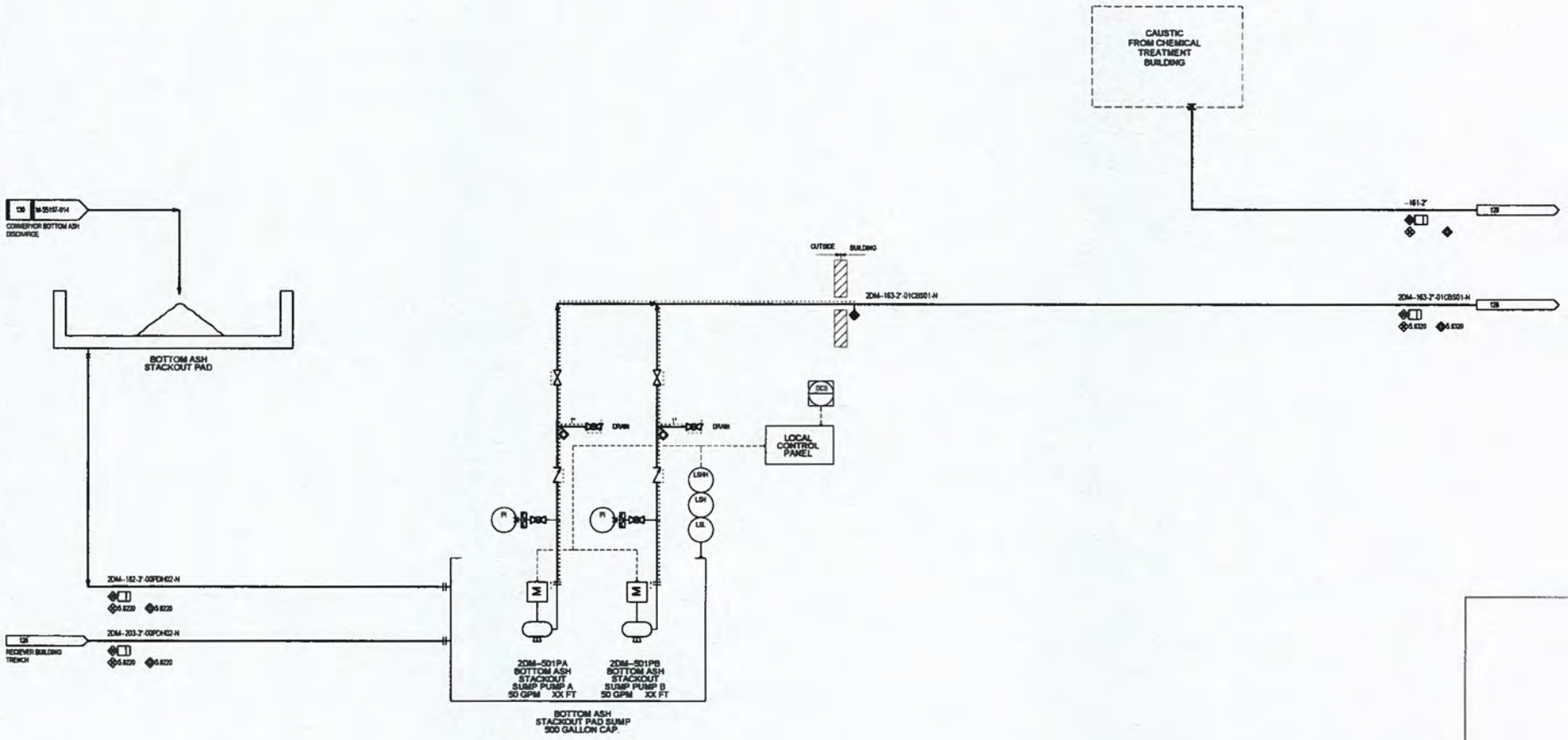
	REVISION: A



FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description	description	no.	date	by	ckd
A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT					

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO.

TITLE: DRY BOTTOM ASH CONVERSION PROJECT
PROCESS & INSTRUMENTATION DIAGRAM
DBA STACKOUT SUMP

FOR: EAST BEND STATION (UNIT 2)

DUKE ENERGY

SCALE: NTS	DES:
DWG TYPE: ML	DFTR: TDE
JOB NO: 86669	CHKD:
DATE:	ENGR:
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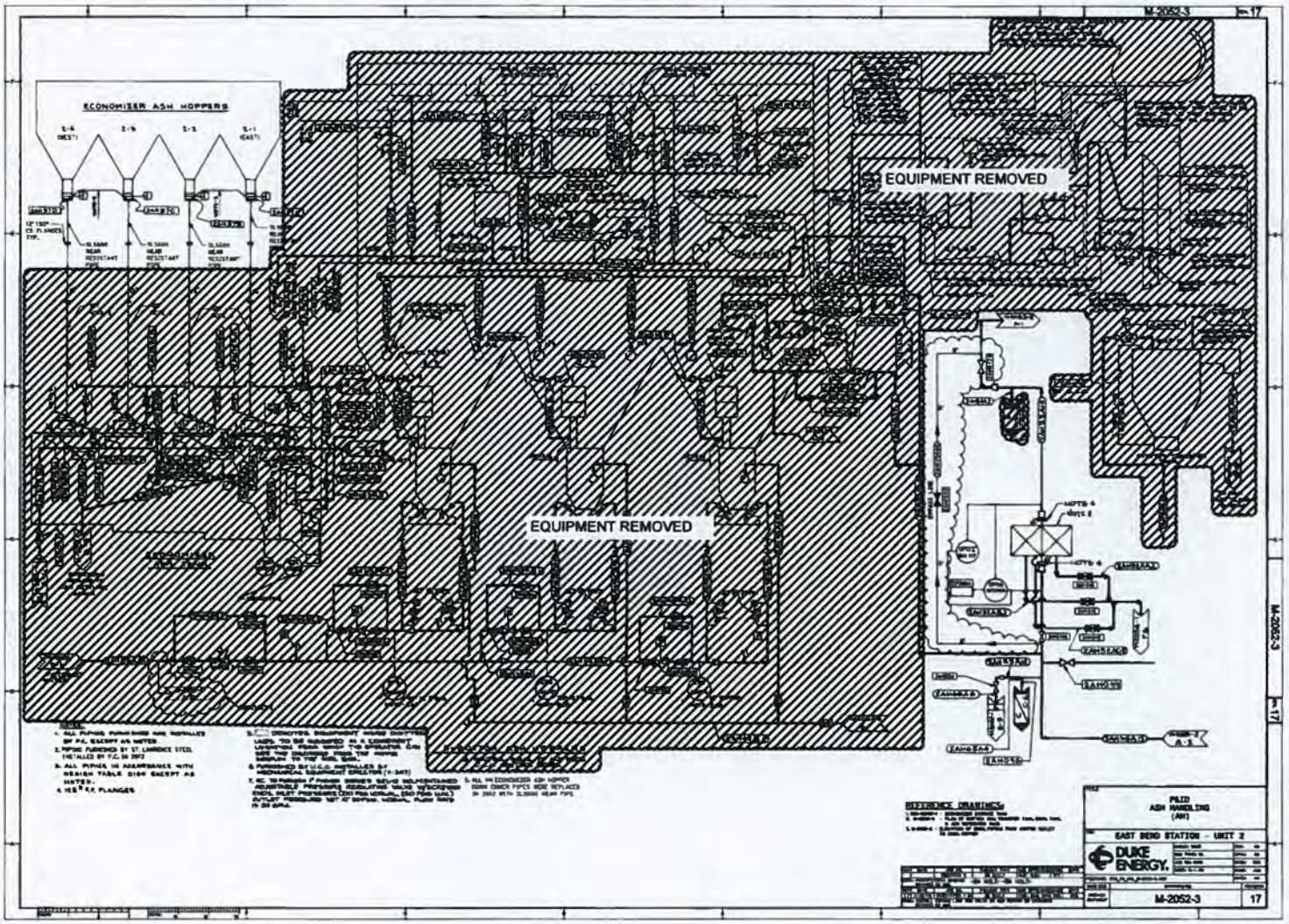
	REVISION: A



BURNS McDONNELL — THE REGISTRANT OF THE NEWLY APPLIED SEAL DATED 08/24/18 ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED ON BURNS & McDONNELL DRAWING M-2052-3-D REVISION A

NOT FOR PROCUREMENT OR CONSTRUCTION

no.	date	by	ckd	description
A	08/24/18	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

TITLE
DRY BOTTOM ASH CONVERSION PROJECT
DEMOLITION DRAWING
ASH HANDLING SYSTEM

FOR
EAST BEND STATION UNIT 2

DUKE ENERGY. BOONE COUNTY, KY

SCALE: NONE	DES: AES		
DWG TYPE: ML	DRFT: RLC		
JOB NO: 84669	CHKD:		
DATE: 08/17/2018	CHGR:		
FILENAME: M-2052-3-D.dwg	APPD:		
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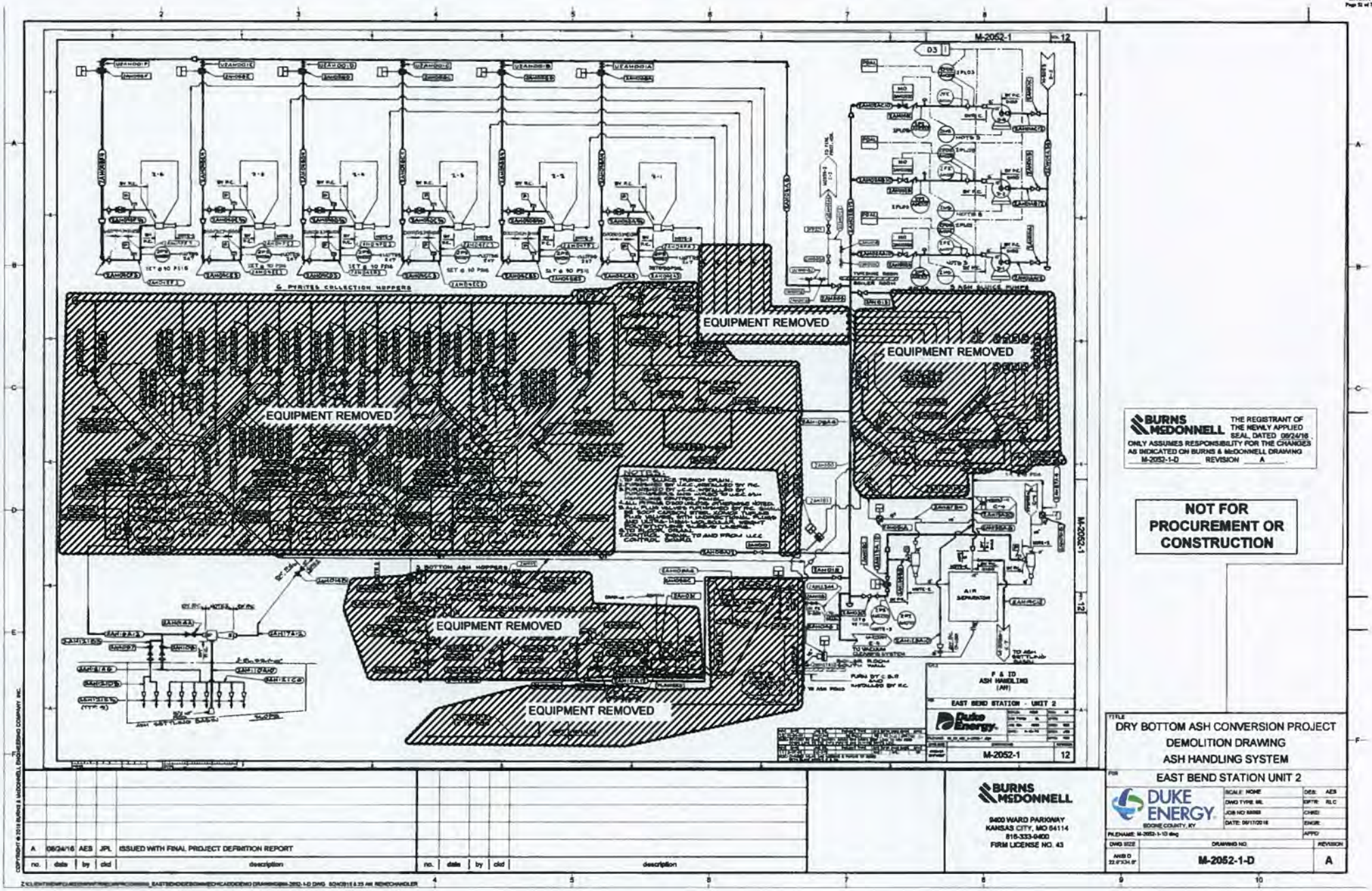

BURNS MCDONNELL

THE REGISTRANT OF THE NEWLY APPLIED SEAL DATED 09/24/16 ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED ON BURNS & MCDONNELL DRAWING M-2052-1-D REVISION A

NOT FOR PROCUREMENT OR CONSTRUCTION

no.	date	by	chd	description
A	09/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT

BURNS MCDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

TITLE
DRY BOTTOM ASH CONVERSION PROJECT
DEMOLITION DRAWING
ASH HANDLING SYSTEM

PLT
EAST BEND STATION UNIT 2

DUKE ENERGY
BOONE COUNTY, KY

SCALE: NONE	DES: AES		
DWG TYPE: ML	DFTR: RLC		
JOB NO: 84888	CHKD:		
DATE: 09/17/2016	ENGR:		
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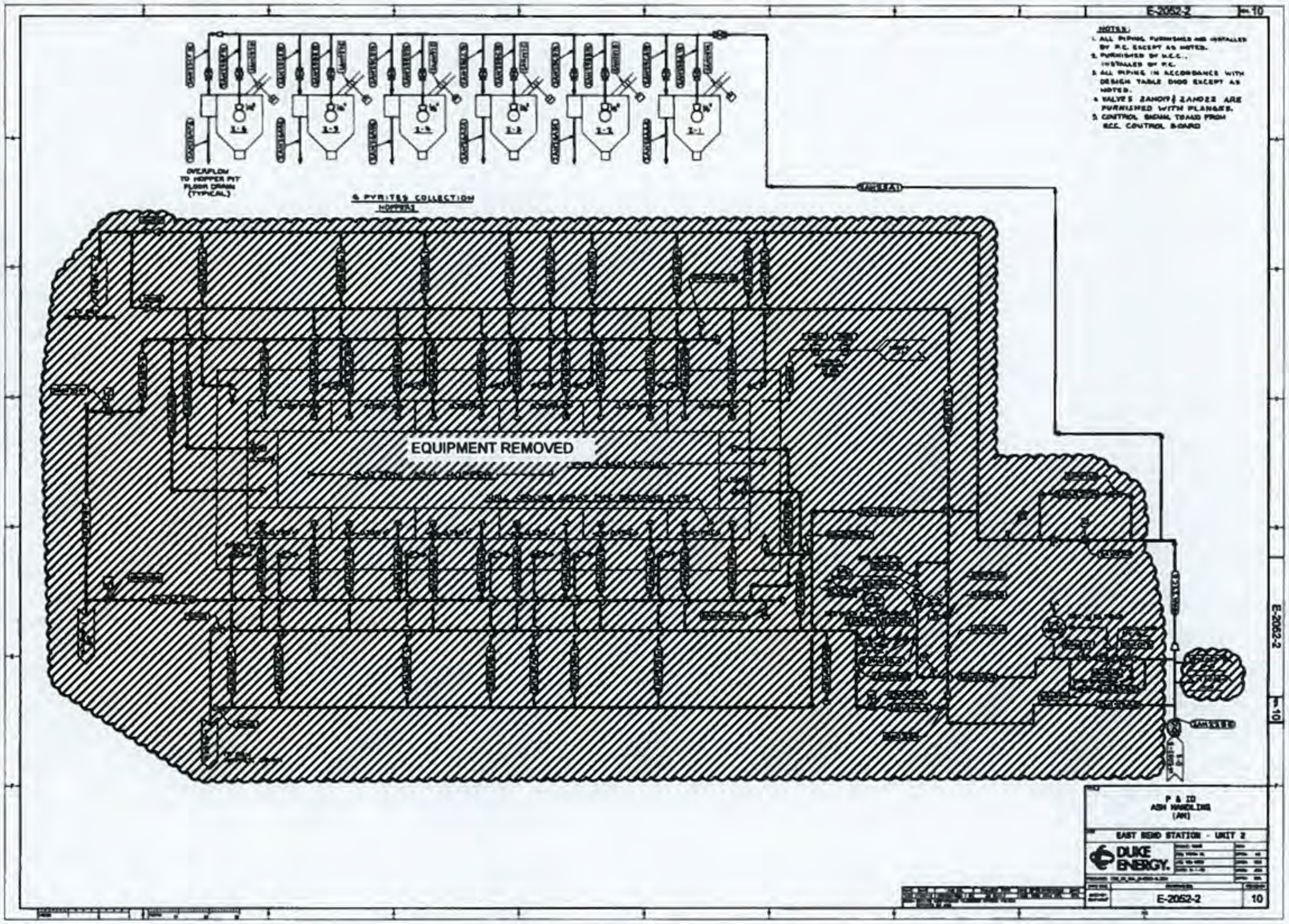


BURNS & McDONNELL THE REGISTRANT OF THE NEWLY APPLIED SEAL DATED 08/24/16 ONLY ASSUMES RESPONSIBILITY FOR THE CHANGES AS INDICATED ON BURNS & McDONNELL DRAWING E-2052-2-D REVISION A

