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FILE

PUCO EXHIBIT FILING

Date of Hearing: April 9, 2019

Case No. 16-0253-BTX

PUCO Case Caption:

In the Matter of the Application of Duke Energy Ohio, Inc.; for a Certificate of Environmental Compatibility and Public Need for the C314V Central Corridor Pipeline Extension.

Volume I

List of exhibits being filed:

City/County 1

NOPE 1, 4, 6, 7, 8

Blue Ash/Columbia Township 1, 2

Reporter's Signature: Karen Sue Gibson

Date Submitted: 4-12-2019

BEFORE THE OHIO POWER SITING BOARD

\- - -

In the Matter of the :
Application of Duke Energy :
Ohio, Inc., for a :
Certificate of Environmental: Case No. 16-0253-GA-BTX
Compatibility and Public :
Need for the C314V Central :
Corridor Pipeline Extension :
Project. :

\- - -

PROCEEDINGS

before Ms. Greta See and Ms. Sarah Parrot, Administrative Law Judges, 180 East Broad Street, Room 11-A, Columbus, Ohio, called at 10:08 a.m. on Tuesday, April 9, 2019.

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VOLUME I

\- - -

ARMSTRONG & OKEY, INC.
222 East Town Street, 2nd Floor
Columbus, Ohio 43215-5201
(614) 224-9481 - (800) 223-9481

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Central Corridor Pipeline Extension Project

DUKE ENERGY

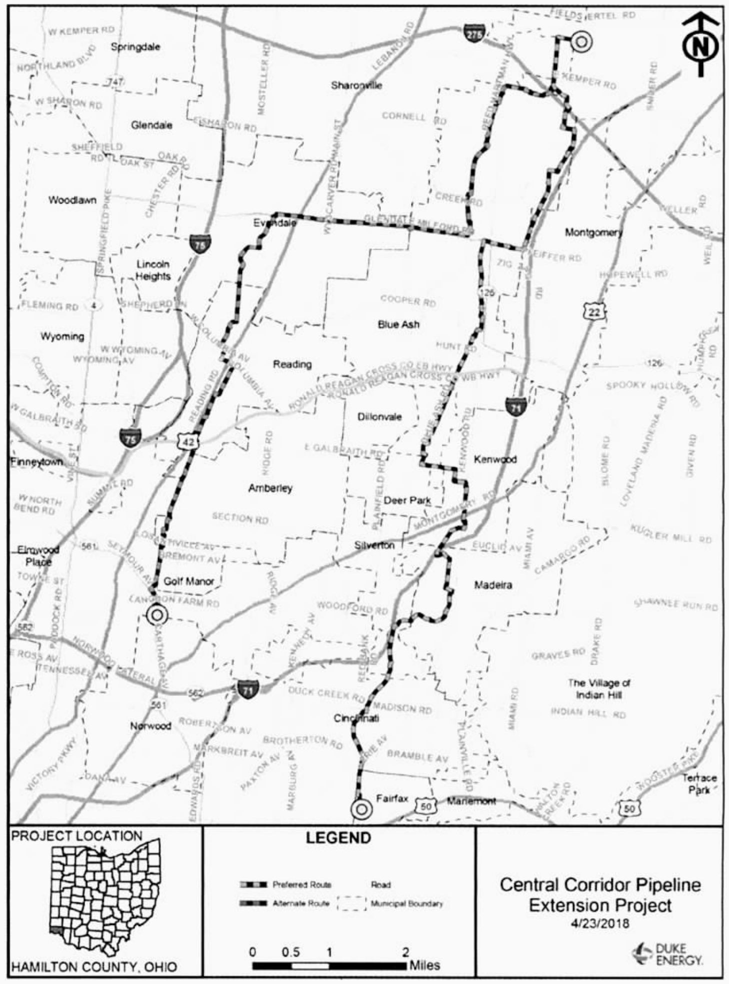
December 2018

INTRODUCTION

Duke Energy has proposed a new natural gas pipeline to serve its southwest Ohio natural gas distribution system. This project is part of a large-scale plan to improve, protect and expand our system to continue reliable delivery of natural gas to our customers.

The new pipeline will:

- Serve the Duke Energy gas distribution system and supply natural gas solely to local customers,
- Enhance reliability and flexibility of gas supply,
- Replace and modernize aging infrastructure,
- Reduce dependence on propane peaking facilities and Kentucky transmission lines.



PIPELINE AND ROUTE DETAILS

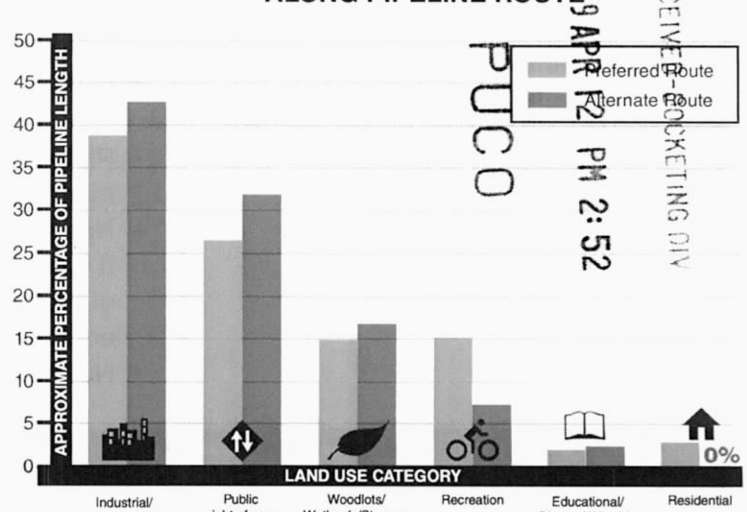
Two potential routes are under consideration, as shown in the map to the right. The Preferred Route (Eastern) is shown in orange, and the Alternate Route (Western) is shown in green. The proposed natural gas pipeline will be located in Hamilton County and will connect to existing natural gas lines to the north and south. It will begin just south of the boundaries of Hamilton, Butler and Warren counties and end in either Fairfax (Eastern Route) or Norwood (Western Route).

The pipeline will be:

- 20-inch diameter,
- About 400 psi operating pressure,
- About 14 miles in length, and
- A minimum of 4 feet deep, with many areas deeper when directional drilling techniques are used.

Duke Energy will strive to complete the project with the least overall impact as possible to the community. With this in mind, the selected routes limit the number of residential properties directly affected by the pipeline. In fact, there are no residential properties crossed along the Alternate Route. See the graph to the right.

LAND USE DISTRIBUTIONS ALONG PIPELINE ROUTE



built to be SAFE AND SECURE

Safety, security and environmental stewardship are core values at Duke Energy. Our company has been operating natural gas pipeline systems safely for more than 175 years. This dedication to safe system operation is why the new pipeline will be:

FULLY COMPLIANT
with state and federal regulations,

CONSTRUCTED
of thick-walled steel pipe,

COATED WITH
anti-corrosion fusion bonded epoxy,

INSTALLED
with cathodic protection
for additional corrosion prevention,

RIGOROUSLY TESTED
using the most advanced technologies available,

INSPECTED REGULARLY
using multiple inspection methods, and

EQUIPPED
with remote control
shut-off valves.

In addition to these pipeline safety features, Duke Energy will coordinate with local fire departments and government officials along the pipeline route to adequately engage them and develop planning scenarios.

PROJECT TIMELINE

While this project has been part of Duke Energy's long-term plan for more than 15 years, the timing and project details were developed through a comprehensive study completed in 2015. Preliminary routes were selected in early 2016. In August 2017, Duke Energy requested a delay in OPSB's procedural schedule to allow more time to conduct additional environmental investigations along the alternate route. In April 2018, Duke restarted its amended application with the OPSB.

Project Milestones Completed

- February 2016: Met with community leaders along routes.
- March and June 2016: Held three public open houses.
- July 2016: Met with Hamilton County leadership in public meeting.
- September 2016: Submitted OPSB application.
- January 2017: Held fourth public open house.
- Winter/Spring 2017: Continued design and surveying/soil borings. OPSB resumed review of Duke Energy's application.
- June 2017: OPSB held public hearing at UC Blue Ash.

Anticipated Future Milestones

- March 2019: OPSB holds public hearing at UC Blue Ash.
- April 2019: OPSB holds adjudicatory hearing in Columbus.
- Summer 2019: OPSB issues permit to construct the pipeline.
- Summer 2019: Easement negotiations begin.
- Spring/Summer 2020: Start construction.
- Fall 2021: Complete construction.
- Spring 2022: Complete restoration.

Construction may span 14-16 months, but individual properties will be affected for a much shorter time period – likely three to six weeks or less, depending on the size of the property.

NATURAL GAS PIPELINE FACTS

According to the Pipeline and Hazardous Materials Safety Administration/U.S. Department of Transportation:

- Pipelines are the safest, most environmentally friendly, and most efficient and reliable mode of transporting natural gas.
- Natural gas pipelines also make the most economic sense. It would take nearly 750 tanker trucks constantly shipping out every two minutes, around the clock, to transport the equivalent of a small to medium diameter pipeline.
- Natural gas supplies 25% of the energy Americans consume.

For more information about the Central Corridor Pipeline Extension Project,
VISIT: duke-energy.com/centralcorridor CALL: 513.287.2130
EMAIL: CentCorridorPipeline@duke-energy.com

2017

LONG-TERM FORECAST REPORT

FOR GAS DEMAND, GAS SUPPLY, AND FACILITY PROJECTIONS

Case No. 17-1317-GA-FOR

****

OF

DUKE ENERGY OHIO, INC.

139 EAST FOURTH STREET

CINCINNATI, OHIO 45202

A SUBSIDIARY OF DUKE ENERGY CORPORTION

TO THE

PUBLIC UTILITIES COMMISSION OF OHIO

DIVISION OF FORECASTING

****

PREFACE

Duke Energy Ohio, Inc. has prepared this Long-Term Forecast Report as a response to Section 4935.04(C) of the Ohio Revised Code. The organization of the report follows the order of those Rules and Regulations relating to such forecast reports in Ohio Administrative Code 4901.5-7-03.

(3) Energy Conservation

Changes in gas use due to energy conservation cannot be easily identified within the forecast. Energy conservation tends to occur in response to energy price changes. As such, the effects of energy conservation are included in the energy-price impacts discussed in Section (4) below. However, in the residential sector, the level of energy conservation in the forecast due to increasing furnace efficiency can be estimated. It should be recognized that energy conservation due to increasing furnace efficiency is still a price-driven conservation effect although there is a somewhat longer time lag between cause and effect. The difference between a residential forecast based upon a zero increase in furnace efficiency and the actual forecast is the basis for the gas energy conservation impacts provided in Table 1.

TABLE 1
FURNANCE EFFFICIENCY-INDUCED CONSERVATION
MCF

	RESIDENTIAL	SENDOUT	PEAK
2017	167,113	168,008	3,697
2018	362,958	364,901	4,343
2019	582,422	585,540	4,858
2020	821,165	825,560	5,265
2021	1,072,288	1,078,028	5,561
2022	1,331,265	1,338,391	5,770
2023	1,595,494	1,604,034	5,915
2024	1,862,559	1,872,528	5,968
2025	2,126,410	2,137,792	5,918
2026	2,385,433	2,398,201	5,818
2027	2,636,536	2,650,648	5,652

June 1, 2017

Public Utilities Commission of Ohio
Division of Forecasting
180 East Broad Street
Columbus, OH 43266-0573

RE: 2017 LONG-TERM FORECAST REPORT FOR GAS
DEMAND, GAS SUPPLY, AND FACILITY PROJECTIONS

Pursuant to Ohio Administrative Code Rule 4905:5-3-01, Duke Energy Ohio, Inc. ("Duke Energy Ohio") submits an original and 20 copies of its 2017 Long-Term Forecast Report for Gas Demand, Gas Supply, and Facility Projections.

Portions of this forecast are based upon information and conditions that were current in the spring of 2017. This information is subject to the same degree of review and modification by Duke Energy Ohio as would be exercised by it with respect to its forecasts in general.

Questions regarding the contents of this document should be directed to Mr. Jeff L. Kern at Duke Energy Ohio's regional offices located at 139 E. Fourth Street, EX460, Cincinnati, Ohio 45202, Telephone (513) 287-2837.

Please note that Ms. Elizabeth Watts, Legal Department, is the Attorney of Record for the forecast.

Sincerely,

Jeff L. Kern
Lead, Gas Resources
Duke Energy Corporation

Attachments

ATTACHEMENT "A"

DUKE ENERGY OHIO, INC.
2017 GAS LONG-TERM FORECAST REPORT

CERTIFICATE OF SERVICE

The undersigned states that he is Lead Gas Resources, Duke Energy Business Services; that he is duly authorized in such capacity to execute and file this Long-Term Forecast on behalf of Duke Energy Ohio, Inc.; that the facts set forth in this Long-Term forecast are true and correct to the best of his knowledge, information, and belief, and that all other matters set forth herein reflect the best judgment of Duke Energy Corporation at this time.

I hereby certify that, concurrently with the filing of the 2017 Long-Term forecast Report for Gas Demand, Gas Supply, and Facility Projections and pursuant to the Ohio Administrative Code Rule 4901:5-1-03(E), one copy of the Report has been filed with the Ohio Power Siting board and one copy has been sent to the public libraries listed on page iv of this Report (Attachment "B").

One copy of this Report will be kept at the principal business address of Duke Energy Ohio, Inc. (139 East Fourth Street, Cincinnati, Ohio) for public inspection during office hours. A copy of the Report will be provided to any person, upon request, at cost to cover expenses incurred.

Jeff L. Kern
Lead, Gas Resources
Duke Energy Corporation

6/1/17
DATE

ATTACHEMENT "B"

LIBRARIES RECEIVING A COPY OF DUKE ENERGY OHIO'S 2017 GAS LONG-TERM FORECAST REPORT FOR GAS DEMAND, GAS SUPPLY, AND FACILITY PROJECTIONS

County	Library	Address
Adams	Manchester Branch Library	401 Pike Street Manchester, Ohio 45144
Brown	Mary P. Shelton Library	200 West Grant Avenue Georgetown, Ohio 45121
Butler	Lane Public Library	300 North Third Street Hamilton, Ohio 45011
Butler	Middletown Public Library	125 South Broad Street Middletown, Ohio 45044
Clermont	Clermont County Public Library	180 South Third Street Batavia, Ohio 45103
Clinton	Wilmington Public Library	268 North South Street Wilmington, Ohio 45177
Hamilton	Public Library of Cincinnati and Hamilton County	800 Vine Street Cincinnati, Ohio 45202
Montgomery	Dayton and Montgomery County Public Library	215 East Third Street Dayton, Ohio 45402
Preble	Preble County District Library	450 North Baron Street Eaton Ohio 45320
Warren	Lebanon Public Library	101 South Broadway Lebanon, Ohio 45036
Highland	Highland County District Library	10 Whillettsville Pike Hillsboro, Ohio 45133
Hamilton	University of Cincinnati Library-Reference Division	2600 Clifton Avenue Cincinnati, Ohio 45221

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*APPENDIX I and II contain critical infrastructure information and are available for review at Duke Energy's office upon request.

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DUKE ENERGY OHIO

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Duke Energy Corp. 2016 Annual Report is available at:

www.duke-energy.com/ /media/pdfs/our-company/investors/de-annual-reports/2016/2016annualreport.pdf

Or by visiting www.duke-energy.com and selecting "Our Company", "Investors" and "2016 Annual Report"

4901:5-7-01 DEFINITIONS

(A) No response necessary.

(B) No response necessary.

(C) No response necessary.

(D) No response necessary.

(E) No response necessary.

(F) No response necessary.

(G) No response necessary.

(H) Duke Energy Ohio" refers to Duke Energy Ohio, Inc. and its service area, not the consolidated system.

(I) No response necessary

4901:5-7-02 PURPOSE AND SCOPE

(A) No response necessary.

(B) No response necessary.

(C) No response necessary.

4901:5-7-03 **GAS AND NATURAL GAS DEMAND FORECASTS FOR GAS DISTRIBUTION COMPANIES SERVING MORE THAN FIFTEEN THOUSAND CUSTOMERS**

(A) GENERAL GUIDELINES

No response required for items (1) through (4)

(B) SPECIAL SUBJECT AREAS

(1) Description of Forecast Preparation and Coordination

(a) Duke Energy Ohio coordinates its load forecasts with those of Duke Energy Kentucky, Inc., an affiliated company operating in Northern Kentucky. The load forecasts and peak demand forecasts are prepared under common supervision and direction using the same forecasting methodology. Currently, the Duke Energy Ohio gas and electric load forecasts are prepared in the same department and under the same assumptions regarding energy prices and the future course of the local economy.

(b) Duke Energy Ohio also owns a propane peak-shaving plant and has access to 64% of the output from a peak shaving plant which is owned by Duke Energy Kentucky. Duke Energy Ohio also has an interconnection with Vectren Inc. (formally the Dayton Power and Light Company) for the sole purpose of transporting gas, on an interruptible basis, to Vectren Inc. from the Texas Gas Transmission. There is no reason to coordinate Duke Energy Ohio's forecasting activities with those of Vectren Inc.

(c) Duke Energy Ohio develops the gas load forecast through the use of econometric computer modeling techniques. Duke Energy relies on Moody's Analytics for all of its national and local economic projections. All series used for the forecast that are available annually or at a greater frequency are updated at least once a year.

(2) State Energy Policy

(a) No response required.
(b) No response required.

The estimate of the conservation impact is developed using the same equations and models as the base forecast. For the forecast period, the conservation impact is identified by comparing the base forecast to one in which residential furnace efficiency is held constant, i.e., no improvement in efficiency. The difference in gas energy usage and peak demand between the two forecasts represents the projected impact of residential conservation due to the improvement in furnace efficiencies.

(4) Energy Price Relationships

(a) Energy conservation identified within the forecast period reflects changes in gas usage due to changes in the real price of energy. The difference between a forecast based upon a zero percent increase in real energy price and the base forecast provides estimates for the gas conservation impacts seen in Table 2.

TABLE 2
PRICE-INDUCED CONSERVATION
MCF

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	SENDOUT	PEAK
2017	1,681	(3,307)	190,281	189,666	1,987
2018	(25,400)	(29,002)	221,425	167,917	2,271
2019	(49,470)	(81,785)	255,762	125,174	2,593
2020	(85,417)	(141,387)	293,046	66,596	2,954
2021	(26,461)	(212,773)	327,360	88,598	3,269
2022	73,945	(143,779)	285,779	217,101	2,820
2023	109,909	(33,427)	220,670	298,742	2,152
2024	124,892	6,196	197,269	330,114	1,900
2025	139,871	23,162	187,160	352,067	1,783
2026	174,102	41,165	176,218	393,581	1,660
2027	208,211	79,967	153,071	443,611	1,424

(b) The impact of energy-price changes is based upon the same equations and models as the base forecast. For the forecast period, energy-price impacts were identified by comparing the base forecast to one with a zero percent annual increase in the real average price of natural gas. The resulting difference in energy usage and peak demand represents the forecasted impact of conservation due to changes in the real price of energy.

(C) FORECAST DOCUMENTATION

(1) Forecast Methodology

(a) The general framework of the Gas Energy and Peak Load Forecast of Duke Energy Ohio and Subsidiary Companies involves a national economic forecast, a local or service area economic forecast, and the gas load forecast. The following sections discuss the national and service area economic forecasts, and the methodological framework of the gas energy model and peak load model:

National Economic Forecast: The national economic forecast is prepared by Moody's Analytics and provides information on the prospective growth of the national economy. This involves projections for future levels of numerous national economic and demographic concepts such as population, employment, gross product, inflation, and income. The national economic forecast is obtained from Moody's Analytics, a national economic consulting firm.

Service Area Economic Forecast. The service area, or local economic forecast is prepared by Moody's Analytics. The service area forecast incorporates both national and local impacts into the local economic forecast. This forecast is used as a driver within the energy and peak models that produce the gas load forecast.

There are four major sectors to the service area forecast: employment, income, production, and population. These forecasts serve as inputs into the energy and peak load forecast models.

Employment. Total service area employment can be broken into three major categories: commercial, industrial, and governmental sectors.

Income: Income is broken into five components, which together produce total nominal service area income. The five components are:

+ Wage and salary disbursements,
+ Governmental transfer payments,
+ Property income,
+ Proprietors' income, and
− Personal contributions for social insurance.

Population: Service area population projections are provided for each five-year age-cohort by Moody's Analytics.

Inflation is measured by changes in the Personal Consumption Expenditure Index (PCE) as provided by Moody's Analytics.

Gas Energy Forecast

Duke Energy Ohio supplies and distributes gas in the Southern Ohio counties within the Greater Cincinnati metropolitan area, while Duke Energy Kentucky supplies and distributes natural gas in Northern Kentucky counties within the Greater Cincinnati metropolitan area. Duke Energy Ohio and Duke Energy Kentucky forecast models employ econometric equations that estimate gas load using local and regional data from each territory. The sum of these forecasts is equivalent to the consolidated system.

The Residential Sector. The forecast of residential gas usage is broken into two major parts: A forecast of the number of residential customers, and a forecast of gas usage (MCF) per residential customer. The forecast of total residential sales is the product of the residential customer forecast and the use per customer forecast, or:

$$Residential\ Sales =$$
$$\#\ Residential\ Customers\ x\ Use\ per\ Residential\ Customer$$

Residential Customers. The residential customer forecast is driven by the projected population in the Duke Energy Ohio territory.

Residential Use per Customer. The general structure of the relationship is as follows:

$$ResidentialGas_{UPC}$$
$$= f(Real\ Average\ Gas\ Price, HDD, Real\ Household\ Median\ Income)$$

In general, residential natural gas consumption is dependent upon usage for space heating, water heating, cooking, and to a lesser extent, clothes drying. If a customer has obtained gas service, the usage of gas tends to exhibit a regular pattern that follows weather conditions, though it has experienced some downward pressure due to conservation, driven by increasing equipment efficiencies. This phenomenon is evidenced by the historical downward trend in gas usage per customer.

In the gas use per customer model above ($ResidentialGas_{UPC}$), the estimated coefficient for real average gas price represents an estimate of the price elasticity. One issue regarding this estimate is the degree of price-reversibility inherent in the way consumers use natural gas. In other words, perfect price-reversibility assumes that consumers react the same to a price increases as to a price decrease, while imperfect price reversibility implies that consumer responses to a price change can vary depending upon whether the price increased or decreased.

An article in an issue of the Energy Journal (Dermot Gately, "Imperfect Price-Reversibility of U.S. Gasoline Demand: Asymmetric Responses to

Price Increases and Declines," Energy Journal, Volume 13 (4), 1992 pp. 179-207), examined this issue, and proposed one model for estimating price elasticity for price increases and another for price declines. The reasoning behind the differences in price elasticity follows from the realization that once a more efficient piece of equipment has been installed, price declines do not evoke the same type of increase in energy use as price increases.

Applying the same logic to residential natural gas sales, once insulation levels have been raised or a more efficient furnace has been installed, price declines do not bring the same degree of response as price increases. Presumably, as prices rose in the past, consumers adjusted their thermostats in the short-run, but eventually in the longer-term, consumers adjusted the energy efficiency of their thermal shell, furnaces, or other pieces of their energy—using capital stock. Once the investments have been made, they are not likely to be removed. As a result, one should expect that the percentage impact on sales and usage from a specific percent decline in price be less than that from a similar percent increase in price. Likewise, if a price increase causes the price to exceed its highest level historically, the consumer response is expected to vary from other price increases, as well as price declines.

Commercial Sector. There are two components to the total commercial sector gas forecast: Commercial firm and Commercial interruptible sales. The distinction between firm and interruptible usage is required due to the differences in supply conditions and gas prices. The forecast is prepared for firm commercial deliveries and interruptible commercial deliveries (which both include transportation gas). Total commercial gas usage is computed as the sum of firm and interruptible deliveries.

Commercial Gas Deliveries—Firm. An econometric equation structure can be used to forecast Duke Energy Ohio firm commercial deliveries. Commercial firm gas deliveries are found to be dependent upon household projections, the real average price of gas, and normal heating degree weather. The general form of the equation is as follows:

$$CommercialGasDeliveries_{Firm} = f(Total\ Employment, Real\ Average\ Gas\ Price, Billed\ HDD)$$

Commercial Gas Deliveries—Interruptible. Duke Energy Ohio Interruptible commercial gas sales are forecast using a relationship similar to firm commercial gas deliveries.

Industrial Gas Deliveries—Firm. An econometric equation structure can be used to forecast Duke Energy Ohio firm industrial deliveries. Industrial firm gas deliveries are found to be dependent upon real manufacturing gross product, the real average price of gas, and normal heating degree weather. The general form of the equation is as follows:

$$IndustrialGasDeliveries_{Firm} = f(RealManufacturing\ GDP, Real\ Average\ Gas\ Prices, HDD)$$

Industrial Gas Deliveries—Interruptible. Duke Energy Ohio Interruptible industrial gas deliveries are forecast using a relationship similar to firm industrial gas deliveries.

Gas transported through our system for industrial customers are included in the amount of interruptible deliveries. Preparing the forecast in this manner provides an indication of the total gas usage and hence the available market for gas.

Other Public Authority Gas Deliveries ("OPA"). The forecast model for the OPA sector is similar in structure to the commercial sector model. The two components that make up the OPA forecast include OPA firm and OPA interruptible gas deliveries

OPA Gas Deliveries—Firm. An econometric equation structure can be used to forecast Duke Energy Ohio firm OPA deliveries. OPA firm gas deliveries are found to be dependent upon projected OPA customers, the real average price of gas, and normal heating degree weather. The general form of the equation is as follows:

$$OPAFirmGasDeliveries = f(Governmental\ Employment, Real\ Average\ Gas\ Prices, HDD)$$

OPA Gas Deliveries—Interruptible. Duke Energy Ohio Interruptible OPA gas deliveries are forecast using a relationship similar to firm OPA gas deliveries.

Street Lighting. Gas deliveries to Duke Energy Ohio Street Lighting customers are directly related to the projected number of Street Lighting gas customers, which is driven by the projected number of households.

Inter-Departmental ("ID") Gas Sales. The Duke Energy Ohio ID sales forecast is generated using a seasonal trend projection.

