

**BEFORE THE
PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Gas Rates.	)	
	)	Case No. 12-1685-GA-AIR
	)	
In the Matter of the Application of Duke Energy Ohio, Inc., for Tariff Approval.	)	Case No. 12-1686-GA-ATA
	)	
In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of an Alternative Rate Plan for Gas Distribution Service.	)	
	)	Case No. 12-1687-GA-ALT
	)	
In the Matter of the Application of Duke Energy Ohio, Inc., for Approval to Change Accounting Methods.	)	
	)	Case No. 12-1688-GA-AAM
	)	

SUPPLEMENTAL DIRECT TESTIMONY OF

ANDREW C. MIDDLETON

ON BEHALF OF

DUKE ENERGY OHIO, INC.

_____	Management policies, practices, and organization
_____	Operating income
_____	Rate base
_____	Allocations
_____	Rate of return
_____	Rates and tariffs
<u> X </u>	Other: Manufactured Gas Plants

February 25, 2013

TABLE OF CONTENTS

	<u>PAGES</u>
I. INTRODUCTION AND PURPOSE	1
II. WEST END MGP	5
III. EAST END MGP	7
IV. CONCLUSION	12

I. INTRODUCTION AND PURPOSE

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Andrew C. Middleton, and my business address is P.O. Box 58,
3 Mount Sidney, VA 24467.

4 **Q. ARE YOU THE SAME ANDREW C. MIDDLETON WHO PREVIOUSLY**
5 **SUBMITTED DIRECT TESTIMONY IN THESE PROCEEDINGS?**

6 A. Yes.

7 **Q. WHAT IS THE PURPOSE OF THIS SUPPLEMENTAL DIRECT**
8 **TESTIMONY?**

9 A. The purpose of this Supplemental Direct Testimony is to supplement my previous
10 testimony submitted July 20, 2012, and with regard to this matter to support the
11 objections of Duke Energy Ohio, Inc., (Duke Energy Ohio or the Company) to
12 certain findings and recommendations contained in the Report by the Staff of the
13 Public Utilities Commission of Ohio (Staff) issued in these proceedings on
14 January 4, 2013 (Staff Report). My previous testimony was about the history of
15 manufactured gas in general. This testimony provides information about the
16 historical use of the East End and West End sites of the Cincinnati Gas & Electric
17 Company (CG&E) in the supply of gas and the current remediation efforts
18 underway at these sites.

19 **Q. HAS OTHER TESTIMONY BEEN SUBMITTED ON THESE TOPICS?**

20 A. Yes. Jessica Bednarcik of Duke Energy provided information on these topics in
21 her Direct Testimony of July 20, 2012 and in her Supplemental Direct Testimony
22 filed contemporarily with this testimony.

1 **Q. PLEASE SUMMARIZE YOUR SUPPLEMENTAL DIRECT TESTIMONY.**

2 A. My Supplemental Direct Testimony summarizes how these sites and the facilities
3 thereon were historically used and are currently used by the Company in
4 providing utility service. While both sites, especially West End, have undergone
5 numerous changes and are also utilized for other Duke Energy Ohio utility
6 services, gas has been supplied to Cincinnati and surrounding areas, utilizing
7 equipment at East End and West End, since the 1800s. Gas was manufactured at
8 both sites using different processes at different times, resulting in the generation
9 of residuals other than gas as was typical of these operations. The management of
10 the residuals appears to have followed common industry practices at the time of
11 operation. The steps that Duke Energy Ohio has taken to manage and remediate
12 the residuals, and their constituents, from gas manufacture that remained on the
13 properties have been prudent and consistent with current common industry
14 practices.

15 **Q. PROVIDE AN OVERVIEW OF GAS SUPPLY TO CINCINNATI AREA**
16 **FROM INCEPTION TO THE PRESENT.**

17 A. The first gas supplied to the Cincinnati area was that manufactured at the West
18 End MGP beginning in 1843. In 1884, gas manufacture began at the East End
19 MGP to increase the supply of gas thereby also establishing a second major
20 distribution point within the area. Cincinnati was supplied only with
21 manufactured gas until 1907 when some of the gas supply began to come from
22 natural gas wells in Ohio. In 1909 natural gas became the sole source of gas as a
23 pipeline from natural gas wells in West Virginia reached Cincinnati. Gas

1 manufacture was restarted with new equipment at West End in 1918 and at East
2 End in 1925 to supplement the supply of natural gas as needed. Gas manufacture
3 apparently ceased at West End in 1928. In addition to this manufactured gas,
4 other manufactured gas (e.g., coke oven gas) was purchased to supplement natural
5 gas in the time frame of 1928-50. In 1947 a propane gas plant began operation at
6 East End to supplement the supply of natural gas as needed and has continued to
7 operate through the present. After expansion of propane storage capacity in 1963,
8 gas manufacture by coal and/or oil processes (e.g., carburetted water gas and oil
9 gas) at East End ceased. However, the propane gas plant at East End has
10 continued to operate through the present to supplement the natural gas supply as
11 needed. More details about the processes used at West End and East End are
12 provided below.