NOT FOR PROCUREMENT OR CONSTRUCTION

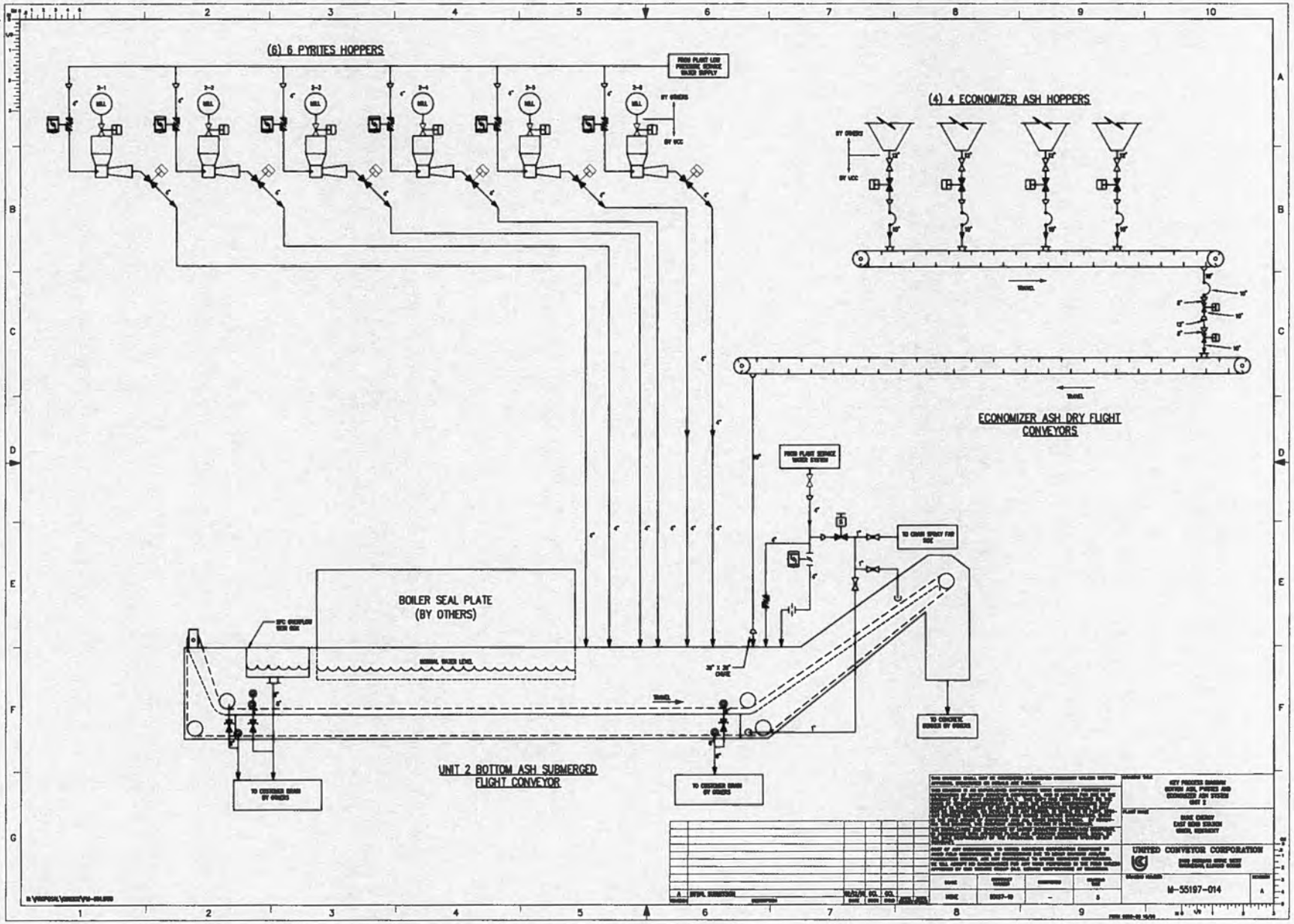
no.	date	by	ckd	description
A	08/24/16	AES	JPL	ISSUED WITH FINAL PROJECT DEFINITION REPORT

BURNS & McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

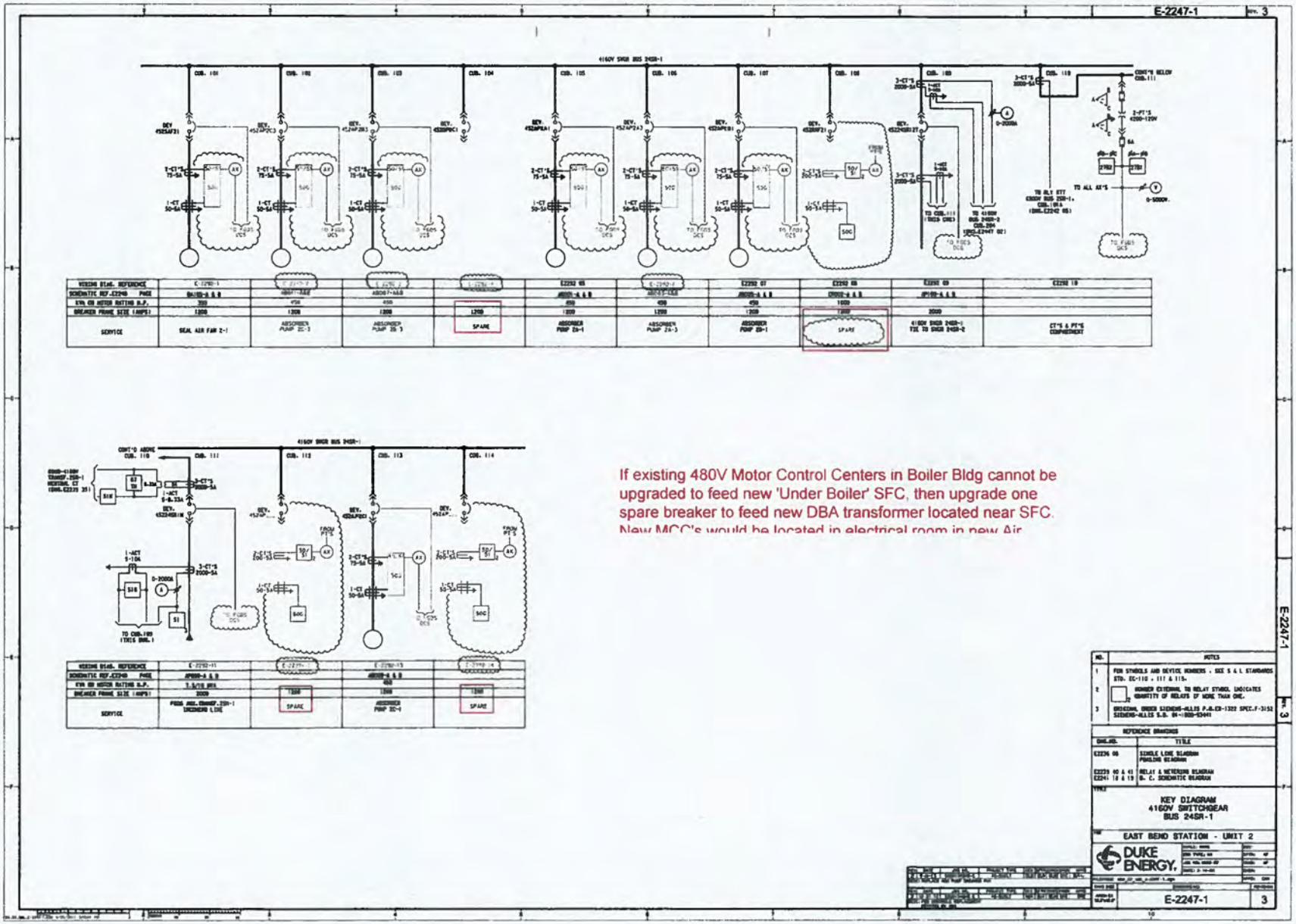
TITLE
DRY BOTTOM ASH CONVERSION PROJECT
DEMOLITION DRAWING
ASH HANDLING SYSTEM

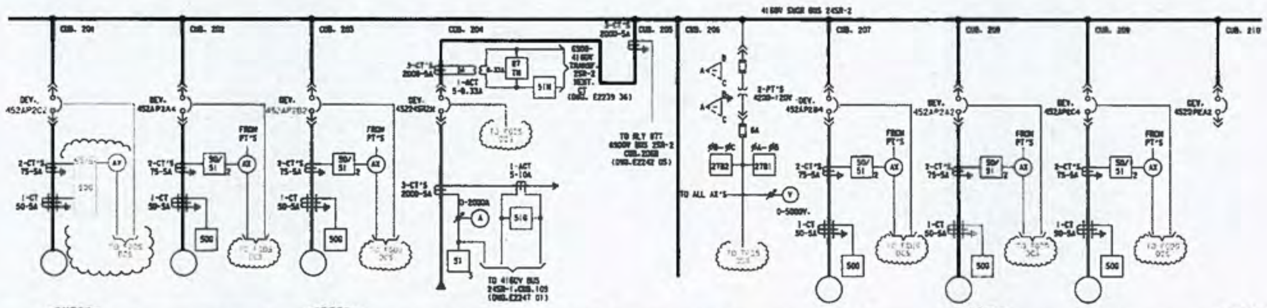
FOR
EAST BEND STATION UNIT 2
DUKE ENERGY
BOONE COUNTY, KY

SCALE: NONE
DWG TYPE: ML
JOB NO 88969
DATE 08/17/2016
DES: AES
DFTR: RLC
CHKD:
ENGR:
APPD:
FILENAME: E-2052-2-D.dwg
DWG SIZE: ANSI D 22.0"X34.0"
DRAWING NO. E-2052-2-D
REVISION A

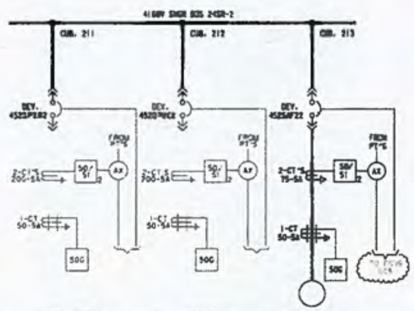

(6) 6 PYRITES HOPPERS
(4) 4 ECONOMIZER ASH HOPPERS
ECONOMIZER ASH DRY FLIGHT CONVEYORS
BOILER SEAL PLATE
(BY OTHERS)
UNIT 2 BOTTOM ASH SUBMERGED FLIGHT CONVEYOR
UNITED CONVEYOR CORPORATION
M-55197-014

Appendix G
Electrical One Lines


E-2247-1
4160V SWGR BUS 24SR-1
If existing 480V Motor Control Centers in Boiler Bldg cannot be upgraded to feed new 'Under Boiler' SFC, then upgrade one spare breaker to feed new DBA transformer located near SFC. New MCC's would be located in electrical room in new Air
KEY DIAGRAM
4160V SWITCHGEAR
BUS 24SR-1
EAST BEND STATION - UNIT 2
DUKE ENERGY.
E-2247-1
3



WIRING DIAG. REFERENCE	E-2293-1	E2293 02	E-2293-3	E2293 04	E2293 05	E2293 06	E2293 07	E-2293-8	E2293 09	E-2293-10
SCHEMATIC REF. E2240 PAGE	AB010-A&B	AB004-A & B	AB006-A&B	AP009-A & B			AB008-A & B	AB002-A&B	AB012-A & B	
KVA OR MOTOR RATING H.P.	450	450	450	7.5/10MVA			450	450	450	
BREAKER FRAME SIZE (AMPS)	1200	1200	1200	2000			1200	1200	1200	1200
SERVICE	ABSORBER PUMP 2C-2	ABSORBER PUMP 2A-4	ABSORBER PUMP 2B-2	FGDS AUX.TRANSF.2SR-2 INCOMING LINE	AUX. COMPARTMENT	4160V.SWGR.24SR-1 TIE TO SWGR.24SR-2 & PT COMPT.	ABSORBER PUMP 2B-4	ABSORBER PUMP 2A-2	ABSORBER PUMP 2C-4	SPARE



WIRING DIAG. REFERENCE	E-2293-11	E-2293-12	E2293 13
SCHEMATIC REF. E2240 PAGE			BA106-A & B
KVA OR MOTOR RATING H.P.			350
BREAKER FRAME SIZE (AMPS)	1200	1200	1200
SERVICE	SPARE	SPARE	SEAL AIR FAN 2-2

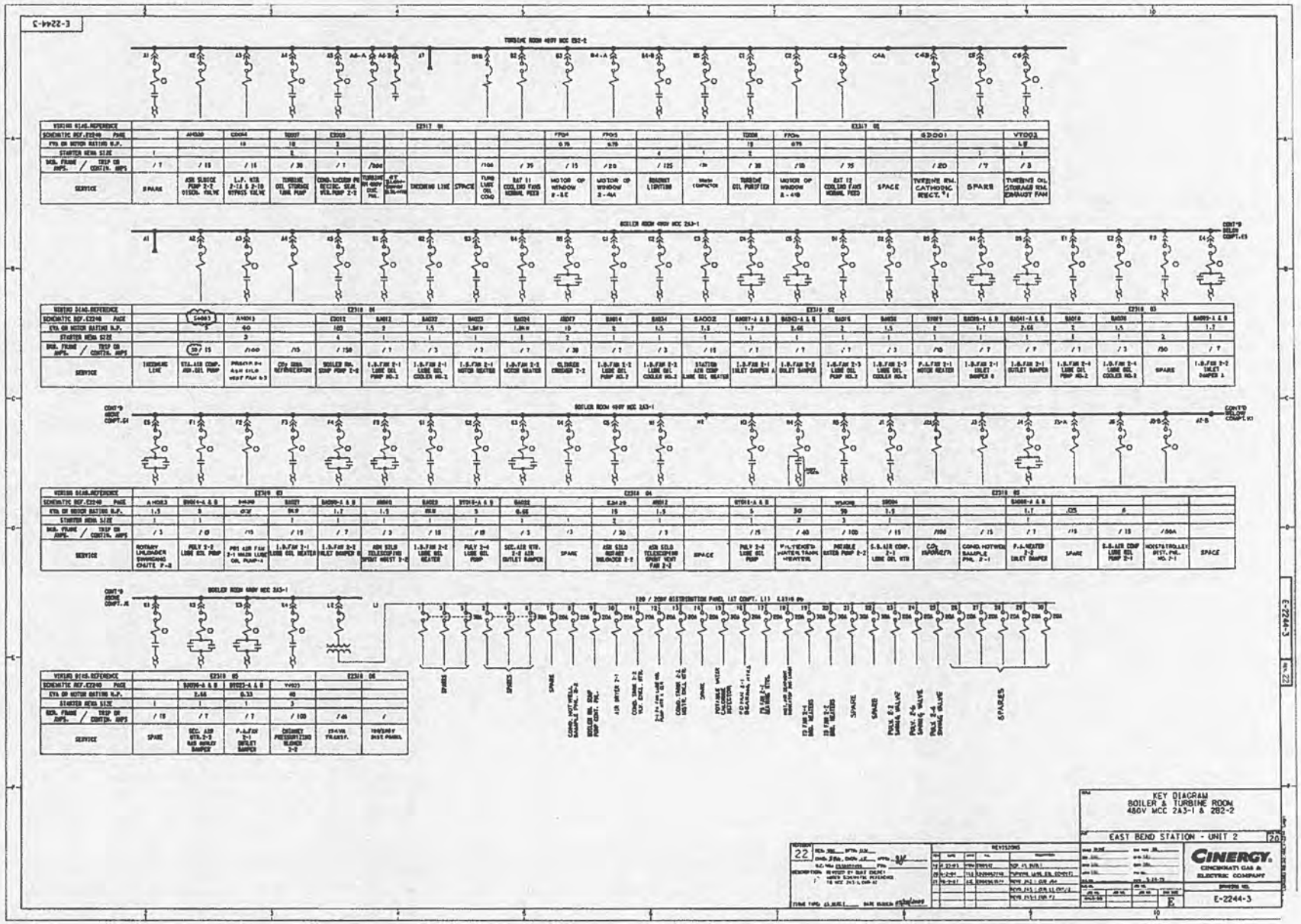
If existing 480V Motor Control Centers near future Under Boiler SFC cannot be upgraded, then upgrade one spare breaker to feed new DBA transformer located near SFC. New MCC's would be located in electrical room in the new Air