Company Use ("CU") Gas Sales. The Duke Energy Ohio CU sales forecast is generated using a seasonal trend projection.

Total System Deliveries. Once the forecasts for all sectors are completed, the forecast for total system deliveries can be prepared. This requires that all individual sector forecasts be combined along with the Inter-Departmental sales forecast:

$$Total\ System\ Deliveries = sum(TotalRESGas,\ TotalCOMGas,\ TotalINDGas,\ TotalOPAGas,\ TotalSLGas,\ TotalIDGas)$$

A projection for pipeline losses is then computed, using the annual historical average of pipeline losses for the past three years:

$$Projected\ Gas\ Line\ Losses = Average(Annual\ Gas\ Losses_{-1}, Annual\ Gas\ Losses_{-2}, Annual\ Gas\ Losses_{-3})$$

Total System Sendout. Once the projection for losses are computed, a forecast for Gas Sendout can be generated, which is a function of Total System Deliveries, Company Use, and Gas Line Losses:

$$Gas\ Sendout = sum(Total\ System\ Deliveries, CU, Gas\ Line\ Losses)$$

Once the gas sendout forecast is completed, the gas peak load forecast can be generated.

The Peak Load Forecast

The winter peak demand forecast is generated using econometric modeling. The econometric model was obtained by examining the historical relationship between monthly peak and factors such as weather, the economy, and space heating saturation. Therefore, the winter peak forecast is driven by the energy model's forecast of total system deliveries and weather. The peak forecast is produced under specific assumptions regarding the weather conditions that normally occur at the time of the peak.

Peak Load Specification. The winter peak equation has the following specification:

$$Peak = f(Historical\ Daily\ Deliveries, Weather)$$

Weather conditions at time of winter peak are represented by the heating degree days on the day of the peak. Specifications that include the heating degree days on the day before the peak were also considered. A daily model estimates the historical peaks, with forecast peaks then projected using the growth rates from the gas volume forecast.

Weather-Normalized Deliveries. The level of peak demand is related to economic conditions such as manufacturing GDP and prices. The best indicator of the combined influences of economic variables on peak demand is the level of base load demand exclusive of aberrations caused by abnormal weather. Thus, the first step in developing the above described peak equation is to weather normalize monthly deliveries. Historical weather normalized deliveries is found by summing the component pieces of sendout after these have been weather normalized. That is, the historical values of residential, commercial and other sales are adjusted to what they would have been if normal weather had occurred. This adjustment is performed using the results from the equations described in earlier sections. In all cases, the equations used to explain historical sales and to forecast sales into the future can be separated into a weather component and a component dependent upon economic variables as follows:

$MCF = f(W)g(E)$MCF = f(W)g(E)

Where: MCF = Sales

W = Weather Variables

E = Economic and other variables.

In the case of historical sales figures, actual sales resulted from actual weather conditions so the equation can be rewritten as:

$$MCF_a = f(W_a)g(E)$$

With the "a" subscript referring to actual weather conditions.

Similarly, under "normal" conditions the equation would be:

$$MCF_n = f(W_n)g(E)$$

With the "n" subscript referring to "normal" weather conditions.

Dividing equation (8b) by equation (8a) yields:

$$MCF_n = MCF_a \frac{fW_n}{fW_a}$$

Thus, weather normal sales are found by scaling actual sales using a factor based on the forecast model equations.

This weather-adjusted sendout was then used as the driving variable in the winter peak equation.

Forecast Procedure

The seasonal winter peak is assumed to occur in January of the winter season (November through March) of the year for which it is reported. Since the energy model produces forecasts under the assumption that normal weather will prevail, the forecast of sendout is "weather normalized" by design. Thus, the forecast of deliveries drives the forecast of the peaks. In the forecast, the equation weather variables are set to values determined to be normal peak-producing conditions. These values were derived using historical weather data.

Gas Price

A key ingredient throughout the development of econometric models for use in projecting gas consumption is the selection of the gas price variable. Due to the historical use of declining block rates, a degree of simultaneity exists between the bill charged a customer and the customer's energy usage. If, for example, a customer or group of customers would increase their usage due to extreme weather conditions (or other circumstances), the average price of gas, $/MCF, would fall as those customers' usage moved into higher MCF consumption blocks with lower marginal energy rates. In an econometric model, this could be incorrectly interpreted to mean that the price decrease brought about an increase in gas consumption instead of the correct cause—the extreme weather.

The price variable issue has received significant attention in the economic literature, most noticeably after the publication of two articles in 1975, one by Robert Halvorsen and the other by Lester Taylor. Numerous solutions have been offered and, in turn, criticized since that time. Most of the attention, however, has been focused on electricity demand, but the same situation exists for any price schedule containing declining or increasing block rates, including gas and water rates. Some of the suggested solutions offered in the literature are as follows:

--Average price is appropriate since that is the price customers observe

--Marginal price should be employed because that is the price to which customers actually respond.

--An estimated average price is appropriate where the estimated price is developed from a first stage equation that incorporates the factors affecting the level of gas price (i.e., labor, capital, and fuel costs).

--Marginal price should be employed with an income premium variable to account for the income effects associated with declining block rates.

The existence of simultaneity between energy consumption and average price is potentially quite serious. If average price were employed in an econometric model using time series data, conservation by customers over time could raise the average price and result in an incorrect estimation of the price elasticity.

To avoid this problem in the Duke Energy Ohio forecast, a fixed level of consumption is used to select the price from the relevant rate schedule at each point in time. This is not a restrictive procedure because the range of consumption within a block is rather wide for the relevant blocks.

This approach was employed for the development of historical price data for the customer classes.

This technique avoids the serious problem of simultaneity between usage and price and allows the true price changes which customers have experienced to be reflected in the data and the econometric models.

(b) Specific Analytical Techniques Used

Regression Analysis

Ordinary least squares is the principal regression technique employed to estimate the relationships among the relevant variables. However, quite often there is a lagged response between the change in one variable and a subsequent change in another variable. For example, if the real price of gas changes, consumers usually do not fully adjust to the price change in the same time period. Rather, it takes several months or more for the consumer to alter the stock of energy using equipment in the home and to complete the adjustment process. To incorporate this concept of lagged response, the energy model equations employ a polynomial distributed lag structure.

Polynomial Distributed Lag Structure

One method of accounting for the lag between a change in one variable and its ultimate impact on another variable is through the use of polynomial distributed lags. This technique is also referred to as Almon lags. Polynomial distributed lag structures derive their name from the fact that the lag weights follow a polynomial of specified degree. That is, the lag weights all lie on a line, parabola, or higher order polynomial as required. This technique is employed in developing econometric models for most of the energy equations.

Serial Correlation

It is often the case in forecasting an economic time series that forecast errors in one period are related to those in a previous period. By correcting for serial correlation of the estimated residuals, forecast error is reduced. The Marquardt algorithm (similar to the Gauss-Newton method) is employed to correct for the existence of autocorrelation. This correction technique was used in numerous instances in the development of the econometric equations.

Qualitative Variables

In several equations, qualitative variables are employed. In estimating an econometric relationship using time series data, it is quite often the case that outliers will occur. The unusual deviations in the data can be the result of data problems such as errors in the reporting of data or other such perturbations that do not repeat with predictability. Therefore, in order to identify the underlying economic relationship between the dependent and independent variables, qualitative variables are employed to remove the outliers.

(c) The relationship between specific techniques are discussed in (b)

(d) Summary of Statistical Techniques Used

i. Equations

A display of all the relevant equations used in the forecast can be viewed starting on page 3-18. Specifically, for each of the equations in the Gas Energy Forecast Model and Gas Peak Load Model the following information is included:

ii. Statistical Test Results

The results of the estimation of each of the stochastic equations in the models is provided. Included are the estimated coefficients and the results of appropriate statistical tests. Those equations which required a correction for serial correlation are so indicated.

The computer output for each variable lists the estimated coefficient , standard error, and the t-statistic. In the forecast equations, lagged variables and the number of periods lagged are denoted in the definition column.

iii. A description of the statistical technique

A comprehensive overview of statistical techniques are provided in (C)(1)(b) above

iv. Rationale for using the chosen techniques

A comprehensive overview rationalizing the validity of the techniques used are provided in (C)(1)(b) above

v. Computer Software

All of the equations in the Gas Energy Forecast Model and Gas Peak Load Model were estimated and forecasted on personal computers using the MetrixND software from Itron, Inc.

(e) Interruptible Load Forecast

Duke Ohio energy has interruptible gas volumes in the commercial, industrial, and governmental classes. All three sectors use the same forecast methodology as the traditional gas volume forecast models.

(f) Use Per Customer

An overview of the use per customer projection is provided in section C(1)(a).

(g) Methodology Changes

No significant forecast methodology change has been made for any customer class to develop the 2017 OH IRP gas forecast, compared to the previous IRP. One subtle difference is the switch in analytical software from Eviews to Itron.

(2) Assumptions and Special Information.

(a) No special information (planned industrial expansion, etc.) was used in this forecast.

(b) No special information (planned industrial expansion, etc.) was used in this forecast.

(3) Data base documentation

(a) Data sets used to develop the Duke Energy Ohio gas forecast:

i. Historical customers, sales, and price data. Source: Duke Energy Ohio

ii. Regional, state, and U.S. economic projections: Moody's Analytics

Moody's Analytics is widely recognized as a reliable provider of economic projections worldwide. Duke Energy Ohio has used Moody's Analytics for years as their economic vendor. Each year, this relationship is evaluated to determine its value in relation to its cost and effectiveness.

(b) No action necessary.

(c) No action necessary.

GAS EQUATIONS AND STATISTICAL TEST RESULTS

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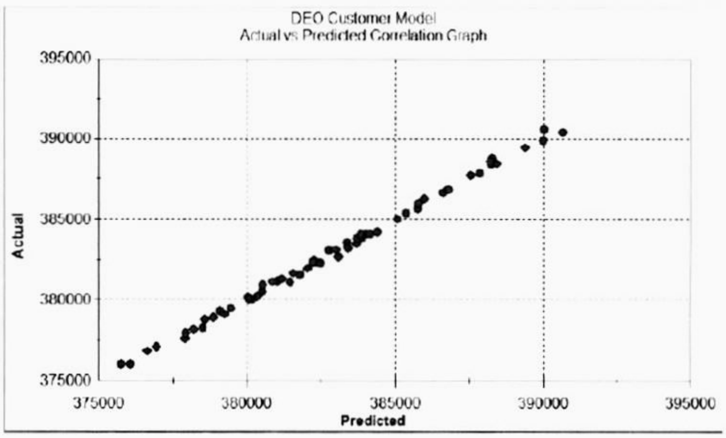
DEO RESIDENTIAL CUSTOMER MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
Econ_CGE_SU16.POP_TOTAL	234.406	0.098	2394.764	0.00%
mIndicators.MAR11	2261.534	170.923	13.231	0.00%
mIndicators.JUN11	491.714	222.260	2.212	3.23%
mIndicators.JUL11	-2015.248	224.950	-8.959	0.00%
mIndicators.SEP11	-1365.358	172.112	-7.933	0.00%
mIndicators.MAR13	-3195.440	168.816	-18.928	0.00%
mIndicators.DEC14	591.327	166.866	3.544	0.10%
mCalendar.Jan	1088.641	111.606	9.754	0.00%
mCalendar.Feb	1105.866	138.828	7.966	0.00%
mCalendar.Mar	968.039	112.657	8.593	0.00%
mCalendar.May	-1976.964	122.700	-16.112	0.00%
mCalendar.Jun	-3716.627	196.728	-18.892	0.00%
mCalendar.Jul	-4816.120	232.758	-20.692	0.00%
mCalendar.Aug	-6177.078	239.473	-25.794	0.00%
mCalendar.Sep	-5471.116	230.277	-23.759	0.00%
mCalendar.Oct	-4492.304	191.885	-23.411	0.00%
mCalendar.Nov	-1981.303	125.580	-15.777	0.00%
AR(1)	1.167	0.126	9.243	0.00%
AR(2)	-0.394	0.092	-4.287	0.01%

Model Statistics	
Iterations	19
Adjusted Observations	62
Deg. of Freedom for Error	43
R-Squared	0.997
Adjusted R-Squared	0.996
AIC	11.238
BIC	11.890
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-417.35
Model Sum of Squares	867,575,258.22
Sum of Squared Errors	2,551,662.61
Mean Squared Error	59,340.99
Std. Error of Regression	243.60
Mean Abs. Dev. (MAD)	161.97
Mean Abs. % Err. (MAPE)	0.04%
Durbin-Watson Statistic	2.273
Durbin-H Statistic	#NA
Ljung-Box Statistic	20.52
Prob (Ljung-Box)	0.6669
Skewness	0.247
Kurtosis	2.996
Jarque-Bera	0.630
Prob (Jarque-Bera)	0.7300



DUKE ENERGY OHIO
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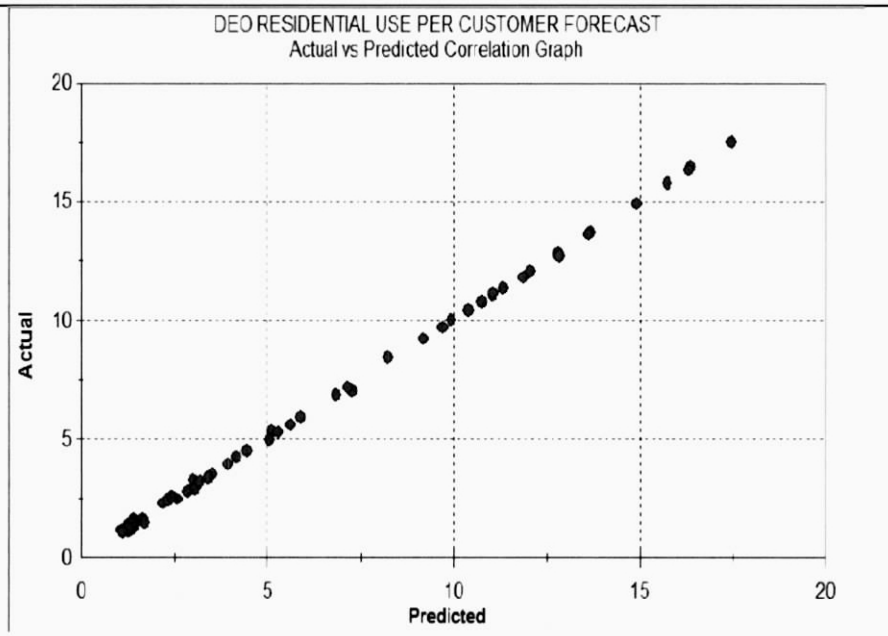
DEO RESIDENTIAL USE PER CUSTOMER MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value	Units	Definition
Econ_CGE_SU16.POP_20_64	0.005	0.001	3.859	0.05%		
DEOG_BTU.Filled	-0.003	0.001	-2.370	2.33%		
PRICE_LAGS.UPC_C_PRICE_LAG	-0.204	0.039	-5.236	0.00%		
Weather_by_month.JAN_C_HDD59	0.014	0.000	128.040	0.00%		
Weather_by_month.MAR_C_HDD59	0.018	0.000	57.918	0.00%		
Weather_by_month.APR_C_HDD59	0.020	0.001	31.076	0.00%		
Weather_by_month.MAY_C_HDD59	0.016	0.001	10.737	0.00%		
Weather_by_month.OCT_C_HDD59	0.009	0.000	23.631	0.00%		
Weather_by_month.NOV_C_HDD59	0.011	0.000	53.678	0.00%		
Weather_by_month.DEC_C_HDD59	0.014	0.000	86.295	0.00%		
Weather_by_month.FEB_C_HDD45	0.009	0.001	16.902	0.00%		
mIndicators.MAR11	-0.991	0.166	-5.968	0.00%		
mIndicators.JAN12	0.582	0.134	4.339	0.01%		
mIndicators.FEB12	-1.141	0.193	-5.925	0.00%		
mIndicators.APR12	-1.405	0.141	-9.958	0.00%		
mIndicators.FEB13	0.455	0.161	2.823	0.77%		
mIndicators.MAR13	-2.312	0.203	-11.378	0.00%		
mIndicators.NOV13	-0.569	0.143	-3.989	0.03%		
mIndicators.FEB14	0.355	0.150	2.374	2.31%		
mIndicators.MAR14	-2.091	0.186	-11.271	0.00%		
mIndicators.JAN15	1.748	0.141	12.379	0.00%		
mIndicators.APR15	-1.029	0.143	-7.210	0.00%		
mIndicators.DEC15	-0.543	0.143	-3.808	0.05%		
mIndicators.JAN16	-0.463	0.151	-3.068	0.41%		
mIndicators.FEB16	-0.660	0.188	-3.503	0.12%		
mIndicators.MAR16	-0.728	0.153	-4.748	0.00%		
mIndicators.APR16	-1.445	0.169	-8.569	0.00%		
mCalendar.Feb	8.465	0.262	32.269	0.00%		

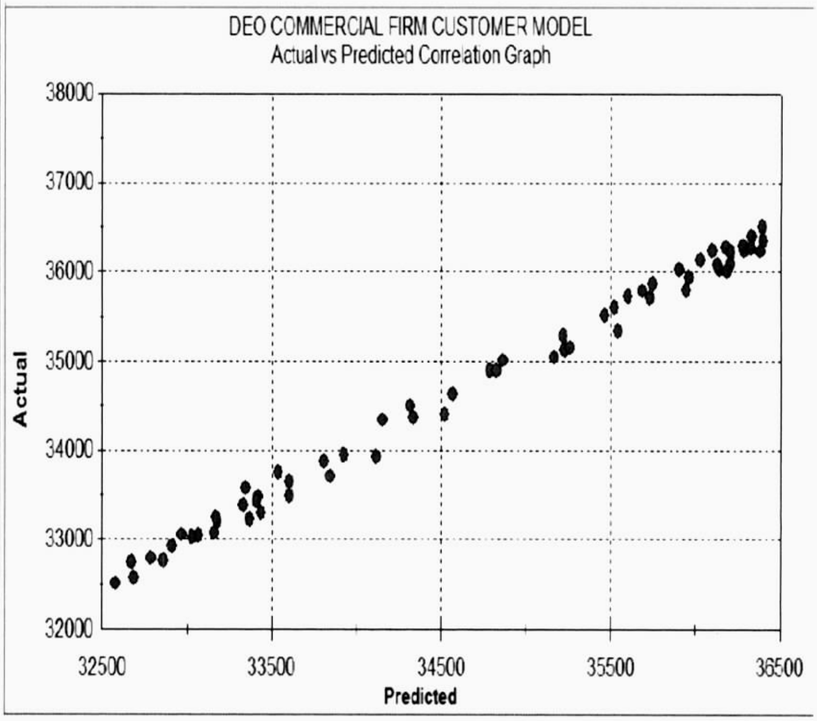
Model Statistics	
Iterations	1
Adjusted Observations	64
Deg. of Freedom for Error	36
R-Squared	1.000
Adjusted R-Squared	0.999
AIC	-3.919
BIC	-2.974
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	62.59
Model Sum of Squares	1,619.05
Sum of Squared Errors	0.53
Mean Squared Error	0.01
Std. Error of Regression	0.12
Mean Abs. Dev. (MAD)	0.06
Mean Abs. % Err. (MAPE)	2.76%
Durbin-Watson Statistic	1.896
Durbin-H Statistic	#NA
Ljung-Box Statistic	36.01
Prob (Ljung-Box)	0.0548
Skewness	-0.129
Kurtosis	3.711
Jarque-Bera	1.527
Prob (Jarque-Bera)	0.4660



DEO COMMERCIAL FIRM CUSTOMER MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
CGE_ECON_CNTY_SU16.CGE_EMPLY_GOV	259.921	0.870	298.792	0.00%
mIndicators.MAR11	229.694	86.994	2.640	1.14%
mIndicators.MAR13	-388.396	86.833	-4.473	0.01%
mIndicators.NOV13	252.839	86.939	2.908	0.57%
mIndicators.APR14	250.272	88.780	2.819	0.72%
mIndicators.MAY15	-204.497	87.408	-2.340	2.39%
mCalendar.Feb	149.727	37.183	4.027	0.02%
mCalendar.Apr	-739.917	66.629	-11.105	0.00%
mCalendar.May	-1730.679	101.874	-16.988	0.00%
mCalendar.Jun	-2479.290	126.398	-19.615	0.00%
mCalendar.Jul	-2945.875	140.851	-20.915	0.00%
mCalendar.Aug	-3159.615	145.392	-21.732	0.00%
mCalendar.Sep	-3248.750	140.820	-23.070	0.00%
mCalendar.Oct	-2701.260	126.610	-21.335	0.00%
mCalendar.Nov	-1302.713	102.542	-12.704	0.00%
mCalendar.Dec	-329.159	61.771	-5.329	0.00%
AR(1)	1.234	0.141	8.764	0.00%
AR(2)	-0.397	0.135	-2.945	0.51%

Model Statistics	
Iterations	17
Adjusted Observations	62
Deg. of Freedom for Error	44
R-Squared	0.993
Adjusted R-Squared	0.990
AIC	9.950
BIC	10.568
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-378.43
Model Sum of Squares	102,162,384.42
Sum of Squared Errors	727,091.32
Mean Squared Error	16,524.80
Std. Error of Regression	128.55
Mean Abs. Dev. (MAD)	91.48
Mean Abs. % Err. (MAPE)	0.26%
Durbin-Watson Statistic	1.982
Durbin-H Statistic	#NA
Ljung-Box Statistic	25.32
Prob (Ljung-Box)	0.3884
Skewness	-0.033
Kurtosis	2.105
Jarque-Bera	2.081
Prob (Jarque-Bera)	0.3532



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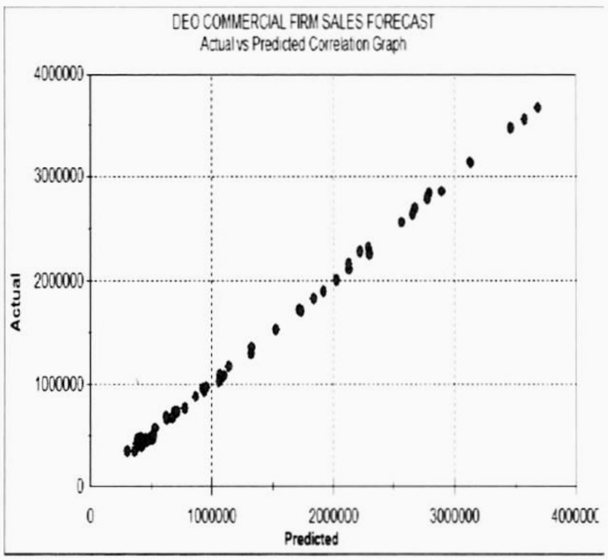
DEO COMMERCIAL FIRM SALES FORECAST

Variable	Coefficient	StdErr	T-Stat	P-Value
CGE_ECON_CNTY_SU16.CGE_EMPLY_TTL	625.921	41.547	15.065	0.00%
PRICE_LAGS.COM_C_LAG	-127320.147	27248.010	-4.673	0.00%
Weather_by_month.JAN_C_HDD59	788.146	153.941	5.120	0.00%
Weather_by_month.FEB_C_HDD59	3011.346	47.920	62.841	0.00%
Weather_by_month.MAR_C_HDD59	3164.521	79.811	39.650	0.00%
Weather_by_month.MAY_C_HDD59	3815.009	285.686	13.354	0.00%
Weather_by_month.NOV_C_HDD59	2464.462	62.681	39.317	0.00%
Weather_by_month.DEC_C_HDD59	2827.774	61.335	46.104	0.00%
mIndicators.OCT11	334019.341	24188.791	13.809	0.00%
mIndicators.OCT12	584860.867	37832.029	15.459	0.00%
mIndicators.NOV12	364090.687	61113.522	5.958	0.00%
mIndicators.DEC12	-358144.712	62663.585	-5.715	0.00%
mIndicators.JAN13	-228914.913	46781.585	-4.893	0.00%
mIndicators.MAR13	-548089.880	42329.688	-12.948	0.00%
mIndicators.AUG13	-183160.059	32808.668	-5.583	0.00%
mIndicators.SEP13	-164121.832	34043.534	-4.821	0.00%
mIndicators.DEC13	124054.217	44617.557	2.780	0.88%
mIndicators.FEB14	264058.519	55518.792	4.756	0.00%
mIndicators.MAR14	251670.009	50797.575	4.954	0.00%
mIndicators.OCT14	65956.081	31035.584	2.125	4.09%
mIndicators.JAN15	626611.972	38322.505	16.351	0.00%
mIndicators.MAR15	-382131.888	31626.129	-12.083	0.00%
mIndicators.OCT15	226704.749	24849.509	9.123	0.00%
mIndicators.JAN16	176665.732	32261.692	5.476	0.00%
mCalendar.Jan	1719274.788	133477.419	12.881	0.00%
mCalendar.Apr	502928.268	19566.907	25.703	0.00%
AR(1)	1.200	0.118	10.150	0.00%
AR(2)	-0.719	0.121	-5.932	0.00%

Model Statistics	
Iterations	17
Adjusted Observations	62
Deg. of Freedom for Error	34
R-Squared	0.999
Adjusted R-Squared	0.998
AIC	21.452
BIC	22.413
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-724.99
Model Sum of Squares	61,355,907,160,280.20
Sum of Squared Errors	52,071,293,133.59
Mean Squared Error	1,531,508,621.58
Std. Error of Regression	39,134.49
Mean Abs. Dev. (MAD)	24,555.39
Mean Abs. % Err. (MAPE)	3.38%
Durbin-Watson Statistic	1.543
Durbin-H Statistic	#NA
Ljung-Box Statistic	28.57
Prob (Ljung-Box)	0.2369
Skewness	0.425
Kurtosis	2.396
Jarque-Bera	2.806
Prob (Jarque-Bera)	0.2459



