FILE

DE-OHIO EXHIBIT______

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio to Adjust and Set Its Gas and Electric Recovery Rate for SmartGrid Deployment Under Riders AU and Rider DR-IM	)))))	Case No. 09-543-GE-UNC
In the Matter of the Application of Duke Energy Ohio for Tariff Approval	))	Case No. 09-544-GE-ATA
In the Matter of the Application of Duke Energy Ohio to Change its Accounting Methods	)))	Case No. 09-545-GE-AAM

DIRECT TESTIMONY OF

TODD W. ARNOLD

ON BEHALF OF

DUKE ENERGY OHIO

June 30, 2009

270189

TABLE OF CONTENTS

DESCRIPTION OF TESTIMONY	TESTIMONY PAGES

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Todd W. Arnold. My business address is 139 East Fourth Street, Cincinnati, Ohio 45202.

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

A. I am employed by the Duke Energy Corporation (Duke Energy) affiliated companies as Senior Vice President, SmartGrid and Customer Systems.

Q. PLEASE BRIEFLY DESCRIBE YOUR JOB DUTIES AS SENIOR VICE PRESIDENT, SMARTGRID AND CUSTOMER SYSTEMS.

A. As Vice President, SmartGrid and Customer Systems, I am responsible for the SmartGrid strategy, deployment planning and implementation, as well as the customer and meter data management systems for all of Duke Energy's utility operating companies, including Duke Energy Ohio, Inc. (Duke Energy Ohio or the Company).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QULIFICATIONS.

A. I received a Bachelor's Degree in Marketing from Indiana State University in 1977 and a Master's Degree in Business Administration from the University of Indianapolis in 1986. I began my career with Public Service Indiana (PSI) in 1977 in field sales and marketing. I have served in many customer operations, distribution operations and corporate office capacities. I have my "Strategic Leader" professional certification from the Call Center Industry Advisory Council

(CIAC). CIAC is a non-profit corporation established by the call center industry to provide standardized competency-based professional certification for call center leaders.

Q. PLEASE SUMMARIZE YOUR WORK EXPERIENCE.

A. I have over 33 years of utility experience, including field operations, customer service, strategic planning, system implementation, process reengineering and merger integration. Prior to my current position, I was Senior Vice President, Customer Service for Duke Energy, responsible for call center operations, billing, credit and collections and meter data management for Duke Energy's affiliated operating companies.

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

A. The purpose of my testimony is to describe Duke Energy Ohio's activities related to SmartGrid deployment in 2008.

II. DISCUSSION OF SMARTGRID DEPLOYMENT

Q. PLEASE DISCUSS DUKE ENERGY OHIO'S INITIAL ROLL-OUT OF SMARTGRID IN 2008.

A. Beginning in 2008, Duke Energy Ohio began deploying new electric smart meters, new gas modules, associated communications devices, and the communication network for mostly residential customers as part of our overall plan to create a SmartGrid.

Q. PLEASE DESCRIBE THESE DEVICES IN GREATER DETAIL.

A. The SmartGrid technology used for the electric meter includes the Echelon EM-50202, which integrates reading multiple channels of data with an information display. An Echelon model 78705 DC-1000/SL data concentrator manages meters and provides the connectivity infrastructure between these devices through low voltage power line and the Communications Node. The data concentrator automatically discovers meters, ensures reliable communications, securely configures devices to communicate on the encrypted network, coordinates the two-way delivery of device data, including metering data, and monitors the health and operation of the devices on an ongoing basis. The Echelon data concentrator is installed in the Communications Node. The head end system software, Network Energy Services (NES), collects and reports consumption, load profiles, power quality, and other events. The NES system integrates with Duke Energy's Energy Data Management System and enables remote control, remote firmware upgrades, and remote configuration of Echelon meters and data concentrators.