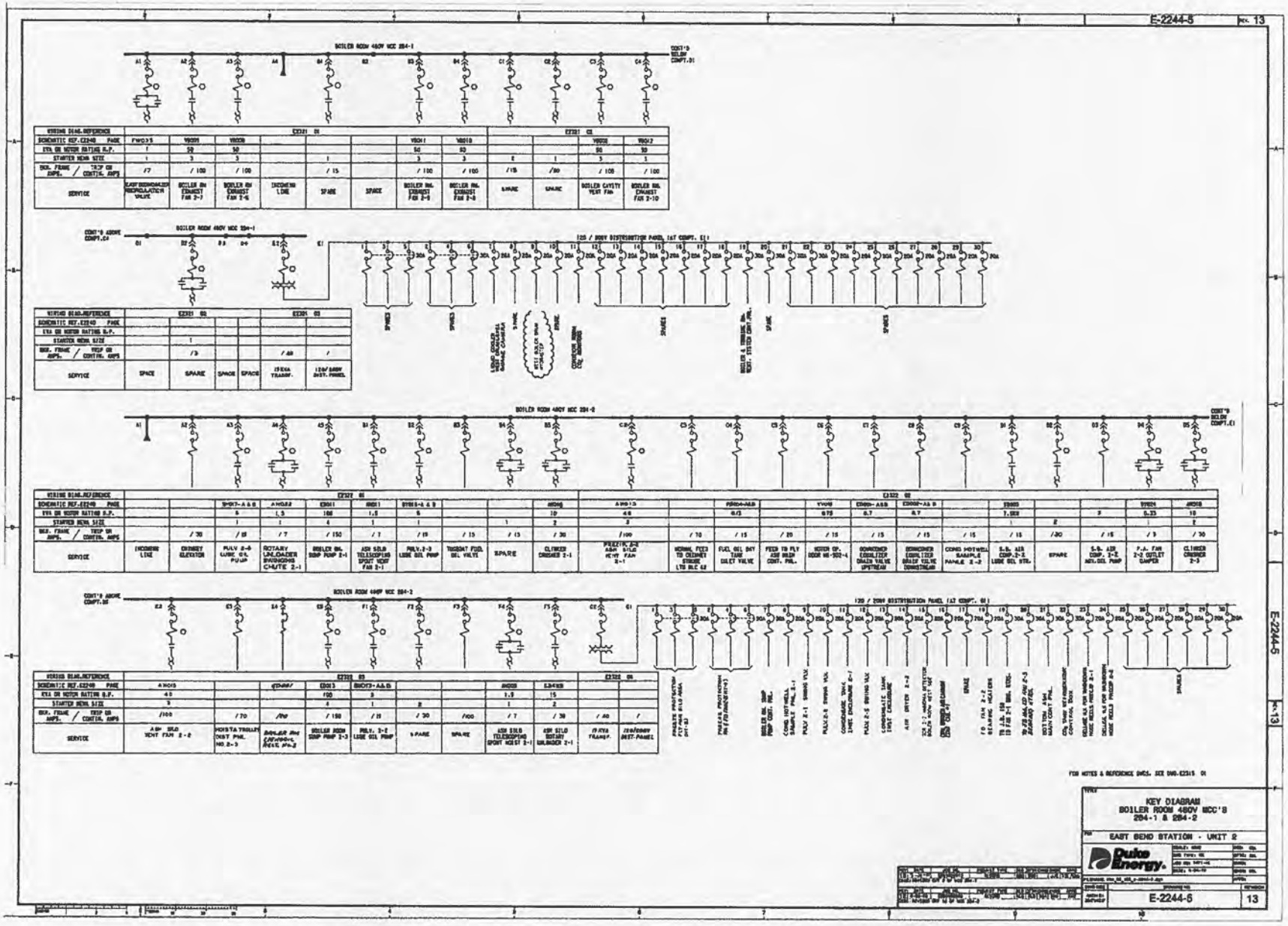
KEY DIAGRAM
4160V SWITCHGEAR
BUS 24SR-2

EAST BEND STATION - UNIT 2

DUKE ENERGY

E-2247-2 3


E-2244-3
TURBINE ROOM 480V MCC E32-2
BOILER ROOM 480V MCC 2A3-1
BOILER ROOM 480V MCC 2A3-1
BOILER ROOM 480V MCC 2A3-1
120 / 208V DISTRIBUTION PANEL 1ST CONPT. L11
KEY DIAGRAM
BOILER & TURBINE ROOM
480V MCC 2A3-1 & 2B2-2
EAST BEND STATION - UNIT 2
CINERGY.
CINCINNATI GAS & ELECTRIC COMPANY
E-2244-3


E-2244-5
Rev. 13
KEY DIAGRAM
BOILER ROOM 480V MCC'S
2B4-1 & 2B4-2
EAST BEND STATION - UNIT 2
Duke Energy.
E-2244-5
13

Appendix H

Contract List and Descriptions

APPENDIX H – Contract List and Descriptions

1 EQUIPMENT CONTRACTS

Where practical equipment will be contracted on a program wide basis as noted below. The below scope reflects site specific rather than program wide contract scope.

5.2190 – Miscellaneous Pumps

A. General Description: Design, fabricate, and deliver to site the following equipment:
   1. Two (100%) Stackout Pad sump pumps.
   2. All submittals and operating and maintenance manuals
   3. Field technical services to support startup.

5.2631 – Dry Bottom Ash Handling (Program)

A. General Description: Design, fabricate, and deliver the following equipment:
   1. One underboiler drag chain conveyors with accessories.
   2. UDCC local control station.
   3. UDCC jog station panel.
   4. UDCC hydraulic power unit.
   5. UDCC HPU oil heater.
   6. New pyrites sluice, BA cooling water, conveyor overflow, and chain spray piping.
   7. One lot of actuated valves.
   8. Spare parts, special tools, lubricants, and consumables.
   9. All submittals and operating and maintenance manuals.
   10. Field technical services to support startup.
   11. Training of Owner operators and maintenance staff on systems and equipment supplied by this contract.

5.5330 – 480V Motor Control Centers

A. General Description: Design, fabricate, and deliver to site the following equipment:
   1. 480V motor control centers.
   2. All submittals and operating and maintenance manuals.
   3. Field technical services to support startup.

5.6110 – Distributed Control System

A. General Description: Design, fabricate, and deliver to site the following equipment:
   1. DCS I/O cabinets.
   2. DCS programming.
   3. Factory acceptance test.
   4. All submittals and operating and maintenance manuals.
   5. Field technical services to support initial operation, startup, and tuning.

5.6210 – Instruments

A. General Description: Design, fabricate, and deliver to site the following loose instruments which are not supplied under other contracts or the construction contracts:
   1. Pressure transmitters.
   2. Level transmitters.
   3. Flow meters.
   4. pH meters.

APPENDIX H – Contract List and Descriptions

5. Indicators.
6. All submittals and operating and maintenance manuals.

2 FURNISH AND ERECT CONTRACTS

5.4310 – Pre-Engineered Buildings

A. General Description: Design, furnish, and site erection of the following buildings:
   1. Air Reciever Building

3 CONSTRUCTION CONTRACTS

5.8140 – Site Finishing

A. General Description: Construction services for finish grading, asphalt, and concrete pavement installation, and any required site work not covered by other contracts including:
   1. Construct the subgrade for the final surfacing.
   2. Complete finish grading and final drainage.
   3. Furnish and place crushed rock, asphalt paving, and concrete surfacing.
   4. Complete all final pavement markings.
   5. Topsoil and seed all disturbed areas not receiving alternate surfacing.
   6. Upon completion of project, remove all erosion control structures once proper grass has been established.

5.8210 – Piling

A. General Description: Construction services to install piles:
   1. Furnish and install piles.
   2. Perform pile load tests or PDA testing. Due to the schedule for the project and the need for information to support design, this scope may result in a separate contract.

5.8220 – Site Preparation and Foundations

A. General Description: Construction services for civil construction, construct foundations, and install underground utilities:
   1. Construct the Erosion and Sedimentation Control Plan (E&SC Plan) features.
   2. Maintain the E&SC Plan features through demobilization.
   3. Install temporary construction facilities.
   4. Perform clearing, grubbing, and rough grading of required areas.
   5. Construct access roads.
   6. Excavation, subgrade preparation, dewatering and backfill for all foundations.
   7. Construct pile caps, mats, foundations, grade beams and anchor bolts as required for all building, tanks, equipment, etc.
   8. Perform soil compaction and concrete testing during construction.
   9. Furnish and install below-grade piping.
   10. Furnish and install electrical manholes, duct banks, and all below grade conduit embedded in or under concrete.
   11. Furnish and install below grade electrical grounding grid.

APPENDIX H – Contract List and Descriptions

12. Construct the storm drainage system.
13. Construction testing services.

5.8320 – Mechanical/Electrical Construction

A. General Description: This is a furnish and construct contract including, but is not limited to, the following major activities:
   1. Unload, receive, and install all Owner-furnished equipment:
      a. Under-boiler bottom ash conveyor equipment and accessories.
      b. Motor control centers.
      c. DCS hardware.
   2. Unload, receive, and install all balance of plant furnished equipment:
      a. Slurry pumps
      b. Miscellaneous pumps.
      c. Instruments.
   3. Furnish and install the following:
      a. Large bore and small bore piping systems including pipe supports.
      b. Miscellanous manual valves.
      c. Piping and equipment insulation and lagging.
      d. Fire protection system.
      e. Heat tracing system.
      f. Building HVAC systems.
      g. Electrical raceway systems including cable tray, conduit, and supports.
      h. Electrical cable.
      i. Above-grade grounding cables.
      j. Lighting systems including all yard and roadway lighting.
      k. Miscellaneous instruments not supplied under any other contract.
   4. Perform final calibration of instruments.
   5. Performing touch-up painting for equipment and materials.
   6. Provide mechanical and electrical startup craft labor to support commissioning, startup, and initial operation of the installed systems.
   7. Providing final cleanup of all areas worked around or painted by this Contract.

4 CONSTRUCTION SERVICES CONTRACTS

5.9010 – Subsurface Investigation

A. General Description: Construction services to perform field geotechnical investigation work:
   1. Field drilling of test borings.
   2. Prepare a geotechnial report to document field investigation results and to provide foundation recommendations.

5.9020 – Surveying

A. General Description: Construction services prepare a survey:
   1. Perform field survey of existing and new construction areas.
   2. Prepare drawings and electronic files of the surveying results for use in detailed design.

APPENDIX H – Contract List and Descriptions

5.9030 – Underground Utility Investigation

A. General Description: Construction services to locate underground utilities:
   1. Hydroexcavation services to locate existing underground utilities.
   2. Survey services.
   3. Prepare drawings showing locations of underground utilities.

5.9210 – Civil/Structural Testing

A. General Description: Construction services testing to independently verify construction contractor field testing:
   1. Compaction testing.
   2. Concrete testing.
   3. Bolt torque testing
   4. Field services test reports.

5.9250 – Electrical Testing

A. General Description: Construction electrical testing services:
   1. Adjust relay settings.
   2. Relay testing.
   3. MV electrical system testing.
   4. Testing contractor will provide test equipment and labor to direct testing.
   5. Field services test reports.

* * * * *

Appendix I
Division of Responsibility

APPENDIX I – Division of Responsibilities

1 OVERALL PROJECT DIVISION OF RESPONSIBLITIES

The following table shows the division of responsibility for the various parties involved in the Project where O = Duke Energy, CE = Burns and McDonnell, DBA = DBA OEM (UCC), G = General Work Contractor and V = Miscellaneous Vendors.

Item No.	Work Categories	Specify Design Criteria	General Argmt	Engineering Design & Drawings	Prepare Technical Spec Bid Eval	Issue Contract	Vendor Drawings	Material Procurement & Fabrication	Erection	Start-Up & Commission
1.0	**Project Development**									-
1.1	Site Plan		CE	CE						
1.2	Subsurface investigation	CE	CE	CE	CE/O	O	V			
1.3	Surveying	CE	CE	CE	CE/O	O	V			
1.4	Project Definition Report		CE	CE						
2.0	**Dry Bottom Ash Conversion (DBA)**									
2.1	Under-Boiler Conveyor	O	DBA	DBA	O	O	DBA	DBA	G	DBA/CE/O
2.2	Mechanical Equipment	O	DBA	DBA	O	O	DBA	DBA	G	DBA/CE/O
2.3	BOP Mechanical Equipment	CE	CE	CE	CE	CE	V	V	G	CE/O
2.4	Structural Steel	CE	CE	CE	CE	G	G	G	G	
2.5	Electrical	CE/O	CE	CE	CE/O	O	V	V	G	CE/O
2.6	Control System/DCS	CE/O	CE	CE	CE/O	O	V	V	G	CE/O
2.7	Buildings / Enclosures	CE	CE	CE	CE	CE	V	V	V	CE/O
2.8	Construction	CE/O	CE	CE	CE	O	G	G	G	G/CE/O

APPENDIX I – Division of Responsibilities

2 STARTUP DIVISION OF RESPONSIBLITIES

The following tables shows the recommend startup and commissioning responsibilities for the various parties involved with the Project:

Responsibility Area	BMcD Engineering	BMcD Construction	Mech /Elec Construction Contractor	BMcD Startup	Duke Energy	Equipment Suppliers	Comments
Procurement							
Onsite Procurement			X		X		Each company supplies their own site procurements
Materials Management							
Receipt			X		C		
Storage / Maintenance			X		C		
Spares / Consumables Inventory control			X		C		
System Cleaning Operations							
Lube Oil Flushes			X	S			
Water System Flushes			X				
Misc Blows / Flushes			X				
Construction Completion							
Const. Completion Punchlist			X	S			
QA/QC Construction Completion Documentation			X	S	C		
Construction Completion Documentation (by SU package)			X	S			
Spares & Consumables							
Supply of SU Consumables						X	
Application of first fill of lubricants etc.			X				
Supply of Plant Spares	S		S		X	S	Equipment Suppliers to provide list to Duke.
Supply of SU Spares			X			X	Equipment Suppliers to provide SU spares with order.
Mechanical							
Pressure / Leak Testing			X	C			
In Service Test			X	C			Need to determine where this may apply
Supply of Mech. SU Techs			L				
Supply of Mech. SU Tools			X				

APPENDIX I – Division of Responsibilities

Responsibility Area	BMcD Engineering	BMcD Construction	Mech /Elec Construction Contractor	BMcD Startup	Duke Energy	Equipment Suppliers	Comments
Instrument & Control							
I&C Device Initial Calibration				C	X	X	Factory Calibration. I&C Techs to perform field calibration if no factory calibration
I&C Device Functionality				X	S		I&C Techs to support
Loop Checkout				X	S		I&C Techs to support
Logic Checkout	S			X	S		I&C Techs to support
Supply of I&C SU Techs			L				
Supply of I&C SU Tools			X				
Calibration of Performance Test Instruments					X		
Electrical SU							
Wire Ringout			X	C			
Transformer Dressing			X				
Electrical Device Calibration & Setting (Med Voltage)			X	S			
Electrical Device Calibration & Setting (Low Voltage)				X			
Supply of Electrical SU Techs			L				
Supply of Electrical SU Tools			X				
Startup / Operational Misc.							
Schedule Administration	S		S	S	X		
System Functional Testing	S		S	X	S		
Logic Functional Testing	S		S	X	S		
Lead on individual system startups	S		S	X	S		
Lead Plant Startup Coordination Role	S			X	S		
Safety Tagging Program Administration			S	S	X		
Punchlist Administration			X	C	X		
Plant Operator Training (Equipment Familiarization)	S					X	

APPENDIX I – Division of Responsibilities

Responsibility Area	BMcD Engineering	BMcD Construction	Mech /Elec Construction Contractor	BMcD Startup	Duke Energy	Equipment Suppliers	Comments
Plant Operator Training (operations)	S					X	
Supply of Operators					X		
Shift Supervision of Operators			C	S	X		
Responsibility for operations direction (up to PA or CO)			C	S	X		
Implementation of PDM/PM Program (Up to Substantial Completion)			X				
Execution of Operations Readings and Routines					X		
Supply of Chemistry control testing facilities					X		
Supply of Chemistry control analytical equipment					X		
Supply of Plant Chemist					X		
Testing / Demonstrations							
Performance Testing	S			S	X		
Procedures							
Project Startup Manual				X			
Project Checkout Forms			S	X		S	Suppliers to provide forms for equipment supplied.
Safety Tagging Procedure				S	X		
Punchlist Procedure					X		
Back Energization Procedure	X						
Chemical Cleaning Procedure	X						
Flushing Procedures			X				
Performance Test Procedure	X			S			
Warranty Administration Procedure				S	X		
Plant Operating Procedures					X		
Operations Routines and Readings Procedure				S	X		

APPENDIX I – Division of Responsibilities

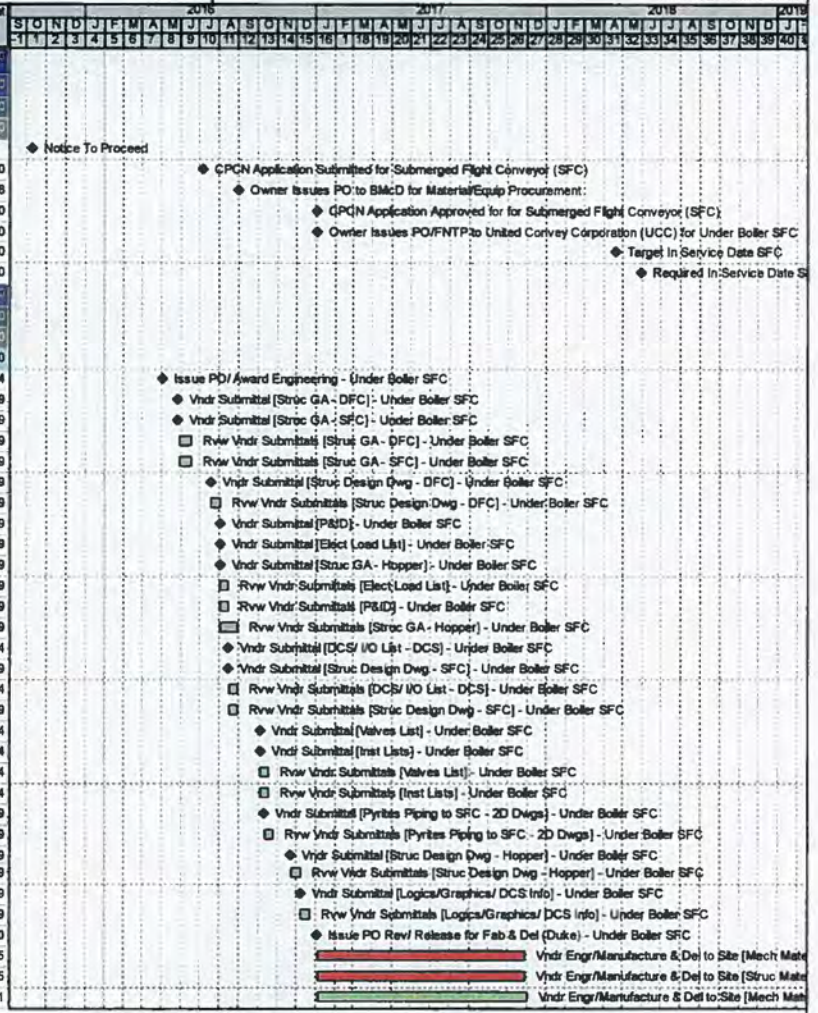
Responsibility Area	BMcD Engineering	BMcD Construction	Mech /Elec Construction Contractor	BMcD Startup	Duke Energy	Equipment Suppliers	Comments
PDM/PM Procedures (preventive/predictive maintenance)						X	
Plant Chemistry Control Plan (testing & dosing plans, etc.)				S	X		If Required
System Descriptions	X			S			
Turnover							
Conformed to Construction Records	X		X	S			
Construction QC Records (welding, etc.)			X				
SU Turnover Packages			X	S		S	
Supplier Manuals	S		X	S		X	
Closeout							
Closeout of Project assets	S				X		
Warranty Administration	S		S		X		

X = Total Responsibility
C = Coordination/Supervision Responsibility
S = Provision of Support
L = Provision of Labor