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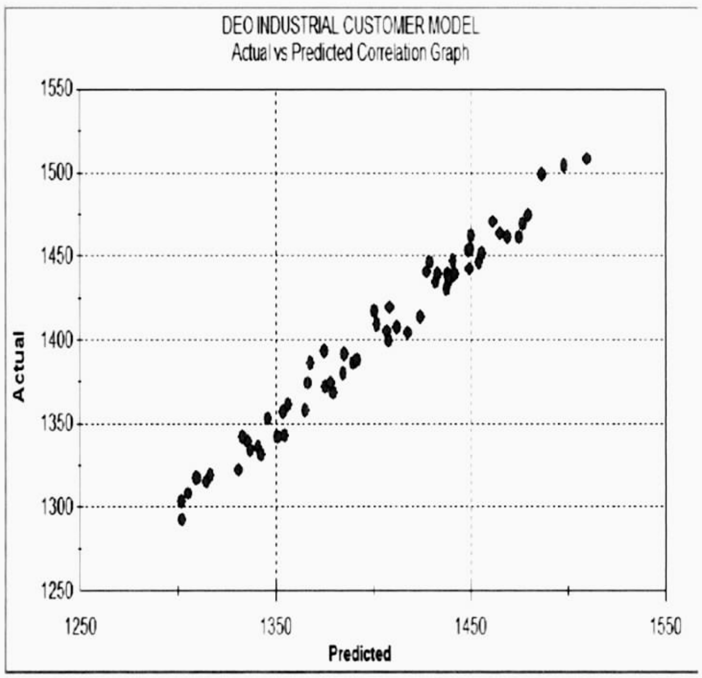
DEO INDUSTRIAL FIRM CUSTOMER FORECAST MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
CGE_ECON_CNTY_SU16.CGE_EMPLY_MFG	2.386	8.737	0.273	78.60%
mIndicators.FEB14	68.720	6.776	10.141	0.00%
mIndicators.MAY14	-32.844	7.644	-4.296	0.01%
mIndicators.MAR15	26.968	6.886	3.916	0.03%
mIndicators.MAY15	-22.366	7.645	-2.925	0.52%
mCalendar.Jan	11.407	2.894	3.942	0.03%
mCalendar.Apr	-28.046	3.792	-7.396	0.00%
mCalendar.May	-59.090	5.676	-10.411	0.00%
mCalendar.Jun	-91.821	5.866	-15.654	0.00%
mCalendar.Jul	-107.913	6.205	-17.390	0.00%
mCalendar.Aug	-113.214	6.218	-18.207	0.00%
mCalendar.Sep	-113.311	5.907	-19.181	0.00%
mCalendar.Oct	-94.609	5.215	-18.141	0.00%
mCalendar.Nov	-42.705	3.945	-10.825	0.00%
AR(1)	0.999	0.002	443.593	0.00%

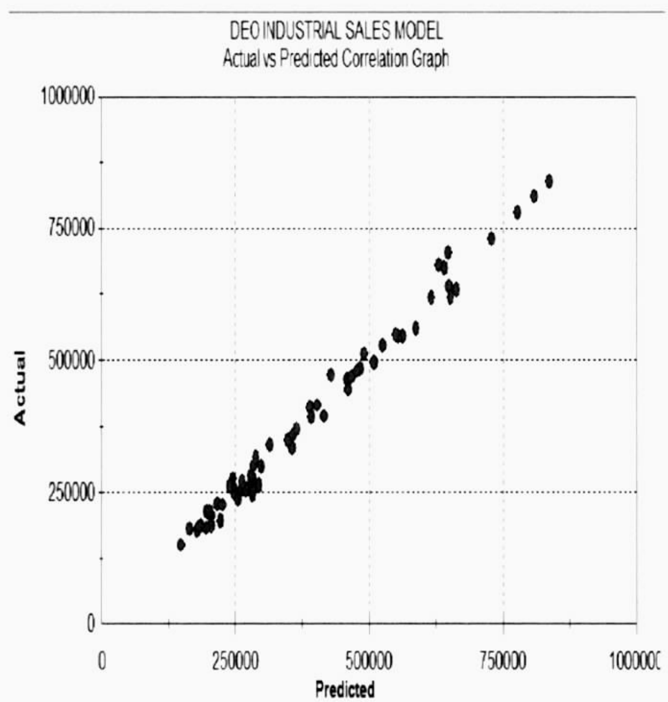
Model Statistics	
Iterations	21
Adjusted Observations	63
Deg. of Freedom for Error	48
R-Squared	0.978
Adjusted R-Squared	0.971
AIC	4.697
BIC	5.207
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-222.36
Model Sum of Squares	189,822.98
Sum of Squared Errors	4,290.45
Mean Squared Error	89.38
Std. Error of Regression	9.45
Mean Abs. Dev. (MAD)	7.03
Mean Abs. % Err. (MAPE)	0.50%
Durbin-Watson Statistic	1.984
Durbin-H Statistic	#NA
Ljung-Box Statistic	39.27
Prob (Ljung-Box)	0.0255
Skewness	0.365
Kurtosis	2.321
Jarque-Bera	2.612
Prob (Jarque-Bera)	0.2709



DEO INDUSTRIAL FIRM SALES FORECAST

Variable	Coefficient	StdErr	T-Stat	P-Value
OH_Econ_SU16.GDP_REAL_MFG	4.518	0.242	18.693	0.00%
PRICE_LAGS.IND_C_LAG_SU16	-124819.134	16601.907	-7.518	0.00%
Weather_by_month.JAN_C_HDD59	388.866	17.275	22.510	0.00%
Weather_by_month.FEB_C_HDD59	512.200	21.335	24.007	0.00%
Weather_by_month.MAR_C_HDD59	415.937	28.137	14.783	0.00%
Weather_by_month.APR_C_HDD59	455.440	103.352	4.407	0.01%
Weather_by_month.MAY_C_HDD59	1520.244	424.279	3.583	0.10%
Weather_by_month.NOV_C_HDD59	310.790	30.552	10.172	0.00%
Weather_by_month.DEC_C_HDD59	478.313	27.201	17.584	0.00%
mIndicators.FEB11	-54403.857	28107.368	-1.936	6.06%
mIndicators.MAY11	-129810.377	41816.805	-3.104	0.36%
mIndicators.JUL11	-56122.177	26461.284	-2.121	4.07%
mIndicators.SEP11	-57711.431	26068.488	-2.214	3.31%
mIndicators.DEC11	-104109.600	29041.449	-3.585	0.10%
mIndicators.FEB12	93029.991	27667.343	3.362	0.18%
mIndicators.APR12	-74632.722	29744.992	-2.509	1.66%
mIndicators.DEC12	-82985.767	28873.683	-2.874	0.67%
mIndicators.APR13	48477.640	31902.689	1.520	13.71%
mIndicators.SEP13	-36341.901	26203.034	-1.387	17.38%
mIndicators.JAN14	54287.960	30293.889	1.792	8.13%
mIndicators.FEB14	-124397.210	29979.100	-4.149	0.02%
mIndicators.APR14	133770.804	28956.474	4.620	0.00%
mIndicators.OCT14	63114.870	26885.279	2.348	2.44%
mIndicators.JAN15	197678.874	28752.616	6.875	0.00%
mIndicators.MAR15	230170.396	28184.377	8.167	0.00%
mIndicators.JUL15	43660.138	26071.558	1.675	10.24%
mIndicators.AUG15	61335.823	26071.813	2.353	2.41%

Model Statistics	
Iterations	1
Adjusted Observations	64
Deg. of Freedom for Error	37
R-Squared	0.989
Adjusted R-Squared	0.981
AIC	20.585
BIC	21.496
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-722.53
Model Sum of Squares	2,074,191,659,548.29
Sum of Squared Errors	23,967,108,475.52
Mean Squared Error	647,759,688.53
Std. Error of Regression	25,451.12
Mean Abs. Dev. (MAD)	13,758.15
Mean Abs. % Err. (MAPE)	4.07%
Durbin-Watson Statistic	1.539
Durbin-H Statistic	#NA
Ljung-Box Statistic	30.37
Prob (Ljung-Box)	0.1727
Skewness	0.421
Kurtosis	3.305
Jarque-Bera	2.139
Prob (Jarque-Bera)	0.3431



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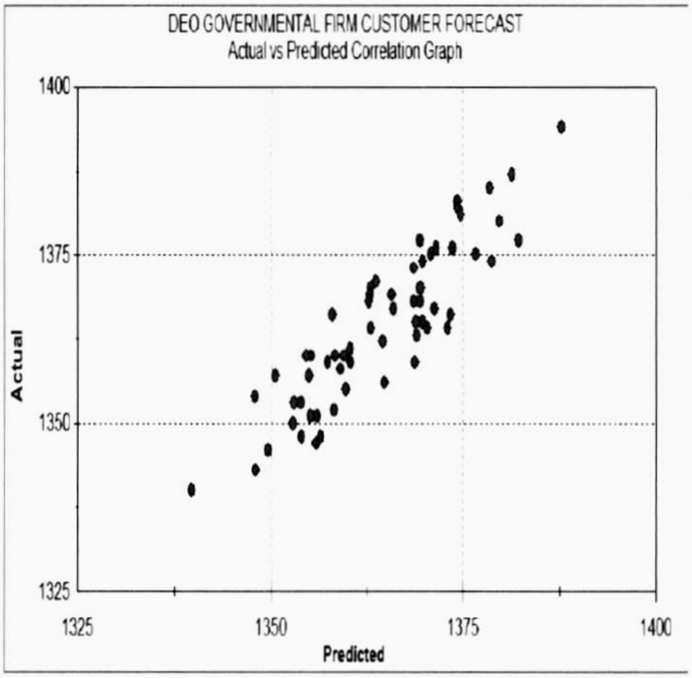
DEO GOVERNMENTAL FIRM CUSTOMER FORCAST

Variable	Coefficient	StdErr	T-Stat	P-Value
CGE_ECON_CNTY_SU16.CGE_EMPLY_GOV	9.865	0.022	451.625	0.00%
mIndicators.FEB11	23.219	4.892	4.747	0.00%
mIndicators.JUL11	-12.381	5.289	-2.341	2.35%
mIndicators.OCT12	12.005	6.029	1.991	5.22%
mIndicators.NOV12	11.214	6.025	1.861	6.88%
mIndicators.MAR13	-42.927	4.749	-9.040	0.00%
mIndicators.APR15	-6.592	4.944	-1.333	18.88%
mCalendar.May	-7.767	2.807	-2.767	0.80%
mCalendar.Jun	-12.618	3.454	-3.653	0.06%
mCalendar.Jul	-13.810	3.893	-3.548	0.09%
mCalendar.Aug	-16.968	3.827	-4.434	0.01%
mCalendar.Sep	-19.463	3.726	-5.224	0.00%
mCalendar.Oct	-14.153	3.615	-3.915	0.03%
mCalendar.Nov	-11.051	2.957	-3.737	0.05%
AR(1)	0.723	0.075	9.591	0.00%

Model Statistics	
Iterations	13
Adjusted Observations	63
Deg. of Freedom for Error	48
R-Squared	0.794
Adjusted R-Squared	0.734
AIC	3.754
BIC	4.264
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-192.63
Model Sum of Squares	6,437.53
Sum of Squared Errors	1,670.02
Mean Squared Error	34.79
Std. Error of Regression	5.90
Mean Abs. Dev. (MAD)	4.40
Mean Abs. % Err. (MAPE)	0.32%
Durbin-Watson Statistic	1.836
Durbin-H Statistic	#NA
Ljung-Box Statistic	26.89
Prob (Ljung-Box)	0.3094
Skewness	-0.088
Kurtosis	1.865
Jarque-Bera	3.461
Prob (Jarque-Bera)	0.1772



DUKE ENERGY OHIO
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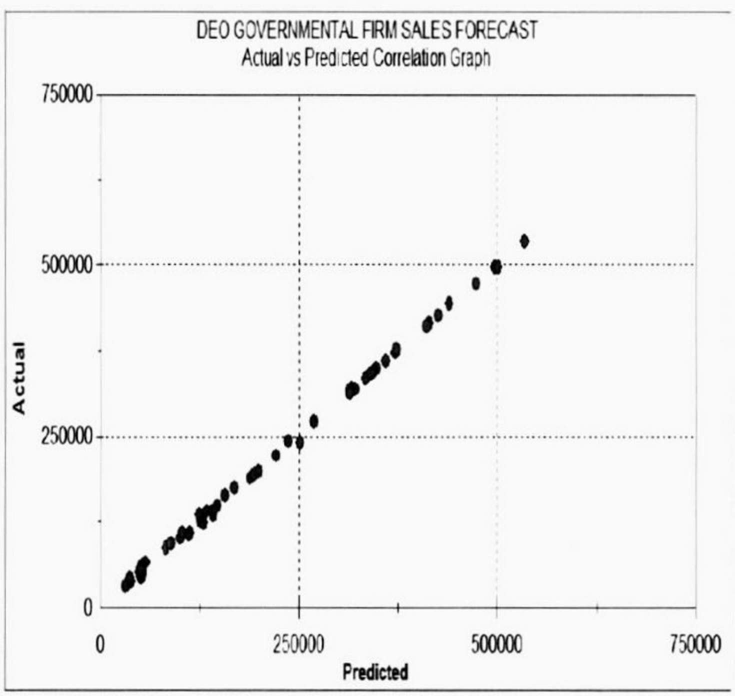
DEO GOVERNMENTAL FIRM SALES FORECAST MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
OH_Econ_SU16.GDP_REAL_GOVT	1.040	0.068	15.278	0.00%
PRICE_LAGS.OPA_C_LAG_SU16	-6580.392	2290.880	-2.872	0.66%
Weather_by_month.JAN_C_HDD59	407.811	4.351	93.738	0.00%
Weather_by_month.FEB_C_HDD59	440.477	4.561	96.567	0.00%
Weather_by_month.MAR_C_HDD59	503.829	10.879	46.311	0.00%
Weather_by_month.APR_C_HDD59	566.112	25.465	22.231	0.00%
Weather_by_month.MAY_C_HDD59	722.221	61.240	11.793	0.00%
Weather_by_month.OCT_C_HDD59	388.315	17.992	21.583	0.00%
Weather_by_month.NOV_C_HDD59	363.181	7.031	51.653	0.00%
Weather_by_month.DEC_C_HDD59	439.789	6.349	69.268	0.00%
mIndicators.FEB11	36278.485	6016.899	6.029	0.00%
mIndicators.MAR11	51734.477	7107.183	7.279	0.00%
mIndicators.NOV11	21124.689	5890.774	3.586	0.09%
mIndicators.JAN12	70064.276	6189.246	11.320	0.00%
mIndicators.FEB13	40577.558	6133.833	6.615	0.00%
mIndicators.MAR13	-57943.495	8394.320	-6.903	0.00%
mIndicators.APR13	24780.215	6925.409	3.578	0.10%
mIndicators.OCT13	-23944.407	6306.405	-3.797	0.05%
mIndicators.DEC13	-40281.934	6794.473	-5.929	0.00%
mIndicators.JAN14	30022.903	6855.733	4.379	0.01%
mIndicators.MAR14	-26957.934	7913.831	-3.406	0.16%
mIndicators.JUL14	-17787.536	5720.037	-3.110	0.35%
mIndicators.JAN15	73074.518	6463.881	11.305	0.00%
mIndicators.DEC15	21315.096	6041.145	3.528	0.11%
mIndicators.MAY15	-26554.461	5788.182	-4.588	0.00%
mIndicators.APR16	-23414.410	6848.152	-3.419	0.15%

Model Statistics	
Iterations	1
Adjusted Observations	64
Deg. of Freedom for Error	38
R-Squared	0.999
Adjusted R-Squared	0.999
AIC	17.547
BIC	18.424
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-626.31
Model Sum of Squares	1,400,525,463,232.82
Sum of Squared Errors	1,185,333,083.93
Mean Squared Error	31,192,975.89
Std. Error of Regression	5,585.07
Mean Abs. Dev. (MAD)	3,155.45
Mean Abs. % Err. (MAPE)	3.76%
Durbin-Watson Statistic	1.754
Durbin-H Statistic	#NA
Ljung-Box Statistic	52.66
Prob (Ljung-Box)	0.0006
Skewness	-0.028
Kurtosis	2.830
Jarque-Bera	0.085
Prob (Jarque-Bera)	0.9585



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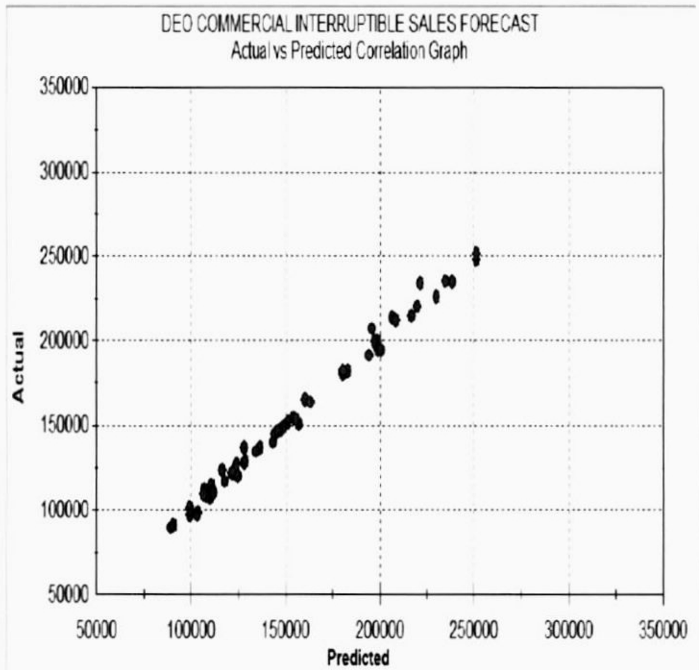
DEO COMMERCIAL INTERRUPTIBLE SALES FORECAST MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
OH_Econ_SU16.GDP_REAL_NONMFG	0.121	0.019	6.418	0.00%
CUST_OEU_COM_SU16 Filled	2078.082	320.879	6.476	0.00%
Weather_by_month.JAN_B_HDD59	149.179	3.627	41.133	0.00%
Weather_by_month.FEB_B_HDD59	130.699	3.760	34.763	0.00%
Weather_by_month.MAR_B_HDD59	122.486	4.941	24.792	0.00%
Weather_by_month.APR_B_HDD59	111.477	9.638	11.566	0.00%
Weather_by_month.MAY_B_HDD59	171.424	36.740	4.666	0.01%
Weather_by_month.OCT_B_HDD59	373.964	47.094	7.941	0.00%
Weather_by_month.NOV_B_HDD59	253.302	12.432	20.374	0.00%
Weather_by_month.DEC_B_HDD59	142.665	5.036	28.327	0.00%
mIndicators.APR11	11145.792	6165.619	1.808	8.04%
mIndicators.MAY11	16477.485	6540.080	2.519	1.71%
mIndicators.AUG11	11574.215	5680.033	2.038	5.02%
mIndicators.JUN11	26104.351	5726.858	4.558	0.01%
mIndicators.JUL11	18347.994	5687.153	3.226	0.30%
mIndicators.OCT11	11854.642	6219.179	1.906	6.59%
mIndicators.NOV11	-22296.001	6207.209	-3.592	0.11%
mIndicators.APR12	24350.147	5613.267	4.338	0.01%
mIndicators.AUG12	-9236.580	5567.142	-1.659	10.72%
mIndicators.NOV12	-17632.371	6810.456	-2.589	1.45%
mIndicators.DEC12	17598.310	5869.945	2.998	0.53%
mIndicators.MAR13	25629.041	6248.988	4.101	0.03%
mIndicators.JUL13	21830.012	5537.410	3.942	0.04%
mIndicators.OCT13	12313.677	5667.194	2.173	3.76%
mIndicators.AUG14	-14237.194	5531.170	-2.574	1.51%
mIndicators.FEB15	33147.443	6188.172	5.357	0.00%
mIndicators.JUN15	-8517.052	5632.484	-1.512	14.06%
mIndicators.JAN16	29833.659	5980.480	4.989	0.00%
mIndicators.MAR16	31621.843	5652.929	5.594	0.00%

Model Statistics	
Iterations	1
Adjusted Observations	60
Deg. of Freedom for Error	31
R-Squared	0.993
Adjusted R-Squared	0.987
AIC	17.467
BIC	18.479
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-580.14
Model Sum of Squares	124,979,105,043.27
Sum of Squared Errors	879,085,050.24
Mean Squared Error	28,357,582.27
Std. Error of Regression	5,325.18
Mean Abs. Dev. (MAD)	2,569.55
Mean Abs. % Err. (MAPE)	1.76%
Durbin-Watson Statistic	1.808
Durbin-H Statistic	#NA
Ljung-Box Statistic	41.60
Prob (Ljung-Box)	0.0143
Skewness	0.824
Kurtosis	4.277
Jarque-Bera	10.860
Prob (Jarque-Bera)	0.0044



DUKE ENERGY OHIO
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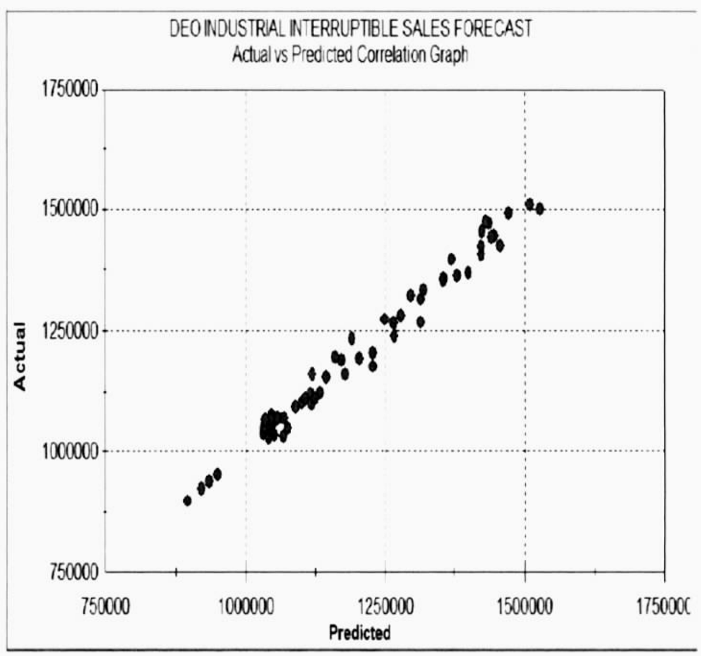
DEO INDUSTRIAL INTERRUPTIBLE SALES FORECAST MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
OH_Econ_SU16.GDP_REAL_MFG	8.862	0.524	16.914	0.00%
CUST_OEU_IND_SU16.Filled	3059.577	489.884	6.246	0.00%
Weather_by_month.JAN_B_HDD59	486.001	19.580	24.821	0.00%
Weather_by_month.FEB_B_HDD59	410.855	18.971	21.657	0.00%
Weather_by_month.MAR_B_HDD59	502.909	28.912	17.394	0.00%
Weather_by_month.APR_B_HDD59	337.406	51.988	6.490	0.00%
Weather_by_month.MAY_B_HDD59	1381.267	240.035	5.754	0.00%
Weather_by_month.OCT_B_HDD59	1645.759	230.133	7.151	0.00%
Weather_by_month.NOV_B_HDD59	800.008	59.281	13.495	0.00%
Weather_by_month.DEC_B_HDD59	394.897	33.231	11.883	0.00%
mIndicators.APR11	-92490.369	33066.833	-2.797	0.85%
mIndicators.MAY11	-161156.276	38474.790	-4.189	0.02%
mIndicators.JUN11	-137215.585	30926.367	-4.437	0.01%
mIndicators.DEC11	59162.246	33331.351	1.775	8.51%
mIndicators.JUL11	194443.500	30685.025	6.337	0.00%
mIndicators.AUG11	-165735.494	30592.369	-5.418	0.00%
mIndicators.SEP11	-193518.927	30567.947	-6.331	0.00%
mIndicators.FEB12	103291.586	31963.225	3.232	0.28%
mIndicators.MAY13	-67209.588	36472.593	-1.843	7.44%
mIndicators.SEP13	41163.916	30157.838	1.365	18.15%
mIndicators.OCT13	135578.059	30574.743	4.434	0.01%
mIndicators.NOV13	116713.203	33464.373	3.488	0.14%
mIndicators.DEC13	96845.845	36747.424	2.635	1.27%
mIndicators.MAR15	-85526.061	37056.644	-2.308	2.74%
mIndicators.NOV15	-94614.216	32007.729	-2.956	0.57%
mIndicators.JAN16	103953.738	32874.205	3.162	0.34%
mIndicators.MAR16	81538.540	31504.801	2.588	1.42%

Model Statistics	
Iterations	1
Adjusted Observations	60
Deg. of Freedom for Error	33
R-Squared	0.983
Adjusted R-Squared	0.970
AIC	20.864
BIC	21.807
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-684.06
Model Sum of Squares	1,657,648,385,051.05
Sum of Squared Errors	28,084,361,125.38
Mean Squared Error	851,041,246.22
Std. Error of Regression	29,172.61
Mean Abs. Dev. (MAD)	16,206.34
Mean Abs. % Err. (MAPE)	1.33%
Durbin-Watson Statistic	1.442
Durbin-H Statistic	#NA
Ljung-Box Statistic	29.87
Prob (Ljung-Box)	0.1892
Skewness	-0.160
Kurtosis	2.722
Jarque-Bera	0.450
Prob (Jarque-Bera)	0.7984



DUKE ENERGY OHIO
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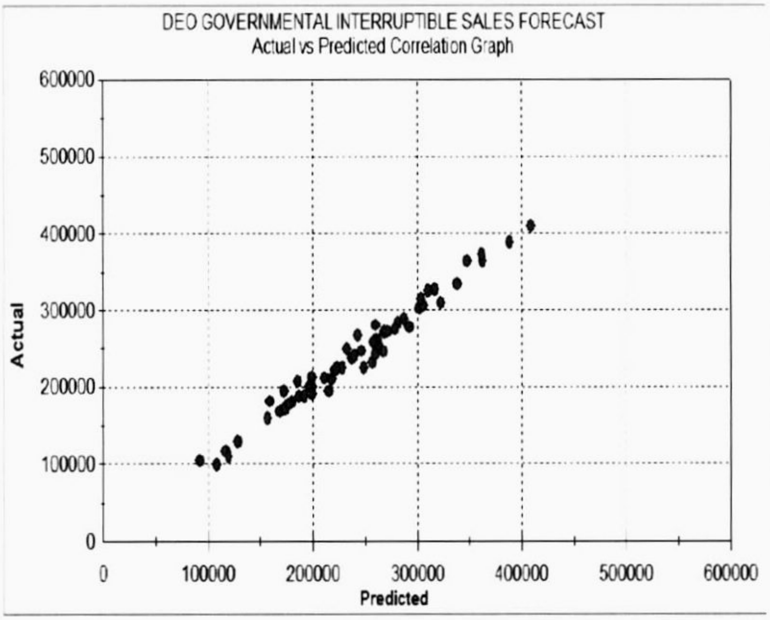
DEO GOVERNMENTAL INTERRUPTIBLE SALES FORECAST MODEL