13 **Q. WHAT HAS BEEN THE RELATIONSHIP BETWEEN MANUFACTURED**
14 **GAS, NATURAL GAS AND OTHER ENERGY GENERATION AT THE**
15 **EAST END AND WEST END FACILITIES?**

16 A. The initiation of gas manufacture at the West End facility in 1843 and the East
17 End facility in 1884 established gas service within the Cincinnati area including
18 development of the local distribution piping systems from these two locations and
19 a residential population using gas as a source of energy. In 1907-09 the presence
20 of these facilities provided a basis for the provision of natural gas to the
21 Cincinnati area as natural gas wells in Ohio and West Virginia were developed
22 and the construction of pipeline technology for conveyance of natural gas from
23 these wells became practical. Within ten years of the conversion to solely natural

1 gas, gas manufacture from coal and oil was restarted as described above to
2 supplement the supply of natural gas during peak demand re-establishing the
3 Cincinnati area as receiving a mixture of natural gas and manufactured gas early
4 in the 20th Century. Supplementation of the natural gas supply with
5 manufactured or propane produced gas has continued through the present with the
6 historical manufacture from coal and/or oil ending at West End apparently in
7 1928 and at the East End around 1963. Propane produced gas from the East End
8 continues to supplement natural gas through the present.

9 Storage of gas (manufactured, natural, or mixed gas) in low-pressure,
10 water-sealed gas holders apparently occurred at East End and West End at least
11 until the 1950s and possibly into the 1960s.

12 Both the East End and West End facilities represent points which are part
13 of present gas distribution systems with a transmission pipeline at West End and a
14 connection at East End to pipeline gas and to the propane gas production facility.

15 The West End facility became the site of other energy production around
16 1916, when the decision was made to construct a coal-fired steam electric plant at
17 the West End facility. This decision was logical given the property's ownership
18 by CG&E, its location adjacent to the river, and the cessation (albeit only
19 temporarily) of gas manufacture at this location. Presently, the West End facility
20 continues as an integral part of the interstate gas transmission and regulation
21 system and an electrical energy system providing space in downtown Cincinnati
22 for substations and transmission towers.

1 In summary, the historical manufactured gas facilities and equipment have been
2 interrelated to natural gas distribution and electrical generation and distribution
3 systems from the first inception of these latter systems through the present.

II. WEST END MGP

4 **Q. PLEASE PROVIDE AN OVERVIEW OF THE HISTORY OF THE WEST**
5 **END MGP.**

6 A. The West End MGP began gas production in January 1843; one of the earliest
7 MGPs in the U.S. It operated from that time until around 1909 during which time
8 certain expansions of gas-making capacity and gas storage occurred. In 1909
9 natural gas became available to all of Cincinnati thereby negating the need to
10 manufacture gas, albeit only temporarily. This hiatus of gas manufacture at West
11 End lasted from 1909 until 1918 when the demand for gas in the heating season
12 was such that manufacture needed to be restarted to supplement natural gas. The
13 West End MGP then manufactured gas until 1928 when gas manufacture there
14 apparently ended. Gas holders remained on the site at least through 1956
15 indicating the storage of gas there. The West End electric generating plant began
16 operation in 1918 and operated until 1976, fueled by coal over the dominant
17 period of its operation (1918-68) and natural gas in its last years (1968-76).

18 **Q. PLEASE DESCRIBE HOW MANUFACTURED GAS MADE AT WEST**
19 **END?**

20 A. Gas manufacture was solely by the coal gas process using retorts from 1843 until
21 1893 when the carburetted water gas process was added to the facility. See my
22 Direct Testimony of July 20, 2012, for descriptions of these processes. Gas

1 manufacture continued until 1909 when the gas distribution system in the
2 Cincinnati area was converted solely to natural gas. In 1918 a newly constructed
3 producer gas plant began operation to supplement natural gas supplies, especially
4 during the heating season. This producer gas plant was apparently a "blue gas
5 plant" based on it being listed as a "water gas producer" on the 1934 Sanborn
6 map. A blue gas plant is effectively the first vessel of a carburetted water gas
7 plant where a lower Btu gas of primarily hydrogen and carbon monoxide is made
8 in a cyclical process consisting first of blowing air through a bed of burning solid
9 fuel (e.g., coal) to heat it until the bed is red hot, then followed by blowing of
10 steam through the red hot bed to make the hot gas, which cools the bed causing
11 the need to repeat the air blowing step. Hot gas processing steps include
12 quenching, cooling and purification. Since this blue or producer gas did not have
13 its heat content increased by addition of oil (i.e., carburetted), it had a lower Btu
14 content suitable for supplementing natural gas supply, but not being a single
15 source of gas for distribution. J.J. Morgan, in his "Textbook of American Gas
16 Practice, Vol. 1: Production of Manufactured Gas," 1931 at p.443, commented on
17 this process: "One of the great advantages of the blue gas apparatus is its
18 adaptability to use as a standby apparatus. It can be brought into operation even
19 when cold in a few hours and can be shut down on a few minutes notice." This
20 plant operated until around February 1928 when it was apparently closed down.