Appendix J
Schedule

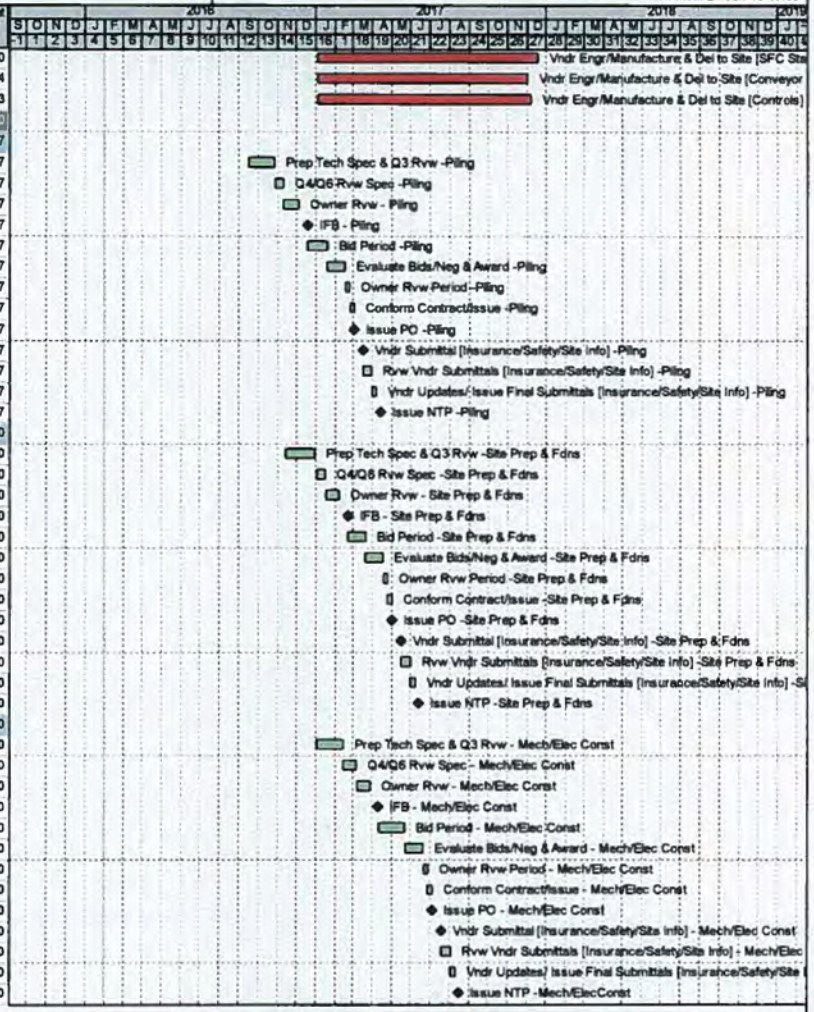
Duke Water Re-Direction Program - East Bend L3 | Standard Layout - JRW #1 | Printed: 23-Jun-16 17:03

Activity ID	Activity Name	OD	Start	Finish	Total Float
Duke Water Re-Direction Program - East Bend L3		590	09-Oct-15 A	29-May-18	-20
Milestones		590	09-Oct-15 A	29-May-18	-20
Project Milestones		590	09-Oct-15 A	29-May-18	-20
Contractual Milestones		590	09-Oct-15 A	29-May-18	-20
BMMM0000M01	Notice To Proceed	0		09-Oct-15 A	
BMMM0000M130	CPCN Application Submitted for Submerged Flight Conveyor (SFC)	0		05-Jul-16	-20
BMMM0000M150	Owner Issues PO to BMcD for Material/Equip Procurement	0		31-Aug-16*	58
BMMM0000M140	CPCN Application Approved for for Submerged Flight Conveyor (SFC)	0		03-Jan-17	-20
BMMM0000M160	Owner Issues PO/FNTP to United Convey Corporation (UCC) for Under Boiler SFC	0		03-Jan-17	-20
BMMM0000M40	Target In Service Date SFC	0		19-Apr-18	-20
BMMM0000M30	Required In Service Date SFC - April 2018	0		29-May-18*	-20
Overall Site & Water Re-Directs		413	02-May-16	18-Dec-17	-10
Procurement		413	02-May-16	18-Dec-17	-10
Mechanical Contracts		413	02-May-16	18-Dec-17	-10
5.2631 - Bottom Ash Handling		413	02-May-16	18-Dec-17	-10
BMPM2631690	Issue PO/ Award Engineering - Under Boiler SFC	0		02-May-16*	14
BMPM2631770	Vndr Submittal [Struc GA - DFC] - Under Boiler SFC	0		27-May-16	119
BMPM8324071	Vndr Submittal [Struc GA - SFC] - Under Boiler SFC	0		27-May-16	119
BMPM8321991	Rvw Vndr Submittals [Struc GA - DFC] - Under Boiler SFC	14	31-May-16	17-Jun-16	119
BMPM8324091	Rvw Vndr Submittals [Struc GA - SFC] - Under Boiler SFC	14	31-May-16	17-Jun-16	119
BMPM8324111	Vndr Submittal [Struc Design Dwg - DFC] - Under Boiler SFC	0		18-Jul-16	109
BMPM8324141	Rvw Vndr Submittals [Struc Design Dwg - DFC] - Under Boiler SFC	10	19-Jul-16	01-Aug-16	109
BMPM2631760	Vndr Submittal [P&ID] - Under Boiler SFC	0		01-Aug-16	99
BMPM2631780	Vndr Submittal [Elect Load List] - Under Boiler SFC	0		01-Aug-16	69
BMPM8324061	Vndr Submittal [Struc GA - Hopper] - Under Boiler SFC	0		01-Aug-16	89
BMPM8321931	Rvw Vndr Submittals [Elect Load List] - Under Boiler SFC	10	02-Aug-16	15-Aug-16	69
BMPM8321871	Rvw Vndr Submittals [P&ID] - Under Boiler SFC	10	02-Aug-16	15-Aug-16	99
BMPM8324101	Rvw Vndr Submittals [Struc GA - Hopper] - Under Boiler SFC	20	02-Aug-16	29-Aug-16	89
BMPM2631800	Vndr Submittal [DCS/ I/O List - DCS] - Under Boiler SFC	0		15-Aug-16	14
BMPM8324121	Vndr Submittal [Struc Design Dwg - SFC] - Under Boiler SFC	0		15-Aug-16	109
BMPM8322111	Rvw Vndr Submittals [DCS/ I/O List - DCS] - Under Boiler SFC	10	16-Aug-16	29-Aug-16	14
BMPM8324151	Rvw Vndr Submittals [Struc Design Dwg - SFC] - Under Boiler SFC	10	16-Aug-16	29-Aug-16	109
BMPM2631771	Vndr Submittal [Valves List] - Under Boiler SFC	0		04-Oct-16	74
BMPM2631790	Vndr Submittal [Inst Lists] - Under Boiler SFC	0		04-Oct-16	74
BMPM8321901	Rvw Vndr Submittals [Valves List] - Under Boiler SFC	10	05-Oct-16	18-Oct-16	74
BMPM8321961	Rvw Vndr Submittals [Inst Lists] - Under Boiler SFC	10	05-Oct-16	18-Oct-16	74
BMPM2631750	Vndr Submittal [Pyrites Piping to SFC - 2D Dwgs] - Under Boiler SFC	0		11-Oct-16	69
BMPM8322021	Rvw Vndr Submittals [Pyrites Piping to SFC - 2D Dwgs] - Under Boiler SFC	10	12-Oct-16	25-Oct-16	69
BMPM8324131	Vndr Submittal [Struc Design Dwg - Hopper] - Under Boiler SFC	0		22-Nov-16	59
BMPM8324161	Rvw Vndr Submittals [Struc Design Dwg - Hopper] - Under Boiler SFC	10	23-Nov-16	08-Dec-16	59
BMPM2631810	Vndr Submittal [Logics/Graphics/ DCS Info] - Under Boiler SFC	0		08-Dec-16	19
BMPM8322051	Rvw Vndr Submittals [Logics/Graphics/ DCS Info] - Under Boiler SFC	10	09-Dec-16	22-Dec-16	49
BMPM8324081	Issue PO Rev/ Release for Fab & Del (Duke) - Under Boiler SFC	0		03-Jan-17	-20
BMPM2631710	Vndr Engr/Manufacture & Del to Site [Mech Material - DFC] - Under Boiler SFC	229	04-Jan-17	27-Nov-17	-5
BMPM8324171	Vndr Engr/Manufacture & Del to Site [Struc Material - DFC] - Under Boiler SFC	229	04-Jan-17	27-Nov-17	-5
BMPM8324181	Vndr Engr/Manufacture & Del to Site [Mech Material] - Under Boiler SFC	233	04-Jan-17	01-Dec-17	1



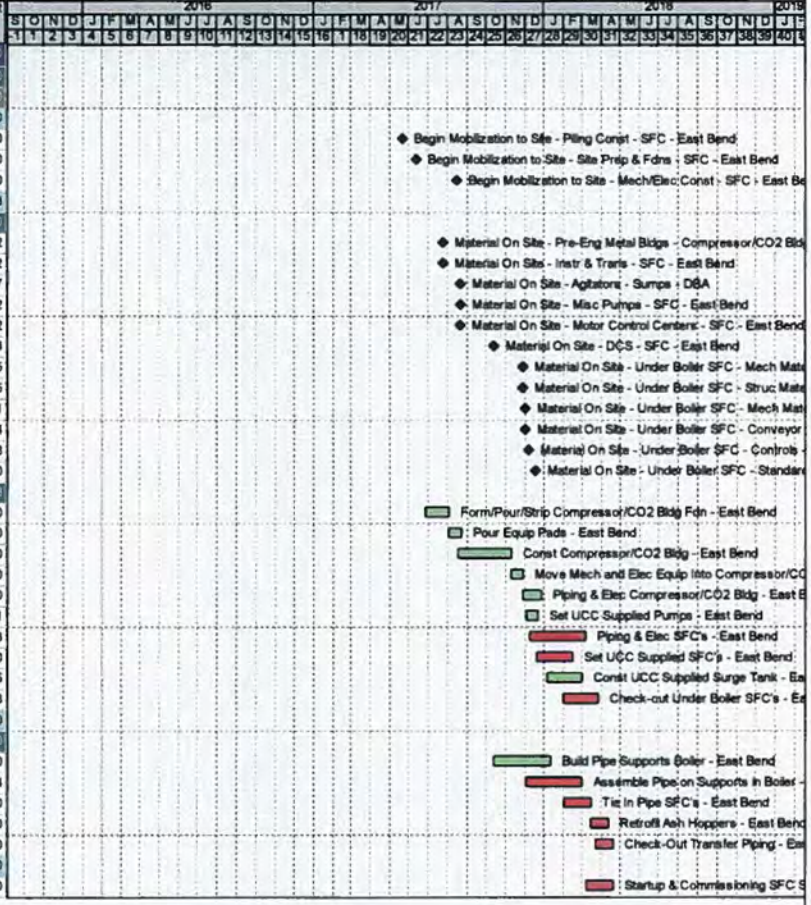
Duke Water Re-Direction Program - East Bend L3 | Standard Layout - JRW #1 | Printed: 23-Jun-16 17:03

Activity ID	Activity Name	OD	Start	Finish	Total Float
BMPM8324191	Vndr Engr/Manufacture & Del to Site [SFC Standard Sections] - Under Boiler SFC	244	04-Jan-17	18-Dec-17	-20
BMPM8324201	Vndr Engr/Manufacture & Del to Site [Conveyor Piping] - Under Boiler SFC	233	04-Jan-17	01-Dec-17	-4
BMPM8324211	Vndr Engr/Manufacture & Del to Site [Controls] - Under Boiler SFC	237	04-Jan-17	07-Dec-17	-3
Construction Contracts		232	16-Sep-16	16-Aug-17	10
5.8210 - Piling		145	16-Sep-16	13-Apr-17	57
BMPS8210860	Prep Tech Spec & Q3 Rvw -Piling	30	16-Sep-16	27-Oct-16	57
BMPS9112430	Q4/Q6 Rvw Spec -Piling	10	28-Oct-16	10-Nov-16	57
BMPS8210870	Owner Rvw - Piling	15	11-Nov-16	05-Dec-16	57
BMPS8210880	IFB - Piling	0		19-Dec-16	57
BMPS8210890	Bid Period -Piling	20	20-Dec-16	19-Jan-17	57
BMPS8210900	Evaluate Bids/Neg & Award -Piling	20	20-Jan-17	16-Feb-17	57
BMPS9112400	Owner Rvw Period -Piling	5	17-Feb-17	23-Feb-17	57
BMPS8210920	Conform Contract/Issue -Piling	5	24-Feb-17	02-Mar-17	57
BMPS8210910	Issue PO -Piling	0		02-Mar-17	57
BMPS8210930	Vndr Submittal [Insurance/Safety/Site Info] -Piling	0		16-Mar-17	57
BMPM8323831	Rvw Vndr Submittals [Insurance/Safety/Site Info] -Piling	10	17-Mar-17	30-Mar-17	57
BMPM8323851	Vndr Updates/ Issue Final Submittals [Insurance/Safety/Site Info] -Piling	5	31-Mar-17	06-Apr-17	57
BMPS8210M58	Issue NTP -Piling	0		13-Apr-17	57
5.8220 - Site Prep & Foundations		145	15-Nov-16	13-Jun-17	30
BMPS8220940	Prep Tech Spec & Q3 Rvw -Site Prep & Fdns	30	15-Nov-16	30-Dec-16	30
BMPS9112440	Q4/Q6 Rvw Spec -Site Prep & Fdns	10	03-Jan-17	16-Jan-17	30
BMPS8220950	Owner Rvw - Site Prep & Fdns	15	17-Jan-17	06-Feb-17	30
BMPS8220960	IFB - Site Prep & Fdns	0		20-Feb-17	30
BMPS8220970	Bid Period -Site Prep & Fdns	20	21-Feb-17	20-Mar-17	30
BMPS8220980	Evaluate Bids/Neg & Award -Site Prep & Fdns	20	21-Mar-17	17-Apr-17	30
BMPS9112410	Owner Rvw Period -Site Prep & Fdns	5	18-Apr-17	24-Apr-17	30
BMPS8220000	Conform Contract/Issue -Site Prep & Fdns	5	25-Apr-17	01-May-17	30
BMPS8220990	Issue PO -Site Prep & Fdns	0		01-May-17	30
BMPS8220010	Vndr Submittal [Insurance/Safety/Site Info] -Site Prep & Fdns	0		15-May-17	30
BMPM8323861	Rvw Vndr Submittals [Insurance/Safety/Site Info] -Site Prep & Fdns	10	16-May-17	30-May-17	30
BMPM8323881	Vndr Updates/ Issue Final Submittals [Insurance/Safety/Site Info] -Site Prep & Fdns	5	31-May-17	06-Jun-17	30
BMPS8220M58	Issue NTP -Site Prep & Fdns	0		13-Jun-17	30
5.8320 - Mechanical/Electrical Construction		160	03-Jan-17	16-Aug-17	10
BMPM8320741	Prep Tech Spec & Q3 Rvw - Mech/Elec Const	30	03-Jan-17*	13-Feb-17	10
BMPM8324221	Q4/Q6 Rvw Spec - Mech/Elec Const	15	14-Feb-17	06-Mar-17	10
BMPM8320751	Owner Rvw - Mech/Elec Const	15	07-Mar-17	27-Mar-17	10
BMPM8320762	IFB - Mech/Elec Const	0		10-Apr-17	10
BMPM8320771	Bid Period - Mech/Elec Const	30	11-Apr-17	22-May-17	10
BMPM8320781	Evaluate Bids/Neg & Award - Mech/Elec Const	20	23-May-17	20-Jun-17	10
BMPM8323951	Owner Rvw Period - Mech/Elec Const	5	21-Jun-17	27-Jun-17	10
BMPM8320801	Conform Contract/Issue - Mech/Elec Const	5	28-Jun-17	05-Jul-17	10
BMPM8320791	Issue PO - Mech/Elec Const	0		05-Jul-17	10
BMPM8320811	Vndr Submittal [Insurance/Safety/Site Info] - Mech/Elec Const	0		19-Jul-17	10
BMPM8323891	Rvw Vndr Submittals [Insurance/Safety/Site Info] - Mech/Elec Const	10	20-Jul-17	02-Aug-17	10
BMPM8323911	Vndr Updates/ Issue Final Submittals [Insurance/Safety/Site Info] - Mech/Elec Const	5	03-Aug-17	09-Aug-17	10
BMPM8320M58	Issue NTP -Mech/ElecConst	0		16-Aug-17	10



Duke Water Re-Direction Program - East Bend L3 | Standard Layout - JRW #1 | Printed: 23-Jun-16 17:03