Variable	Coefficient	StdErr	T-Stat	P-Value
SALES_OEU_OPA_SU16.LagDep(1)	0.931	0.012	75.156	0.00%
Weather_by_month.JAN_B_HDD59	88.468	9.046	9.779	0.00%
Weather_by_month.NOV_B_HDD59	167.164	24.677	6.774	0.00%
Weather_by_month.DEC_B_HDD59	50.511	13.257	3.810	0.06%
mIndicators.FEB11	-63707.741	15288.308	-4.167	0.02%
mIndicators.MAR11	75095.748	15112.038	4.969	0.00%
mIndicators.JUL11	93286.359	15213.971	6.132	0.00%
mIndicators.MAY11	33286.114	15207.440	2.189	3.60%
mIndicators.OCT11	33234.933	15283.012	2.175	3.72%
mIndicators.DEC11	22414.975	16272.625	1.377	17.79%
mIndicators.APR12	60948.683	15487.721	3.935	0.04%
mIndicators.MAY12	50752.695	15618.845	3.249	0.27%
mIndicators.JUL12	63004.015	15651.700	4.025	0.03%
mIndicators.AUG12	-93725.074	15794.517	-5.934	0.00%
mIndicators.FEB13	-40683.157	15437.844	-2.635	1.29%
mIndicators.MAR13	39690.251	15266.082	2.600	1.40%
mIndicators.APR13	-39761.160	15324.958	-2.595	1.42%
mIndicators.JUN13	37180.745	15159.143	2.453	1.98%
mIndicators.JUL13	54095.588	15209.223	3.557	0.12%
mIndicators.OCT13	-28689.860	15213.312	-1.886	6.84%
mIndicators.MAR14	-34461.519	15455.867	-2.230	3.29%
mIndicators.APR14	-72068.417	15295.611	-4.712	0.00%
mIndicators.JUN14	28829.971	15085.880	1.911	6.50%
mIndicators.JUL14	-47569.264	15116.424	-3.147	0.36%
mIndicators.OCT14	31211.294	15013.533	2.079	4.57%
mIndicators.FEB15	55391.662	15230.868	3.637	0.10%
mIndicators.MAR15	-65833.849	15330.615	-4.294	0.02%
mIndicators.APR15	-45603.319	15135.475	-3.013	0.50%
mIndicators.JUN15	97100.862	15018.682	6.465	0.00%
mIndicators.MAR16	-47328.359	15254.580	-3.103	0.40%

Model Statistics	
Iterations	1
Adjusted Observations	62
Deg. of Freedom for Error	32
R-Squared	0.977
Adjusted R-Squared	0.955
AIC	19.532
BIC	20.562
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-663.47
Model Sum of Squares	298,144,958,305.94
Sum of Squared Errors	7,159,016,903.31
Mean Squared Error	223,719,278.23
Std. Error of Regression	14,957.25
Mean Abs. Dev. (MAD)	6,882.06
Mean Abs. % Err. (MAPE)	3.16%
Durbin-Watson Statistic	2.309
Durbin-H Statistic	-1.222
Ljung-Box Statistic	21.07
Prob (Ljung-Box)	0.6348
Skewness	-0.075
Kurtosis	3.442
Jarque-Bera	0.564
Prob (Jarque-Bera)	0.7541



(D) DEMAND FORECAST FORMS

(1) SERVICE AREA NATURAL GAS DEMAND

The Duke Energy Ohio and Subsidiary Companies' total natural gas service area includes areas outside of Ohio. The gas load forecast is prepared for the consolidated system that includes the non-Ohio portion of the service area. The forecast for Ohio represents a portion of the consolidated forecast. Form FG1-1 contains the history and forecast of gas usage for the Ohio portion of the service area.

(2) GAS DEMAND BY INDUSTRIAL SECTOR

Form FG1-2, "Historical and Forecast Annual Gas Demand by Industrial Sector", provides historic and forecasted gas demands by selected manufacturing sectors displayed according to the Standard Industrial Classification (SIC) Code. It should be noted that "transportation gas" is reflected both in the actual period and the forecast period on Form FG1-2. Recent shifts in how customers are classified within the billing system have changed anticipated allocations across industry groups.

(3) MONTHLY GAS SENDOUT

Form FG1-3, "Monthly Ohio Gas Sendout", shows a month by month forecast of total gas sendout, including transportation, for the years 2016, 2017 and 2018 and is based on the forecast data detailed in this report. As a reminder, the forecast was prepared in mid-2016.

(4) RANGE OF FORECASTS: HIGHEST, LOWEST, MOST LIKELY

The two major sources of forecast uncertainty were studied in the development of forecast ranges. First, abnormally harsh and abnormally mild weather conditions were employed to generate high and low forecasts. For the second study, alternate economic scenarios - optimistic and pessimistic - were used to set the bounds for a high and a low forecast. The most likely forecast relied upon normal weather and a base-case economic forecast.

Weather-Based Ranges

The overall level of Duke Energy Ohio's gas sales are highly sensitive to weather conditions. If an extreme weather situation develops, there can be a large difference between actual and projected sales. For system sendout, variability in the forecast depends upon the level of heating degree days.

In a simulation study, the gas energy model was solved using weather that was colder than normal and warmer than normal based on heating degree days, respectively. Using the results of these simulations, ranges were developed to show the sensitivity of gas sales to the weather.

The upper band for total gas sendout reflects a ten percent increase above normal in the number of heating degree days. Similarly, the lower band represents a ten percent decrease below normal in the number of heating degree days.

In another simulation study, a gas peak model was solved fifty separate times using the weather that occurred in each of the winter seasons between 1964 and 2013. Using the results of these simulations, probability ranges were developed to show the sensitivity of the gas peak to the weather and to develop forecasts of the gas peak under abnormal weather conditions.

The upper limit to the band for the gas peak reflects a five percent probability that weather conditions will be more severe than those that generated the upper band. Similarly, the lower limit to the band represents a five percent probability that weather conditions could be milder than those used to generate the band.

Form FG1-4(a) provides the forecasts of sendout and peak day deliveries expected under alternate weather conditions. The probability range calculation as described above was applied to the weather term in the peak model to simulate an extreme peak forecast for the 1% most extreme weather conditions on day of peak; this forecast is referred to as a "design" peak.

Confidence Interval Based Ranges

The most likely forecast of gas energy load is generated using base-case forecasts of numerous economic variables and under the assumption of normal weather. The source of the national economic forecast is Moody's Analytics.

In generating the high and low forecasts, the Company used the standard errors of the regression from the econometric models used to produce the base energy forecast. The bands are based on a 95% confidence interval around the forecast which equates to +/-1.96 standard deviations. These calculations were used to adjust the base forecast up or down, thus providing high and low bands around the most likely forecast. In general, the upper band reflects relatively optimistic assumptions about the future growth of gas sales while the lower band depicts the impact of a pessimistic scenario.

In Form FG1-4(b), forecasts of industrial gas usage and total energy usage are provided for the high, low, and most likely forecasts.

(5) PEAK AND FORECAST DESIGN DAY REQUIREMENTS

The detailed information to complete Form FG1-5, "Historic Peak and Forecast Design Day requirements," is not available. Duke Energy Ohio does not forecast peak day requirements by sector, but only by total system requirements as discussed in Section (C)(1)(a) of this report. For forecasting purposes, the simulation study that produced the weather-based ranges discussed above is also used to determine peak design day requirements. Based on the standard error of the weather term in the peak forecasting model, the peak day design level chosen reflects a three percent probability that peak load will be more severe than the peak day design level because of extreme weather. For operating purposes, it is Duke

Energy Ohio's policy to supply all firm requirements at temperatures that can reasonably be expected to occur.

(6) SELF-HELP AND OTHER TRANSPORTED GAS

Form FG1-6 provides the forecast of self-help and transportation gas.

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DUKE ENERGY OHIO

FORM FG1-1: HISTORICAL AND FORECAST SERVICE AREA ANNUAL GAS DEMAND
UNITS: MMCF/YEAR
COMPANY: DUKE ENERGY OHIO AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) RESIDENTIAL SALES	(2) COMMERCIAL SALES[1]	(3) INDUSTRIAL SALES	(4) SALES TO ELECTRIC UTILITIES	(5) SALES TO ULTIMATE CUSTOMERS (1)+(2)+(3)+(4)	(6) SALES FOR RESALE[2]	(7) OTHER SALES FOR RESALE	(8) TOTAL SALES (5)+(6)+(7)	(9) COMPANY USE[3]	(10) TOTAL CONSUMPTION (8)+(9)	(11) NET[4] INJECTIONS TO STORAGE	(12) LOSSES AND UFG	(13) TOTAL DEMAND (10)+(11)+(12)	(14) SUM OF INTERRUPTIBLE INCLUDED IN COL (1) THRU (4)	(15) TOTAL INJECTIONS TO STORAGE	(16) TOTAL WITHDRAWAL FROM STORAGE
-5	2012	14,779	5,654	701		21,134	0	0	21,134	46	21,181	-228	113	21,066	0	7,165	7,393
-4	2013	13,355	5,882	1,009		20,246	0	0	20,246	46	20,292	-291	109	20,110	0	8,032	8,323
-3	2014	15,773	7,057	946		23,776	0	0	23,776	47	23,823	-1,121	128	22,829	0	8,732	9,853
-2	2015	14,719	5,770	818		21,308	0	0	21,308	47	21,355	993	114	22,462	0	8,717	7,724
-1	2016	12,887	4,784	665		18,336	0	0	18,336	37	18,373	-1,246	98	17,226	0	7,287	8,533
0	2017	13,856	5,262	677		19,796	0	0	19,796	51	19,847	0	106	19,953	0	8,321	8,321
1	2018	13,916	5,317	697		19,930	0	0	19,930	52	19,983	0	107	20,090	0	8,321	8,321
2	2019	13,953	5,350	711		20,014	0	0	20,014	53	20,067	0	107	20,174	0	8,321	8,321
3	2020	14,046	5,365	721		20,132	0	0	20,132	54	20,186	0	108	20,294	0	8,321	8,321
4	2021	13,978	5,355	732		20,066	0	0	20,066	56	20,121	0	108	20,229	0	8,321	8,321
5	2022	13,944	5,337	738		20,018	0	0	20,018	57	20,075	0	107	20,183	0	8,321	8,321
6	2023	13,941	5,311	740		19,993	0	0	19,993	58	20,051	0	107	20,158	0	8,321	8,321
7	2024	14,001	5,323	748		20,072	0	0	20,072	59	20,132	0	108	20,239	0	8,321	8,321
8	2025	13,952	5,314	755		20,020	0	0	20,020	60	20,080	0	107	20,188	0	8,321	8,321
9	2026	13,947	5,323	763		20,032	0	0	20,032	62	20,094	0	108	20,201	0	8,321	8,321
10	2027	13,939	5,328	771		20,039	0	0	20,039	63	20,102	0	108	20,209	0	8,321	8,321

[1] Includes Sales to Other Public Authorities, Interdepartmental Sales, and Street Lighting
[2] Includes municipals and small natural gas companies
[3] Includes Lease and Plant Fuel and Pipeline Fuel if applicable
[4] Net Injections to Storage (NITS) = Total Injections to Storage (Column 15) - Total Withdrawal from Storage (Column 16). NITS<0, then NITS = 0

* LOAD DEFINITION: FS SALES ONLY--NO TRANSPORTATION, NO INTERRUPTIBLE. ALL VOLUMES ARE CALENDAR. HISTORICAL CALENDAR SALES ARE NOT WEATHER-NORMALIZED.

DUKE ENERGY OHIO
4901:5-7-03

FORM FG1-2: HISTORICAL AND FORECAST OF ANNUAL GAS DEMAND BY INDUSTRIAL SECTOR (MMCF/YEAR)

AVERAGE BTU CONTENT: 1076.2 (FOR THE YEAR 2016)

		(1) 311, 312	(2) 22, 23	(3) 26	(4) 27	(5) 29	(6) 28	(7) 30	(8) 32	(9) 33	(10) 34	(11) 35		(12) 36	(13) 37	(14)	(15)
	YEAR	FOOD, BEVERAGE AND TOBACCO MFG	APPAREL MFG	PAPER AND ALLIED PRODUCT MFG	PRINTING AND RELATED SUPPORT ACTIVITIES	PETROLEUM AND COAL PRODUCTS MFG	CHEMICAL PRODUCT MFG	PLASTICS AND RUBBER PRODUCTS MFG	NON-METALLIC MENERAL PRODUCTS MFG	PRIMARY METAL MFG	FABRICATE D METAL PRODUCT MFG	MACHINERY MFG	COMPUTER AND ELECTRONIC PRODUCT MFG	ELECTRICIAL EQUIPMENT, APPLIANCE AND COMPONENT MFG	TRANSPORT ATION EQUIPMENT MFG	ALL OTHER INDUSTRIALS	TOTAL INDUSTRIALS[1]
-5	2012	1,109	99	1,627	1,019	142	3,685	519	521	1,176	2,336	2,023	0	930	2,165	817	18,169
-4	2013	1,518	103	1,712	882	198	4,150	506	600	1,299	2,416	2,103	0	886	2,389	841	19,602
-3	2014	2,121	24	2,271	275	1,114	9,474	593	138	874	857	707	0	269	1,221	248	20,185
-2	2015	2,028	23	2,171	263	1,065	9,058	567	132	835	819	676	0	257	1,168	237	19,299
-1	2016	2,070	23	2,216	268	1,088	9,246	579	134	853	836	690	0	262	1,192	242	19,701
0	2017	2,141	24	2,292	278	1,125	9,563	599	139	882	865	713	0	271	1,233	250	20,376
1	2018	2,181	24	2,334	283	1,146	9,739	610	142	898	881	727	0	276	1,255	255	20,751
2	2019	2,202	25	2,357	285	1,157	9,834	616	143	907	890	734	0	279	1,268	257	20,954
3	2020	2,211	25	2,367	287	1,161	9,875	618	144	911	893	737	0	280	1,273	258	21,040
4	2021	2,230	25	2,386	289	1,171	9,957	624	145	918	901	743	0	283	1,284	261	21,214
5	2022	2,248	25	2,406	291	1,181	10,040	629	146	926	908	749	0	285	1,294	263	21,392
6	2023	2,263	25	2,423	293	1,189	10,108	633	147	932	914	754	0	287	1,303	265	21,537
7	2024	2,280	26	2,440	295	1,197	10,180	637	148	939	921	759	0	289	1,312	266	21,690
8	2025	2,297	26	2,459	298	1,207	10,260	643	149	946	928	765	0	291	1,323	269	21,861
9	2026	2,316	26	2,479	300	1,217	10,344	648	150	954	936	772	0	294	1,334	271	22,041
10	2027	2,338	26	2,502	303	1,228	10,440	654	152	963	944	779	0	296	1,346	273	22,243

1 THE TOTAL INDUSTRIAL COLUMN IS EQUAL TO THE SUM OF ALL PREVIOUS ITEMS (1) THROUGH (15)

NOTE: THESE FIGURES INCLUDE TRANSPORTATION AND INTERRUPTIBLE GAS ON A CALENDAR BASIS

DUKE ENERGY OHIO

FORM FG1-3: MONTHLY OHIO GAS SENDOUT (MMCF)

COMPANY: DUKE OHIO

AVERAGE BTU CONTENT: 1021.0

	YEAR 0	YEAR 1	YEAR 2
JANUARY	10,325	10,331	10,368
FEBRUARY	8,672	9,078	9,130
MARCH	4,890	7,272	7,311
APRIL	3,470	3,212	3,255
MAY	1,641	1,573	1,607
JUNE	1,244	1,423	1,461
JULY	1,345	1,347	1,385
AUGUST	1,218	1,320	1,362
SEPTEMBER	1,382	1,382	1,423
OCTOBER	2,096	2,151	2,189
NOVEMBER	5,181	5,196	5,229
DECEMBER	9,051	9,098	9,129

DUKE ENERGY OHIO
4901-5-7-01
FORM FG1-4a RANGE OF DEMAND FORECASTS
WEATHER BANDS FOR SENDOUT (MCF)
SENDOUT

YEAR	MILD	BASE	HARSH
2014	76,700,317	80,823,551	84,961,728
2015	70,782,025	74,403,256	78,022,142
2016	68,018,238	71,667,071	75,278,924
2017	71,072,635	74,696,829	78,312,752
2018	71,721,436	75,344,587	78,961,553
2019	72,247,272	75,870,123	79,487,389
2020	72,923,415	76,556,436	80,184,100
2021	73,209,919	76,833,478	80,450,036
2022	73,465,114	77,090,204	80,705,231
2023	73,721,438	77,348,009	80,961,555
2024	74,269,676	77,906,876	81,530,361
2025	74,488,167	78,116,130	81,728,284
2026	74,868,626	78,497,241	82,108,743
2027	75,239,349	78,868,849	82,479,467

PEAK DAY DELIVERIES AND
EXTREME WEATHER CASE (MCF)[1]

YEAR	TOTAL 50%	MEAN WEATHER	EXTREME WEATHER
2017	640,227	640,227	756,956
2018	644,259	644,259	761,723
2019	645,573	645,573	763,277
2020	646,652	646,652	764,552
2021	647,271	647,271	765,285
2022	649,585	649,585	768,020
2023	651,809	651,809	770,650
2024	653,418	653,418	772,551
2025	653,374	653,374	772,500
2026	654,961	654,961	774,377
2027	656,552	656,552	776,257

[1]The column headings give the probability of experiencing more severe weather conditions.

DUKE ENERGY OHIO
4901:5-7-01
FORM FG1-4b: RANGE OF DEMAND FORECASTS
ECONOMIC BANDS FOR INDUSTRIAL, SENDOUT, AND PEAK (MCF)

	PESSIMISTIC	BASE	OPTMISTIC
INDUSTRIAL			
2017	20,140,020	20,376,344	20,612,669
2018	20,514,698	20,751,022	20,987,347
2019	20,717,478	20,953,802	21,190,127
2020	20,803,724	21,040,049	21,276,373
2021	20,978,102	21,214,427	21,450,752
2022	21,156,032	21,392,357	21,628,682
2023	21,300,652	21,536,976	21,773,301
2024	21,454,100	21,690,425	21,926,750
2025	21,624,542	21,860,867	22,097,191
2026	21,804,550	22,040,875	22,277,199
2027	22,007,083	22,243,407	22,479,732
SENDOUT			
2017	73,785,056	74,696,829	75,608,602
2018	74,432,814	75,344,587	76,256,360
2019	74,958,350	75,870,123	76,781,896
2020	75,644,663	76,556,436	77,468,209
2021	75,921,706	76,833,478	77,745,251
2022	76,178,431	77,090,204	78,001,977
2023	76,436,236	77,348,009	78,259,782
2024	76,995,104	77,906,876	78,818,649
2025	77,204,357	78,116,130	79,027,903
2026	77,585,468	78,497,241	79,409,014
2027	77,957,076	78,868,849	79,780,622
PEAK			
2017	605,168	640,227	671,900
2018	609,086	644,259	676,042
2019	610,487	645,573	677,291
2020	611,679	646,652	678,276
2021	612,437	647,271	678,781
2022	614,801	649,585	681,062
2023	617,081	651,809	683,249
2024	618,604	653,418	684,935
2025	618,563	653,374	684,890
2026	620,066	654,961	686,553
2027	621,571	656,552	688,221

FORM FG1-5: HISTORIC PEAK AND FORECAST DESIGN DAY REQUIREMENTS
UNITS: MMCF/ DAY
COMPANY NAME: DUKE ENERGY OHIO

AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) RESIDENTIAL SALES	(2) COMMERCIAL[1] SALES	(3) INDUSTIRAL SALES	(4) SALES TO ELECTRIC UTLITIES	(5) SALES TO ULTIMATE CUSTOMERS (1)+(2)+(3)+(4)	(6) SALES FOR RESALE TO MUNICPALS AND SMALL NATURAL GAS CO.	(7) OTHER SALES FOR RESALE	(8) TOTAL SALES (5)+(6)+(7)	(9) UNACCOUNTED FOR	(10) TOTAL[2] (8)+(9)
-5	2012	-	-	-	-	-	-	-	-	-	347
-4	2013	-	-	-	-	-	-	-	-	-	292
-3	2014	-	-	-	-	-	-	-	-	-	373
-2	2015	-	-	-	-	-	-	-	-	-	340
-1	2016	-	-	-	-	-	-	-	-	-	287
0	2017	-	-	-	-	-	-	-	-	-	332
1	2018	-	-	-	-	-	-	-	-	-	396
2	2019	-	-	-	-	-	-	-	-	-	397
3	2020	-	-	-	-	-	-	-	-	-	397
4	2021	-	-	-	-	-	-	-	-	-	397
5	2022	-	-	-	-	-	-	-	-	-	398
6	2023	-	-	-	-	-	-	-	-	-	399
7	2024	-	-	-	-	-	-	-	-	-	400
8	2025	-	-	-	-	-	-	-	-	-	400
9	2026	-	-	-	-	-	-	-	-	-	400
10	2027	-	-	-	-	-	-	-	-	-	401

NOTE:

1 Includes Sales to Other Public Authorities, Interdepartmental Sales and Street Lighting.

2 Does not include gas supply obtained from unregulated suppliers through the FT and RFT services.

FORM FG1-6: SUPPLY AND DISPOSITION OF SELF-HELP AND OTHER TRANSPORTED VOLUMES
UNITS: MMCF/ DAY
COMPANY NAME: DUKE ENERGY OHIO

AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) OHIO PRODUCED GAS TRANSPORTED SOLELY BY RESPONDENT FOR ON-SYSTEM CUSTOMERS	(2) OHIO PRODUCED GAS TRANSPORTED FROM OTHER COMPANY TO RESPONDENT FOR ON-SYSTEM CUSTOMERS	(3) OTHER VOLUMES TRANSPORTED BY RESPONDENT FOR ON-SYSTEM CUSTOMERS	(4) TOTAL VOLUMES TRANSPORTED BY RESPONDENT FOR ON-SYSTEM CUSTOMERS (1)+(2)+(3)	(5) OHIO PRODUCED GAS TRANSPORTED OFF-SYSTEM BY RESPONDENT	(6) OTHER VOLUMES TRANSPORTED BY RESPONDENT FOR OFF-SYSTEM CUSTOMERS	(7) TOTAL VOLUMES TRANSPORTED BY RESPONDENT FOR OFF-SYSTEM CUSTOMERS (5)+(6)	(8) TOTAL VOLUMES TRANSPORTED (4)+(7)
-5	2012	-	-	45,110	45,110	-	-	-	45,110
-4	2013	-	-	53,990	53,990	-	-	-	53,990
-3	2014	-	-	56,725	56,725	-	-	-	56,725
-2	2015	-	-	54,043	54,043	-	-	-	54,043
-1	2016	-	-	54,639	54,639	-	-	-	54,639
0	2017	-	-	50,115	50,115	-	-	-	50,115
1	2018	-	-	50,822	50,822	-	-	-	50,822
2	2019	-	-	51,278	51,278	-	-	-	51,278
3	2020	-	-	51,604	51,604	-	-	-	51,604
4	2021	-	-	51,906	51,906	-	-	-	51,906
5	2022	-	-	52,117	52,117	-	-	-	52,117
6	2023	-	-	52,240	52,240	-	-	-	52,240
7	2024	-	-	52,501	52,501	-	-	-	52,501
8	2025	-	-	52,686	52,686	-	-	-	52,686
9	2026	-	-	52,943	52,943	-	-	-	52,943
10	2027	-	-	53,216	53,216	-	-	-	53,216

4901: 5-7-04 GAS AND NATURAL GAS SUPPLY FORECASTS FOR GAS DISTRIBUTION COMPANIES SERVING MORE THAN FIFTEEN THOUSAND CUSTOMERS

(A) General Guidelines

No response required.

(B) Special Subject Areas

Duke Energy Ohio has historically purchased Ohio-produced gas if supply is reliable and the price is competitive. However, the Company's service territory is not conducive to natural gas formation. Most of Ohio's oil and gas wells are located in the northeast region of the state and in the Marcellus and Utica regions at the far eastern edge of the state. Duke Energy Ohio monitors the delivered price of Appalachian gas supplies (which includes Ohio-produced gas) and compares it to the price of delivered natural gas from other supply regions in the United States.

Duke Energy Ohio's contract to purchase recovered methane gas from the Rumpke Sanitary Landfill represents a source of Ohio gas. The Rumpke Sanitary Landfill is located in Colerain Township, Hamilton County, Ohio. The recovered methane is mixed with flowing natural gas in Duke Energy Ohio's distribution system and delivered to customers. As of September 1, 2009, the recovered methane gas is sold directly to a third party which then sells it to Duke Energy Ohio for distribution to its customers. The recovery of methane gas has several environmental benefits: it reduces methane gas emissions that escape from the landfill and enter the Earth's atmosphere; it reduces the danger of explosion to surrounding buildings; and it reduces odors from the landfill. Global warming is a concern of nations worldwide. Duke Energy Ohio's involvement in the Rumpke Landfill methane recovery project partially addresses two of the Company's commitments: one, to the Department of Energy's Climate Challenge program; and two, to the Environmental Protection Agency's Landfill Methane Outreach Program.

(C) Gas and Natural Gas Supply Forecast Discussion

(1) Duke Energy Ohio's historical and projected supply of gas, by source, are shown in Section 4901:5-7-04 (1), on Form FG2-1, Annual Gas Supply.

Currently, the only long-term supply contracted by Duke Energy Ohio are for fixed and collared prices as part of the Company's hedging program. Duke Energy Ohio continues to rely on contracts for short-term, seasonal supply for the majority of the requirements to serve its firm sales customers. This strategy allows greater flexibility for changes in demand, while providing a portfolio of fixed and indexed prices. A small portion of winter supply is sometimes purchased on the daily spot market. Summer supply is purchased through firm seasonal contracts or monthly spot market purchases depending on market conditions during the preceding spring.