III. EAST END MGP

1 **Q. PLEASE PROVIDE AN OVERVIEW OF THE HISTORY OF THE EAST**
2 **END MGP**

3 A. The East End MGP began gas production in November 1884, operating from that
4 time until around 1909 when the system was converted solely to natural gas. The
5 hiatus of gas manufacture at East End lasted from 1909 until 1925 when new gas
6 manufacturing equipment was installed to supplement natural gas. The East End
7 MGP then manufactured gas from coal, coke or oil with various modifications
8 until around 1963, when gas manufacture there ended. In 1947 a propane gas
9 plant was installed at East End which continues to operate through the present.

10 **Q. PLEASE DESCRIBE HOW MANUFACTURED GAS MADE AT EAST**
11 **END?**

12 A. Gas manufacture was by the coal gas process using retorts from 1884 until 1909
13 when gas manufacture temporarily ended. In 1925, a carburetted water gas
14 process was installed at the restart of gas manufacture. See my Direct Testimony
15 of July 20, 2012, for descriptions of these processes. The carburetted water gas
16 plant operated to supplement natural gas until 1946, at which time it was
17 converted to an oil gas process with the subsequent addition of oil gas equipment.
18 See my Direct Testimony of July 20, 2012, for descriptions of this process. In
19 1947 a propane gas plant was installed at East End. A propane gas plant
20 vaporizes and blends propane with air to make a gas mixture compatible for
21 distribution with natural gas. Propane is purchased, delivered to East End and
22 placed in storage until needed to supplement natural gas. With the 1963

1 expansion of propane storage, there was no longer a need to manufacture gas from
2 oil and gas manufacture ended.

3 **Q. WHAT RESIDUALS DID THE WEST END AND EAST END GAS**
4 **MANUFACTURING GENERATE?**

5 A. My Direct Testimony described the generation of solid and liquid residuals in
6 more detail and I will summarize them here by the types of gas manufacturing
7 processes that operated at these two facilities at different times. The types of
8 residuals found at East End and West End are consistent with the processes
9 described below, as well as the equipment and structures found in the subsurface
10 that would have been used to manufacture gas and handle the residuals generated.

- 11 • Coal Gas (East End and West End): The primary residuals were coke, coal
12 tar, ammonia, spent purifier solids (spent lime until the 1880s and spent
13 iron oxides thereafter), ash from the burning of coke beneath the retorts
14 and wastewater effluent.
- 15 • Carburetted Water Gas (East End and West End): The primary residuals
16 were carburetted water gas tar, spent purifier solids (spent iron oxides),
17 clinker from the generator vessel and wastewater effluent.
- 18 • Producer Gas (West End): The primary residual produced by a blue gas
19 plant was clinker resulting from the ash content of the solid fuel used;
20 analogous to the clinker from the carburetted water gas process. Other
21 residuals included tar and spent iron oxides.

- 1 • Oil Gas (East End): The primary residuals were oil gas tar, spent purifier
2 solids (spent iron oxides), clinker from the generator vessel and
3 wastewater effluent.
- 4 • Propane Gas (East End): There are no solid or liquid residuals from this
5 process.
- 6 • Boiler Ash (East End and West End): Where ash-containing fuel (e.g.,
7 coal) was used to produce steam at any of these plants, boiler ash would
8 also be a residual.

9 **Q. PLEASE EXPLAIN HOW THE RESIDUALS WERE MANAGED AT**
10 **WEST END AND EAST END DURING THE MGP OPERATION TIME**
11 **PERIOD AND DURING THE DEMOLITION OF THE STRUCTURES.**

12 A. Based on the historical information that has been found about these two facilities,
13 it appears that residuals were managed in a manner consistent with the practices I
14 described for the industry in general in my Direct Testimony of July 20, 2012.
15 For example, historic Sanborn maps show the presence of tar wells and separators
16 and tar tanks on the East End and West End MGPs indicating the presence of
17 equipment for tar recovery and storage. In addition, on the 1904 East End
18 Sanborn shows the presence of the B.P. Clapp Ammonia Co. adjacent to the East
19 End property which would be consistent with the manufacture of coal gas at that
20 time from which ammonia could be recovered as a byproduct. A 1963 CG&E site
21 drawing of East End shows the presence of tar recovery and management
22 equipment and facilities.