SmartGrid technology for gas meters is slightly different than for electric meters. The Badger ORION Integral Transmitter for gas meters is not a meter, but an add-on module. It is an integrated unit compatible with many gas meter brands. The transmitter is mounted under the glass between the gas meter and the meter's index without any modification to the meter itself. Gas meters located at the customer home are retrofitted with a transmitter to send out data to the Orion Network Gateway Receivers over a 900MHz transmission. The Orion Receivers are located in Communications Node. It is one-way communication. Neither the Badger's module nor data concentrator has data logging capability. However, the network supports polling a concentrator on set intervals to gather the current data in the concentrator. The concentrator timestamps the last reading received. The Badger head end System provides tamper protection and alarm, non-usage notification, and data profiling.

Gas meters that cannot be retrofitted in the field due to meter age, installation configuration or other impediment will be removed and replaced with a new gas meter. Duke Energy is using American Meters residential gas diaphragm meters for a majority of advanced metering infrastructure and smart grid gas meter applications in Ohio and is supplemented with Actaris residential gas diaphragm meters.

The Ambient X-2000 nodes serve as the primary link between the meter and Duke Energy's software systems. The node transfers data between Echelon electric meters and gas meters with Badger transmitters and their respective head end systems via the Verizon cellular network.

In addition to the Echelon data concentrator and Orion Receiver, as mentioned above, the Ambient X-2000 includes a Verizon modem. The Ambient Network Monitoring System (NMS) application allows configuration of the Ambient Communications Nodes. The system also allows for firmware and software downloads. The system is configured to perform a health check of each gateway.

Q. HOW MANY ELECTRIC METERS WERE DEPLOYED AND WHERE WERE THEY DEPLOYED?

A. There were 43,418 electric meters replaced for mostly residential customers in 2008. Consistent with our commitment in Duke Energy Ohio's Electric Security Plan (ESP) case, Case No. 08-920-EL-SSO, we have deployed these on circuits mostly in high density areas with a high percentage of inside meters.

Twelve areas in the Cincinnati Region were selected for the initial deployment of meters in 2008. They include the following:

TABLE 1	
Area #	Sections of the following Suburbs
1	Bond Hill
2	Price Hill (East)
3	Westwood / Price Hill (West)
4	Price Hill (West)
5	Price Hill (East)
6	Clifton / Fairview
7	Avondale (South) / Mt Auburn / Corryville
8	Mt Adams / Walnut Hills
9	Bond Hill / Pleasant Ridge
10	Norwood / Deer Park
11	Avondale (North) / Paddock Hills
12	Hyde Park / Oakley / Evanston

Deployment in these areas continues in 2009.

Q. HOW MANY GAS MODULES WERE DEPLOYED AND WHERE WERE THEY DEPLOYED?

A. In 2008, Duke Energy Ohio deployed 24,010 new Badger gas modules, which were retrofitted on legacy gas meters for mostly residential gas customers. There were 3,535 instances where the Badger gas module was not compatible with the legacy gas meter. When retrofitting the Badger gas modules on existing gas meters was not possible, new gas meters were installed with gas modules and the incompatible legacy gas meters were removed. Consistent with our commitment in Duke Energy Ohio's ESP case, we have deployed these on circuits mostly in high density areas with a high percentage of inside meters.

Q. WHY IS IT IMPORTANT FOR THE COMPANY TO DEPLOY BOTH GAS AND ELECTRIC METERS AT THE SAME TIME?

A. It is important to deploy the gas and electric components of the SmartGrid deployment at the same time. Most Duke Energy Ohio customers have both electric and gas service and many of their meters are in locations that are difficult to access. Gaining access to these premises only once is a more efficient means to deploy equipment and reduces the number of times customers have their schedules interrupted. Deploying gas and electric components at the same time also enables the elimination of the entire (gas and electric) manual meter read process at the premise.

Q. HOW MANY COMMUNICATION NODES WERE DEPLOYED AND WHERE WERE THEY DEPLOYED?

A. 2,147 communication nodes were installed in 2008. Of these 2,066 were "electric only" communication nodes and 81 were electric and gas (combination) communication nodes. These were installed in generally the same areas where meters were deployed.

Q. PLEASE EXPLAIN WHAT IT MEANS FOR A METER TO BE CERTIFIED AS COMMISSIONED.

A. A meter is certified as commissioned where the meter reading occurs through a digital communication and the bill is derived from this electronic read.