Duke Energy Ohio's supply contracts typically include provisions that allow for a variety of pricing structures (i.e. index, fixed price, price caps and collars). The strategy is to lower the risk of price volatility. The contracted firm supply may have a premium attached by the supplier for that service.

Duke Energy Ohio also owns a propane peak-shaving plant and has access to 64% of a plant owned by Duke Energy Kentucky. The two facilities yield a combined total of 135,940 per day in equivalent dekatherms for peak day usage.

(2) Historical and projected gas prices by supplier are shown in Section 4901:5 7-04 (G) (2), on Form FG2-2, Gas Supply Prices. Projected gas prices are based upon NYMEX futures prices, utilizing current rates on each pipeline.

(3) Duke Energy Ohio does not own any storage facilities. Duke Energy Ohio subscribes to storage services on the Columbia Gas Transmission system, and the Texas Gas Transmission system.

(D) Projected Sources of Gas

(1) Form FG2-1, Annual Gas Supply in Section 4901:5-7-04 (G) (1), shows Duke Energy Ohio's historical and projected supply of gas by source. Projected supply is predominantly expected to come from "All other interstate supply", which represents amounts to be purchased through seasonal firm contracts. Current long term contracts are carried out through their date of termination. It is assumed that injections will equal withdrawals on an annual basis, so the net withdraws are projected to be zero. Duke Energy Ohio does not have company-owned gas. Duke Energy Ohio does not own, nor is it currently proposing to construct, any storage facilities, nor lease storage facilities outside of its gas service area at this time.

It is anticipated that the FERC and PUCO will continue to advocate open access, nondiscriminatory transportation on interstate pipelines, as evidenced in FERC Order #636, and on the local distribution companies' systems, as evidenced by PUCO Order #85-800. Correspondingly, Duke Energy Ohio is continuing the process of unbundling traditional utility services to small industrial, commercial and residential customers through its Firm Transportation (FT) and Residential Firm Transportation (RFT) services. Participating customers have the option under this program of directly securing gas supply from unregulated suppliers. Those volumes are transported on various interstate pipelines that serve Duke Energy Ohio. Once delivered at the utility's city gate, Duke Energy Ohio has the obligation to deliver, on a firm basis, such volumes to burner tip.

In response to Duke Energy Ohio's FT and RFT Programs, Duke Energy Ohio continuously reviews its gas procurement upstream pipeline contracts in order to minimize contract commitment costs from pipelines and suppliers for capacity or supply that may be unused due to customers switching from sales service to transportation service on Duke Energy Ohio's system. As a result of Duke Energy Ohio's collaborative process with PUCO Staff, Ohio Consumers Counsel and FT/RFT Program suppliers in 2007, changes to the FRAS tariff allow for assignment of some of Duke Energy Ohio's upstream interstate pipeline capacity as participation in the FT and RFT programs grows.

(2) Duke Energy Ohio is proposing to construct those facilities identified in 4901:5-7-05(B)(2). In addition, Duke Energy Ohio is proposing to further improve its integrated system through the C314V Central Corridor Pipeline Extension Project. This project, which is a continuation of the C314 pipeline constructed in 2003, is integral to the Company's long-term plan to retire propane-air plants and balance system supply from north to south. To more readily achieve this second objective, Duke Energy Ohio originally intended to propose a 30-inch pipeline engineered to an operating pressure of 600 pounds per square inch gauge (PSIG). Through the process of meetings with elected representatives, community leaders, and members of the public, and through the review of over 2,900 comments, Duke Energy Ohio has determined that it will reduce the size and scope of the project to a pipeline that is consistent with the pipelines already in use in southwest Ohio and that have been operated safely by Duke Energy Ohio for decades. As a result of these reductions in the design specifications, Duke Energy Ohio anticipates achieving its long-term plan through a combination of the Project and other infrastructure modernization efforts implemented over many years to come.

DUKE ENERGY OHIO
CITY GATE PEAK DAY FIRM CAPACITY (DTH/D)

	1/1/17	1/1/18	1/1/19
PIPELINE FT:			
TEXAS GAS	48,250	6,250	0
TENN/KO TRANS	23,788	23,926	23,926
COL GULF/KO TRANS	69,383	69,785	69,785
PANHANDLE/TEXAS EASTERN	0	0	0
TOTAL FT	141,421	99,961	93,711
PIPELINE STORAGE:			
COLUMBIA GAS FSS	216,514	216,514	216,514
TEXAS GAS NNS	25,000	25,000	0
TOTAL STORAGE	241,514	241,514	216,514
TOTAL UPSTREAM CAPACITY	382,935	341,475	310,225
PROPANE	135,940	135,940	135,940
PEAKING/City Gate SERVICE	46,000		
TOTAL PEAK CAPACITY	564,875	477,415	446,165
PEAK DAY DESIGN*	814,636	819,766	821,439

(*) – Includes peak day requirements for the RFT/FT customers.

SEASONAL STORAGE QUANTITIES

	1/1/14	1/1/15	1/1/16
COLUMBIA FSS	9,244,079	9,244,079	9,244,079
TEXAS GAS NNS	2,350,000	2,350,000	0

(E) Reliability of Gas Sources

(1) Reliable gas sources are those gas suppliers with industry experience, and in which Duke Energy Ohio has confidence in the deliverability of contracted amounts of gas to Duke Energy Ohio on a peak day, seasonal and/or annual basis without interruption.

(2) Duke Energy Ohio believes that to ensure a reliable supply of gas on peak days and on a seasonal/annual basis, it is necessary to diversify its "firm" gas purchases among proven gas suppliers with the capability to deliver gas into pipelines connected to, or located near, Duke Energy Ohio's gas service area. It is Duke Energy Ohio's policy to assure its firm customers, those with no alternate fuel capability, with the most reliable gas supplies. Utilizing storage capacity, firm interstate pipeline capacity, and proven gas suppliers currently provides the most reliable gas supplies. Duke Energy Ohio continues to monitor the reliability factor regarding its gas supply sources and to determine potential changes from state and federal orders and/or rules.

(3) The reliability of Duke Energy Ohio's suppliers regarding peak day gas supply over the past five (5) years has been near 100%. During the winter of 2013-2014, the supplier providing peaking service delivered to Duke Energy Ohio's city gate failed to deliver the full contracted volume on 2 days. The cut volumes were relatively minor, with 8,315 dth cut on January 6, 2014 and 5,293 cut on January 7, 2014. Due to these cuts, the supplier waived the reservation fees for the entire winter, but continued to provide the peaking service. Duke Energy Ohio anticipates that the reliability of supply from its current suppliers will remain high over the forecast period, and will require the winning bidders for peaking service to provide documentation that they have relevant firm transportation to Duke Energy Ohio's city gate.

(F) Analysis of System Peak and Winter Season Planning

(1) Form FG2-3, Historical Peak and Forecast Design Day Supply, is shown in Section 4901:5-7-04 (G) (3). The design day peak level is based on the econometric model

described fully on pages 3-1 through 3-33. For the winter of 2016 – 2017, the design peak day was 814,636 dth (756,956 mcf x 1.0762, See page 3-37). The total peak winter season requirements are estimated based on the weather conditions from the winter of 1995 – 1996, the equations utilized to estimate typical load to calculate the Target Supply Quantity (TSQ) for FT/RFT pools, and the forecasted number of customers. For the winter of 2016 – 2017, this resulted in estimated firm seasonal load for an extremely cold winter of 49 million dth.

The calculated peak day and peak season requirements represent the total firm load, including the load that will be supplied by third parties in FT/RFT program. To determine the amount of capacity that Duke Energy Ohio needs to acquire, the peak day and peak season requirements are reduced by the estimated amount of supply that will be provided by third parties for the FT/RFT pools. The calculated capacity requirements are further adjusted based on the fact that Duke Energy Ohio releases capacity to third party suppliers to the FT/RFT program per the Full Requirements Aggregation Service (FRAS) tariff.

(G) Supply Forecast Forms

(1) Gas Supplies, Form FG2-1; see page 4-8.

(2) Gas Prices, Form FG2-2; see page 4-9.

(3) Peak and Design Day Supply, Form FG2-3; see page 4-10.

(4) Natural Gas Storage Facilities, Form FG2-4; see page 4-11.

(5) Propane Facilities, Form FG2-5; see page 4-12.

(6) Other Peaking Facilities, Form FG2-6; Duke Energy Ohio owns no peaking facilities other than those identified on Form FG2-5; page 4-13.

FORM FG2-1: ANNUAL GAS SUPPLY
UNITS: MMCF/YEAR
COMPANY NAME: DUKE ENERGY OHIO

AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) LONG-TERM INTERSTATE SUPPLY	(2) SPOT MKT INTERSTATE SUPPLY	(3) ALL OTHER INTERSTATE SUPPLY	(4) OHIO PRODUCTION	(5) PROPANE	(6) SNG	(7) LNG	(8) OTHER	(9) TOTAL REQUIREMENTS (1) THRU (8)	(10) NET WITHDRAWAL FROM STORAGE	(11) TOTAL SUPPLIES (9) + (10)
BTU				1078.2	977.6	1347.7				1076.2		1076.2
-5	2012	4,352	-	17,190	1,238	4	–	–	–	22,784	228	23,012
-4	2013	2,351	-	18,378	1,324	44	–	–	–	22,097	291	22,388
-3	2014	4,067	1,006	17,582	1,344	236	–	–	–	24,235	1,121	25,356
-2	2015	4,267	1,937	14,048	1,424	80	–	–	–	21,756	-	21,756
-1	2016	2,748	-	12,337	1,467	156	–	–	–	16,708	1,246	17,954
0	2017	1,357	-	16,606	1,359	91	–	–	–	19,413		19,413
1	2018	1,357	-	16,790	1,359	81	–	–	–	19,587		19,587
2	2019	335	-	17,974	1,359	81	–	–	–	19,749		19,749
3	2020	-	-	18,448	1,359	81	–	–	–	19,888		19,888
4	2021	-	-	19,225	680	81	–	–	–	19,986		19,986
5	2022	-	-	19,920	-	81	–	–	–	20,001		20,001
6	2023	-	-	19,898	-	81	–	–	–	19,979		19,979
7	2024	-	-	19,967	-	81	–	–	–	20,048		20,048
8	2025	-	-	20,004	-	81	–	–	–	20,085		20,085
9	2026	-	-	20,071	-	81	–	–	–	20,152		20,152
10	2027	-	-	20,126	-	81	–	–	–	20,207		20,207

NOTE:

Column (3) - Represents contracted seasonal firm supply.

Column (10) - Includes net storage withdrawal volumes from Columbia Gas Transmission and Texas Gas NNS.

FORM FG2-2: GAS SUPPLY PRICES
UNITS: $/MCF
COMPANY NAME: DUKE ENERGY OHIO

AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) LONG-TERM INTERSTATE SUPPLY	(2) SPOT MKT INTERSTATE SUPPLY	(3) ALL OTHER INTERSTATE SUPPLY	(4) OHIO PRODUCTION	(5) PROPANE	(6) SNG	(7) LNG	(8) OTHER	(9) WITHDRAWAL FROM STORAGE	(10) TOTAL SUPPLIES (WACOG)
BTU				1078.2	977.6	1347.7					1076.2
-5	2012	$5.55	–	$2.93	$2.82	$6.87	–	–	–	$5.44	$3.45
-4	2013	$4.85	–	$3.73	$3.68	$6.97	–	–	–	$4.80	$3.86
-3	2014	$4.17	$7.28	$4.66	$4.39	$14.11	–	–	–	$4.47	$4.75
-2	2015	$4.12	$3.47	$2.78	$2.54	$11.74	–	–	–	$4.21	$3.12
-1	2016	$4.03	–	$2.47	$2.31	$10.69	–	–	–	$3.54	$2.84
0	2017	$3.68	–	$3.39	$3.12	$12.92	–	–	–	$3.45	$3.44
1	2018	$3.18	–	$3.28	$2.94	$12.92	–	–	–	$3.25	$3.29
2	2019	$3.18	–	$3.30	$2.73	$12.92	–	–	–	$3.15	$3.30
3	2020	–	–	$3.39	$2.73	$12.92	–	–	–	$3.17	$3.38
4	2021	–	–	$3.52	$2.78	$12.92	–	–	–	$3.25	$3.53
5	2022	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56
6	2023	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56
7	2024	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56
8	2025	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56
9	2026	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56
10	2027	–	–	$3.52	–	$12.92	–	–	–	$3.25	$3.56

NOTE:

Column (3) - Represents contracted seasonal firm supply.

Column (9) - Includes storage volumes from Columbia Gas Transmission and Texas Gas NNS.
- Demand Charges associated with the storage and transport are included in the rate.

FORM FG2-3: HISTORICAL PEAK AND FORECASTED DESIGN PEAK DAY
UNITS: MMCF
COMPANY NAME: DUKE ENERGY OHIO AVERAGE BTU CONTENT: 1076.2

	YEAR	(1) LONG-TERM INTERSTATE SUPPLY	(2) SPOT MKT INTERSTATE SUPPLY	(3) ALL OTHER INTERSTATE SUPPLY	(4) OHIO PRODUCTION	(5) PROPANE	(6) SNG	(7) LNG	(8) OTHER	(9) TOTAL REQUIREMENTS (1) THRU (8)	(10) WITHDRAWAL FROM STORAGE	(11) TOTAL SUPPLIES (9) + (10)
BTU				1078.2	977.6	1347.7				1076.2		1076.2
-5	2012	10	-	136	3	0	--	--	--	149	198	347
-4	2013	8	-	86	2	10	--	--	--	106	186	292
-3	2014	10	39	92	0	83	--	--	--	224	149	373
-2	2015	11	71	75	2	11	--	--	--	170	170	340
-1	2016	10	-	107	3	25	--	--	--	145	142	287
0	2017	4	-	106	4	40	--	--	--	154	178	332
1	2018	4	-	118	3	47	--	--	--	172	224	396
2	2019	4	-	119	3	47	--	--	--	173	224	397
3	2020	-	-	126	0	47	--	--	--	173	224	397
4	2021	-	-	126	0	47	--	--	--	173	224	397
5	2022	-	-	127	0	47	--	--	--	174	224	398
6	2023	-	-	128	0	47	--	--	--	175	224	399
7	2024	-	-	129	0	47	--	--	--	176	224	400
8	2025	-	-	129	0	47	--	--	--	176	224	400
9	2026	-	-	129	0	47	--	--	--	176	224	400
10	2027	-	-	130	0	47	--	--	--	177	224	401

NOTE:
Column (3) - Represents contracted seasonal firm supply.

Column (10) - Includes storage withdrawal volumes from Columbia Gas Transmission and Texas Gas NNS.

FORM FG2-4: EXISTING AND PROPOSED STORAGE FACILITIES (In MMCF)

COMPANY NAME: DUKE ENERGY OHIO

Reservoir Name (Percent Ownership)	Location	Capacity Cushion (Base) Gas	Capacity Working (Top) Gas	Total	Completion Date

Note: Duke Energy Ohio neither owns, nor is currently proposing
To construct any storage facilities.

FORM FG2-5: EXISTING AND PROPOSED PROPANE FACILITIES (In Gallons)

COMPANY NAME: DUKE ENERGY OHIO

Facility Name	Location	Capacity	Completion Date
Eastern Ave. Plant	2817 Eastern Ave. Cincinnati, OH	8,000,000 Gals.	Year: 1946-47 Addition: 1963-64
Erlanger Plant (1)	3000 Crescent Springs Rd. Erlanger, KY	7,000,000 Gals	Year: 1961

(1) Owned by Duke Energy Kentucky, a subsidiary company.

Note: Duke Energy Ohio is currently not proposing to construct additional propane facilities.

FORM FG2-6: OTHER PEAKING FACILITIES

COMPANY NAME: DUKE ENERGY OHIO

Facility Name	Location	Capacity	Completion Date

Note: Duke Energy Ohio neither owns, nor is currently proposing to construct, any peaking facilities other than those identified in Form FG2-4 and Form FG2-5 in this report.

4901: 5-7-05 RESOURCE FORECASTS AND SITE INVENTORIES OF TRANSMISSION FACILITIES FOR GAS DISTRIBUTION COMPANIES SERVING MORE THAN FIFTEEN THOUSAND CUSTOMERS

COMPANY: Duke Energy Ohio, Inc.

(A) General Guidelines

Duke Energy Ohio, Inc. (Duke Energy) has plans for additional gas transmission lines and replacement of sections of existing transmission lines. Pipelines reported on form FG3-1 includes the entire length of the pipeline where some segments along the pipeline operate below 20% SMYS. Data reported is as of 5/25/17.

(B) Specific Requirements

1) Existing Transmission System

a) Duke Energy has fifteen (15) existing pipelines that qualify as gas transmission lines under the PUCO, Division of Forecasting and Siting definitions. The characteristics of these gas transmission pipelines are listed on Form FG3-1, Pages 5-2 and 5-3 of this report.

b) (i) A detailed map showing Duke Energy's present gas transmission system is presented in Appendix I. All fifteen (15) existing pipelines are identified on this map. (ii) Duke Energy is participating in the PUCO joint mapping project and has met the requirement of providing a map to the PUCO.

2) Planned Transmission System

The specifications and identifying names and numbers of the proposed gas transmission pipelines are listed on Form FG3-2, Pages 5-4 through 5-15.

a) A detailed map of the proposed and existing gas transmission system is presented in Appendix II.

b) Duke Energy is participating in the PUCO joint mapping project and has met the requirement of providing a map to the PUCO.

3) Transmission Forecast Forms

a) Existing Transmission Lines, Form FG3-1; see pages 5-2 and 5-3

b) Planned Transmission Lines, Form FG3-2; see page 5-4 through 5-15

ODOE FORM FG3-1: CHARACTERISTICS OF EXISTING GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

Name & Number	Point of Origin & Terminus	Size & Capacity	Line Length	Associated Facilities	Year
"A"	Centerville Sta. to Norwood Sta.	20" 225 PSI 150 PSI	112,872 feet 88,236 feet	1. Centerville Sta. No. 9 2. Huntsville Sta. No. 22 3. Norwood Sta. No. 36	1950-91 1950-98
"D"	California Sta. to East Works Sta.	24" 200 PSI 388 PSI 175 PSI	23,766 feet	1. California Sta. No. 7 2. Riverside Dr. Sta. No. 81	1948-49
"V"	Line "D" to Norwood Sta.	20" 200 PSI 175 PSI	45,116 feet	4 Stations	1950-89
"AA"	Anderson Ferry Sta. to North Bend Rd. Sta.	20"-24" 175 PSI	86,588 feet	12 Stations	1956-94
"EE"	California Sta. to Line "V"	24" 200 PSI	25,481 feet	1. California Sta. No. 7	1960-79
"CG07"	Butler Sta. to Dicks Creek Sta.	10" & 12", 16" 400 PSI 438 PSI 800 PSI	25,443 feet	1. Butler Sta. No. 146 2. Dicks Creek Sta. No. 120	1964-89
"LP2"	Dicks Creek Sta. to Line "A"	20" 225 PSI 438 PSI 800 PSI	1,524 Feet	None	1958
"LP5"	Dicks Creek Sta. to AK Steel Back-Up Station	8" & 12" 438 PSI	4,371 feet	1. Dicks Creek Sta. 2. Lefferson Rd. Sta. No. 3	1965-66
"C210"	Princeton Rd. to Woodsdale Plant	16" 670 PSI 24" 500 PSI 400 PSI	24,359 feet	1. Liberty Sta. No. 512 2. Woodsdale Sta. No. 563	1991
"CG04"	Line "AA" to Livingston Rd.	20" 175 PSI	20,754 feet	1. Jessup Rd. Sta. No. 330 2. Blue Rock Rd. Sta. No. 216	1965

ODOE FORM FG3-1: CHARACTERISTICS OF EXISTING GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

Name & Number	Point of Origin & Terminus	Size & Capacity	Line Length	Associated Facilities	Year
"C314"	Mason Rd. @ Texas Gas to F/L "WW" on Fields Ertel Rd.	24" 670 PSI	56,303 feet	1. Mason Rd. Sta. No. 726 2. Sta. No. 727 at F/L "WW"	2003
"C338"	Ohio River to Bethel Sta. #760	12" 535 PSI	86,967 feet	1. Sta. No. 760	2008
"C340"	Sta. #759 (Bracken Co., KY) to F/L "C338" on Ohio shore	12" 535 PSI	3,699 feet	1. Sta. No. 759 @ F/L "AM09"	2008
C251	STA 137 Minton Rd to Miami Western Dr.	8"360 PSI	38,387feet	1. Sta. No. 137	1991 - 93
"CG63"	LP02 TAP TO Sta 311 & 181	8 438 PSI	582 feet	1. Sta. No. 311 2. Sta. No 181	1968

ODOE FORM FG3-2: SPECIFICATONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	T/L C314 Lebanon Connector
2. POINTS OF ORIGIN AND TERMINATION:	Existing Line "C314" to Lebanon gas pipeline Hub (Warren Co)
3. SIZE AND CAPACITY:	24-inch nominal diameter welded steel pipeline rated for MAOP of 720 psig
4. RIGHT-OF-WAY: ~	Length: Approx. 48,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2023
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Loop current pipeline to increase capacity for system, load growth and provide greater operational alternatives
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher degree of customer curtailment and lack of future growth in the area
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	T/L C338 Part 2
2. POINTS OF ORIGIN AND TERMINATION:	Existing Line "C338" at Bethel to Blanchester in Clermont County
3. SIZE AND CAPACITY:	12-inch nominal diameter welded steel pipeline rated for MAOP of 650 psig
4. RIGHT-OF-WAY:	Length: Approx. 132,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	Unknown
6. CONSTRUCTION:	Proposed 2024
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Loop current pipeline to increase capacity for system for future industrial growth
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher degree of customer curtailment and Lack of future growth in the area
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	D000b Replacement From 10-Year Plan WP #27b
2. POINTS OF ORIGIN AND TERMINATION:	Start at our East Works Plant at the intersection of Riverside Drive and Corbin St. replacing east to just past Kellogg Ave and Stites Rd.
3. SIZE AND CAPACITY:	20-inch and 24-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 17,600 feet Width: Varies
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	2017
7. CAPITAL INVESTMENT:	Approximate $14M
8. APPLICATION TIMING:	Spring 2017
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure with high pressure distribution main.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possible smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	A000b Replacement From 10-Year Plan WP #48
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 2,000 lf from our Huntsville facility south.
3. SIZE AND CAPACITY:	20-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 2,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2018
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure with high pressure distribution main.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	EE00 Replacement From 10-Year Plan WP #36
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 3,000 lf from Renslar Ave. & Kellogg Ave north and approx.. 5,000 lf from Beechmont Ave & Wilmer going south east.
3. SIZE AND CAPACITY:	24-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 8,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2018
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	CG07b Replacement and ILI Retrofits From 10-Year Plan WP #88
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 6,000 lf in various sections in HCA areas and perform ILI retrofits.
3. SIZE AND CAPACITY:	16-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 6,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2019
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	EE00 Replacement and ILI Retrofits From 10-Year Plan WP #93
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 17,000 lf in various sections in HCA areas and perform ILI retrofits.
3. SIZE AND CAPACITY:	24-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 17,000 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2021
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

DUKE ENERGY OHIO, INC
4901: 5-7-05

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	V000 Replacement and ILI Retrofits From 10-Year Plan WP #103
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 2,200 lf in various sections in HCA areas and perform ILI retrofits.
3. SIZE AND CAPACITY:	20-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 2,200 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2022
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	C251 ILI Retrofits From 10-Year Plan WP #105
2. POINTS OF ORIGIN AND TERMINATION:	Based on ILI study replace varies fittings to accommodate ILI.
3. SIZE AND CAPACITY:	8-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Varies Width: Varies
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2023
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Based on ILI study replace varies fittings to accommodate ILI.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Unable to use ILI tool.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	CG04 ILI Retrofits From 10-Year Plan WP #86
2. POINTS OF ORIGIN AND TERMINATION:	Based on ILI study replace varies fittings to accommodate ILI.
3. SIZE AND CAPACITY:	20-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Varies Width: Varies
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2023
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Based on ILI study replace varies fittings to accommodate ILI.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Unable to use ILI tool.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	A000a Replacement From 10-Year Plan WP #28
2. POINTS OF ORIGIN AND TERMINATION:	Replace approx. 18,500 lf in various sections in HCA areas.
3. SIZE AND CAPACITY:	20-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Approx. 18,500 feet Width: Approx. 50 feet
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2024
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Replacing aging infrastructure.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Higher O&M cost possibly smaller replacements due to aging infrastructure.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

ODOE FORM FG3-2: SPECIFICATIONS OF PLANNED GAS TRANSMISSION LINES

COMPANY: Duke Energy Ohio, Inc.

1. LINE NAME AND NUMBER:	AA00 ILI Retrofits From 10-Year Plan WP #53
2. POINTS OF ORIGIN AND TERMINATION:	Based on ILI study replace varies fittings to accommodate ILI.
3. SIZE AND CAPACITY:	20-inch and 24-inch nominal diameter welded steel pipeline rated for MAOP of 500 psig
4. RIGHT-OF-WAY:	Length: Varies Width: Varies
5. ASSOCIATED FACILITIES:	None
6. CONSTRUCTION:	Proposed 2025
7. CAPITAL INVESTMENT:	Undetermined
8. APPLICATION TIMING:	Undetermined
9. PARTICIPATION WITH OTHER UTILITIES:	None
10. PURPOSE OF THE PLANNED GAS LINE:	Based on ILI study replace varies fittings to accommodate ILI.
11. CONSEQUENCES OF CONSTRUCTION DEFERMENT:	Unable to use ILI tool.
12. CLASS DESIGNATION:	III
13. MISCELLANEOUS:	None

Duke Energy Ohio
Case No. 16-253-GA-BTX
CITY Second Set Interrogatories
Date Received: June 5, 2017

CITY-INT-02-008

REQUEST:

Your response to STAFF-DR-12-001 states your expectation that the proposed 20-inch pipeline will reduce reliance on the Foster Station from 55 percent to 45 percent.

a. Does this expectation assume the Preferred Route is used?

b. What is the expectation with respect to the Alternate Route?