Activity ID	Activity Name	OD	Start	Finish	Total Float
Dry Bottom Ash		230	22-May-17	19-Apr-18	-20
Construction		230	22-May-17	19-Apr-18	-20
DBA		230	22-May-17	19-Apr-18	-20
Information & Equipment Available		60	22-May-17	16-Aug-17	10
PR4310-3265	Begin Mobilization to Site - Piling Const - SFC - East Bend	0		22-May-17	30
PR4310-3255	Begin Mobilization to Site - Site Prep & Fdns - SFC - East Bend	0		13-Jun-17	30
PR4310-3275	Begin Mobilization to Site - Mech/Elec Const - SFC - East Bend	0		16-Aug-17	10
Under Boiler SFC		188	26-Jun-17	27-Mar-18	-3
Information & Equipment Available		102	24-Jul-17	18-Dec-17	-10
PR4310-050	Material On Site - Pre-Eng Metal Bldgs - Compressor/CO2 Bldg - SFC - East Bend	0		24-Jul-17	42
PR6210-050	Material On Site - Instr & Trans - SFC - East Bend	0		24-Jul-17	72
BMPC3420C76	Material On Site - Agitators - Sumps - DBA	0		21-Aug-17	67
PR2190-050	Material On Site - Misc Pumps - SFC - East Bend	0		21-Aug-17	52
PR5330-050	Material On Site - Motor Control Centers - SFC - East Bend	0		21-Aug-17	52
PR6110-050	Material On Site - DCS - SFC - East Bend	0		13-Oct-17	14
BMPM2631C178	Material On Site - Under Boiler SFC - Mech Material (DFC) - SFC - East Bend	0		27-Nov-17	-5
BMPM2631C188	Material On Site - Under Boiler SFC - Struc Material (DFC) - SFC - East Bend	0		27-Nov-17	-5
BMPM2631C198	Material On Site - Under Boiler SFC - Mech Material - SFC - East Bend	0		01-Dec-17	1
BMPM2631C208	Material On Site - Under Boiler SFC - Conveyor Piping - SFC - East Bend	0		01-Dec-17	-4
BMPM2631C218	Material On Site - Under Boiler SFC - Controls - SFC - East Bend	0		07-Dec-17	-3
BMPM2631C228	Material On Site - Under Boiler SFC - Standard Sections - SFC - East Bend	0		18-Dec-17	-20
Construction		188	26-Jun-17	27-Mar-18	-3
CN17300	Form/Pour/Strip Compressor/CO2 Bldg Fdn - East Bend	25	26-Jun-17	02-Aug-17	30
CN16970	Pour Equip Pads - East Bend	15	03-Aug-17	23-Aug-17	60
CN17310	Const Compressor/CO2 Bldg - East Bend	60	17-Aug-17	09-Nov-17	30
CN17320	Move Mech and Elec Equip into Compressor/CO2 Bldg - East Bend	10	10-Nov-17	27-Nov-17	30
CN17330	Piping & Elec Compressor/CO2 Bldg - East Bend	20	28-Nov-17	27-Dec-17	30
CN16980	Set UCC Supplied Pumps - East Bend	15	04-Dec-17	22-Dec-17	1
CN17020	Piping & Elec SFC's - East Bend	60	08-Dec-17	06-Mar-18	-3
CN16990	Set UCC Supplied SFC's - East Bend	40	19-Dec-17	15-Feb-18	-20
CN17040	Const UCC Supplied Surge Tank - East Bend	40	05-Jan-18	01-Mar-18	15
CN16870	Check-out Under Boiler SFC's - East Bend	40	31-Jan-18	27-Mar-18	-3
Transfer Piping		130	13-Oct-17	19-Apr-18	-20
Construction		130	13-Oct-17	19-Apr-18	-20
CN16900	Build Pipe Supports Boiler - East Bend	60	13-Oct-17	11-Jan-18	10
CN17220	Assemble Pipe on Supports in Boiler - East Bend	60	04-Dec-17	28-Feb-18	-4
CN17270	Tie In Pipe SFC's - East Bend	30	02-Feb-18	15-Mar-18	-20
CN17280	Retrofit Ash Hoppers - East Bend (OUTAGE)	20	16-Mar-18	12-Apr-18	-20
CN17240	Check-Out Transfer Piping - East Bend	20	23-Mar-18	19-Apr-18	-20
Startup & Commissioning DBA		30	09-Mar-18	19-Apr-18	-20
CN17290	Startup & Commissioning SFC System - East Bend	30	09-Mar-18	19-Apr-18	-20



Appendix K

Cost Estimate
(Submitted Separately)

ENG CAPITAL COST ESTIMATE
DUKE ENERGY
EAST BEND - DBA
88669.10
UNION, KY

	Area / Discipline	Direct MHRS	Labor Cost	Engr Equip/ Material Cost	Subcontract Cost	Const. Equipment Cost	Total Cost
	Equipment Supply			$3,337,000	$196,000		$3,533,000
	Equipment Install	6,480	$868,816		$500,000	$57,672	$1,426,488
	Civil				$500,000		$500,000
	Deep Foundations	1,176	$118,867	$467,902	$91,778	$31,560	$710,106
	Concrete	7,142	$667,201	$328,738	$92,520	$56,287	$1,144,746
	Structural Steel	877	$109,778	$143,262		$10,524	$263,564
	Architectural	878	$92,960	$91,570	$269,825	$13,177	$467,532
	Coatings						
	Piping	15,366	$1,921,867	$314,564	$1,725	$115,245	$2,353,401
	Insulation				$20,760		$20,760
	Electrical	13,374	$1,510,328	$466,573	$322,938	$99,630	$2,399,470
	Instrument & Control	731	$81,357	$78,277		$5,479	$165,113
	Misc Directs	750	$87,127		$250,000	$5,625	$342,752
	Total Direct Cost	**46,774**	**$5,458,302**	**$5,227,886**	**$2,245,546**	**$395,199**	**$13,326,933**

Rev.	Revision Date
0	04/01/16

	% Dir	
Construction Mgmt & Indirects	15.7%	$2,096,000
Engineering	10.7%	$1,422,535
Start-Up	5.0%	$672,000
Insurance / Surety / Permits		
Warranty	0.1%	$18,000
Escalation	2.5%	$333,173
Total Indirect Cost		**$4,541,708**
Total Direct and Indirect Costs		**$17,868,641**
	% Dir	
Project Contingency	10%	$1,786,864
Total Project Cost		**$19,655,505**
Owner Cost - General		
Owner Cost - Taxes		
Owner Cost - Owner Contingency	5%	$982,775
Total Project Cost Incl. Owner Cost		**$20,638,280**

BURNS McDONNELL

V2.0

PROJECT CLIENT: **DUKE ENERGY**
PROJECT DESC: **EAST BEND - DBA**
PROJECT # : **88669.10**

SUMMARY
EQUIPMENT SUPPLY

EST LEVEL: **STUDY**
ESTIMATE DUE DATE: **4/1/2016**
ESTIMATOR:

DESCRIPTION	LABOR MH	LABOR COST	MATERIAL COST	SUBCON COST	EQUIPMENT RENT / STS	TOTAL COST
P 2 BOTTOM ASH			2,987,000			2,987,000
P 3 MECHANICAL EQUIPMENT						
P 4 ELECTRICAL EQUIPMENT			350,000			350,000
P 5 DCS				196,000		196,000
ESTIMATE TOTALS			$3,337,000	$196,000		$3,533,000

PROJECT CLIENT: **DUKE ENERGY**
PROJECT DESC: **EAST BEND - DBA**
PROJECT # : **88669.10**

SUMMARY
INDIRECTS

EST LEVEL: **STUDY**
ESTIMATE DUE DATE: **4/1/2016**
ESTIMATOR:

DESCRIPTION	LABOR		MATERIAL	SUBCON	EQUIPMENT	TOTAL
	MH	COST	COST	COST	RENT / STS	COST
P 2 CONSTRUCTION MGMT & INDIRECTS	9,210	2,016,000		80,000		2,096,000
P 3 ENGINEERING	8,897	1,422,535				1,422,535
P 4 START-UP	2,930	661,000		11,000		672,000
P 5 INSURANCE / SURETY / PERMITS						
P 6 WARRANTY				18,000		18,000
P 7 ESCALATION				333,173		333,173
ESTIMATE TOTALS	21,037	$4,099,535		$442,173		$4,541,708

COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc.,	)	
For a Certificate of Public Convenience and	)	Case No. 2016-00268
Necessity for Dry Bottom Ash Conversion of the	)	
East Bend Generating Station	)	

DIRECT TESTIMONY OF

JOSEPH A. MILLER, JR.

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

July 28, 2016

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I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Joseph A. Miller Jr., and business address is 526 South Church Street, Charlotte, North Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC, (DEBS) as Vice President Central Engineering and Services. DEBS is a service company subsidiary of Duke Energy Corporation (Duke Energy), which provides services to Duke Energy and its subsidiaries, including Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.

A. I graduated from Purdue University with a Bachelor of Science degree in Mechanical Engineering. I also completed twelve post-graduate level courses in Business Administration at Indiana State University. My career began with Duke Energy began with Duke Energy Indian, Inc., (Duke Energy Indiana) f/k/a Public Service of Indiana, in 1991 as a staff engineer at Duke Energy Indiana's Cayuga Steam Station. Since that time, I have held various roles of increasing responsibility in the generation engineering, maintenance, and operations areas, including the role of station manager, first at Duke Energy Kentucky's East Bend Generating Station (East Bend), followed by Duke Energy Ohio's Zimmer Steam Station. I was named General Manager of Analytical and Investments Engineering in 2010 and became General Manager of Strategic Engineering in

2012 following the merger between Duke Energy and Progress Energy, Inc. I became the Vice President of Central Engineering and Services in 2014.

Q. PLEASE SUMMARIZE YOUR DUTIES AS VICE PRESIDENT OF CENTRAL ENGINEERING SERVICES.

A. In this role, I am responsible for providing direction and oversight for engineering and business services, along with strategic and technical services including environmental compliance planning, for Duke Energy's fleet of fossil and hydroelectric (hydro and collectively, fossil/hydro) facilities.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. Most recently, I provided testimony in support of the Company's application to construct a new landfill at its East Bend in Case No. 2015-0089.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I briefly describe Duke Energy Kentucky's East Bend station. I then describe and support the Company's proposal in this proceeding to convert the existing wet bottom ash handling system at East Bend to a dry ash disposal system.

II. GENERAL DESCRIPTION OF DUKE ENERGY KENTUCKY'S EAST BEND GENERATING STATION

Q. PLEASE DESCRIBE EAST BEND.

A. East Bend is a 648 megawatt (MW) (nameplate rating) coal-fired base load unit located along the Ohio River in Boone County, Kentucky, that was commissioned in 1981. Duke Energy Kentucky owns 100 percent of the station, having recently completed its purchase of the Dayton Power and Light Company's 31 percent interest in the station.

The nameplate ratings are the ratings provided by the manufacturer of the generating equipment and these ratings are actually engraved on a nameplate that is affixed to the equipment. The net ratings represent the net amount of power that we can dispatch from the plants after some portion of the gross power output is used to power the plant machinery. The net rating for East Bend is 600 MW. East Bend was originally planned for up to four coal-fired units but only one unit (Unit 2) was constructed. The station has river facilities to allow barge deliveries of coal and lime. East Bend is designed to burn eastern bituminous coal and achieved a net plant heat rate year-to-date through April 2016 of 11,135 Btu/kWh. The major pollution control features are: a high-efficiency hot side electrostatic precipitator, a lime-based flue gas desulfurization (FGD) system, and a selective catalytic reduction control (SCR) system designed to reduce nitrogen oxide (NO_x) emissions by 85 percent. The FGD system was upgraded in 2005 to increase the sulfur dioxide (SO_2) emissions removal to an average of 97 percent. The station's

electrical output is directly connected to the Duke Energy Midwest (consisting of Kentucky and Ohio) 345 kilovolt (kV) transmission system.

Duke Energy Kentucky currently operates a landfill at East Bend (East Landfill) and is in the process of constructing a replacement landfill (West Landfill), as well as an ash pond, which together are used for the storage and disposal of waste products resulting from the Company's FGD system and other waste material.

Q. IS EAST BEND USED AND USEFUL FOR SERVING DUKE ENERGY KENTUCKY'S NATIVE LOAD CUSTOMERS?

A. Yes. East Bend, as described above, has performed well and is a high quality generating asset relative to the age and condition of comparable generating plants. One useful measure of the quality of a coal-fired generating station is the equivalent availability factor, which measures the percentage of time that the station is available for operations after planned and unplanned outages and derates (which result from operational conditions) are taken into account. The equivalent availability factor for East Bend for time period 2010 through May 2016 was 79.35 percent. The average equivalent availability for coal-fired plants in the North American Electric Reliability Council (NERC) from 2010 through 2016, which is the most recent data available for 600 MW units with scrubbers, was 76.2 percent.

East Bend has been well maintained and is in good working order. Coal supplies are readily available and there are no transmission constraints.

III. DUKE ENERGY KENTUCKY'S PROPOSAL TO CONVERT TO A FULL DRY ASH HANDLING SYSTEM

Q. PLEASE BRIEFLY SUMMARIZE DUKE ENERGY KENTUCKY'S PROPOSAL IN THIS APPLICATION.

A. Duke Energy Kentucky is proposing to convert East Bend's existing wet bottom ash handling system to a dry bottom ash handling and disposal system. Today, approximately 80 percent of the ash produced at East Bend is dry fly ash. That material is mixed with the spent scrubber slurry and lime to make a stable material called Poz-O-Tec. The mixture sets up much like concrete once it is placed in the onsite East Bend Landfill. The remaining 20 percent is wet bottom ash treated and stored in an onsite ash pond impoundment (Pond). The presence of the Pond and Landfill have permitted Duke Energy Kentucky to manage its costs of providing safe and reliable electric service by eliminating the need to transport to and pay for disposal of the generator waste in commercial landfills.

Q. PLEASE EXPLAIN THE REASON DUKE ENERGY KENTUCKY IS MAKING THIS INVESTMENT AT THIS TIME.

A. To continue operation, East Bend must comply with the United States Environmental Protection Agency's (U.S. EPA) rule for Coal Combustion Residual (CCR Final Rule) storage and disposal and the Steam Electric Effluent Limitation Guidelines (ELG Final Rule). The CCR Final Rule, which became effective October 19, 2015, deals extensively with coal ash storage and disposal. The CCR and ELG Final Rules require the Company to take action to evaluate

compliance with ash handling and wastewater streams at East Bend and ensure compliance within specific deadlines.

To assist in this evaluation, Duke Energy Kentucky retained Burns & McDonnell to assist the Company in developing the strategy, scope, design, schedule, and cost estimates to ensure East Bend's continued operation in compliance with the CCR Final Rule and ELG Final Rule. This evaluation included examining all CCR- and ELG- related processes at the station to confirm compliance and developing a compliance strategy where existing processes fell short to meet specific deadlines contained in these regulations. Duke Energy Kentucky has determined that in order to maintain East Bend's commercial availability under the CCR and ELG Final Rules, specific compliance actions must occur and include conversion to dry ash handling system, installation of new wastewater streams, and eventual Pond closure and repurposing in a way that is in compliance with the CCR and ELG Final Rules' new requirements. The timing of these various actions is dependent upon the deadlines imposed within the CCR and ELG Final Rules.

Duke Energy Kentucky has determined that in order to comply with the CCR and ELG Final Rules, the Company must convert East Bend to a dry bottom ash disposal system and install new wastewater streams by April 2018 so to allow sufficient time to meet the ELG compliance deadline of November 2018. Duke Energy Kentucky's need to begin construction of the dry bottom ash disposal system is immediate given the long fabrication and acquisition lead times for some of the component parts that are necessary to complete the conversion. The

timing for the Company's eventual Pond closure is driven by the compliance requirements under the ELG for water redirection and Pond repurposing, as well as meeting CCR Final Rule closure specifications. Duke Energy Kentucky is currently evaluating Pond closure and repurposing design and engineering strategies. Although the Company is not seeking approval for the Pond closure and repurposing or water redirection in this Application, the Company does anticipate such a filing in the near future. The dry bottom ash conversion proposed now is consistent with and complimentary to future anticipated work at the site. In short, the CCR and ELG Final Rules are prompting Duke Energy Kentucky to take action now to maintain compliance and to continue to operate East Bend under these regulations in the future.

Q. PLEASE SUMMARIZE HOW THE CONVERSION TO A DRY BOTTOM ASH HANDLING AND DISPOSAL SYSTEM WILL BE ACCOMPLISHED.

A. Currently, boiler bottom ash is collected in a wet bottom ash hopper at the base of the boiler and then it is sluiced to the Pond. The CCR and ELG Final Rules will prohibit future sluicing of bottom ash to a pond. Bottom ash must be collected in a dry state and be disposed of in a landfill. The conversion of the existing wet bottom ash sluicing system will include construction of a Submerged Flight Conveyor (SFC) bottom ash removal system. The construction will require demolition of the existing bottom ash sluicing system and installation of the new under-boiler SFC for dewatering bottom ash, economizer ash, and mill rejects.

The Company will also construct a dewatered bottom ash storage area and truck load out area for trucking to the existing Landfills for final disposal.

Q. PLEASE DESCRIBE THE STATUS OF THE CURRENT LANDFILLS LOCATED AT THE EAST BEND GENERATING STATION AND WHETHER THEY CAN HANDLE THE ADDITIONAL ASH ONCE THE CONVERSION IS COMPLETED.

A. There are two permitted landfills at East Bend. The East Landfill is comprised of approximately 162 acres and has been in place since East Bend was constructed in 1981. The West Landfill, once completed, will consist of approximately 200 acres of lined landfill that is designed to accept approximately 30 years of generator waste from the East Bend Station and other sources, as permitted. Although the West Landfill has been and will continue to be designed to comply with the CCR Final Rule, the East Landfill's original construction pre-dated CCR's effective date. The East Landfill will eventually have to be closed in a manner that complies with the CCR Final Rule.

The Landfills are permitted to receive various forms of waste, including, but not limited to, FGD waste, fly ash, and bottom ash (Generator Waste), from a number of generating sources, including those generating stations currently owned and/or operated by Duke Energy Kentucky and for generating stations for other Kentucky utilities and Ohio-based electric generators. The Landfills are permitted to receive Generator Waste from sources other than East Bend to ensure that Duke Energy Kentucky has sufficient dry fly ash material available to make the Poz-O-Tec byproduct necessary to operate the station's FGD handling process. This

permitting for multiple stations is a significant benefit to the Company as Duke Energy Kentucky, at times, does not produce sufficient quantities of ash to make the Poz-O-Tec. The West Landfill design and estimated life contemplated the likely need to convert East Bend to a 100 percent dry ash disposal system eventually.

Q. PLEASE DESCRIBE THE ASH POND AT EAST BEND.

A. The Pond was also commissioned in 1981 and it has a volume of 1,844 acre feet. It is used to separate bottom ash from the water used to convey the ash from the plant before the water is discharged to the Ohio River from the pond under the National Pollutant Discharge Elimination System (NPDES) permit. The Pond is also used to treat other plant water streams, such as coal pile run-off and landfill leachate, before they are discharged under the NPDES permit. Currently, boiler bottom ash is collected in a wet bottom ash hopper at the base of the boiler and then sluiced to East Bend's Pond for storage.