Q. HOW MANY METERS WERE CERTIFIED AS COMMISSIONED IN 2008?

A. Duke Energy Ohio was just beginning to establish the communications network and related information technology systems and procedures in 2008. Meter commissioning has commenced in 2009.

Q. PLEASE DESCRIBE THE EQUIPMENT DEPLOYED TO ADDRESS COMMERCIAL AND INDUSTRIAL CUSTOMERS.

A. No meter equipment was deployed in 2008 to address electric commercial and industrial customers except for some smaller commercial customers that did receive an Echelon meter. Work started on the communication network and lessons learned in the deployment of residential equipment will provide a more efficient deployment of commercial and industrial meter equipment to electric customers. Approximately 1,031 commercial and industrial gas customers received new Badger gas modules.

Q. WAS DISTRIBUTION AUTOMATION EQUIPMENT DEPLOYED?

A. As planned, no distribution automation equipment was deployed in 2008.

Q. WHAT ARE THE "LESSONS LEARNED" TO DATE WITH RESPECT TO THIS INITIAL ROLL-OUT?

A. We experienced more difficulty gaining access to the inside meters than we expected. Some of this was due to scheduling conflicts, and, in other instances, customers refused to provide access to the premise. Internal procedures are being revised to improve our ability to gain access more efficiently. We also learned that with this technology, it is more efficient to deploy the communication nodes first, followed closely with the installation of meters and modules. Another lesson is that we anticipated falling prices for communication modules due to manufacturing efficiencies resulting from larger scale. Prices continue to be higher than expected as manufacturing efficiencies have not been achieved by the vendors. An industry market of SmartGrid technologies has not yet developed. Encouragement by the federal government to implement SmartGrid technologies via federal stimulus grants should significantly assist with this market development. Duke Energy Ohio expects to aggressively apply for matching federal stimulus funding.

Q. IS DUKE ENERGY OHIO'S SMARTGRID DEPLOYMENT ON TRACK FOR 2009?

A. Yes. Although this filing addresses our deployment for 2008, I can report that the project is progressing and is on schedule for the second quarter of 2009. Duke Energy Ohio anticipated that it would be able to complete – and to provide to the Public Utilities Commission of Ohio - the 2009 deployment plan approximately sixty days after an order is received pertaining to Rider AU which was approved in Case No. 07-589-GA-AIR.

Q. PLEASE DESCRIBE ATTACHMENT TWA-1.

A. Attachment TWA-1 is a high level summary of our deployment plan which is referred to as the "Ohio Tranche 1.0". It details our deployment initiative and is submitted to more fully illustrate what I have been discussing in my testimony.

III. <u>CONCLUSION</u>

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

A. Yes.

Ohio 2009/2010 SmartGrid Field Deployment Plan

(Initial Deployment and Ohio Tranche 1)

Introduction

Duke Energy's SmartGrid program is transforming the electric power grid by creating an integrated digital platform for enterprise-wide solutions resulting in improved operational efficiencies and overall customer satisfaction. One key and initial element of realizing the Duke Energy SmartGrid vision is the field deployment of power system infrastructure technology improvements. The field deployment plan is developed under the direction of Duke Energy's SmartGrid Design Basis Document (DBD).

This field deployment plan includes two segments; the plan to complete the initial field deployment started in 2008 and the plan for 2009/2010 scaled field deployment. The initial field deployment plan refers to the January-September 2009 activity to complete the work that commenced in 2008 to install and commission approximately 50,000 electric meters, 40,000 gas modules and associated communication nodes in the mostly inner-city regions of Cincinnati. At the time of this filing, we find most of this work complete. Meter commissioning will continue through September for this initial field deployment. The scaled field deployment plan lays out the details for the Ohio service territory for the period starting in the fourth quarter of 2009 and continuing through year-end 2010, otherwise referred to throughout this plan document as "Ohio Tranche 1".