RESPONSE:

a. Yes

b. It is expected that use of the Alternate route would reduce reliance on Foster Station from 55 percent to approximately 50 percent.

PERSON RESPONSIBLE:

Vince Andres

U.S. Department
of Transportation

**Pipeline and
Hazardous Materials Safety
Administration**

233 Peachtree Street Ste. 600
Atlanta, GA 30303

NOTICE OF PROBABLE VIOLATION PROPOSED CIVIL PENALTY and PROPOSED COMPLIANCE ORDER

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 15, 2018

Ms. Lynn J. Good
Chairman, President and Chief Executive Officer
Duke Energy Kentucky, Inc.
139 East Fourth Street, Mail Drop EX403
Cincinnati, OH, 45202

CPF 2-2018-0002

Dear Ms. Good:

Between July 31, 2017 and September 21, 2017, representatives of the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), pursuant to Chapter 601 of 49 United States Code (U.S.C.) inspected Duke Energy Kentucky, Inc.'s (Duke Energy) records in its Cincinnati, Ohio and Erlanger, Kentucky offices, and inspected Duke Energy's facilities in Kenton County, Kentucky.

As a result of the inspection, it is alleged that Duke Energy committed probable violations of the Pipeline Safety Regulations, Title 49, Code of Federal Regulations (CFR). The items inspected and the probable violations are:

1. **§195.1 Which pipelines are covered by this Part?**
   (a) Covered. Except for the pipelines listed in paragraph (b) of this Section, this Part applies to pipeline facilities and the transportation of hazardous liquids or carbon dioxide associated with those facilities in or affecting interstate or foreign commerce, including pipeline facilities on the Outer Continental Shelf (OCS). Covered pipelines include, but are not limited to:
   (1) Any pipeline that transports a highly volatile liquid;
   (2) Any pipeline segment that crosses a waterway currently used for commercial navigation;

(3) Except for a gathering line not covered by paragraph (a)(4) of this Section, any pipeline located in a rural or non-rural area of any diameter regardless of operating pressure;
(4) Any of the following onshore gathering lines used for transportation of petroleum:
(i) A pipeline located in a non-rural area;
(ii) A regulated rural gathering line as provided in §195.11; or
(iii) A pipeline located in an inlet of the Gulf of Mexico as provided in §195.413.

Duke Energy failed to comply with the regulation because it did not incorporate its Constance Cavern Liquid Propane Gas (LPG) Storage Facility (Constance Cavern) into all relevant portions of its pipeline safety program.

Section 195.2 defines *pipeline* or *pipeline system* as "all parts of a pipeline facility through which a hazardous liquid or carbon dioxide moves in transportation, including, but not limited to, line pipe, valves, and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks." Furthermore, § 195.2 defines *pipeline facility* as "new and existing pipe, rights-of-way and any equipment, facility, or building used in the transportation of hazardous liquids or carbon dioxide."

Duke Energy's Constance Cavern meets the above-referenced definition of "pipeline facility" because the submerged pumps and appurtenances within the cavern transfer LPG out of the storage cavern to the bi-directional pipeline for transport downstream (relative to the cavern) to the Erlanger plant. Furthermore, the cavern receives LPG from the same bi-directional pipeline via trucking injection at the Erlanger plant. Consequently, Constance Cavern is covered under § 195.1.

2. **§195.49 Annual report.**
   Each operator must annually complete and submit DOT Form PHMSA F 7000-1.1 for each type of hazardous liquid pipeline facility operated at the end of the previous year. An operator must submit the annual report by June 15 each year, except that for the 2010 reporting year the report must be submitted by August 15, 2011. A separate report is required for crude oil, HVL (including anhydrous ammonia), petroleum products, carbon dioxide pipelines, and fuel grade ethanol pipelines. For each state a pipeline traverses, an operator must separately complete those sections on the form requiring information to be reported for each state.

   Duke Energy failed to comply with the regulation because it did not complete its 2016 Annual Report as required by § 195.49.

   Part F, Section 5 of the Annual Report requires operators to provide "Mileage Inspected and Actions Taken in Calendar Year Based on Other Inspection Techniques." Review of Duke Energy's integrity assessment plan indicated that, in Calendar Year 2016, Duke Energy conducted an integrity assessment on its Line LP03 using "Other Technology" (LP-ICDA). Duke Energy failed to include this data in Part F, Section 5 of its 2016 Annual Report.

3. **§195.402 Procedural manual for operations, maintenance, and emergencies.**
   (a) General. Each operator shall prepare and follow for each pipeline system a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. This manual shall be reviewed at intervals not exceeding 15 months, but at least once each calendar year, and appropriate changes made as necessary to insure that the manual is effective. This manual shall be prepared before initial operations of a pipeline system commence, and appropriate parts shall be kept at locations where operations and maintenance activities are conducted.

   Duke Energy failed to comply with the regulation because it could not demonstrate that it reviewed its emergency plans and procedures at intervals not exceeding 15 months, but at least once each calendar year. Specifically, Duke Energy could not demonstrate that it had reviewed its *Plan for Emergencies and Natural Disasters* at intervals not exceeding 15 months, but at least once each calendar year.

   Records provided to the PHMSA inspectors consisted of the first page of the 2014, 2015, and 2016 revisions of the *Plan for Emergency and Natural Disasters*. The pages referenced only the December revision (edition) dates of the prior year. While Duke Energy personnel provided plan approval records for the referenced years, these records did not indicate that the plans had been <u>reviewed</u> as required of the regulations.

   Similarly, records documenting the required annual reviews of Duke Energy's Hazardous Liquid Operations Plan (HLOP) referenced review due dates for years 2014, 2015, and 2016, but did not provide the dates the reviews were completed.

4. **§195.446 Control room management.**
   (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by §195.402. An operator must develop the procedures no later than August 1, 2011, and must implement the procedures according to the following schedule. The procedures required by paragraphs (b), (c)(5), (d)(2) and (d)(3), (f) and (g) of this section must be implemented no later than October 1, 2011. The procedures required by paragraphs (c)(1) through (4), (d)(1), (d)(4), and (e) must be implemented no later than August 1, 2012. The training procedures required by paragraph (h) must be implemented no later than August 1, 2012, except that any training required by another paragraph of this section must be implemented no later than the deadline for that paragraph.

   Duke Energy failed to comply with the regulation because it did not have and follow written control room management (CRM) procedures that implement the requirements of § 195.446. Specifically, Duke Energy did not identify the Erlanger air-propane plant office (Erlanger office) as a control room, as defined in § 195.2

Control room is defined in § 195.2 as "an operations center staffed by personnel charged with the responsibility for remotely monitoring and controlling a pipeline facility." Furthermore, *controller* is defined in § 195.2 as "a qualified individual who remotely monitors and controls the safety-related operations of a pipeline facility via a SCADA system from a control room, and who has operational authority and accountability for the remote operational functions of the pipeline facility." During the inspection, PHMSA inspectors interviewed personnel at the Erlanger office regarding certain plant operators' roles in operating and controlling Duke Energy's Line LP03, as well as its Constance Cavern facility.

Based on the information and facts listed below, the Erlanger office is a Control Room and certain Erlanger plant operators are Controllers, per § 195.2.

- August 3, 2017 interview with the gas Control Manager (Cincinnati): Control Center calls the Erlanger air-propane plant (Erlanger Plant), located at the north end of Line LP03, and instructs Erlanger personnel when to operate the pipeline. (*See below* regarding Erlanger operation of the pipeline.) Cincinnati Gas Control monitors the LP03 line pressures, receives safety-related alarms, and has the ability to shut down the pumps at Constance Cavern.
- August 4, 2017 and September 21, 2017 interviews at Erlanger plant with the Systems Operations Manager and an Erlanger Plant Operator:
    - Erlanger could be called on to start and operate the LP03 line to supply its natural gas system during certain peak demand days during winter months.
    - Starting the pipeline on peak days to supply the propane-air plant: Erlanger operator(s) remotely start the submerged pump(s) and manipulate certain valves located at Constance Cavern (3.41 pipeline miles from Erlanger), via the use of Erlanger SCADA screen data and pump on/off and valve positioning commands. Erlanger operators monitor the pipeline operation and pressure on a 24/7 basis when the line is operating in withdrawal mode.
    - Refilling Constance Cavern: propane trucks typically pump the propane into the pipeline at Erlanger, and the product moves down the pipeline into the cavern via gravity flow. May take a month to refill the cavern, depending on storage volume and number of Mon-Fri 12-hour daytime (only) shifts when re-filling the cavern.
- November 10, 2017 email response conveys that Duke Energy considers Cincinnati Gas Control to be its only control room. Procedure GD50.1263-2, titled "Erlanger Gas Plant – Starting, Operating And Shutting Down Mixing System," also conveys pipeline start up and shutdown as part of the Erlanger plant operation.

As of PHMSA's inspection, Duke Energy did not consider the Erlanger office as a Control Room, and the referenced operators as Controllers, subject to the Control Room Management requirements of § 195.446. Furthermore, Duke Energy provided no records or related procedures, indicating it conducted any study referencing the *Control Room* and *Controller* definitions in § 195.2, to determine whether the Erlanger was a Control Room. The Erlanger office is located at the south end of the 3.41-mile long Line LP03, and remotely controls the pipeline; therefore, it meets the definition of a Control Room, as defined in § 195.2. Because the Erlanger office is a Control Room, Duke Energy was required to have and follow written CRM procedures that implement the requirements of § 195.446.

5. **§195.446 Control room management.**
...(j) Compliance and deviations. An operator must maintain for review during inspection:
(1) Records that demonstrate compliance with the requirements of this section.

Duke Energy failed to comply with the regulation because it did not maintain records relating to alarm management as prescribed in §195.446(e)(3).

Section 195.446(e)(3) requires that "[e]ach operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to... [v]erify the correct safety-related alarm set-point values and alarm descriptions when associated field instruments are calibrated or changed and at least once each calendar year, but at intervals not to exceed 15 months." Duke Energy's CRM records did not accurately describe a pressure deviation alarm for Line LP03 in its annual (not to exceed 15 months) safety-related alarm reviews, as required by § 195.446(e)(3). Duke Energy's 2014, 2015, and 2016 safety-related alarm review records describe the pressure deviation alarm as "RTU Calculation Based on Pressures." However, in its response to PHMSA's request to describe the programming/algorithm(s) in its Supervisory Control and Data Acquisition (SCADA) system that would trigger the leak detection alarm(s), Duke Energy described the alarm as "*When comparison of Constance Cavern outlet pressure and Erlanger Gas Plant pressure deviates more than 5 psig for a period of more than 2 minutes.*"

6. **§195.452 Pipeline integrity management in high consequence areas.**
...(b) What program and practices must operators use to manage pipeline integrity? Each operator of a pipeline covered by this section must:
...(5) Implement and follow the program.

Duke Energy failed to comply with the regulation because it did not follow its Integrity Management (IM) program as follows:

A. Duke Energy performed an integrity assessment on its Line LP03 in 2016 using a Liquid Petroleum Internal Corrosion Direct Assessment (LP-ICDA) assessment method. At the time of the assessment, which was completed on July 1, 2016, Section 8 of Duke Energy's Hazardous Liquid Pipeline IMP, dated September 30, 2013, and Duke Energy Procedure GD70.06-006, titled "Assessment Methods Selection Process Flowchart," did not specify LP-ICDA as an approved integrity assessment method. Duke Energy drafted a LP-ICDA procedure in February of 2016, prior to the 2016 assessment, but the procedure was not finalized until April 6, 2017. Furthermore, as of PHMSA's 2017 inspection, Duke Energy had not incorporated the above-referenced LP-ICDA procedure into its IM program.

B. Item 4A of Duke Energy Procedure GD75.01-008, titled "Hazardous Liquid IMP Liquid Analysis," requires that "Within 150 days of completion of the Integrity Assessment for each pipeline, a review of the assessments results will be completed and the Information Analysis will be performed." Following a June 6, 2016, External Corrosion Direct Assessment (ECDA) of Line LP03, the required Information Analysis was submitted to Duke Energy on July 20, 2017, 259 days after the 150-day deadline required by the above-referenced procedure.

C. Section 3 of Duke Energy Procedure GD75.01-007 (Effective Date November 25, 2013), titled "Continuing Evaluation and Assessment," requires that Duke Energy perform formal evaluations of the integrity of its pipelines, including the development and documentation of a formal process for such evaluations. Furthermore, the same procedure requires that the evaluations "will consider the results of the baseline and subsequent assessments, the information analysis performed after each assessment, decisions regarding remediation and decisions regarding preventive and mitigative measures." Duke Energy conducted an ECDA assessment of its Line LP03 on June 6, 2016. At the time of PHMSA's inspection, Duke Energy personnel were unable to produce a record of the required formal evaluation. Duke Energy stated that its Continual Assessment Plan (CAP) complied with this requirement. However, the CAP does not provide the information required by the above-referenced procedure, such as the results of the assessment, the information analysis, decisions regarding remediation, and decisions regarding Preventive and Mitigative Measures (P&MMs).

D. Duke Energy failed to compile Integrity Management Program (IMP) performance measures for Calendar Years 2013, 2014, and 2015 on the *Performance Measures* spreadsheet, as required to be gathered annually by Duke Energy's Hazardous Liquid Pipeline IMP "Section 9 – Performance Plan, and Appendix B - Performance Measures."

7. **§195.452 Pipeline integrity management in high consequence areas. ...(f) What are the elements of an integrity management program? An integrity management program begins with the initial framework. An operator must continually change the program to reflect operating experience, conclusions drawn from results of the integrity assessments, and other maintenance and surveillance data, and evaluation of consequences of a failure on the high consequence area. An operator must include, at minimum, each of the following elements in its written integrity management program...**

   Duke Energy failed to comply with the regulation because it did not change its IM program to reflect operating experience, conclusions drawn from results of the integrity assessments, and other maintenance and surveillance data. Specifically, Duke Energy did not include, nor reference in its IM program, the LP-ICDA procedures that were used to assess Line LP03 in 2015 after it determined that the line could not be assessed using in-line inspection (ILI) tools.

   Duke Energy installed ILI tool launchers and receivers on its Line LP03 in preparation for an integrity assessment in 2015. When attempting to run the ILI tool(s) it was discovered that restrictions in the line prevented a successful tool run. As an alternative, a LP-ICDA assessment was conducted 2016 on Line LP03 in 2016, between Constance Cavern and the Erlanger air-propane plant. The 2016 LP-ICDA report conveys that the assessment was conducted according to Duke Energy Energy's LP-ICDA procedure, as well as guidance from NACE Standard Practice (SP) 0208-2008, titled "Internal Corrosion Direct Assessment Methodology for Liquid Petroleum Pipelines." However, such procedures were neither approved nor incorporated into Duke Energy's IMP.

8. **§195.452 Pipeline integrity management in high consequence areas.**
...(j) *What is a continual process of evaluation and assessment to maintain a pipeline's integrity?*—(1) General. After completing the baseline integrity assessment, an operator must continue to assess the line pipe at specified intervals and periodically evaluate the integrity of each pipeline segment that could affect a high consequence area.
...(5) Assessment methods. An operator must assess the integrity of the line pipe by any of the following methods. The methods an operator selects to assess low frequency electric resistance welded pipe or lap welded pipe susceptible to longitudinal seam failure must be capable of assessing seam integrity and of detecting corrosion and deformation anomalies.
(i) In-Line Inspection tool or tools capable of detecting corrosion and deformation anomalies, including dents, gouges, and grooves. For pipeline segments that are susceptible to cracks (pipe body and weld seams), an operator must use an in-line inspection tool or tools capable of detecting crack anomalies. When performing an assessment using an In-Line Inspection tool, an operator must comply with §195.591;
(ii) Pressure test conducted in accordance with subpart E of this part;
(iii)External corrosion direct assessment in accordance with §195.588; or
(iv) Other technology that the operator demonstrates can provide an equivalent understanding of the condition of the line pipe. An operator choosing this option must notify OPS 90 days before conducting the assessment, by sending a notice to the address or facsimile number specified in paragraph (m) of this section.

Duke Energy failed to comply with the regulation because it did not notify OPS 90 days before conducting an assessment using "other technology." Specifically, Duke Energy conducted a LP-ICDA on its Line LP03 in 2016 and did not notify OPS. LP-ICDA is considered "other technology" under § 195.452(j)(5).

Duke Energy assessed Line LP03 for the identified threat of internal corrosion in 2016. Duke Energy personnel conveyed to the PHMSA inspector that the LP-ICDA assessment served as a P&MM for continual monitoring of the internal corrosion threat. This explanation notwithstanding, Duke Energy's reassessment plan reviewed by PHMSA indicated the 2016 LP-ICDA assessment of Line LP03 was an integrity re-assessment.

9. **§195.452 Pipeline integrity management in high consequence areas.**
...(l) What records must an operator keep to demonstrate compliance?
(1) An operator must maintain, for the useful life of the pipeline, records that demonstrate compliance with the requirements of this subpart. At a minimum, an operator must maintain the following records for review during an inspection:

...(ii) Documents to support the decisions and analyses, including any modifications, justifications, deviations and determinations made, variances, and actions taken, to implement and evaluate each element of the integrity management program listed in paragraph (f) of this section.

Duke Energy failed to comply with the regulation because it did not maintain records or documents to support its decisions and analyses, including any modifications, justifications, deviations and determinations made, variances, and actions taken, to implement and evaluate each element of the integrity management program listed in § 195.452(f).

Duke Energy could not produce records or documentation as to why the segments listed below were not assessed within Duke Energy's prescribed time period, contrary to the requirements of § 195.452(l)(1)(ii). Each segment was baseline-assessed by pressure test on October 20, 2005 and, per the procedure, each was required to be re-assessed by October 20, 2010. It is noted that the below-listed segments were components of pipelines that were still in service as of the dates of the PHMSA inspection.

- Segment in Casing 23: 400-foot Interstate I-71/75 crossing; pipe was not re-assessed, and was replaced on November 15, 2011.
- Segment in Casing 55: Amsterdam Road; re-assessed on December 5, 2012.
- Segment in Casing 39: Crescent Springs Pike crossing; pipe was not re-assessed, and was abandoned in place on August 3, 2012.
- Segment in Casing 13221 I-275 crossing; pipe was not re-assessed, and was replaced on September 10, 2012.

10. **§195.573 What must I do to monitor external corrosion control?**
(a) Protected pipelines. You must do the following to determine whether cathodic protection required by this subpart complies with §195.571:
(1) Conduct tests on the protected pipeline at least once each calendar year, but with intervals not exceeding 15 months. However, if tests at those intervals are impractical for separately protected short sections of bare or ineffectively coated pipelines, testing may be done at least once every 3 calendar years, but with intervals not exceeding 39 months.

Duke Energy failed to comply with the regulation because it did not conduct tests on its protected pipeline at least once each calendar year, but with intervals not exceeding 15 months.

Per records documenting Duke Energy's 2014 annual cathodic protection (CP) survey, pipe-to-soil (p/s) potential readings were taken at three test stations in the vicinity of Duke Energy's Erlanger air-propane plant on February 9, 2014. Records documenting the 2015 annual CP survey indicate the subsequent p/s potential readings at the above-referenced test stations were taken on August 26, 2015, exceeding the 15-month interval by 109 days. Records indicate that, on March 31, 2015, the corrosion technician "couldn't get inside the Duke Energy station," leading to Duke Energy exceeding with 15-month interval.

11. **§195.588 What standards apply to direct assessment?**
...(b) The requirements for performing external corrosion direct assessment are as follows:
(1) General. You must follow the requirements of NACE SP0502 (incorporated by reference, see §195.3). Also, you must develop and implement a External Corrosion Direct Assessment (ECDA) plan that includes procedures addressing pre-assessment, indirect examination, direct examination, and post-assessment.

Duke Energy failed to comply with the regulation because it did not follow the requirements of NACE SP0502 (incorporated by reference, *see* §195.3). Specifically, Duke Energy did not follow the pre-assessment step in NACE SP0502 when conducting continual ECDA integrity assessments on its Line LP03 in 2012 and 2016, as follows.

A. Duke Energy combined segments of multiple pipelines into one ECDA Region. Duke Energy included the hazardous liquid 8-inch Line LP03 cased pipe segment (Casing #55) and predominantly 24-inch natural gas transmission pipeline cased segments into a single Region when conducting the 2012 Cased Pipe ECDA (CECDA) on Line LP03. NACE SP0502-2008 Sections 3.5.1.1.1 and 3.5.1.3 indicate that an ECDA region is, in part, a portion of a pipeline segment.

From NACE SP0502-2008[a] (*emphasis added*):
3.5 Identification of ECDA Regions
3.5.1 The pipeline operator shall analyze the data collected in the Pre-assessment Step to identify ECDA regions.
3.5.1.1 The pipeline operator should define criteria for identifying ECDA regions.
3.5.1.1.1 An ECDA region is **a portion of a pipeline segment** that has similar physical characteristics, corrosion histories, expected future corrosion conditions, and that uses the same indirect inspection tools.

B. The 2016 Line LP03 *ECDA Preassessment Step Data Element Sheet* indicates the pipeline joint coating types as "Heat shrinks and hot wax with paper were applied at the joints." This description is incomplete because the original pipeline joint coating type was not included. 1961 engineering records indicate that 156 rolls of Royston "4-in. wide Hi-flo Quik-wrap" and 10 gallons of "Raybond A-36 primer" were specified for the initial construction project, indicating that a hand-applied tape wrap coating was applied at the girth weld joints during original construction.

Certain shrink sleeves and hand-applied tapes are known to be shielding coatings which, in the event of a disbondment or loss of adhesion, diverts or prevents the flow of cathodic protection current from its intended path. Table 1 of NACE SP0502-2010, titled "*ECDA Data Elements*," requires joint coating type to be determined during the Preassessment Step, and conveys that "*ECDA may not be appropriate for coatings that cause shielding*." The above-referenced records indicate that Duke Energy failed to meet the NACE SP0502-2010 requirement for joint coating type to be determined

[a] The 2012 CECDA records indicate that NACE SP0502-2010 was used; regardless, at the time of the assessment the 2008 edition was the code-referenced edition. The 2010 edition became effective March 6, 2015.

during the Preassessment Step. Furthermore, Table 2 of NACE SP0502-2010, titled "*ECDA Tool Selection Matrix,*" conveys the following:

"*Shielding by Disbonded Coating: None of these survey tools is capable of detecting coating conditions that exhibit no electrically continuous pathway to the soil.*"

12. **195.589 What corrosion control information do I have to maintain?**
...(c) You must maintain a record of each analysis, check, demonstration, examination, inspection, investigation, review, survey, and test required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures or that corrosion requiring control measures does not exist. You must retain these records for at least 5 years, except that records related to §§195.569, 195.573(a) and (b), and 195.579(b)(3) and (c) must be retained for as long as the pipeline remains in service.

Duke Energy failed to comply with the regulation because it did not maintain a record of each analysis, check, demonstration, examination, inspection, investigation, review, survey, and test required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures or that corrosion requiring control measures does not exist.

During PHMSA's inspection, Duke Energy personnel were unable to produce records confirming inspection for evidence of internal corrosion when pipe was removed in 2014 to install an ILI tool launcher and receiver on Line LP03.

Proposed Civil Penalty

Under 49 U.S.C. § 60122 and 49 CFR § 190.223, you are subject to a civil penalty not to exceed $209,002 per violation per day the violation persists, up to a maximum of $2,090,022 for a related series of violations. For violations occurring prior to November 2, 2015, the maximum penalty may not exceed $200,000 per violation per day, with a maximum penalty not to exceed $2,000,000 for a related series of violations. The Compliance Officer has reviewed the circumstances and supporting documentation involved in the above probable violations and has recommended that you be preliminarily assessed a civil penalty of $55,700 as follows:

Item number	PENALTY
6	$39,200
9	$16,500

Warning Items

With respect to Items 2, 3, 5, 7, 8, 10, 11, and 12, we have reviewed the circumstances and supporting documents involved in this case and have decided not to conduct additional enforcement action or penalty assessment proceedings at this time. We advise you to promptly correct these items. Failure to do so may result in additional enforcement action.

Proposed Compliance Order

With respect to items 1 and 4, pursuant to 49 U.S.C. § 60118, the Pipeline and Hazardous Materials Safety Administration proposes to issue a Compliance Order to Duke Energy Kentucky, Inc. Please refer to the *Proposed Compliance Order*, which is enclosed and made a part of this Notice.

Response to this Notice

Enclosed as part of this Notice is a document entitled *Response Options for Pipeline Operators in Compliance Proceedings*. Please refer to this document and note the response options. All material you submit in response to this enforcement action may be made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), along with the complete original document you must provide a second copy of the document with the portions you believe qualify for confidential treatment redacted and an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b).

Following the receipt of this Notice, you have 30 days to submit written comments, or request a hearing under 49 CFR § 190.211. If you do not respond within 30 days of receipt of this Notice, this constitutes a waiver of your right to contest the allegations in this Notice and authorizes the Associate Administrator for Pipeline Safety to find facts as alleged in this Notice without further notice to you and to issue a Final Order. If you are responding to this Notice, we propose that you submit your correspondence to my office within 30 days from receipt of this Notice. This period may be extended by written request for good cause.

In your correspondence on this matter, please refer to **CPF 2-2018-6002** and, for each document you submit, please provide a copy in electronic format whenever possible.