Q. WHY DOES THE COMPANY NEED TO BEGIN CONSTRUCTION OF DRY ASH HANDLING SYSTEM NOW?

A. Duke Energy Kentucky needs to begin planning and acquisition for the construction of the conversion project as soon as possible so to complete the conversion in time for ELG Final Rule compliance. The Company is diligently working to align the construction with planned station maintenance outages scheduled to occur in the spring of 2018. Several of the component parts necessary for the conversion will require long fabrication lead times. The Company hopes to begin requisition of these parts immediately upon approval of

its Application and by January 2017 so to ensure delivery in late 2017 or early 2018. Because an extended outage will be required to complete the conversion, the Company is striving to accomplish the conversion as part of an already scheduled planned extended maintenance outage in the spring of 2018. By performing the work as part of the already-scheduled outage, the Company will avoid having to take an additional outage to complete the project.

Q. PLEASE EXPLAIN WHY CONVERTING THE EXISTING WET BOTTOM ASH HANDLING SYSTEM TO A DRY BOTTOM ASH HANDLING AND DISPOSAL SYSTEM IS A REASONABLE AND ECONOMIC LONG-TERM CCR AND ELG COMPLIANCE SOLUTION.

A. As I previously mentioned, in order for East Bend to continue commercial operation and supply Duke Energy Kentucky's customers, the station must comply with all applicable environmental regulations that now include the CCR and ELG Final Rules. If the Company does not make the necessary ash conversion investments, the Company will either have to find another disposal source for the wet bottom ash that is offsite and at a much higher cost or cease operations at East Bend. The ELG Final Rule makes it impossible for Duke Energy Kentucky to continue to store wet bottom ash in the Pond and will necessitate new waste water processes to be developed. The Pond in its current form and purpose cannot continue to operate under the ELG Final Rule. The ELG Final Rule will necessitate future Pond repurposing following Pond closure that will have to occur in accordance with the CCR Final Rule. The alternative is for Duke Energy

Kentucky to simply shut down East Bend and pursue alternative sources of energy and capacity to serve its customers.

Q. WILL CONVERSION TO A DRY BOTTOM ASH HANDLING AND DISPOSAL SYSTEM IMPACT THE OPERATION OF EAST BEND OR RESULT IN WASTEFUL DUPLICATION OF SERVICES?

A. No. Duke Energy Kentucky will continue to be able to provide safe, reliable, and adequate service to its customers. In fact, that is precisely why the Company is seeking to begin the conversion at this time. The Company intends to perform the work necessary to convert the wet bottom ash system during an upcoming scheduled outage in the spring of 2018. Duke Energy Kentucky intends to have the new handling system fully operational in time for ELG Final Rule compliance so to ensure there is no interruption of service or impact to the plant's operation.

As explained by Company witness, Tammy Jett, the ELG Final Rule is creating additional restrictions on the generator wastewater streams and is impacting disposal of generator waste from coal combustion facilities. There is no wasteful duplication because the new processes are necessary under environmental regulations that make the existing wet bottom ash handling processes obsolete and non-compliant. The practical impact of these regulations is to change the handling of coal combustion byproducts, drive the closure of existing ash ponds, and the elimination of wet bottom ash disposal across the industry. Duke Energy Kentucky estimates, based upon known information, that it will likely have to initiate Pond closure activities in the near future to timely repurpose the Pond and accommodate new water processes required under the

ELG Final Rule. The Company must act now to ensure the continued operation of East Bend by addressing its waste disposal systems.

Q. HAS DUKE ENERGY KENTUCKY ACQUIRED THE NECESSARY ENVIRIONMENTAL PERMITS TO PERFORM THE CONVERSION TO FULL DRY ASH DISPOSAL?

A. Yes. The Company's current waste disposal permits allow the disposal of dry ash through the onsite East Bend landfill. The detail is included in the Kentucky Division of Waste Management Permit number SW00800006 as Exhibit 2 to the Company's Application in this proceeding. The Company will also seek to obtain a minor modification to its existing Title V for the additional fugitive dust that will be created. The Company has included a copy of its application for minor modification to the Kentucky Division for Air Quality as Exhibit 3 to its Application. No additional permitting is necessary to accomplish this conversion. The Company's West Landfill, as explained in Case No. 2015-0089, was designed with CCR regulation compliance in mind.

Q. IS THE NEED TO CONVERT TO A DRY BOTTOM ASH DISPOSAL SYSTEM A RECENT DEVELOPMENT?

A. It is a relatively new development in that the impetus for the investment and change is the recent enactment and effective date of the U.S. EPA's CCR and ELG Final Rules. With the passage of both the CCR and ELG Final Rules, Duke Energy Kentucky was compelled to begin various analysis of its ash handling systems and Pond to determine compliance. This analysis is multi-faceted, has taken many months, and continues today.

Q. WILL THE CONVERSION TO A DRY BOTTOM ASH HANDLING SYSTEM ADDRESS DUKE ENERGY KENTUCKY'S ENTIRE FUTURE GENERATOR WASTE DISPOSAL NEEDS?

A. As I previously mentioned, Duke Energy Kentucky will eventually have to conduct additional redirection work and close and repurpose the Pond in a manner complying with the CCR Final Rule for purposes of ELG Final Rule compliance. The Company anticipates filing an application with the Commission to begin that work in the coming months once designs are completed and permit applications are completed. Together, the conversion and the eventual water redirection and repurposing of the Pond will allow East Bend to continue operating under a CCR/ELG restricted world.

Q. DO YOU BELIEVE IT IS IN THE PUBLIC INTEREST FOR DUKE ENERGY KENTUCKY TO CONVERT EAST BEND TO THE DRY BOTTOM ASH HANDLING SYSTEM?

A. Yes. As I previously stated, East Bend provides necessary and low-cost base load capacity and energy to Duke Energy Kentucky's customers. In order to continue to operate East Bend, it must comply with all applicable environmental regulations, including the CCR and ELG Final Rules. The conversion to a complete dry bottom ash handling system is a reasonable and cost effective compliance strategy that will allow East Bend to continue to serve our customers.

IV. FILING REQUIREMENTS SPONSORED BY WITNESS

Q. PLEASE DESCRIBE THE FILING REQUIREMENTS YOU SPONSOR.

A. I sponsor portions of Duke Energy Kentucky Exhibit 4, to the Company's Application, Duke Energy Kentucky's Project Definition Report for Dry Bottom Ash Conversion addressing the need and scope of the project.

V. CONCLUSION

Q. WAS EXHIBIT 4 TO THE COMPANY'S APPLICATION PREPARED BY YOU OR AT YOUR DIRECTION?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF NORTH CAROLINA)
) SS:
COUNTY OF MECKLENBURG)

The undersigned, Joseph A. Miller Jr., Vice President Central Engineering and Services, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and they are true and correct to the best of his knowledge, information, and belief.

Joseph A. Miller Jr., Affiant

Subscribed and sworn to before me by Joseph A. Miller Jr. on this 28th day of July, 2016.

EVELYN G ROSEMAN NOTARY PUBLIC MECKLENBURG COUNTY, NC

Evelyn G Roseman
NOTARY PUBLIC

My Commission Expires: Aug. 18, 2019

COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc.,	)	
For a Certificate of Public Convenience and	)	Case No. 2016-00268
Necessity for Dry Bottom Ash Conversion of the	)	
East Bend Generating Station	)	

DIRECT TESTIMONY OF

BRANDON DELIS

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

July 28, 2016

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PAGE

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Brandon Delis and my business address is 526 South Church Street, Charlotte, North Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC, (DEBS) as Director Generation Strategic Engineering Programs. DEBS provides various administrative and other services to Duke Energy Kentucky, Inc., (Duke Energy Kentucky or the Company) and other affiliated companies of Duke Energy Corporation (Duke Energy).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.

A. I have a Bachelor of Science in Mechanical Engineering from the University of Kentucky and am a licensed professional engineer in the Commonwealth of Kentucky. I have been with Duke Energy for 16 years and have held various positions in engineering, project management, and operational management.

Q. PLEASE SUMMARIZE YOUR DUTIES AS DIRECTOR GENERATION STRATEGIC ENGINEERING PROGRAMS.

A. I manage a team of engineers and program managers who develop solutions for challenges that impact Duke Energy's regulated utility generation fleet. This includes, but is not limited to, developing compliance strategies for environmental regulations impacting Duke Energy's electric generating assets.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to support the Company's Application for a certificate of public convenience and necessity (CPCN) by providing detail on the analysis, design, cost estimates, and considerations that lead to the Company's proposal to convert to a dry bottom ash handling system at Duke Energy's East Bend Generating Station (East Bend).

II. DISCUSSION

Q. PLEASE PROVIDE A BRIEF OVERVIEW OF THE CURRENT ASH HANDLING PROCESSES AT EAST BEND.

A. East Bend is the only coal-fired and base load resource in Duke Energy Kentucky's generating portfolio. The coal combustion byproducts from East Bend are currently disposed of in an onsite landfill owned and maintained by Duke Energy Kentucky that consists of the existing East Landfill and the soon to be completed West Landfill (collectively the Landfill). Wet ash is stored at the onsite ash pond impoundment (Pond) in compliance with the existing permits issued by the Kentucky Division of Waste Management.

The Landfill is designed to have sufficient capacity to accept approximately 30 years of generator waste from the East Bend Station and other sources, as permitted.

The onsite Pond was also commissioned in 1981 and it has a volume of 1,844 acre feet. It is used to separate bottom ash from the water used to convey the ash from the plant before the water is discharged to the Ohio River from the pond. The pond is also used to treat other plant wastewater streams, such as coal pile run-off and landfill leachate, before they are discharged. Currently, boiler bottom ash is collected in a wet bottom ash hopper at the base of the boiler and then sluiced to East Bend's Pond.

Approximately 80 percent of the ash produced at East Bend is dry fly ash. That material is mixed with the spent scrubber slurry and lime to make a stable material called Poz-O-Tec. The mixture sets up much like concrete once it is placed in the Landfill. The remaining 20 percent is bottom ash treated and stored in the Pond. The presence of the Pond and Landfill enable Duke Energy Kentucky to manage its costs of providing safe and reliable electric service by eliminating the need to transport to and pay for disposal of the generator waste in commercial landfills.

Q. PLEASE EXPLAIN THE POZ-O-TEC DISPOSAL PROCESS.

A. As I previously described, the dry fly ash material produced by East Bend is mixed with the spent scrubber slurry and lime to make a stable material called Poz-O-Tec. This is done in an on-site waste stabilization plant (WSP) located near the current East Landfill. The mixture sets up much like concrete and is placed in the onsite Landfill. The Poz-O-Tec product is necessary to stabilize and solidify the slurry for proper waste disposal. On average, the station produces a greater volume of the slurry than it does dry fly ash. Therefore, based upon the station's

generation, East Bend must be able to receive additional fly ash waste from other sources to make sufficient Poz-O-Tec to dispose of the slurry.

Q. PLEASE SUMMARIZE THE PRIMARY DRIVER OF COMPANY'S PROPOSAL TO CONSTRUCT A NEW ASH HANDLING AND DISPOSAL PROCESS AT EAST BEND.

A. As more fully explained by Duke Energy Kentucky witness, Tammy Jett, East Bend must comply with the United States Environmental Protection Agency's (U.S. EPAs) rules for Steam Electric Effluent Limitation Guidelines (ELGs) and Coal Combustion Residual (CCR) storage and disposal in order to continue operation. To develop its compliance strategy, Duke Energy Kentucky retained Burns & McDonnell to assist in developing the scope, design, schedule, and cost estimates to bring East Bend Station into compliance with the CCR and ELG Final Rules. Because the combination of the CCR and ELG Final Rules will prohibit future sluicing of bottom ash to a pond, the existing bottom ash must soon be collected in a dry state and be disposed of in a landfill and the Pond will eventually have to be closed for repurposing under the ELG Final Rule. Exhibit 4 to the Company's Application is the Project Definition Report for Dry Bottom Ash Conversion (Conversion Report).

Q. PLEASE EXPLAIN THE CONVERSION REPORT.

A. The Conversion Report includes the design, basis, and scope of the dry bottom ash conversion project for East Bend. The Conversion Report defines the design scopes of all major components of the project and supports the design for the equipment to be used, the configurations, the contracting approach, a project

schedule, and projected cost estimates. The Appendices to the Conversion Report include the maps, designs, plans, and specifications required for submittal of the Company's CPCN request to the Kentucky Public Service Commission.

Q. DID THE COMPANY CONSIDER ANY ALTERNATIVES TO CONVERTING EAST BEND TO A DRY ASH HANDLING SYSTEM?

A. Yes. The Company investigated installing new CCR compliant impoundments as well as both under boiler solutions and remote systems where bottom ash would still be sluiced into a remote dewatering device. The under-boiler solutions considered included submerged flight conveyors, and pneumatic and vibratory conveying. The remote systems evaluated included submerged flight conveyors and dewatering bins.

Q. PLEASE EXPLAIN WHY THE COMPANY DETERMINED THAT THE DRY ASH CONVERSION PROJECT WAS THE BEST COMPLIANCE ALTERNATIVE CONSIDERED.

A. The Company developed conceptual construction and Operations and Maintenance (O&M) costs of all options previously described. The under-boiler submerged flight conveyor proved to be the most economic choice of all options.

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSAL TO CONSTRUCT A NEW ASH HANDLING AND DISPOSAL PROCESS AT EAST BEND.

A. Exhibit 4, the Conversion Report, contains the plans detailing the construction of the dry ash conversion. The recommended plant modifications to East Bend were developed after a review and evaluation of CCR and ELG Final Rule requirements. The construction includes demolition of the existing bottom ash

sluicing system and installing a new under-boiler submerged flight conveyor (SFC) for dewatering bottom ash, economizer, and pyrites. The project will provide a dewatered bottom ash storage area and truck load out area for trucking the dewatered bottom ash to the onsite landfill for final disposal.

Q. WHEN WILL THE CONVERSION ACTUALLY TAKE PLACE?

A. The bulk of this work will occur during an extended scheduled outage in spring 2018. Work that can be accomplished with the unit on line will occur prior to the outage. The construction schedule contained in Appendix J of the Conversion Report is based upon completion of the SFC no later than May 2018.

Q. PLEASE BRIEFLY EXPLAIN WHY THE COMPANY NEEDS TO BEGIN CONSTRUCTION ON THE DRY ASH CONVERSION.

A. As I previously mentioned, the driver for the conversion is the need to bring East Bend into compliance with the CCR and ELG Final Rules. East Bend must meet ELG requirements for water runoff by November 2018. In order to accomplish that goal, the station needs to be converted to a dry bottom ash handling system in advance of that date. Duke Energy Kentucky is targeting the conversion to occur and be completed in the spring of 2018, during a scheduled outage and well in advance of the date to bring the Pond into ELG compliance or closure under the CCR Final Rule. The schedule is highly dependent upon the early procurement of long lead major plant equipment, including the dry bottom ash equipment.

Q. WHAT IS THE ESTIMATED COST OF THE DRY ASH CONVERSION?

A. The fully loaded estimated cost of construction for the dry ash conversion is approximately $23 million. The detailed project budget for contract labor and

costs (before Company labor and overhead allocation) is detailed in Appendix K to the Conversion Report. The total costs, including Company labor, are estimated as follows:

East Bend Dry Bottom Ash Conversion Estimate

AFUDC Debt	$ 423,067
AFUDC Equity	$ 2,372
	$ 425,439
Additions	
Duke Internal Cost	
Company Labor	$ 271,864
Labor Loading	$ 202,361
Overheads	$ 651,577
	$ 1,125,802
Contract	
Engineered Equipment	$ 3,533,000
Contract Labor (Engineering & Start-up Support)	$ 2,086,808
Contract Labor (Construction)	$ 11,889,933
	$ 17,509,741
Total Additions	**$ 18,635,543**
Retirement	
Contract Labor (Construction)	$ 1,051,017
Overheads	$ 37,837
	$ 1,088,854
Subtotal	$ 20,149,836
Contingency	$ 3,022,475
Est. Project Total	**$ 23,172,311**

Q. WHAT IS THE ESTIMATED ONGOING COST OF OPERATION ONCE THE CONVERSION IS COMPLETED?

A. The estimated ongoing costs of operation once the project is completed is as follows:

- Estimated annual trucking cost of fly ash to the landfill and placement - $480,000 per year;
- Estimated incremental cost to truck dry bottom ash to landfill - $240,000 per year;
- Estimated incremental cost to move bottom ash from the Pond to the landfill for constructive use -$240,000 new incremental cost; and
- Estimated equipment maintenance cost (*e.g.,* general maintenance and chain replacements) -$310,000 per year:
    - $300,000 per year incremental O&M cost for equipment to be removed; and
    - $10,000 per year incremental O&M cost over the existing system.

Q. HOW WERE THESE COSTS DETERMINED?

A. The basis of equipment costs were estimated by Duke Energy Kentucky's engineering consultant and came from vendor pricing that was received for the under-boiler SFC equipment. Construction estimates were based upon in-house pricing information and industry standard pricing for construction commodities and indirect costs. Additionally, Duke Energy over-heads and labor were applied

where appropriate as well as contractor labor estimates based upon budgetary bids.

Q. DO YOU BELIEVE THE DRY BOTTOM ASH CONVERSION IS A NECESSARY AND PRUDENT INVESTMENT FOR DUKE ENERGY KENTUCKY?

A. Yes. Duke Energy Kentucky must take action if it wants to continue to use East Bend to supply base load generation for its Kentucky customers. East Bend is a reliable, well maintained, and reasonably priced unit. The dry bottom ash conversion will allow Duke Energy Kentucky to continue to operate and run the plant in the near term under currently known environmental regulations. Without this investment, the Company could no longer operate East Bend without finding some other source of treatment and disposal of the wet bottom ash produced at the station. The Company simply is unable to continue to use its Pond as it once was under prior environmental regulations.

III. FILING REQUIREMENTS SPONSORED BY WITNESS

Q. PLEASE DESCRIBE THE FILING REQUIREMENTS YOU SPONSOR.

A. I sponsor portions of Exhibit 4, the Conversion Report, which includes information detailing the project construction costs, and engineering design, and well as analysis performed to determine the dry ash conversion is a reasonable and necessary investment.