There are three major components to the field deployment element of Duke Energy's SmartGrid vision for Ohio Tranche 1. These three components together comprise the major power system infrastructure technology improvements necessary to provide a platform to transform today's power grid into a true SmartGrid. These three components include;

- Smart meter deployment (gas & electric)
- Communications Network deployment
- Distribution Automation deployment

This plan document outlines some of the current details regarding the field deployment of these three major components.

Smart Meter Deployment (gas & electric)

The Ohio Tranche 1 deployment includes 190,000 electric smart meters and 130,000 gas meters (modules). Exhibit "A" shows the cumulative meter deployments for both gas and electric meters. This chart includes meters installed to date and planned meter deployments.

The Ohio Tranche 1 deployment plan addresses residential and small commercial customers. The electric meters being deployed will be Form 2S, 120/240 volt, 200 Amp, self-contained. This type meter is generally used for all residential accounts and some small commercial accounts. Existing gas meters will be retrofitted with a transmitter module. Existing gas meters that are not compatible with a transmitter module will be replaced with a new meter retrofitted with a transmitter module.

Exhibit "B" includes a map of the smart meter deployment areas for Ohio Tranche 1. The exact boundaries are still being fine tuned; however, this map provides a general idea of where the smart meters will be deployed. The general approach is to continue working out from the Initial Deployment (pilot) areas which are located in the area just north of downtown Cincinnati. There are three areas that are geographically separated from the main Ohio Tranche 1 deployment area. These areas are Terrace Park, Oxford, and Harrison. Deploying in Terrace Park in 2009 was identified as a requirement in the stipulated agreement. The Oxford and Harrison areas were chosen because Oxford is mostly electric only customers and both areas have a very small amount of hard to access indoor meters. Deploying in these areas early in the project will provide valuable lessons learned for further deployment into other electric only areas as well as areas with minimal indoor meters. Also, with Oxford being a college town with a lot of move-ins and move-outs, we intend to begin capturing savings early in the project by obtaining meter reads remotely and saving truck rolls for these types of orders.

Communications Network Deployment

In correlation to the above smart meter deployment plan, the deployment of our communications network will be in the same locations as the meter deployment described above. The communications network consists of communications nodes that will be installed on distribution line transformers serving the electric smart meters in the area. A Power Line Carrier (PLC) technology is used to transmit the electric smart meter data from the electric meter to the communications node. For gas meter readings, a Radio Frequency (RF) signal is transmitted from the gas modules and received by a gas enabled communications node. For the Ohio Tranche 1 deployment area we will be installing approximately 32,000 communications nodes, with approximately 25% of these being gas enabled.

Distribution Automation Deployment

Our distribution automation deployment began in January of 2009 following the approval of our ESP filing. In accordance with our filing, our distribution automation deployment is linear in fashion; deploying 20% of the total distribution automation spend each year over the 5 year deployment.

The three main criteria used in developing our 5 year distribution automation deployment plan are as follows;

1. Reviewing current reliability results by substation with a focus on beginning work in the substations/areas that are our weak performers.
2. Leveraging any substation projects that are currently planned. If we have projects already planned for a substation, we will review the need for installing distribution automation equipment in that substation and include it in the existing plan, thus helping drive the overall cost down and minimize substation equipment outages.
3. Overlaying the distribution automation work with our smart meter and communications node deployments. This is to provide as many SmartGrid benefits as possible to our customer's day 1 after installing a smart meter at their home.

As part of our 2009 distribution automation plan, we are currently in the process of engineering and installing distribution automation equipment in 29 substations and the 107 distribution circuits associated with these substations. Exhibit "C" contains a listing of these substations and the type and quantity of work being performed. With the ESP approval in late December of 2008, we did not start on the planning and engineering work for the 2009 projects until January. As a result, the installation of some of the 2009 projects will carry over into 2010.

Our 2010 distribution automation plan includes 29 substations and the 97 distribution circuits associated with these substations. Planning and engineering will begin in 2009 on these 2010 projects with the plan to begin installations early in 2010 and have them completed by year-end. Exhibit "D" contains a listing of these substations and the type and quantity of work to be performed.