Sincerely,

James A. Urisko
Director, Office of Pipeline Safety
PHMSA Southern Region

Enclosures: *Proposed Compliance Order*
Response Options for Pipeline Operators in Compliance Proceedings

PROPOSED COMPLIANCE ORDER

Pursuant to 49 United States Code § 60118, the Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes to issue to Duke Energy Kentucky, Inc. (Duke Energy) a Compliance Order incorporating the following remedial requirements to ensure the compliance of Duke Energy with the pipeline safety regulations:

1. In regard to Item 1 of the Notice pertaining to Duke Energy's failure to include its Constance Cavern facility in all relevant portions of its pipeline safety program,
   a. Duke Energy must revise its written plans and procedures to incorporate the Constance Cavern Liquid Propane Gas (LPG) Storage Facility (Constance Cavern), to include all *pipeline facilities* as defined in 195.2 that are located at the plant site and on plant property, including plant property security fencing. The referenced revisions, as a minimum and as applicable to each facility, must be in accordance with Duke Energy's written plans and procedures it uses to administer its pipeline safety program including, but not limited to, those written plans and procedures required of Subparts F and G of Title 49, CFR Part 195 (Part 195).
   b. Duke Energy must provide to PHMSA for approval a written list of activities, with a completion schedule, that are required to be performed in order for Constance Cavern to be in compliance with Duke Energy's revised written plans and procedures that are described in Item 1a. above.
   c. Duke Energy must complete all activities described in Item 1b. above.
2. In regard to Item 4 of the Notice pertaining to Duke Energy's failure to identify the Erlanger air-propane plant office (Erlanger office) as a control room, as defined in § 195.2,
   a. Duke Energy must revise its written control room management (CRM) procedures to incorporate its Erlanger office as a *Control room*, and identify the individuals located at the Erlanger office who control Line LP03 as *Controllers*, all as defined in § 195.2.
   b. Duke Energy must provide to PHMSA for approval a written list of activities, with a completion schedule, that are required to be performed in order for the Erlanger office and individuals. as referenced in item 1b. above, to be in compliance with Duke Energy's revised CRM procedures and § 195.2.
   c. Duke Energy must complete all activities described in Item 2b. above.
3. Duke Energy must complete the above Items within the following time requirements.
   a. Within 30 days of receipt of the Final Order Duke Energy must complete the requirements of Items 1a. and 1b. above.
   b. Within 60 days of receipt of the Final Order Duke Energy must complete the requirements of Items 2a. and 2b. above.

c. Within 150 days of receipt of the Final Order Duke Energy must provide written documentation confirming the completion of Items 1 and 2 above to the Director, Office of Pipeline Safety, PHMSA Southern Region.

4. It is requested (not mandated) that Duke Energy maintain documentation of the safety improvement costs associated with fulfilling this Compliance Order and submit the total to the Director, Office of Pipeline Safety, PHMSA Southern Region. It is requested that these costs be reported in two categories: 1) total cost associated with preparation/revision of plans, procedures, studies and analyses, and 2) total cost associated with replacements, additions and other changes to pipeline infrastructure.

U.S. Department
of Transportation

**Pipeline and
Hazardous Materials Safety
Administration**

233 Peachtree Street Ste. 600
Atlanta, GA 30303

NOTICE OF PROBABLE VIOLATION
PROPOSED CIVIL PENALTY
and
PROPOSED COMPLIANCE ORDER

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 29, 2018

Ms. Lynn J. Good
Chairman, President and Chief Executive Officer
Duke Energy Kentucky, Inc.
KO Transmission Company
139 East Fourth Street, Mail Drop EX403
Cincinnati, OH, 45202

CPF 2-2018-1004

Dear Ms. Good:

Between July 31, 2017, and September 21, 2017, representatives of the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), pursuant to Chapter 601 of 49 United States Code (U.S.C.) inspected KO Transmission Company (KO) records in its Cincinnati, Ohio and Erlanger, Kentucky offices, and inspected KO's facilities in Ohio and Kentucky. KO is a subsidiary of Duke Energy Kentucky, Inc.

As a result of the inspection, it is alleged that KO has committed probable violations of the Pipeline Safety Regulations, Title 49, Code of Federal Regulations (CFR). The items inspected and the probable violations are:

1. **§ 192.805 Qualification program.**
   Each operator shall have and follow a written qualification program. The program shall include provisions to:

   (a) …
   (c) Allow individuals that are not qualified pursuant to this subpart to perform a covered task if directed and observed by an individual that is qualified;
   (d) …

(g) Identify those covered tasks and the intervals at which evaluation of the individual's qualifications is needed;
(h) After December 16, 2004, provide training, as appropriate, to ensure that individuals performing covered tasks have the necessary knowledge and skills to perform the tasks in a manner that ensures the safe operation of pipeline facilities; and
(i) After December 16, 2004, notify the Administrator or a state agency participating under 49 U.S.C. Chapter 601 if the operator significantly modifies the program after the administrator or state agency has verified that it complies with this section. Notifications to PHMSA may be submitted by electronic mail to *InformationResourcesManager@dot.gov*, or by mail to ATTN: Information Resources Manager DOT/PHMSA/OPS, East Building, 2nd Floor, E22-321, New Jersey Avenue SE., Washington, DC 20590.

KO failed to comply with the regulation because its written qualification program did not adequately include the provisions of §§ 192.805(c), 192.805(g), 192.805(h), and 192.805(i), as follows:

- § 192.805(c): KO's Operator Qualification (OQ) Plan, titled "Natural Gas Operator Qualification Plan," revision date February 11, 2016, copied the language of the regulation regarding allowance of non-qualified individuals to perform a covered task if directed and observed by an individual that is qualified. The plan, however, failed to provide details directly applying the regulation to its system. For example, KO's OQ Plan was silent on whether KO had developed a span of control ratio used to manage direct observation and supervision which would include provisions for verbal communications, for applicable covered tasks.

- § 192.805(g): KO's OQ Plan requires a 5 year covered task re-qualification cycle "on the majority of covered tasks," and lists criteria to be applied to each covered task to determine if a more frequent qualification interval is appropriate. KO personnel were unable to provide documentation showing how and if the criteria had been applied to establish the re-qualification intervals. It is noted that KO personnel conveyed that KO normally re-evaluates individuals on a 3 year interval.

- § 192.805(h): KO's OQ Plan did not address the requirement to, after December 16, 2004, provide training, as appropriate, to ensure that individuals performing covered tasks have the necessary knowledge and skills to perform the tasks in a manner that ensures the safe operation of pipeline facilities.

- § 192.805(i): KO's OQ Plan did not require KO to notify the Administrator or a state agency if KO significantly modifies the program after the Administrator or state agency has verified that the program complies with § 192.805.

2. **§ 192.809 General.**
   (a) …
   (d) After October 28, 2002, work performance history may not be used as a sole evaluation method.
   (e) After December 16, 2004, observation of on-the-job performance may not be used as the sole method of evaluation.

   KO failed to comply with the requirements of § 192.809 as follows:

   - § 192.809(d): KO's written OQ Plan did not dis-allow the use, as sole evaluation methods, of work performance history reviews after October 28, 2002.
   - § 192.809(e): KO's written OQ Plan did not dis-allow the use, as a sole evaluation method, of observation of on-the-job performance after December 16, 2004.

3. **§ 192.945 What methods must an operator use to measure program effectiveness?**
   (a) General. An operator must include in its integrity management program methods to measure whether the program is effective in assessing and evaluating the integrity of each covered pipeline segment and in protecting the high consequence areas. These measures must include the four overall performance measures specified in ASME/ANSI B31.8S (incorporated by reference, see §192.7 of this part), section 9.4, and the specific measures for each identified threat specified in ASME/ANSI B31.8S, Appendix A. An operator must submit the four overall performance measures as part of the annual report required by §191.17 of this subchapter.

   KO failed to comply with the regulation because its methods to measure whether the program is effective in assessing and evaluating the integrity of each covered pipeline segment and in protecting the high consequence areas (HCAs) were incorrect.

   Potential threats that an operator must consider include, but are not limited to, the threats listed in ASME/ANSI B31.8S (incorporated by reference, see § 192.7), section 2, which are grouped under the following four categories:

   (1) Time dependent threats such as internal corrosion, external corrosion, and stress corrosion cracking;
   (2) Static or resident threats, such as fabrication or construction defects;
   (3) Time independent threats such as third party damage and outside force damage; and
   (4) Human error.

   Specifically, KO failed to measure its program effectiveness in its integrity management (IM) program regarding manufacturing and construction defects as required by ASME B31.8S, section 2.2. KO's IM program incorrectly defines the method for evaluating manufacturing and construction defects. The KO report, titled "2015-2016 Performance Measures Report," lists the following question for Manufacturing Defects and for Construction defects:

   "Has pressure exceeded MAOP for preceding 5 year pre-TIMP highest pressure."

   Per § 192.917(e)(3), *Manufacturing and Construction Defects*, the correct reference would be whether the operating pressure on the covered segment had increased over the maximum operating pressure experienced during the five years preceding identification of the HCA.

4. **§ 191.17 Transmission systems; gathering systems; liquefied natural gas facilities; and underground natural gas storage facilities: Annual report.**
   (a) Transmission or Gathering. Each operator of a transmission or a gathering pipeline system must submit an annual report for that system on DOT Form PHMSA 7100.2.1. This report must be submitted each year, not later than March 15, for the preceding calendar year, except that for the 2010 reporting year the report must be submitted by June 15, 2011.

   KO failed to comply with the regulation because it did not submit the following data in its annual reports:

   - KO did not report data related to the 0.425 miles of transmission line crossing the Ohio River (0.298 miles in Kentucky and 0.127 miles in Ohio). KO personnel conveyed that the KO considers the segment to be distribution, and not transmission, because the line operates at a hoop stress of less than 20-percent of the pipe's specified minimum yield strength (SMYS).

     Section 192.3 defines a transmission line as:

     Transmission line means a pipeline, other than a gathering line, that:

     (1) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not down-stream from a distribution center;

     (2) operates at a hoop stress of 20 percent or more of SMYS; or

     (3) transports gas within a storage field.

     The segment meets the definition of a *transmission line* in § 192.3 because it is not a gathering line, and transports gas which ultimately comes from upstream gas gathering lines and/or storage field, to distribution center(s). Likewise, KO's FERC Gas Tariff and the tariff-referenced system map convey and illustrate that KO provides transportation services, via its Line AM04, to delivery point(s) in Ohio.

   - KO did not report data related to 0.17 HCA miles (Kentucky side of the Ohio River) traversed by the segment of its Line AM-04 transmission line segment which operates under 20-percent SMYS, as required in Part B of PHMSA Form F7100.2-1, referenced in § 191.17.

   - KO integrity assessed (via pressure-test) approximately 8.5 miles of its Line AM00A in 2016, but failed to report the mileage in Part F its 2016 Annual Report, submitted using PHMSA Form F7100.2-1, referenced in § 191.17.

   - KO did not report the addition of approximately 8.5 miles of its Line AM00A as "Internal Inspection ABLE" pipe in Part R of submitted Annual Reports, submitted using PHMSA Form F7100.2-1, referenced in § 191.17.

5. **§ 191.29 National Pipeline Mapping System.**
(a) Each operator of a gas transmission pipeline or liquefied natural gas facility must provide the following geospatial data to PHMSA for that pipeline or facility:
(1) Geospatial data, attributes, metadata and transmittal letter appropriate for use in the National Pipeline Mapping System. Acceptable formats and additional information are specified in the NPMS Operator Standards Manual available at www.npms.phmsa.dot.gov or by contacting the PHMSA Geographic Information Systems Manager at (202) 366-4595.

   KO failed to comply with the regulation because it did not provide to PHMSA certain geospatial data required in § 191.29(a)(1). The segment of KO's Line AM-04B that crosses the Ohio River from Kentucky into Ohio was not included in mapping submitted to PHMSA's National Pipeline Mapping System (NPMS). KO personnel conveyed that, because the segment at under 20 percent of pipe SMYS, KO considers the segment to be distribution and is not required to be submitted to the NPMS. PHMSA has determined the segment to be transmission for the reasons stated in Item 4 above.

6. **§ 192.465 External corrosion control: Monitoring.**
(a) Each pipeline that is under cathodic protection must be tested at least once each calendar year, but with intervals not exceeding 15 months, to determine whether the cathodic protection meets the requirements of §192.463. However, if tests at those intervals are impractical for separately protected short sections of mains or transmission lines, not in excess of 100 feet (30 meters), or separately protected service lines, these pipelines may be surveyed on a sampling basis. At least 10 percent of these protected structures, distributed over the entire system must be surveyed each calendar year, with a different 10 percent checked each subsequent year, so that the entire system is tested in each 10-year period.

   KO failed to comply with the regulation because it did not test, at least once each calendar year, but with intervals not exceeding 15 months, to determine whether its cathodic protection (CP) meets the requirements of § 192.463 at several test stations.

   The table below summarizes seven test stations where the CP surveys exceeded the above-referenced required frequency. The exceedances ranged from 70 days to 120 days.

   The explanation given by KO's corrosion technician for exceeding the frequency was that the test stations were "no locate" stations, meaning that the stations could not be located and as such, the time period (once each calendar year, but with intervals not exceeding 15 months) re-starts at the "no locate" date. Being unable to locate a test station does not excuse the operator from its obligation to comply with pipeline safety regulations. Likewise, KO personnel were not following KO's written procedures, which do not authorize this practice.

Line ID	Test Station ID	Date of Test Station Read	"On" Reading	"Off" Reading	Comments	Per Technician	Exceedance (days beyond 15-months)
AM09	36830	4/3/2015	-1.52	-1.32	FOUND AT LOCATION		
AM09	36830	4/12/2016	---	---		"no locate"	
AM09	36830	10/3/2016	-1.18	-1.08	FOUND AT LOCATION		92
AM00A	32408	4/27/2015	-1.38	-1.25	FOUND AT LOCATION		
AM00A	32408	4/13/2016	---	---		"no locate"	
AM00A	32408	10/27/2016	-1.35	-1.21	FOUND AT LOCATION		92
AM04A	36858	4/8/2015	-1.14	-1.11	WATER GONE		
AM04A	36858	4/12/2016	---	---		"no locate"	
AM04A	36858	10/3/2016	-1.09	-0.92			87
AM00A	32340	4/8/2015	-1.33	-1.14	FOUND AT LOCATION		
AM00A	32340	4/14/2016	---	---		"no locate"	
AM00A	32340	9/16/2016	-1.18	-0.99	FOUND AT LOCATION		70
AM04B	32322	4/3/2015	-1.54	-1.13	FOUND AT LOCATION		
AM04B	32322	4/7/2016	---	---		"no locate"	
AM04B	32322	10/17/2016	-0.50		BEST READ		
AM04B	32322	10/27/2016	-1.15	-1.07	FOUND AT LOCATION		116
AM04B	32327	3/18/2015	-1.52	-1.08			
AM04B	32327	4/8/2016	---	---		"no locate"	
AM04B	32327	10/17/2016	-1.62	-1.43			121
AM09	31933	4/3/2015	-1.49	-1.31	FOUND AT LOCATION		
AM09	31933	4/12/2016	---	---		"no locate"	
AM09	31933	10/3/2016	-1.15	-1.09	FOUND AT LOCATION		92

7. **§ 192.605 Procedural manual for operations, maintenance, and emergencies.**
   (a) General. Each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response. For transmission lines, the manual must also include procedures for handling abnormal operations. This manual must be reviewed and updated by the operator at intervals not exceeding 15 months, but at least once each calendar year. This manual must be prepared before operations of a pipeline system commence. Appropriate parts of the manual must be kept at locations where operations and maintenance activities are conducted.

KO failed to comply with the requirements of § 192.605(a) as follows:

- KO did not provide evidence that it had conducted annual reviews in years 2014 and 2016, of its written operations and maintenance (O&M) procedures, included in its O&M manual, titled "Duke Energy Natural Gas Operations Plan." KO provided the inspectors with a print out from a program used to track annual review data called "Open Pages, however," this document lists due dates for the required reviews, not the actual review dates for years 2014 and 2016. Similarly, for reviews of the Plan for Emergencies and Natural Disasters, the "Open Pages" document, although listing review due dates, did not provide the actual review dates for years 2014, 2015, and 2016. KO only provided cover pages of the respective plans that indicate the year.
- KO did not adequately complete its Job Control Forms (JCF), as required by its O&M program. Specifics are as follows:
  - Line AM00A Line Segment Installation near Chapman Lane, August 22, 2016: the JCF was incomplete in that the description of the work performed, including results of the pipe inspections (exposed pipe, coating, etc.) was not recorded.
  - Line AM09 Creek Crossing Replacement, October 27, 2016: KO personnel did not complete the "Reported By" section of two JCFs, both dated October 27, 2016, and thus did not identify on the form the person who inspected the existing pipe.

8. **§ 192.615 Emergency plans.**
   (a) …
   (b) Each operator shall:
   (1) …
   (2) Train the appropriate operating personnel to assure that they are knowledgeable of the emergency procedures and verify that the training is effective.

   KO failed to comply with the regulation because it did not provide documentation demonstrating that emergency response personnel are knowledgeable of the emergency procedures and that KO had verified its training effectiveness.

9. **§ 192.709 Transmission lines: Record keeping.**
   Each operator shall maintain the following records for transmission lines for the periods specified:
   (a) …
   (c) A record of each patrol, survey, inspection, and test required by subparts L and M of this part must be retained for at least 5 years or until the next patrol, survey, inspection, or test is completed, whichever is longer.

   KO failed to comply with § 192.709(c) as follows:

   - KO personnel were unable to provide a record of the most recent inspection for evidence of atmospheric corrosion of above-ground facilities at KO's Alexandria station. PHMSA inspectors observed significant coating and paint failure at the facility.

- A segment of Line AM09 was replaced in 2016 at a creek crossing. KO personnel, however, were unable to provide records documenting the inspection of the internal surface of the replaced segment for evidence of corrosion in accordance with § 192.475(b).

10. **§ 192.907 What must an operator do to implement this subpart?**
(a) General. No later than December 17, 2004, an operator of a covered pipeline segment must develop and follow a written integrity management program that contains all the elements described in § 192.911 and that addresses the risks on each covered transmission pipeline segment. The initial integrity management program must consist, at a minimum, of a framework that describes the process for implementing each program element, how relevant decisions will be made and by whom, a time line for completing the work to implement the program element, and how information gained from experience will be continuously incorporated into the program. The framework will evolve into a more detailed and comprehensive program. An operator must make continual improvements to the program.

KO failed to comply with the regulation because it did not follow its written IM program as detailed below.

- KO's IM program requires that a Performance Measures Report be completed annually. The above-referenced report for Calendar Year (CY) 2016 did not accurately convey certain metric data, as indicated below.

	CY2016 Reported	CY2016 Correct
Pressure test miles assessed	0	8.5 (Line AM00A)
Increase in % of piggable pipe	0%	TBD based on corrected total miles
Increase in miles of piggable pipe	0	8.5 (Line AM00A)

Furthermore, as relates to manufacturing and construction defects, the above-referenced form includes the following question:

"Has pressure exceeded MAOP for preceding 5 year pre-TIMP highest pressure"

For CYs 2015 and 2016, this question was unanswered.

- KO did not follow its Section 6 of Procedure GD70.06-32, titled "Determination of Stable Threats," because it did not perform the required annual review in CY 2016. Section 6 required annual reviews of pipeline segments in HCAs with stable Manufacturing/Construction threats for specified changes that would re-classify the threat as unstable. KO conveyed that the 2016 review was not done.

11. **§ 192.925 What are the requirements for using External Corrosion Direct Assessment (ECDA)?**
(a) ...
(b) General requirements. An operator that uses direct assessment to assess the threat of external corrosion must follow the requirements in this section, in ASME/ANSI B31.8S (incorporated by reference, see § 192.7), section 6.4, and in NACE SP0502 (incorporated by reference, see § 192.7). An operator must develop

and implement a direct assessment plan that has procedures addressing pre-assessment, indirect inspection, direct examination, and post assessment. If the ECDA detects pipeline coating damage, the operator must also integrate the data from the ECDA with other information from the data integration (§ 192.917(b)) to evaluate the covered segment for the threat of third party damage and to address the threat as required by § 192.917(e)(1).

KO failed to comply with the regulation because it did not follow the requirements in in NACE SP0502 (incorporated by reference, see § 192.7), as required by § 192.925(b).

- KO records documenting a 2012 Casing External Corrosion Direct Assessment (ECDA) of casings on its Line AM00 indicate that "the casings are believed to be bare and not filled with a dielectric material." Furthermore, KO's form, titled "Cased Piping Data Element Sheet," indicated that all AM00 casings were bare. KO personnel were unable to provide documentation or validation of the casings' assumed "bare" status, nor were they able to confirm whether the casings were dielectrically filled. Table 1 of NACE SP0502 requires detailed information about casing materials and construction techniques to be determined during the Preassessment Step.
- KO records indicate that during the indirect examination phase of a 2016 ECDA of Line AM04A, KO switched from direct current voltage gradient (DCVG) to alternating current voltage shift (ACVG) in HCA Segment 10 because it was not achieving a sufficient pipe-to-soil (p/s) potential shift to use DCVG within that segment. Per Section 4.3.4.1 of NACE SP0502-2010, cathodic protection current demand is a factor to be used in establishing and validating ECDA regions. KO was unable to provide documentation of any consideration given the site-specific cathodic protection demand, and resulting p/s potentials. Furthermore, KO was unable to justify its decision to not reclassify this area as an additional region.

12. **§ 192.225 Welding procedures.**
(a) Welding must be performed by a qualified welder or welding operator in accordance with welding procedures qualified under section 5, section 12, Appendix A or Appendix B of API Std 1104 (incorporated by reference, see § 192.7), or section IX of the ASME Boiler and Pressure Vessel Code (ASME BPVC) (incorporated by reference, see § 192.7) to produce welds meeting the requirements of this subpart. The quality of the test welds used to qualify welding procedures must be determined by destructive testing in accordance with the applicable welding standard(s).

KO failed to comply with the regulation because it did not ensure that welders were tested in accordance with KO's qualified welding procedures.

PHMSA's review of records documenting a 2016 pipe replacement project along KO's Line AM09, as well as a 2017 pipe replacement project along Line AM04A, revealed that welders were not tested in accordance with KO's governing procedures, as detailed below:

- Two welders performed welds on KO's 2016 Line AM09 replacement project, as well as the 2017 Line AM04a replacement project, located from Station 4+74 to Station 5+00. PHMSA's review of KO's documentation of the projects revealed that both welders tested and qualified on Grade X-42 pipe, with 0.250-inch wall thickness. Paragraph 2, Section B1 of KO Procedure GD55-505-1 requires welders to be tested on Grade X-52 pipe, with a 0.188 wall thickness.

- A welder performing welds on KO's 2017 KO Line AM04A Bracken Station Line Take-off Construction project. PHMSA's review of KO's documentation of the project revealed that the welder tested and qualified on Grade X-42 pipe, with 0.250-inch wall thickness. Paragraph 2, Section B1 of KO Procedure GD55-505-1 requires welders to be tested on Grade X-52 pipe, with a 0.188 wall thickness.

13. **§ 192.947 What records must an operator keep?**
An operator must maintain, for the useful life of the pipeline, records that demonstrate compliance with the requirements of this subpart. At minimum, an operator must maintain the following records for review during an inspection.
(a) ...
(d) Documents to support any decision, analysis and process developed and used to implement and evaluate each element of the baseline assessment plan and integrity management program. Documents include those developed and used in support of any identification, calculation, amendment, modification, justification, deviation and determination made, and any action taken to implement and evaluate any of the program elements;

KO failed to comply with the regulation because it did not maintain documents that adequately supported determinations or changes made, as detailed below.

- KO's list of HCA segments for its Line AM04 in 2011 and 2013 included HCA30, with a length of 851 feet and 855 feet, respectively. KO did not include HCA30 in its list of HCA segments for the referenced line in 2012. KO personnel were unable to provide any documentation or justification for why HCA30 was not listed in 2012.

- At the time of PHMSA's inspection, and per KO's cased pipe assessment schedule, dated September 15, 2017, the Grandview Road cased pipe segment, located in HCA Segment #20 on Line AM04B, had not been baseline-assessed. Records indicate that the pipe in HCA Segment #20 was installed in 1948, and was identified as an HCA in 2004. Duke did not have documentation explaining the reasons why the segment had not been base-line assessed.

14. **§ 192.921 How is the baseline assessment to be conducted?**
(a) Assessment methods. An operator must assess the integrity of the line pipe in each covered segment by applying one or more of the following methods depending on the threats to which the covered segment is susceptible. An operator must select the method or methods best suited to address the threats identified to the covered segment (See §192.917).

KO failed to comply with the regulation because it did not conduct a baseline assessment or assess the integrity of the line pipe in each covered segment by applying one of more of the methods listed in § 192.921:

- KO's records indicate that line segment HCA30 segment, which was identified as an HCA, includes a cased road crossing that has never been the subject of an integrity assessment. KO personnel were unable to provide any documentation or justification for why this segment had not been baseline-assessed.
- KO records indicate that a segment of its Line AM04B was identified as being within an HCA in 2004. This HCA segment, identified as HCA20 in KO records, includes a cased road crossing at Grandview Road. PHMSA's review of KO's cased pipe assessment schedule, dated September 15, 2017, indicates the Grandview Road cased crossing had not yet been the subject of a base-line assessment. KO personnel were unable to provide any documentation or justification for why the cased pipe segment at Grandview Road had not been baseline-assessed.

15. **§ 192.917 How does an operator identify potential threats to pipeline integrity and use the threat identification in its integrity program?**
(a) *Threat identification.* An operator must identify and evaluate all potential threats to each covered pipeline segment. Potential threats that an operator must consider include, but are not limited to, the threats listed in ASME/ANSI B31.8S (incorporated by reference, *see* § 192.7), section 2, which are grouped under the following four categories:
(1) Time dependent threats such as internal corrosion, external corrosion, and stress corrosion cracking;
(2) Static or resident threats, such as fabrication or construction defects;
(3) Time independent threats such as third party damage and outside force damage; and
(4) Human error.

KO failed to comply with the regulation because it did not identify and evaluate all potential threats to each covered pipeline segment, as indicated below.

KO did not determine which KO segments were considered to have the unstable Manufacturing and Construction (M&C) threat until years 2015 and 2016.

KO issued its current procedure, titled "Determination of Stable Threats GD70.06-032," on October 1, 2015, which required determination of unstable M&C threats, including those presented by low frequency electric resistance welded (LFERW) pipe. KO IM procedures in place prior to October 1, 2015 did not require KO to integrity-assess low frequency electric resistance welded (LFERW) pipe (reference Sec 6.2.4 of KO's IM manual, titled "Natural Gas TIMP," revision date February 19, 2014).

16. **§ 192.709 Transmission lines: Record keeping.**
Each operator shall maintain the following records for transmission lines for the periods specified:
(a) ...
(c) A record of each patrol, survey, inspection, and test required by subparts L and M of this part must be retained for at least 5 years or until the next patrol, survey, inspection, or test is completed, whichever is longer.