IV. CONCLUSION

Q. WAS EXHIBIT 4 TO THE COMPANY'S APPLICATION PREPARED BY YOU OR AT YOUR DIRECTION?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF NORTH CAROLINA)
) SS:
COUNTY OF MECKLENBURG)

The undersigned, Brandon Delis, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and they are true and correct to the best of his knowledge, information, and belief.

Brandon Delis, Affiant

Subscribed and sworn to before me by Brandon Delis on this 28th day of July, 2016.

EVELYN G ROSEMAN NOTARY PUBLIC MECKLENBURG COUNTY, NC

Evelyn G. Roseman
NOTARY PUBLIC

My Commission Expires: Aug 18, 2019

COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc.,	)	
For a Certificate of Public Convenience and	)	Case No. 2016-00268
Necessity for Dry Bottom Ash Conversion of the	)	
East Bend Generating Station	)	

DIRECT TESTIMONY OF

DANIEL HARTMANN

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

July 28, 2016

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PAGE

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Daniel Hartmann and my business address is 139 East Fourth Street, Cincinnati, Ohio.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC, (DEBS) as Lead Engineer. DEBS provides various administrative and other services to Duke Energy Kentucky, Inc., (Duke Energy Kentucky or the Company) and other affiliated companies of Duke Energy Corporation (Duke Energy).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.

A. I have a Bachelor of Science in Mechanical Engineering and I am a Certified Project Manager and Professional Engineer registered in Ohio. I have been with Duke Energy for 28 years and have held various engineering and management positions.

Q. PLEASE SUMMARIZE YOUR DUTIES AS LEAD ENGINEER.

A. I am the project manager for the East Bend Dry Bottom Ash Conversion project.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide detail on the construction, and impact to current operations, of the dry ash handling and disposal system that is to be constructed at Duke Energy's East Bend Generating Station (East Bend).

II. DISCUSSION

Q. PLEASE SUMMARIZE THE COMPANY'S APPLICATION IN THIS PROCEEDING.

A. Duke Energy Kentucky is seeking approval of a certificate of public convenience and necessity (CPCN) to construct a new ash handling and disposal process intended to convert the existing bottom ash pond storage to a complete dry ash handling system that will enable direct bottom ash disposal in the onsite landfills at East Bend (Landfills).

Q. PLEASE BRIEFLY EXPLAIN WHY A CONVERSION TO A DRY BOTTOM ASH HANDLING SYSTEM IS NEEDED.

A. There are two primary forms of ash, a coal combustion byproduct, produced at East Bend. Approximately 80 percent of the ash produced at East Bend is fly ash. Fly ash is collected in dry form at East Bend. That material is mixed with the spent scrubber slurry and lime to make a stable material called Poz-O-Tec, which sets up much like concrete and is placed in the Landfills. The remaining 20 percent is bottom ash and is currently stored in the onsite ash pond (Pond). It is my understanding that based upon recently enacted regulations by the United States Environmental Protection Agency (U.S. EPA), namely the Steam Electric Effluent Limitation Guidelines (ELG Final Rule) and Coal Combustion Residual (CCR Final Rule), Duke Energy Kentucky must take action to change its

handling, storage, and disposal of bottom ash in order to continue operation at East Bend.

Q. PLEASE DESCRIBE HOW THE NEW ASH HANDLING AND DISPOSAL PROCESS AT EAST BEND WILL BE CONSTRUCTED.

A. The project scope includes conversion of the existing wet bottom ash sluicing system to a Submerged Flight Conveyor (SFC) bottom ash removal system. This will require demolition of the existing bottom ash sluicing system and installation of a new SFC for dewatering of bottom ash, economizer ash, and pyrites. The conversion will also require the construction of a dewatered bottom ash storage area and truck load out area for transporting the dry ash to the onsite landfill for final disposal.

The new under-boiler SFC will be installed in the existing boiler building, beneath the existing boiler, in place of the existing wet bottom ash hoppers. The existing wet bottom ash hoppers and wet economizer ash hopper will be demolished and replaced by the new under-boiler SFC. The conversion will also include interconnecting piping for the under-boiler conveyor, new pyrites piping, and dry economizer ash handling. It will also include additional interconnects with existing plant piping systems such as service water and compressed air required to support the new facility.

The design of the loading area will provide adequate space (minimum 100 feet beyond the bunker) for removal of ash from the bunker, front end loader working space and truck loading. Existing site access roads will be utilized to

access the bottom ash stack out bunker. The existing roads on the East Bend campus will require improvement for the high volume ash-haul truck traffic.

Existing soot blowing air receivers, soot blowing air dryers, and Carbon Dioxide (CARDOX) fire protection system will need to be relocated to provide the new SFC a path out of the building. This equipment, and associated piping, will be relocated to a new pre-engineered building to the southeast of its existing location, outside the boiler building.

The power supply for the under-boiler SFC equipment will be from existing spare breakers in flue-gas desulfurization (FGD) 4.16 kiloVolt (kV) Switchgear 24SR-1 & 24SR-2 located in the FGD 4.16 kV Switchgear Room. These breakers will feed two station service transformers at the new Air Receiver Building. The transformers will step the voltage down to 480 Volts and feed two new 480 Volt Motor Control Centers that will be located in an electrical room of the air receiver building.

The SFC will be controlled by the plant Distributed Control System (DCS). Spare Input/Output (I/O) or additional cards will be added to the existing DCS cabinets to control the breakers in the FGD 4.16 kV switchgear room that will feed the new air receiver building. New DCS controller and cabinets will be installed in the new air receiver building. All of the I/O for the bottom ash dewatering equipment will be wired to this location. The new controller will be tied back to the existing Ovation DCS network.

Exhibit 4 to the Company's Application is the Project Definition Report for Dry Bottom Ash Conversion (Conversion Report), which among other things,

contains a map depicting the precise location of the construction and project scope and includes the system flow diagrams and general arrangements drawings and plans that detail the dry ash conversion.

Q. WILL ANY ADDITIONAL RELATED WORK OCCUR AS PART OF THE ASH CONVERSION?

A. Yes. In addition to the conversion itself, Duke Energy Kentucky is planning to start excavation of the bottom ash currently being stored in the Pond for ultimate disposal in the Landfill. It is my understanding that the ELG Final Rule will require water redirection and the eventual repurposing of the Pond in the near future. The Pond repurposing will trigger closure requirements in accordance with the CCR Final Rule. Duke Energy Kentucky is currently evaluating necessary water redirection and Pond repurposing strategies along with Pond closure requirements under both the ELG and CCR Final Rules, respectively. Although the Company is not requesting a CPCN for actual water redirection and Pond closure and repurposing at this time, the Company anticipates filing such an application once engineering design is completed. Nonetheless, the removal of the bottom ash from the Pond is necessary in accordance with existing permits. It is my understanding that the Pond is not permitted as an ultimate waste disposal site and that additional permitting would be necessary if the Company were to use the Pond to permanently dispose of existing bottom ash. Existing permits contemplate that the stored wet bottom ash would eventually be disposed of in the Landfill, not the Pond. The Company intends to commence this excavation now so there is ample time to complete the ash removal relative to compliance with any eventual

Pond closure activities that will likely have to occur under the CCR Final Rule as early as April 2019.

Q. WHEN WILL THE DRY ASH CONVERSION CONSTRUCTION ACTUALLY TAKE PLACE?

A. The bulk of this work will occur during an extended scheduled outage in spring of 2018. Work that can be accomplished with the unit on line will occur prior to the outage.

Q. PLEASE BRIEFLY EXPLAIN WHY THE COMPANY NEEDS TO BEGIN CONSTRUCTION ON THE DRY ASH CONVERSION AT THIS TIME.

A. The driver for the conversion is the need to bring East Bend into compliance with the CCR and ELG Final Rules. The Pond must meet ELG requirements for water runoff and waste water streams by November 2018. This means that the Company's ability to discharge sluice water into the Pond will cease at that time. Additionally, it is my understanding that the CCR Final Rule may also place an additional timing constraint upon the Pond's operation if it fails certain groundwater statistical exceedance testing that is currently in process. The CCR Final Rule may accelerate the need to discontinue wastewater discharge to April 2019 if the Pond data shows it does not meet CCR requirements. In either event, the Company must have an alternative process in place in order to continue operating the station and to handle coal combustion byproducts.

In order to accomplish that goal, the station needs to be converted to a dry ash handling system in advance of the aforementioned compliance dates. Duke Energy Kentucky is targeting the conversion to occur and be completed during a

planned maintenance outage in the spring of 2018, well in advance of the date to bring the Pond into ELG and, if required, CCR compliance. The need to start construction soon is driven by the long lead-times for fabrication and procurement of key component parts necessary to complete the conversion as well as, ensuring that alternative processes are constructed and in place in advance of any deadlines to discontinue existing processes that will not be permitted in the future. The parts that will require long lead-times in terms of procurement include the SFC hopper, transition hopper to the existing boiler, hydraulic power unit that drives the SFC, transformers, motor control centers, and other control equipment. Duke Energy Kentucky must begin this procurement process to ensure that all components and equipment is available in advance of the spring 2018 construction.

III. FILING REQUIREMENTS SPONSORED BY WITNESS

Q. PLEASE DESCRIBE THE FILING REQUIREMENTS YOU SPONSOR.

A. I sponsor portions of Exhibit 4, which includes a map of the East Bend station that depicts the location of the ash conversion and the design plans including the system flow diagrams and general arrangements drawings detailing the scope of the dry ash conversion.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, Daniel Hartmann, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and they are true and correct to the best of his knowledge, information, and belief.

Daniel Hartmann, Affiant

Subscribed and sworn to before me by Daniel Hartmann on this 28th day of July, 2016.

NOTARY PUBLIC

ADELE M. FRISCH
Notary Public, State of Ohio
My Commission Expires 01-05-2019

My Commission Expires: 1/5/2019

COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc.,	)	
For a Certificate of Public Convenience and	)	Case No. 2016-00268
Necessity for Dry Bottom Ash Conversion of the	)	
East Bend Generating Station	)	

DIRECT TESTIMONY OF

TAMMY JETT

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

July 28, 2016

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I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Tammy Jett and business address is 139 East Fourth Street, Cincinnati, Ohio 45202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC (DEBS) as a Principal Environmental Specialist in the CCP (Coal Combustion Products) Environmental Programs Department. DEBS is a service company subsidiary of Duke Energy Corporation (Duke Energy), which provides services to Duke Energy and its subsidiaries, including Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.

A. I received a Master's Degree in Environmental Science from Miami University in 1989. I have also earned a Bachelor's Degree in Urban Ecology and an Associate's Degree in Psychology from Thomas More College in 1987. I began my career with The Cincinnati Gas & Electric Company in 1989 as an Intern as part of my graduate degree curriculum. I was hired as a Junior Licensing Specialist in 1989 after my internship was completed. I have held a number of environmental compliance-related positions over the last 25 years in the environmental organizations, within what is now call Duke Energy. These positions involved increasing responsibility and include Regulatory Compliance Coordinator, Environmental Scientist III, and Senior and Lead Environmental Specialist. In 2015, I was promoted to Principal Environmental Specialist, which

is the highest technical (non-managerial) position currently available in the Duke Energy environmental organization.

Q. PLEASE SUMMARIZE YOUR DUTIES AS PRINCIPAL ENVIRONMENTAL SPECIALIST.

A. As Principal Environmental Specialist, I am the subject matter expert for environmental coal ash compliance for the Duke Energy Kentucky and Ohio generating stations. I have responsibility for permitting and specializing in all facets of the coal ash program. I obtain permits for the Company's coal ash facilities, such as coal ash landfills, and then assist with monitoring, record keeping, reporting, and other facets of our compliance program. I am also responsible for reviewing new federal and state regulations, which include the regulation of coal ash, such as the United States Environmental Protection Agency's (U.S. EPA) Coal Combustion Residual (CCR) rule and the Kentucky Special Waste rules, among others, and determining their impact on our generating coal ash facilities. I am involved in strategic planning across all the Duke Energy service areas, including Ohio, Kentucky, Indiana, North Carolina, South Carolina and Florida, for federal coal ash compliance issues.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I last provided testimony in Case No. 2015-00089 supporting Duke Energy Kentucky's request for a Certificate of Public Convenience and Necessity for construction of its West Landfill at the East Bend Generating Station (East Bend).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to discuss the environmental requirements applicable to the Company's operation of East Bend that specifically relate to the construction and conversion to a dry ash handling and disposal system. In doing so, I provide an overview of the environmental controls that exist today at East Bend and the regulations that require such controls. I also discuss how East Bend complies with the current environmental regulations and how the conversion is necessary for East Bend's continued compliance with these regulations.

II. GENERAL DESCRIPTION OF ENVIRONMENTAL CONTROLS AT DUKE ENERGY KENTUCKY'S EAST BEND GENERATION STATION

Q. PLEASE DESCRIBE THE ENVIRONMENTAL CONTROLS AT EAST BEND.

A. East Bend is designed to burn low- to high-sulfur eastern bituminous coal. The major environmental and pollution control features are: a mechanical draft cooling tower, a high-efficiency hot side electrostatic precipitator, a lime-based flue gas desulfurization (FGD) system, low nitrogen oxide (NO_x) burners and a selective catalytic reduction control (SCR) system. The SCR is designed to reduce NO_x emissions by approximately 85 percent. The FGD system was upgraded in 2005 to increase the sulfur dioxide (SO_2) emissions removal capability to about 97 percent. The station electrical output is directly connected to the Duke Energy Midwest (consisting of Kentucky and Ohio) 345 kilovolt (kV) transmission system.

Q. PLEASE DESCRIBE HOW ASH IS CURRENTLY HANDLED AT EAST BEND.

A. Duke Energy Kentucky currently operates one landfill at East Bend and is in the process of constructing another onsite landfill (Landfills), which are being and will used for the disposal of materials and ash resulting from the Company's FGD process and other CCR-producing processes. Depending upon generation output, East Bend produces approximately 1.3 million tons of Poz-O-Tec, including approximately 156,000 tons of fly ash annually. The Poz-O-Tec is a mixture of FGD solids, fly ash, and lime that sets up much like concrete, and is placed in the East Landfill. The remaining 20 percent of CCR material is bottom ash. This bottom ash is treated in an ash pond located on site at East Bend.

Q. PLEASE DESCRIBE THE EAST BEND LANDFILLS.

A. There are two permitted landfills at East Bend. The East Landfill is comprised of approximately 162 acres and has been in place since East Bend was constructed in 1981. The West Landfill, once completed, will consist of approximately 200 acres of lined landfill that is designed to accept approximately 30 years of CCR waste from the East Bend Station and other permitted sources, as needed, to make fixated scrubber sludge. Although the West Landfill has been and will continue to be designed to comply with CCR, the East Landfill's original construction pre-dated CCR's effective date. The East Landfill will eventually have to be closed in a manner that complies with the CCR rule.

The Landfills are permitted to receive various forms of CCR waste, including, but not limited to, FGD waste, fly ash and bottom ash (Generator Waste), from a number of generating sources, including those generating stations currently owned and/or operated by Duke Energy Kentucky and from generating stations owned by other Kentucky utilities and Ohio-based electric generators.

The other generating sources are permitted for disposal in the East Bend landfills primarily as fly ash sources to be used in the Poz-O-Tec process since East Bend does not produce enough fly ash needed for Poz-O-Tec production. The presence of the Landfills has permitted Duke Energy Kentucky to manage its costs of environmental compliance and provide safe and reliable electric service by eliminating the need to transport and pay for sending generator waste to commercial landfills.

Q. PLEASE BRIEFLY DESCRIBE THE ASH POND LOCATED AT EAST BEND.

A. The ash pond located at East Bend (Pond) was commissioned in 1981 and it has a volume of 1,844 acre feet. The Pond receives bottom ash from the bottom of the boiler that is sluiced to the Pond with water. While residing in the Pond, the bottom ash separates from the water used to convey the ash from the plant before the water is discharged to the Ohio River from the Pond in accordance with a National Pollutant Discharge Elimination System (NPDES) permit. The Pond is also used to treat other plant water streams, such as coal pile run-off and landfill leachate, before they are discharged under the NPDES permit.

Q. PLEASE DESCRIBE DUKE ENERGY KENTUCKY'S ASH CONVERSION PROPOSAL.

A. Duke Energy Kentucky is proposing to convert its wet bottom ash handling system to a dry ash handling system. As part of this conversion, bottom ash would no longer be transported/sluiced to the ash pond. Instead, the material will be transferred directly to the onsite landfills.

Q. HAS DUKE ENERGY KENTUCKY RECEIVED THE NECESSARY PERMITS FOR THE CONSTRUCTION OF DRY ASH CONVERSION?

A. Yes. Duke Energy Kentucky will not need any additional permits to convert to the dry ash handling system. This authority is already contained in existing station permits. The Company has received a permit from the Kentucky Division of Waste Management, Permit number SW00800006. This permit, along with Kentucky Department for Environmental Protection application form number 7094A, details the various forms of waste that can be disposed of in the onsite Landfills, including, but not limited to, FGD waste, fly ash, and bottom ash from a number of generating sources, including those generating stations currently owned and/or operated by Duke Energy Kentucky as well as other generating sources. These permitted sources include, but are not limited to, the East Bend and Miami Fort 6 Generating Stations owned by Duke Energy Kentucky, the Spurlock Generating Station owned by East Kentucky Power Cooperative, the Ghent Generating Station owned by Kentucky Utilities Company, the Zimmer, and Miami Fort stations owned by Dynegy Inc., the Beckjord Station owned by Duke Energy Ohio, and the Killen Station owned by the Dayton Power and Light

Company (collectively Permitted Stations).[1] The other generating sources are permitted for disposal in the East Bend landfills primarily as fly ash sources to be used in the Poz-O-Tec process because East Bend does not produce enough fly ash alone.