Exhibit "A"

Ohio Cumulative Meter Deployments

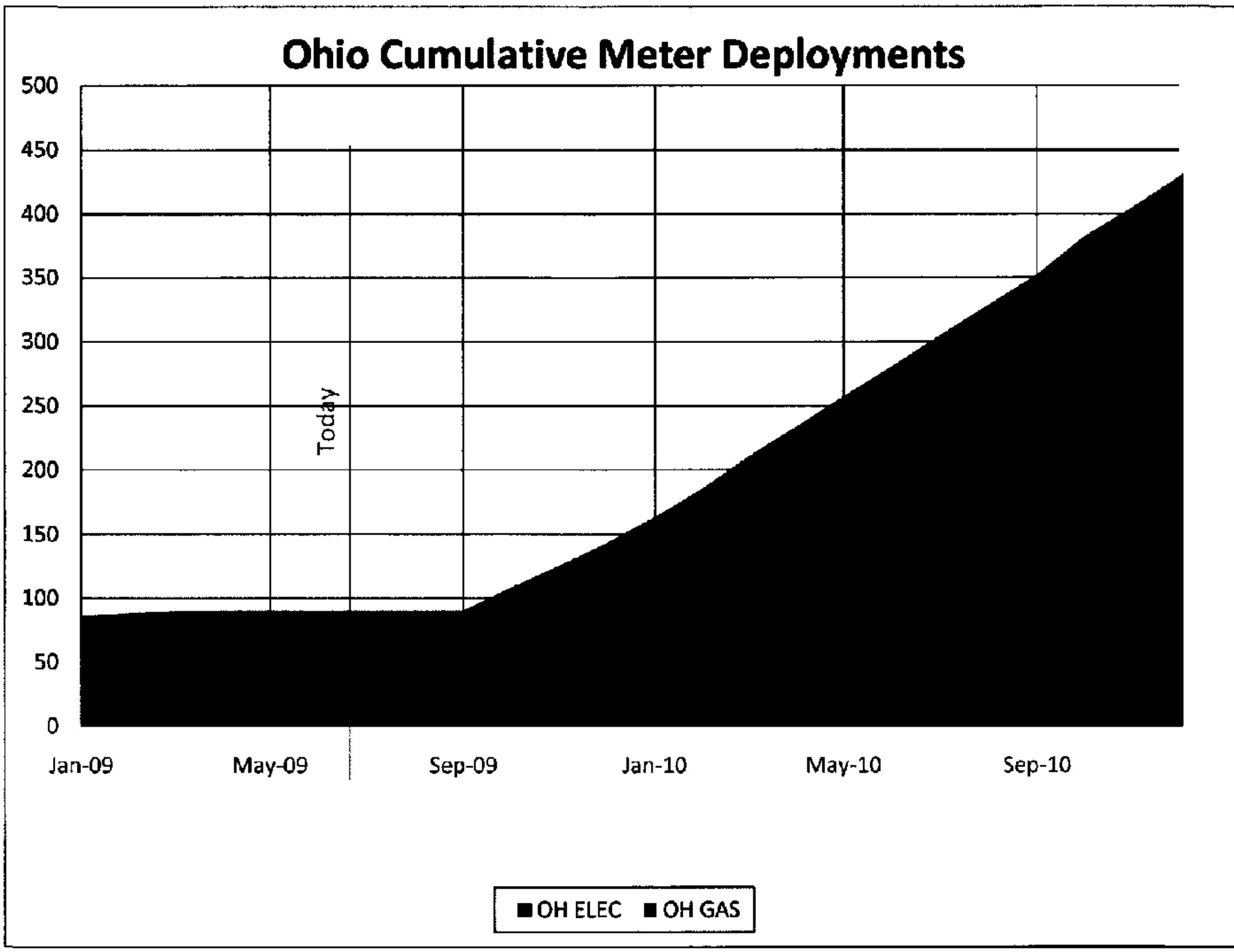
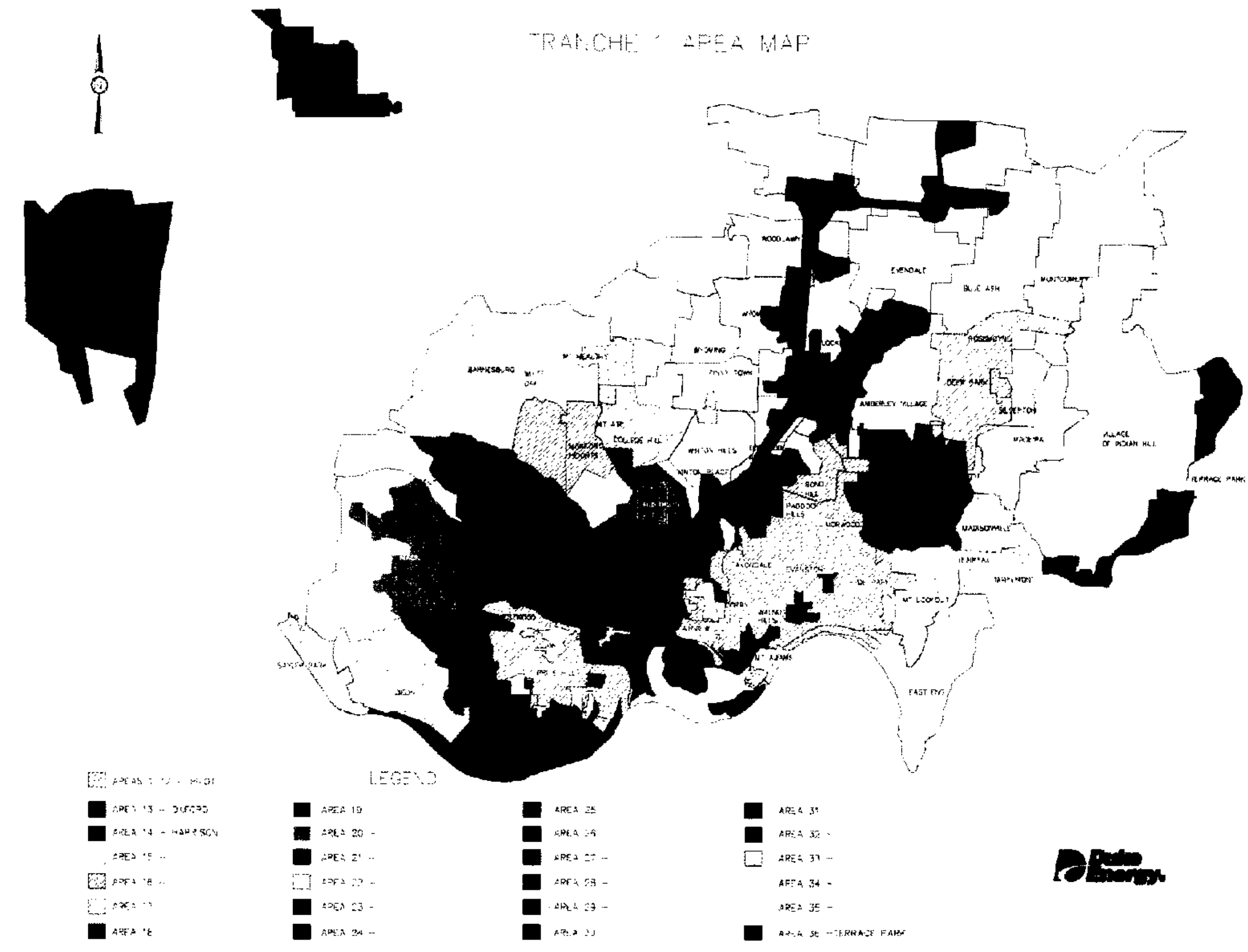