KO failed to comply with the regulation because it did not maintain adequate record of each pipeline right-of-way (ROW) patrol in CYs 2016 and 2017 as follows:

- KO records documenting ROW patrols for CYs 2016 and 2017 indicated 49.65 miles were patrolled, whereas 51.7 miles were reported by KO on annual reports for the same years;
- KO records documenting ROW patrols for CYs 2016 and 2017 did not indicate the method of patrol;
- KO records documenting ROW patrols for CYs 2016 and 2017 did not indicate or confirm that highway and railroad crossings were patrolled in accordance with § 192.705(b); and
- KO records documenting ROW patrols for CYs 2016 and 2017 did not adequately describe the area of patrol on the north end of Line AM04B (near the south side of the Ohio River) – the ROW portion was identified only as "D." Consequently, PHMSA inspectors were unable to confirm that the entirety of Line AM04B had been patrolled, as required by § 192.705(a);

Proposed Civil Penalty

Under 49 U.S.C. § 60122 and 49 CFR § 190.223, you are subject to a civil penalty not to exceed $209,002 per violation per day the violation persists, up to a maximum of $2,090,022 for a related series of violations. For violations occurring prior to November 2, 2015, the maximum penalty may not exceed $200,000 per violation per day, with a maximum penalty not to exceed $2,000,000 for a related series of violations. The Compliance Officer has reviewed the circumstances and supporting documentation involved in the above probable violations and has recommended that you be preliminarily assessed a civil penalty of $94,900 as follows:

Item number	PENALTY
6	$42,400
14	$52,500

Warning Items

With respect to items 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15 and 16, we have reviewed the circumstances and supporting documents involved in this case and have decided not to conduct additional enforcement action or penalty assessment proceedings at this time. We advise you to promptly correct these items. Failure to do so may result in additional enforcement action.

Proposed Compliance Order

With respect to Items 1 and 2, pursuant to 49 U.S.C. § 60118, the Pipeline and Hazardous Materials Safety Administration proposes to issue a Compliance Order to KO Transmission Company. Please refer to the *Proposed Compliance Order*, which is enclosed and made a part of this Notice.

Response to this Notice

Enclosed as part of this Notice is a document entitled *Response Options for Pipeline Operators in Compliance Proceedings.* Please refer to this document and note the response options. All material you submit in response to this enforcement action may be made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), along with the complete original document you must provide a second copy of the document with the portions you believe qualify for confidential treatment redacted and an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b).

Following the receipt of this Notice, you have 30 days to submit written comments, or request a hearing under 49 CFR § 190.211. If you do not respond within 30 days of receipt of this Notice, this constitutes a waiver of your right to contest the allegations in this Notice and authorizes the Associate Administrator for Pipeline Safety to find facts as alleged in this Notice without further notice to you and to issue a Final Order. If you are responding to this Notice, we propose that you submit your correspondence to my office within 30 days from receipt of this Notice. This period may be extended by written request for good cause.

In your correspondence on this matter, please refer to **CPF 2-2018-1004** and, for each document you submit, please provide a copy in electronic format whenever possible.

Sincerely,

James A. Urisko
Director, Office of Pipeline Safety
PHMSA Southern Region

Enclosures: *Proposed Compliance Order*
Response Options for Pipeline Operators in Compliance Proceedings

PROPOSED COMPLIANCE ORDER

Pursuant to 49 United States Code § 60118, the Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes to issue to KO Transmission Company (KO) a Compliance Order incorporating the following remedial requirements to ensure the compliance of KO with the pipeline safety regulations:

1. In regard to Item Number 1 of the Notice pertaining to KO's failure to include certain provisions required of Part 192 in its written qualification program, KO must revise its written operator qualification program (OQ program) as follows:

   a) For each covered task that KO allows "not qualified" individuals to perform, develop a justifiable "span of control ratio" for the purpose of assuring that such individuals will be directed and observed by a qualified individual when performing the task;

   b) For each covered task, determine an evaluation interval, based on a written justification, at which evaluation of individuals' qualifications are needed;

   c) Develop and/or identify a written training program that meets the requirements of §192.805(h). Include, or make reference to, the training program in the written OQ program, and include cross references between each covered task and the applicable required training; and,

   d) Include the notification requirement as specified in §192.805(i).

2. In regard to Item Number 2 of the Notice, KO must revise its written program to include the program restrictions specified in §192.809(d) and §192.809(e).

3. Within 60 days of receipt of the Final Order, KO must complete the requirements of Items 1 and 2 above, and provide written documentation confirming completion to the Director, Office of Pipeline Safety, PHMSA Southern Region.

4. It is requested (not mandated) that KO maintain documentation of the safety improvement costs associated with fulfilling this Compliance Order and submit the total to the Director, Office of Pipeline Safety, PHMSA Southern Region. It is requested that these costs be reported in two categories: 1) total cost associated with preparation/revision of plans, procedures, studies and analyses, and 2) total cost associated with replacements, additions and other changes to pipeline infrastructure.

Duke Energy Ohio
Case No. 16-253-GA-BTX
NOPE Second Set Interrogatories
Date Received: July 18, 2017

NOPE-INT-02-003

REQUEST:

Would Duke Energy be able to retire the propane-air plants with the addition of a LNG peak shaving plant?

a. Please describe the reasons for your Answer to this Interrogatory, whether it is in the affirmative or in the negative.

RESPONSE:

Yes, although an LNG peak-shaving plant would not address the other objectives of the pipeline project.

a. LNG would be a direct replacement for the propane peak-shaving facilities.

PERSON RESPONSIBLE: Chad Fritsch / David Emerick

DUKE ENERGY. Natural Gas Projects

Central Corridor Gas Pipeline Extension Project

Natural Gas Pipeline Construction Project

(i)

Project

This project is part of a larger project designed to improve, protect and expand our system for current and future customers. This pipeline extension project will enhance gas supply reliability and flexibility across the system, replace and modernize aging infrastructure and enable Duke Energy to supply natural gas in southwest Ohio.

Letters of Support>

LEARN MORE

Proposed Route Map>

LEARN MORE

Contact Us

For questions related to the Central Corridor Pipeline Extension:

CALL 513.287.2130>

E-MAIL>

FEEDBACK

2

DUKE ENERGY

Natural Gas Projects

MENU

Project Information

Project Summary and Letters of Support >

In 2015, Duke Energy completed an extensive study of our gas supply system.

LEARN MORE

Pipeline Video >

Duke Energy is constantly looking to improve the safety and reliability of our natural gas pipelines.

LEARN MORE

Construction Process >

This pipeline will be completed in several phases of construction.

LEARN MORE

Construction Schedule >

This is an estimated schedule for the pipeline project.

LEARN MORE

FEEDBACK

3

Frequently Asked Questions

How does safety factor into the materials used for the pipeline itself?

Because a portion of this route is in a densely populated area, the pipe will be designed to a class four location. This means the attributes of the pipe will be more stringent than in more rural areas. The grade of steel will be stronger, the wall thickness will increase, or a combination of both will be specified.

An epoxy coating will be applied to protect the pipe from corrosion. In addition, pipelines involved in horizontal directional bores will have an additional coating called POWERCRETE® to help protect against abrasions when pulling the pipe through the bore hole.

4

What features will help you make sure any problem is identified and addressed quickly?

Remote control shut-off valves will be installed to help isolate individual pipeline segments and to reconfigure the system to maintain its integrity. All pipeline segments will be located within 2.5 miles of a remote control shut-off valve. Our central gas control team monitors pressures 24/7 at various locations on the natural gas network to ensure the integrity of the natural gas system. This team of experts is trained annually to handle abnormal operating conditions that may arise.

What is a cathodic protection system?

A cathodic protection system is used to ensure the metal does not deteriorate from corrosion over time and to maintain the integrity of the pipe. Part of the cathodic protection system is the coating and the other is a process called cathodic protection, which mitigates the corrosive effects of the environment in which the pipeline exist. Anodes are placed at strategic locations on the pipe to provide cathodic protection which will mitigate the effects of corrosion.

The maximum allowable operating pressure (MAOP) is significantly less than the pipe's pressure capacity. What does this mean?

The proposed pipeline will have a normal operating pressure of approximately 400 psi and a maximum allowable operating pressure (MAOP) of 500 psi. Duke Energy is only pressuring the pipe to less than 20% of its designed and manufactured maximum capacity.

5

I've heard people mention a "danger area." What is that?

Duke Energy does not calculate a "danger area," as such. There is no governmental definition of this term. However, the Code of Federal Regulations does define a Potential Impact Radius (PIR) for the purpose of integrity management. The distance determined as the PIR is based on the pressure in the pipeline, the diameter of the pipeline, and a factor that addresses the type of gas being transported. The PIR for this pipeline is 326 feet on either side of the center of the pipeline.

If there are contractors working nearby, how will they know that there is an underground natural gas pipeline?

We will install yellow-capped gas markers along the route so that the pipeline path can be seen. Contractors are also required by law to call 811, "Call Before You Dig," to have underground utilities marked in advance.

Will the work area on my property be safe so my kids, pets or animals don't fall in trenches during work on the project?

The work area will be fenced off to ensure safety. If you notice the fencing has been tampered with, notify Duke Energy immediately.

Is there anything I can do as a home owner to protect my family from a pipeline accident?

6

All gas within the Duke Energy system is odorized to help detect leaks. If you smell natural gas, which is often described as a rotten egg smell, there could be a gas leak. You should leave the area, go to a safe place, immediately call 911, and call us at 800.634.4300.

If you notice any land erosion along the right-of-way or excavation that does not appear to have an Ohio Utilities Protection Services (OUPS) indication of the line (the paint on the grass or pavement), call Duke Energy at 800.634.4300. We will respond with a crew at your home in a short period of time.

Is Duke Energy planning to assist local first responders with training, equipment, resources, funding, etc. to be prepared to handle a failure in the pipeline?

Numerous pipelines already exist in southwest Ohio, for which the community emergency response organizations are prepared to respond. We attend the Hamilton County Fire Chiefs Association Meetings regularly. This topic has been addressed, and we will coordinate an effort with the fire chiefs to adequately engage the government officials and work with them on planning scenarios. Duke Energy also provides grant opportunities for fire departments.

Have you evaluated emergency access routes in the event of an incident and informed first responders and medical facilities of these routes?

At this point in the process, it is too early to advise local responders as the final route has not been selected.

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been selected.

What measures are in place to learn from gas pipeline incidents like San Bruno so as not to repeat them?

Any incident or safety-related condition, as defined by the Pipeline and Hazardous Material Safety Administration (PHMSA), undergoes an extensive investigation to determine the root cause of the incident. Lessons learned are included in that investigation and Duke Energy works collaboratively with PHMSA and/or the Public Utilities Commission of Ohio to develop additional actions that we must take to prevent that type of incident from occurring again.

What studies have been or will be made to determine the corrosivity of the flow?

The gas purchased from interstate pipelines is monitored by gas analyzers at gate stations for H_2S, O_2, H_2O, and CO_2 (molecules that can contribute to corrosion) before entering our distribution system. If the analyzer readings exceed limits, alerts are received.

Duke Energy Ohio also completed an Internal Corrosion Direct Assessment (ICDA) Program in 2007 and 2014 on its system and found no evidence of internal corrosion.

How can you assure the public that the pipeline will maintain its integrity in the event of an earthquake?

The Transmission Integrity Management Program regulations require risk analysis. Duke Energy is expected to consider all information that can affect the likelihood and consequences of

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pipeline failure, including weather-related and outside-force threats. Topography, soil conditions, and earthquake faults all are among the data to be integrated. Thus, if such external risk factors are significant, they must be considered.

How does Duke intend to balance the benefits of the pipeline vs. the known risks?

Strengthening its gas system by replacing and retiring aging infrastructure reduces risk and provides a dependable, flexible gas system for future generations in southwest Ohio.

The two propane peaking plants are specific examples of aging infrastructure that need to be retired. On the coldest days of the year, these plants currently provide more than 10% of the system load on a peak day.

After the propane plants are retired, Duke Energy will not be able to supply gas to all of its customers on a peak day without this pipeline project. The pipeline will be designed, constructed, tested and monitored to reduce or eliminate known risks associated with the installation and operation of a natural gas pipeline.

Who regulates this pipeline?

Duke Energy is proposing to construct and operate this pipeline following industry best management practices and in full compliance with modern engineering safety and regulatory controls. The US Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) has jurisdiction over pipeline safety. It has delegated the responsibility for supervising inspections in Ohio to the Public Utilities Commission of Ohio. Duke Energy, therefore, is subject to regulation at both the federal and state levels.

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Duke Energy, therefore, is subject to regulation at both the federal and state levels.

What regulations are in place?

PHMSA's current Transmission Integrity Management Program regulations, established in 2004, require operators to identify threats, rank risks and implement integrity management assessments to maintain structural integrity and safety of the transmission lines in High Consequence Areas (HCAs).

HCAs include areas such as residential neighborhoods, apartments, schools, hospitals, shopping centers, businesses, retirement communities, ballparks and parks. It is important to note that, even though only segments of the pipeline will be in identified HCAs, Duke Energy plans to construct the entire pipeline to adhere to the more stringent regulations of the pipelines in HCAs.

How will the pipeline be tested before going into service?

Prior to installation, the lead engineer will confirm that the pipeline is constructed in accordance with the design. During installation, 100 percent of every weld will be X-rayed to confirm the weld meets the specifications. All joints must achieve 100 percent pass rate.

Prior to lowering the pipe into the trench, all pipes, including the joints, are checked for coating holidays, or defects, using mechanical detection equipment called a jeep.

Once the pipeline construction is complete, strength testing the pipe proves the structural soundness of the installed pipe and the capability to safely operate at the designed pressures. The pipeline will be filled with water, and the test pressure will increase to 1.5 times the maximum allowable operating pressure, which must hold for 8 hours. After this process, the

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maximum allowable operating pressure, which must hold for 8 hours. After this process, the pipe is certified and dewatered. The air will be purged from the line and natural gas introduced into the facility ready to commence operations.

What specific inspection methods will be used once the line is in service, and how often will these measures take place?

Once the pipe is commissioned, there are requirements mandated by the code of federal regulations that ensure the pipeline is maintained and operated safely.

Annual Surveys: A leak survey is performed over the entire length of the line by patrolling over the top of the pipe with leak detection equipment, and a cathodic protection survey is performed and data is taken along the pipe to ensure the line is not corroding. The remote-control shut-off valves also are inspected annually to ensure the equipment is in the proper working condition.

Quarterly Inspection: A line patrol is performed four times every year, during which the representative will walk the route, observing soil conditions, the coloration of the surrounding vegetation, encroachment concerns, and whether markers are in place.

In-Line Inspection: A safety standard required by the code of federal regulations is to design and construct this type of pipe so it can accommodate in-line inspection tools. This in-line inspection equipment utilizes non-destructive techniques to detect, measure, and record irregularities in pipelines. This data is used to determine the condition of the pipeline and identify safety concerns. This is performed on a cycle not to exceed seven years.

Construction and Project Planning: As required by law, Duke Energy Ohio also locates its facilities for excavations. An inspector will be dispatched to a transmission line excavation site to observe and ensure the integrity of the facility when a third party calls 811 for an

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to observe and ensure the integrity of the facility when a third party calls 811 for an excavation. In addition, we will locate its facilities for planning projects. This aids in identification of facilities on plans to help reduce third-party damage.

Who will inspect the line?

Although Duke Energy is accountable for inspecting its pipelines, the Natural Gas Pipeline Safety division of the Public Utilities Commission of Ohio audits its inspections on a regular basis to ensure compliance with Ohio laws and federal laws governing safety.

Do all leaks in the pipeline have to be repaired?

Duke Energy follows regulations and industry best practices to identify and fix potential concerns before leaks occur. On the slight chance that a leak would be identified on this line, it would be repaired immediately.

What violations has Duke incurred with PHMSA and Occupational Safety and Health Administration (OSHA) over the past 20 years? What have you done to make sure similar incidents don't happen in the future?

Duke Energy Ohio's Gas Operations Department has not incurred any OSHA or PHMSA violations over the past 20 years in the state of Ohio on high-pressure distribution or transmission pipelines.

Five PHMSA violations have occurred from 1996 to present in the state of Ohio on low-

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Five PHMSA violations have occurred from 1996 to present in the state of Ohio on low-pressure distribution pipelines. Duke Energy has taken precautions by implementing new work methods and safety precautions to continuously improve the safety of our pipelines.

1998: A small pit hole in the 2-inch bare steel service allowed gas to migrate underground into the residence, resulting in an explosion.

How Duke Energy Changed: New software was implemented to alert our dispatch team when multiple odor calls occur within a certain distance and within a short time period. Additional crews are sent to the area to find the source of the odor and make the area safe if there is a leak on one of our pipelines.

We also implemented new work processes and 24/7 emergency response crews to enable a better response to odor notifications.

2000: A service riser failed causing an explosion.

How Duke Energy Changed: We implemented additional service riser inspections to look for corrosion or other factors that could cause a riser to fail. We also initiated a service riser replacement program to improve the safety of certain service risers.

2006: A plumbing contractor auguring a sewer lateral struck a gas service, allowing gas to migrate into the home, resulting in an explosion.

How Duke Energy Changed: A public education campaign was developed to increase awareness to check sewer laterals before auger activities to ensure that no gas line crosses that sewer lateral.

Duke also initiated a sewer lateral camera program to identify similar sewer laterals and relocate any gas pipelines to remediate. We worked in conjunction with the Metropolitan Sewer

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relocate any gas pipelines to remediate. We worked in conjunction with the Metropolitan Sewer District of Greater Cincinnati and Middletown Sewer District to develop safer procedures relating to trenchless technology around sanitary and storm sewers.

2010: An apartment property maintenance worker remodeled a vacant apartment and failed to properly remove a gas line in the laundry room. The open gas line was ignited when the new tenant used a cigarette lighter, which resulted in an explosion.

How Duke Energy Changed: We updated procedures to include a pressure test for all gas meters being turned on.

2016: An excavation contractor struck a buried gas service that had not been properly marked by a Duke Energy contractor, causing an ignition of gas and property damage.

How Duke Energy Changed: We reviewed the proper procedure with our local contractor, for situations when gas pipelines are unable to be traced and marked by electronic equipment. We established weekly and monthly meetings with the locating contractor to review their performance metrics, provided refreshed map training, stressed improved quality of their services and began conducting random checks of their work performance.

Announcements and Meetings

Announcements

Application amended with Ohio Public Siting Board on 4/13/18

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Natural Gas Projects

Application amended with Ohio Public Siting Board on 4/13/18
Application filed with Ohio Power Siting Board on 9/13/16
Application amended with Ohio Power Siting Board on 1/20/17

Meetings

PSB Public Hearing: An additional public hearing will be held at 3:00 p.m. on Thursday, March 21, 2019, to allow statements from members of the affected public who are not parties to the case. (An initial public hearing was held in June 2017.) The public hearing will be held at the University of Cincinnati-Blue Ash:

University of Cincinnati-Blue Ash
9555 Plainfield Road
Muntz Hall, Room 119
Blue Ash, OH 45236

OPSB Evidentiary Hearing: The evidentiary (adjudicatory) hearing will be held at 10:00 a.m. on Tuesday, April 9, 2019, to allow parties to the case to provide sworn testimony and cross-examine witnesses. This hearing will take place at the Public Utilities Commission of Ohio (PUCO) at:

PUCO
Hearing Room 11-A
180 E. Broad Street
Columbus, OH 43215

Resources

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DUKE ENERGY.

Natural Gas Projects

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Resources

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TITLE	TYPE	DATE
Central Corridor Pipeline Ext Fact Sheet	Fact Sheet	01/04/2019
Ohio Power Siting Board schedules two hearings for Duke Energy Ohio's proposed Central Corridor Pipeline	News Releases	12/19/2018
Duke Energy Ohio asks the Ohio Power Siting Board to move forward with its consideration of the Central Corridor Pipeline application	News Releases	04/13/2018
Amendment of Application	Application	04/13/2018
Final Project Application	Application	03/30/2017

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Natural Gas Projects

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DUKE ENERGY.

April 2019

CENTRAL CORRIDOR PIPELINE PROJECT

BUILDING A ***SMARTER*** *ENERGY FUTURE.*

Project Background

Duke Energy Ohio has proposed a new natural gas distribution pipeline to serve our southwest Ohio customers. The Central Corridor Pipeline is the next phase in our long-term plan to continue providing safe and reliable natural gas service today and for generations to come.

Southwest Ohio Needs the Central Corridor Pipeline

- ✓ Duke Energy Ohio has critical propane peaking facilities that help provide natural gas to our customers on the coldest days of the winter. These peaking plants must be retired. They were placed in service in 1964 and although we continue to responsibly maintain them, they reflect outdated technology. The facilities include a man-made cavern, located 400-feet underground, to store propane. There is no present-day repair for the cavern walls. If the integrity of the walls is compromised, we would immediately shut the plant down. A loss of the propane facilities on just one day during the winter season could be devastating because 30,000 homes and businesses could likely lose natural gas service. Restoration of service could be lengthy given mandatory safety requirements.

- ✓ The Central Corridor Pipeline will enable us to upgrade existing older pipelines without interrupting natural gas service to our customers. Some of our existing pipelines have been in service for over fifty years.

- ✓ Duke Energy needs the flexibility to bring natural gas into Hamilton County from a diverse supply of pipelines located north of our Ohio service territory. Due to the way our system is configured, we cannot bring additional supplies of natural gas from the south.

Safety is a Top Priority

Safety, security and environmental stewardship are core values at Duke Energy Ohio. **We've listened to our customers' concerns and made significant** changes in the design of the Central Corridor Pipeline and the way it will be installed and maintained. We will exceed federal regulations, including:

- higher grade of steel
- increased pipe wall thickness
- pipe installed deeper, minimum four feet of cover
- x-ray every weld to confirm specifications with a 100 percent pass rate
- decreased distance between remote control shut-off valves, allowing segments of the system to be isolated quicker
- sophisticated in-line inspection tools
- monitoring the pipeline 24/7, 365 days per year

Construction

Duke Energy Ohio realizes that pipeline construction will be disruptive and challenging for customers, but we are committed to working with each and every neighborhood along the pipeline route to make the process as smooth as possible.

- Duke Energy Ohio officials will communicate individually with property owners to negotiate easements and discuss what to expect during construction and restoration.
- The company will work very hard to restore our neighborhoods to their pre-construction condition, within acceptable parameters.
- The pipeline will consist of a 20-inch diameter thick-walled steel pipe with an epoxy coating, with a typical operating pressure around 400 pounds per square inch.
- Once construction begins, the pipeline is targeted for completion in 14-16 months.
- Multiple sections of the route will be constructed simultaneously and work on individual properties should be completed in three to six weeks.
- We will work closely with local communities to ensure pedestrian and traffic safety during construction.

For more about the Central Corridor Natural Gas Pipeline project VISIT: www.duke-energy.com/
CALL: 513.287.2130; or EMAIL: CentCorridorPipeline@duke-energy.com

EXHIBIT
tabbies
Blue Ash and Columbia Township 2

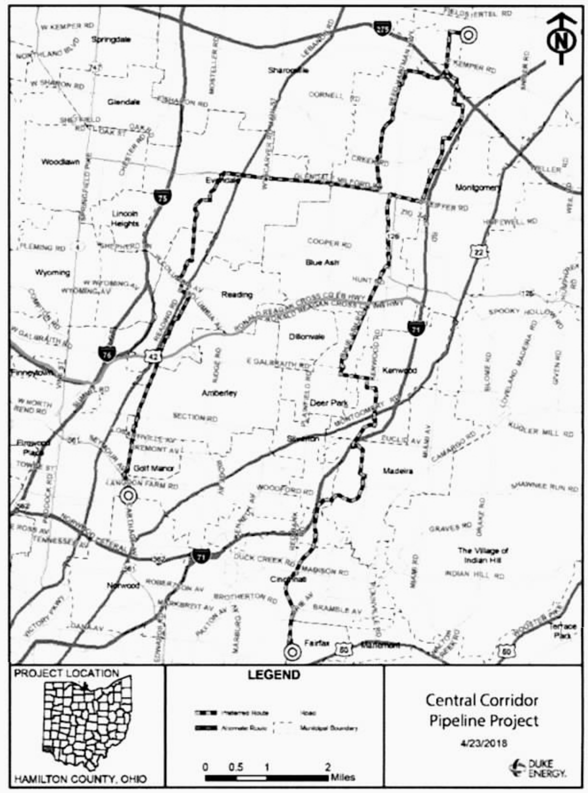
DUKE ENERGY.

CENTRAL CORRIDOR PIPELINE PROJECT

*BUILDING A **SMARTER** ENERGY FUTURE.*

Overview of Project Corridor

- Approximately 14 miles long, the Central Corridor Pipeline will be located in Hamilton County.
- Two proposed route corridors were carefully selected for consideration. The Eastern Route is shown on the map in orange and Western Route is shown on the map in green.
- The northern end of the pipeline will begin near the border of Hamilton, Butler and Warren counties, where it will connect with existing natural gas lines near Sycamore Township. On the southern end, it will terminate in either Norwood or Fairfax, where it will connect to Duke Energy Ohio pipelines at either Norwood Station or Red Bank Station.
- The Central Corridor Pipeline will be similar to the nearly 200 miles of high-pressure, large-diameter pipelines Duke Energy safely operates in the region.
- Because of system pressures, this distribution pipeline can only supply natural gas to local customers.



Key Pipeline Benefits

✓ **A Safer Natural Gas Delivery System.** Outdated natural gas infrastructure will be retired and replaced with a modern pipeline constructed from stronger materials with state-of-the-art monitoring equipment and inspection technology.

✓ **Increased Reliability of Natural Gas Service.** The Central Corridor Pipeline will allow Duke Energy Ohio to continue to provide reliable service to southwest Ohio customers throughout the year.

✓ **Economic Growth.** Once the pipeline is completed, it is expected to provide an infusion of $2 million in tax revenue for local communities and position the region for growth.

For more about the Central Corridor Natural Gas Pipeline project VISIT: www.duke-energy.com/centralcorridor
CALL: 513.287.2130; or EMAIL: CentCorridorPipeline@duke-energy.com