1 The 1958 CG&E history includes the following information about
2 residuals management:

- 3 • "The sale of coke and tar began in the early 1840's ..." Coke was sold
4 under contract to local coal companies and tar was sold to chemical
5 companies in Cleveland and St. Louis. [p.128]
- 6 • The first annual report issued January 1, 1847 noted that construction
7 in 1846 included a new holder of 37 Mcf capacity and a tar well of 200
8 barrel capacity. [pp.15-16]
- 9 • The North and South Works had been consolidated in 1863. The plant
10 was spread over lots on both sides of Front Street and "extending as far
11 north as 2nd Street. Half of the manufacturing was done on the south
12 side ... and half was done on the north side ... Three new holders and
13 ample tar tanks were also built ..." [pp.63-64]
- 14 • Around 1874 ammonia began being sold to chemical companies in
15 Cleveland and St. Louis. [p.128]
- 16 • Around 1890, the sale of by-products (ammonia, coke, and tar)
17 constituted around 19% of gross revenues. [p.128]

18 Information has been found in historic newspapers. An article (May 18,
19 1885) in the Cincinnati Evening Post reported "The [Forest City Chemical] works
20 were built about a year ago, and took all the tar of the Cincinnati Gaslight & Coke
21 Co., amounting to 900,000 gallons." An article (April 15, 1886) in the Cleveland
22 Leader Herald stated that "... in an agreement entered into on June 19, 1880, the

1 [Standard] chemical company undertook to receive all the ammoniacal liquor
2 manufactured by the gas company during the ensuing five years. ... The gas
3 company in pursuance of the contract erected a tank capable of holding 60,000
4 gallons, it being understood that they were not to be held responsible if the
5 accumulation exceeded that quantity and were authorized to allow the surplus to
6 go to waste."

7 All of the above historical information is consistent with the practices of
8 the MGP era as described in my Direct Testimony. As further described in my
9 Direct Testimony, it was the handling and disposition of residuals that resulted in
10 releases of materials or their constituents to the East End and West End MGPs
11 that resulted in levels on the sites that by current laws and regulations require
12 remediation.

13 **Q. WAS THE TIMING OF THE INITIATION OF INVESTIGATION AND**
14 **REMEDATION EFFORTS ON THE EAST END AND WEST END SITES**
15 **REASONABLE?**

16 A. Yes it was. As described in Jessica Bednarcik's Supplemental Direct Testimony,
17 reprioritization of the East End site occurred in 2006 due to anticipated changes in
18 the pathways by which people could be exposed to chemical constituents at the
19 site resulting from nearby residential development and onsite projects. It was
20 reasonable to initiate and proceed with addressing this site in its entirety following
21 these changes to address conditions in advance of the development of the new
22 exposure pathways. As further described by Ms. Bednarcik, reprioritization of the
23 West End site in 2009 occurred when the recommended location of the new Brent

1 Spence Bridge was finalized with part of it on the West End site necessitating the
2 relocation of electrical equipment (e.g., substation) to other parts of the West End
3 site. It was reasonable to proceed with addressing this site in its entirety at that
4 time since a major portion of this site's subsurface will be inaccessible with the
5 new bridge or relocated electrical equipment being on top of it greatly limiting, if
6 not eliminating, the ability to address site conditions in the future. These events
7 on these two sites triggered the need to begin the site assessment and remediation
8 (SAR) process described in my Direct Testimony of July 20, 2012, depicted there
9 diagrammatically in ACM-20.

10 **Q. WAS THE APPROACH FOLLOWED FOR INVESTIGATION AND**
11 **REMEDiation REASONABLE?**

12 A. Yes it was. As described in Jessica Bednarcik's Supplemental Direct Testimony,
13 the work performed followed the general SAR steps I described in my Direct
14 Testimony including site investigations, selection of a remedy to address risks,
15 regulatory requirements and site conditions, all under the guidance of an Ohio
16 EPA certified professional.

IV. CONCLUSION

17 **Q. DOES THIS CONCLUDE YOUR PRE-FILED SUPPLEMENTAL DIRECT**
18 **TESTIMONY?**

19 A. Yes.

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

2/25/2013 3:38:30 PM

in

Case No(s). 12-1685-GA-AIR, 12-1686-GA-ATA, 12-1687-GA-ALT, 12-1688-GA-AAM

Summary: Testimony Supplemental Direct Testimony of Andrew Middleton on Behalf of Duke Energy Ohio, Inc. electronically filed by Carys Cochern on behalf of Duke Energy