Exhibit "B"

<u>Ohio Tranche 1 Meter & Communications Node Deployment Area Map</u>



Note: The area numbers listed on the Ohio Tranche 1 Area Map do not represent the order in which meters will be deployed. The route release plan is still being developed.

Exhibit "C"

Distribution Automation 2009 Deployment Details

		Substation				Line Sectionalization		
Substation Name	**# of Circuits**	**Upgrade Relays**	**Replace Reclosers with Breakers**	**Install New Communications to Substation**	**Upgrade Existing Communications to Substation**	**Circuits to Review**	**Sectionalization Devices to Install**	**Self Healing Devices**
ALLEN	2	0	0	0	0	2	The 107 circuits are currently being reviewed for sectionilation needs. It is estimated that 155 devices will be installed. This is a combination of electroni recloser and non-electronic recloser devices	6 Self Healing Teams are budgeted for 2009. Each team can consist of 4 to 8 devices for an estimated total of about 30 to 40 devices. Price Hill will have devices and Ferguson will have 4 devices. Not all locations have been determined.
AMELIA	2	1	1	1	0	2		
ASHLAND	9	10	0	0	0	9		
CEDARVILLE	5	0	0	0	0	5		
CLINTON COUNTY	2	0	0	0	0	2		
EASTWOOD	2	2	0	0	0	2		
FAIRFIELD	9	10	0	0	0	9		
FELDMAN	6	6	0	0	0	6		
FERGUSON	4	4	0	0	0	4		
HENSLEY	1	0	0	0	1	1		
HUNTER	3	0	0	0	0	3		
KLEEMAN	6	6	0	0	0	6		
LAKE WAYNOKA	1	0	0	0	0	1		
MAINEVILLE	2	0	0	0	0	2		
MONFORT HEIGHTS	1	0	1	1	0	1		
MORGAN	4	4	0	0	0	4		
NEUMANN	2	0	2	0	1	2		
NEW BURLINGTON	2	0	2	1	0	2		
NEW RICHMOND	1	0	1	1	0	1		
NICHOLSVILLE	3	0	0	0	1	3		
NILLES	2	0	2	1	0	2		
OAKLEY STA Ph 1	10	13	0	0	0	10		
OBANNONVILLE	2	0	0	0	0	2		
PRICE HILL	3	3	0	0	0	3		
SEWARD	3	3	0	0	0	3		
SOUTH BETHEL	3	2	1	0	0	3		
STILLWELL	1	0	1	0	1	1		
WALNUT HILLS	13	10	0	0	0	13		
WILLEY	3	0	0	0	0	3		
Totals	**107**	**74**	**11**	**5**	**4**	**107**	**155**	**6 Teams**

Exhibit "D"

Distribution Automation 2010 Deployment Details

		Substation				Line Sectionalization		
Substation Name	# of Circuits	Upgrade Relays	Replace Reclosers with Breakers	Install New Communications to Substation	Upgrade Existing Communications to Substation	Circuits to Review	Sectionalization Devices to Install	Self Healing Devices
BERKSHIRE	2	0	2	1	0	2	To Be Determined	To Be Determined
EBENEZER	6	4	0	0	0	6		
BLAIRVILLE	1	0	1	1	0	1		
LINWOOD	4	4	0	0	0	4		
MIAMITOWN	1	0	1	1	0	1		
EVENDALE	4	4	0	0	0	4		
TWENTY MILE	4	4	0	0	0	4		
AICHOLTZ	2	0	2	1	0	2		
MILLVILLE	2	0	2	1	0	2		
BANNING	2	0	2	1	0	2		
GLEN ESTE	1	0	1	1	0	1		
TURTLE CREEK	2	1	1	1	0	2		
BROWN	3	2	0	0	0	3		
PARK BANK_1	2	2	0	0	0	2		
SOCIALVILLE	4	4	0	0	0	4		
FINNEYTOWN	6	6	0	0	0	6		
DIMMICK	4	2	0	0	0	4		
MASON	1	0	1	1	0	1		
NORTHGREEN	4	4	0	0	0	4		
WYSCARVER	2	2	0	1	0	2		
WOODLAWN	1	1	0	1	0	1		
PISGAH	4	2	2	1	0	4		
HILLSIDE	1	0	1	0	0	1		
TOBASCO	6	4	0	0	0	6		
MARKLEY	6	6	0	0	0	6		
NEWTOWN	4	4	0	0	0	4		
FAIRFAX	4	4	0	0	0	4		
MONTGOMERY	6	6	0	0	0	6		
DEER PARK	8	8	0	0	0	8		
Totals	97	74	16	12	0	97	TBD	TBD