Finally, Duke Energy Kentucky will need to receive a minor modification to its existing Title V air permit due to additional fugitive particulate emissions. Duke Energy Kentucky has applied for this minor permit modification. The Company's current permit is included as Exhibit 2 and the Company's Application to modify its existing Title V air permit is included as Exhibit 3 to the Company's Application in this proceeding.

III. ENVIRONMENTAL REGULATIONS IMPACTING DUKE ENERGY KENTUCKY'S EAST BEND GENERATING STATION

Q. WHAT ARE THE MOST SIGNIFICANT ENVIRONMENTAL REGULATIONS CURRENTLY IMPACTING DUKE ENERGY KENTUCKY'S EAST BEND STATION?

A. There are several programs promulgated by the U.S. EPA under the Clean Air Act (CAA) that impact all of the Company's generating stations, and particularly East Bend. These regulations are the primary drivers of Duke Energy Kentucky's compliance strategies for its plants. They are as follows: the Mercury Air Toxics Standard (MATS Rule) and the Cross State Air Pollution Rule (CSAPR) including the U.S. EPA's December 2015 proposed update.

[1] The Miami Fort Generating Station has three operational units, Unit 6, 7, and 8. The Miami Fort units 7 and 8 as well as common facilities are owned by Dynegy Inc. Duke Energy Kentucky owns Unit 6, which was retired in May 2015, but Dynegy maintains Unit 6 on Duke Energy Kentucky's behalf pursuant to an approved service agreement.

The U.S. EPA Coal Combustion Residuals rule (CCR Final Rule) and Steam Electric Effluent Limitation Guidelines (ELG Final Rule), in addition to other emerging regulations under the Clean Water Act (CWA), and Green House Gas (GHG) emissions are likely to impact the Company's generating stations. The regulations that most directly impact the Company's ash handling strategies as it pertains to the landfill need and operation are the CAA and the CCR and ELG Final Rules.

Q. PLEASE BRIEFLY DESCRIBE THE CAA.

A. The CAA is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish a number of programs to regulate air emissions so as to protect public health and public welfare. Many of these programs overlap and at times regulate the same pollutants.

Q. CAN YOU PROVIDE A BRIEF SUMMARY OF THE MATS RULE?

A. The MATS Rule regulates hazardous air pollutant emissions from new and existing coal- and oil-fired steam electric generating units (EGUs) that are greater than 25 MWs in capacity. It is a command and control program that imposes unit-by-unit restrictions on emissions of mercury, acid gases such as hydrogen chloride, and certain non-mercury metals, including arsenic, chromium, nickel and selenium. The MATS Rule allows EGUs, as one option, to demonstrate compliance by measuring mercury, hydrogen chloride, and non-mercury metal emissions directly. It also allows the EGUs the option of demonstrating compliance by measuring surrogates for acid gases and for non-mercury metals.

Q. DOES EAST BEND CURRENTLY COMPLY WITH THE MATS RULE?

A. Yes. East Bend began complying with MATS Rule in April 2015.

Q. PLEASE PROVIDE A SHORT DESCRIPTION OF THE HISTORY AND STATUS OF CAIR AND CSAPR.

A. On August 8, 2011, the EPA published the final CSAPR rule to replace the existing CAIR. CSAPR established new state-level annual SO_2 and NO_x budgets and ozone-season NO_x budgets. The rule was initially scheduled to take effect January 1, 2012; however, on December 30, 2011, the D.C. Circuit stayed the rule. On August 21, 2012, the D.C. Circuit then vacated CSAPR and directed that EPA continue administering CAIR pending completion of a new rulemaking to replace CSAPR. However, on April 26, 2014, the United States Supreme Court reversed the D.C. Circuit's decision and remanded the case back to the D.C. Circuit for further proceedings. Because of the litigation, the CSAPR deadlines were tolled by three years and CSPAR ultimately went into effect on January 1, 2015. On December 3, 2015, the U.S. EPA proposed to further update and reduce ozone season NO_x allowance budget beginning in 2017. The U.S. EPA intends to finalize this change in the third quarter of 2016.

Q. HOW HAS CSAPR'S IMPLEMENTATION IMPACTED EAST BEND?

A. Because it has well performing wet FGD and SCR, East Bend has, to date, been able to comply with CSAPR without the installation of additional controls. That will likely be the case with the U.S. EPA's proposed update to the ozone season budgets beginning in May 2917, however, Duke Energy Kentucky will not know for certain until the U.S. EPA finalizes its revisions and the Company knows the requirements. Because of the restrictions on trading and the more limited

allowance budgets (particularly ozone season NO_x), the allowance prices under CSAPR could be expected to increase.

Q. PLEASE DESCRIBE THE MAJOR EFFORTS TO REGULATE GREENHOUSE GASES THAT RELATE TO ELECTRIC GENERATING UNITS.

A. In 2007, the Supreme Court ruled in *Massachusetts v. EPA*[2] that greenhouse gases are a pollutant subject to regulation under the CAA. Subsequently, the U.S. EPA undertook a number of rulemakings targeting greenhouse gas emissions from EGUs. The first was the 2010 Tailoring Rule, which required major stationary sources of greenhouse gases to obtain preconstruction and operating permits. The U.S. Supreme Court eventually rule that the U.S. EPA could only require a source to obtain a preconstruction permit for greenhouse gases if it also had to obtain a preconstruction permit for conventional pollutants such as sulfur dioxide. On April 13, 2012, the U.S. EPA proposed a rule to establish New Source Performance Standards for CO_2 emissions from new natural gas and coal-fired EGUs. Then on January 8, 2014, the U.S. EPA withdrew that proposal and proposed emission guidelines for states to follow in developing plans to address CO_2 emissions form existing fossil fuel-fired EGUs. On the same day, the U.S. EPA proposed standards of performance to limit CO_2 emissions form modified and reconstructed EGUs. The WPA finalized both rules on October 23, 2015, the former becoming known as the Clean Power Plan (CPP).

Q. PLEASE DISCUSS THE EPA'S CPP PLAN CO_2 IMPLICATIONS FOR EXISTING EGUS WITH RESPECT TO EAST BEND.

[2] *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007).

A. The CPP established an emission performance rate of 1,305 pounds of CO_2 per net megawatt-hour of electricity produced for all existing coal-fired EGUs, including East Bend. The final rule also established state-level pounds of CO_2 per net megawatt-hour of electricity produced emission performance rates and state-level mass-based annual CO_2 tonnage limits for all states. The CPP requires each state to develop and submit an implementation plan to EPA detailing how it will achieve the CO_2 emission limitations specified in the CPP. The CPP gives states the option of developing a rate-based or a mass-based implementation plan. EPA in the CPP outlined three rate-based and three mass-based approaches states can select from when developing their implementation plans.

Numerous petitions were filed with the D.C. Circuit Court challenging the legal status of the CPP. Oral arguments before the full D.C Circuit are scheduled for September 27, 2016. Regardless of that court's decision in the case, it is expected that the losing parties will seek review by the U.S. Supreme Court. If this occurs, and if the Supreme Court grants review, the final legal status of the CPP might not be settled until sometime in 2018. Meanwhile, on February 9, 2016, the U.S Supreme Court granted a stay of the CPP effective until its legal status is resolved.

The Supreme Court's stay of the CPP means that Kentucky is under no obligation at this time to develop and submit an implementation plan to EPA and will not be unless the CPP is ultimately upheld by the courts. If the CPP is ultimately overturned, there will be no obligation to reduce CO_2 emissions at East Bend. If the CPP is ultimately upheld by the courts, the September 6, 2018, date in the final CPP for states to submit final implementation plans to EPA for

approval will need to be revised. The new date will depend on when the final legal status of the CPP is resolved.

If the CPP survives legal challenge and is implemented, the regulatory requirements that would apply to East Bend will be established by the Commonwealth of Kentucky through its implementation plan. Therefore, Duke Energy Kentucky would not know the exact regulatory requirements that will apply to East Bend until the Commonwealth of Kentucky completes its implementation plan and it is approved by the U.S. EPA, which could occur as late as 2021. Duke Energy Kentucky cannot predict what regulatory requirements might ultimately apply to East Bend.

Q. PLEASE DESCRIBE THE CURRENT STATUS OF, AND THE COMPANY'S MODELING ASSUMPTIONS FOR, THE CCR AND ELG FINAL RULES.

A. In April 2009, the EPA began assessing the integrity of ash dikes nationwide, and began developing regulations to manage CCRs. CCRs primarily include fly ash, bottom ash, and FGD byproducts (typically calcium sulfate (gypsum) or calcium sulfite) that are destined for disposal. In June 2010, the EPA proposed a rule containing two options for handling CCRs: 1) as a special waste listed under the Resource Conservation and Recovery Act (RCRA) Subtitle C Hazardous Waste Regulations; and 2) as a solid waste under RCRA Subtitle D Non-Hazardous Waste Regulations. Both options included dam safety requirements and had strict new requirements regarding the handling, disposal, and beneficial use of CCRs except when reused in encapsulated applications (such as ready mix concrete and the production of wallboard).

When the EPA published its proposed ELG revisions, it indicated that it was working to integrate the ELG rule with the CCR rule. In the CCR proposal, the EPA said that there could be strong support for a conclusion that regulation of CCR disposal under RCRA Subtitle D would be adequate because of 1) potentially lower CCR risk assessment results, 2) the ELG requirements that the EPA may promulgate, and 3) increased federal oversight such requirements could achieve. The CCR Final Rule and/or ELG Final Rule will result in conversions to dry handling of fly ash and bottom ash; increased use of landfills; the closure of existing wet ash storage ponds; and the addition of alternative wastewater treatment systems. In its ELG proposal, the EPA indicated that the requirements of the two rules needed to be harmonized before either rule was released. The CCR rule was published as final as a Subtitle D, non-hazardous waste rule on April 17, 2015.

The ELG Final Rule was published on November 3, 2015. This rule sets new or additional requirements for wastewater streams from several processes and byproducts at steam electric generating plants. Some of these wastewater streams are generated at East Bend Station, including but not limited to fly ash and bottom ash wastewaters. This rule will require the Company to take action to achieve compliance that includes conversion of the existing wet ash system to a dry ash handling system. As part of converting to dry ash handling, new wastewater treatment systems must be installed. The existing Pond can no longer be used as an ash transport water treatment system. Compliance with some aspects of the CCR rule began within 6-12 months after publication, while other actions will

require 5 years or more. Compliance with the ELG Final Rule will begin as early as November 1, 2018, but no later than December 31, 2023.

As expected, the combination of ELG and CCR rule implementation require East Bend's conversion to dry ash handling (bottom ash). Additionally, these rules will require the initiation of closure of the active wet ash storage pond at East Bend; installation of balance-of-plant wastewater treatment systems; and otherwise higher operations and maintenance costs for managing CCR under more stringent disposal requirements.

Q. PLEASE EXPLAIN HOW THE CCR REGULATIONS DIRECTLY IMPACT EAST BEND'S OPERATION.

A. The CCR rule, published on April 17, 2015, includes provisions that may require the conversion to dry handling of ash and closure of the ash pond. The rule requires an altered groundwater monitoring program for the East Bend Landfills and the Pond. The results of the groundwater monitoring program may require the Company to take additional compliance actions, including but not limited to, lining or closing the Pond. The East Landfill and West Landfill will be required to have a more stringent cap design than what is currently set forth in the permit. The post-closure requirements for both the Pond and Landfills are expected to be more stringent than current standards.

Q. WILL THE CONSTRUCTION OF THE DRY BOTTOM ASH HANDLING AND DISPOSAL SYSTEM ALLOW THE COMPANY TO COMPLY THE WITH CCR AND ELG FINAL RULES?

A. Yes. Duke Energy Kentucky must have a way to handle bottom ash dry due to new prohibitions in the ELG Final Rule regarding the discharge of bottom ash

transport water. The ELG Final Rule has a "zero discharge" provision for ash transport/sluice water. The dry ash handling system will free East Bend of transport water for which it will in the future be unable to discharge when the NPDES permit is revised to prohibit such a discharge. In addition, new groundwater monitoring requirements in the CCR Final Rule may force the closure of the Pond. Converting to dry ash handling is imperative if that occurs and it remains the most reasonable and cost effective manner in which to meet both ELG and CCR requirements.

IV. FILING REQUIREMENTS SPONSORED BY WITNESS

Q. PLEASE DESCRIBE THE FILING REQUIREMENTS YOU SPONSOR.

A. I sponsor Exhibits 2 and 3, which are true and accurate copies of Duke Energy Kentucky's East Bend Special Waste Disposal Facility permit, most recently issued June 13, 2016, and the Company's Application for a minor modification to its Title V Air Permit.

V. CONCLUSION

Q. WERE EXHIBITS 2 AND 3 TO THE COMPANY'S APPLICATION PREPARED BY YOU OR UNDER YOUR DIRECTION AND CONTROL?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, Tammy Jett, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing testimony and they are true and correct to the best of her knowledge, information, and belief.

Tammy Jett

Tammy Jett, Affiant

Subscribed and sworn to before me by Tammy Jett on this 28th day of July, 2016.

Adele M. Frisch

NOTARY PUBLIC

ADELE M. FRISCH
Notary Public, State of Ohio
My Commission Expires 01-05-2019

My Commission Expires: 1/5/2019

COMMONWEALTH OF KENTUCKY
BEFORE THE
KENTUCKY PUBLIC SERVICE COMMISSION

In The Matter of:

The Application of Duke Energy Kentucky, Inc., For a Certificate of Public Convenience and Necessity for Dry Bottom Ash Conversion of the East Bend Generating Station	))))	Case No. 2016-00268

DIRECT TESTIMONY OF

WILLIAM DON WATHEN JR.

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

July 28, 2016

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is William Don Wathen Jr., and my business address is 139 East Fourth Street, Cincinnati, Ohio 45202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC (DEBS) as Director of Rates & Regulatory Strategy - Ohio and Kentucky. DEBS provides various administrative and other services to Duke Energy Kentucky, Inc., (Duke Energy Kentucky or the Company) and other affiliated companies of Duke Energy Corporation (Duke Energy).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.

A. I received Bachelor Degrees in Business Administration and Chemical Engineering, and a Master of Business Administration Degree, all from the University of Kentucky. After completing graduate studies, I was employed by Kentucky Utilities Company as a planning analyst. In 1989, I began employment with the Indiana Utility Regulatory Commission as a senior engineer. From 1992 until mid-1998, I was employed by SVBK Consulting Group, where I held several positions as a consultant focusing principally on utility rate matters. I was hired by Cinergy Services, Inc., the predecessor to DEBS, in 1998, as an Economic and Financial Specialist in the Budgets and Forecasts Department. In 1999, I was promoted to the position of Manager, Financial Forecasts. In August 2003, I was

named to the position of Director - Rates. On December 1, 2009, I took the position of Director of Rates & Regulatory Strategy - Ohio and Kentucky.

Q. PLEASE SUMMARIZE YOUR DUTIES AS DIRECTOR OF RATES & REGULATORY STRATEGY - OHIO AND KENTUCKY.

A. As Director of Rates & Regulatory Strategy - Ohio and Kentucky, I am responsible for all state and federal rate matters involving Duke Energy Kentucky and its parent, Duke Energy Ohio, Inc.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I have presented testimony on numerous occasions before the Kentucky Public Service Commission (Commission) and various other state, local, and federal regulators.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide an overview of the Company's proposed financial and accounting treatment and corresponding rate impact of the Company's proposal to construct a dry ash handling and disposal system at Duke Energy Kentucky's East Bend Generating Station (East Bend).

II. DISCUSSION

Q. PLEASE BRIEFLY DESCRIBE THE COMPANY'S APPLICATION IN THIS PROCEEDING.

A. Duke Energy Kentucky is seeking approval of a certificate of public convenience and necessity (CPCN) to construct a new ash handling and disposal process

intended to convert the existing bottom ash Pond storage to a dry ash handling system that will enable direct bottom ash disposal in the onsite landfills at East Bend.

Q. WILL THE CONSTRUCTION OF THE DRY BOTTOM ASH HANDLING SYSTEM MATERIALLY IMPACT DUKE ENERGY KENTUCKY'S FINANCIAL CONDITION?

A. No. The dry bottom ash conversion will not require an investment sufficient to materially affect Duke Energy Kentucky's financial condition.

Q. WHAT ARE THE ESTIMATED COSTS OF CONSTRUCTING THE DRY BOTTOM ASH CONVERSTION?

A. Based upon information provided by Duke Energy Kentucky witness, Brandon Delis, the fully loaded total estimated cost of construction is approximately $23 million.

Q. HOW IS THE COMPANY PROPOSING TO FINANCE THE CONVERSION?

A. The Company is proposing to finance the construction through continuing operations and, if necessary, through debt issuances.

Q. WILL THERE BE AN IMMEDIATE IMPACT TO CUSTOMER RATES WITH THE DRY BOTTOM ASH CONVERSION?

A. No. Although the Company will seek to include the cost of construction and operation and maintenance of the dry bottom ash handling system in its rates at some point, the Company is not seeking cost recovery in this Application. The Company may seek to include this project as part of an overall environmental

compliance plan and recovery mechanism pursuant to KRS 278.183 or it may simply seek recovery through a traditional base rate case. A final decision in that regard has not yet been reached; however, in either case, the Company acknowledges that Commission approval will be required in order to recover these costs.

III. FILING REQUIREMENTS SPONSORED BY WITNESS

Q. PLEASE DESCRIBE THE FILING REQUIREMENTS YOU SPONSOR.

A. I sponsor the financial exhibit contained in Exhibit 1 to the Company's Application.

Q. WAS EXHIBIT 1 TO THE COMPANY'S APPLICATION PREPARED BY YOU OR AT YOUR DIRECTION?

A. Yes.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, William Don Wathen Jr., Director of Rates & Regulatory Strategy – Ohio and Kentucky, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and they are true and correct to the best of his knowledge, information, and belief.

William Don Wathen Jr., Affiant

Subscribed and sworn to before me by William Don Wathen Jr. on this 28th day of July, 2016.

NOTARY PUBLIC

ADELE M. FRISCH
Notary Public, State of Ohio
My Commission Expires 01-05-2019

My Commission Expires: 1/5/2019