

FILE

**ET. BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Commission's
Investigation into the Testing and
Verification of Advanced Metering
Infrastructure Installations.

)
)
)
)

Case No. 10-325-EL-COI

PUCO

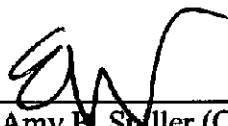
2010 JUN -1 PM 3:29

RECEIVED-DOCKETING DIV

**RESPONSE OF DUKE ENERGY OHIO, INC.
TO COMMISSION INVESTIGATION INTO THE TESTING AND VERIFICATION OF
ADVANCED METERING INFRASTRUCTURE INSTALLATIONS**

On March 24, 2010, the Public Utilities Commission of Ohio (Commission) initiated an investigation, noting that six Ohio utilities have proposed deployment of Advanced Metering Infrastructure (AMI). The Commission further noted in its entry that Rule 4901:1-10-05, Ohio Administrative Code requires that meters comply with the American Standards Institute's standards for accuracy, and places responsibility for meter accuracy upon the utility. The Commission directed each electric utility that is deploying AMI to respond to questions set forth in the entry. Duke Energy Ohio, Inc. submits its responses herein to those questions in the attached document.

Respectfully submitted,



Amy B. Spiller (Counsel of Record)
Associate General Counsel
Elizabeth H. Watts
Assistant General Counsel
Duke Energy Business Services LLC
139 East Fourth Street
Atrium II, 25th Floor
Cincinnati, Ohio

Counsel for Duke Energy Ohio, Inc.

This is to certify that the images appearing are an
accurate and complete reproduction of a case file
document delivered in the regular course of business
Technician Ad~ Date Processed 6/1/10

REPORT TO THE COMMISSION REGARDING TESTING AND VERIFICATION OF ADVANCED METERING INFRASTRUCTURE

Duke Energy Ohio, Inc. (Duke Energy Ohio) Current Meter Practices

- Duke Energy Ohio receives and stores manufacturer test results for all meters from all vendors. Test results are imported and stored in the Meter Tacking System.
- Duke Energy Ohio performs testing on a large volume of new meters prior to first deployment of new meter types (example: 10,000 Echelon E2L meters were shop tested). Test results are stored in the Meter Tracking System.
- After initial large scale testing is complete, Duke Energy Ohio performs sample testing on each new shipment of meters. Test results are stored in the Meter Tracking System.
- Accuracy must be within +99.5% to 100.5% accuracy tolerance
- Random sample testing (based on ANSI standards) is conducted on these meters each year (they are mostly field tested)
- Upon meter change-out, the old meter is returned to the meter shop and a shop read is entered by a meter shop employee. A validation is conducted to compare the final remove read to the shop read. Differences outside of the tolerance level are sent to order completion personnel to resolve the read discrepancy
- Meter Data Management system performs Hi-Low validations and zero usage validations on each read (currently treated as Informational messages)
- During Billing processing (prior to certification of AMI meters), meter reads go through Hi-Low validations and zero usage validations (includes reads from meter change-out as well as monthly Billing reads). Work files are created for reads outside of the tolerance that require reviews to resolve the difference.
- After installation, AMI meters are tested for certification which includes consistency of obtaining reads via the Head-end system and a Billing read synchronization test.

AREAS OF INQUIRY

(a) Meter testing and testing procedures for ensuring the accuracy of AMI meters.

- Duke Energy Ohio receives meter manufacturer test results for all new meters via meter vendor files. Meter manufacturer test results are imported and stored in Duke Energy Ohio's Meter Tracking System.
- Duke Energy Ohio shop tests new meters upon first delivery (10,000 Echelon E2L meters were shop tested). Recent shipments are sample tested in the meter shop. Meters must be within 99.5% to 100.5% accuracy tolerance. Duke Energy Ohio's testing methods are standardized, ANSI-approved and industry accepted practices that include testing at various loading conditions and also before and after environmental exposure. All shop testing results are imported and stored in the Meter Tracking System.
- Duke Energy Ohio conducts random sample testing (based on ANSI standards) on these meters each year (mostly field tested). All field test results are imported and stored in the Meter Tracking System.
- For the first 2 months after installation, Duke Energy Ohio continues to manually read the meter and compare these reads with the remote reads as recorded in the meter data management system. If any discrepancies occur, the AMI meter is physically examined and may be manually reread.

(b) Practices, procedures, and standards for ensuring that the information received by the electric utility's meter data management and billing systems will be accurate and consistent with the data recorded by its AMI meters.

- Duke Energy Ohio utilizes a combination of validation procedures to ensure data integrity of the meter information through the billing system. It utilizes the Meter Data Management system to perform various validation techniques on each read as they flow into the system. This includes Hi-Low validations and zero usage validations, validations of meter ID's, etc. Within the Billing system the monthly billing readings and meter removal readings are validated via Hi-Low validations and zero usage validations. These Billing validations are conducted prior to certification of AMI meters.

(c) Practices and procedures for documenting meter readings made at the time of replacing meters and installing AMI equipment, including the verification of the final reading on the replaced meter.

- Duke Energy Ohio creates a work order for each location to have an AMI smart meter installed. The installer records onto paper the initial read of the new meter, the stop read of the old meter and the old meter ID number. In addition, the installer records the old meter information into a handheld unit. The Meter Tracking System is updated daily with this information.
- When the old meter is returned to the meter shop, a shop read is obtained by a shop employee and the read is stored in the Meter Tracking System. The read taken at the time the meter is removed and the shop read are compared. Discrepancies of greater than 10 kWh (Electric) are reported within the Meter Tracking System and Order Completion personnel are responsible for addressing the read discrepancies.
- In addition, Billing validations are conducted on all removal readings. This includes Hi-Low and zero usage validations.

(d) Meter upgrade capabilities of the electric utility's AMI meters and compliance with National Electrical Manufacturers Association standard SG-AMI1-2009.

- The residential meters (we have not yet determined our solution for commercial meters) being deployed in Ohio meet all of the sections of SG-AMI 1-2009 with the following exceptions:
- 3.2.9 'Smart Meter shall support a mechanism for coordinating activation of firmware image updates. Specifically, the smart meter shall not activate the new firmware image until instructed to do so.'—On Duke's meters, the activation has been combined with the completion of firmware download and verification. So, the activation is initiated immediately after the completion of download and verification.
- 3.6.1 'Upgrade Management System shall support a mechanism for coordination activation of firmware image updates.'—Coordination is available for the overall process, but not specifically to activation.
- 4.1 'Cryptographic algorithms shall be current, publically vetted, and government approved. Advanced Encryption Standard (AES), Elliptic Curve Cryptography, (ECC) and RSA algorithms, for example, all meet these criteria.'—On the communication between the data collector and

meter, Duke uses RC4 for encryption. This meets all the criteria except being government approved.

(e) Any additional practices or procedures for avoiding or addressing any questions or potential disputes that might arise regarding the accuracy of AMI meter data.

- Any Duke Energy Ohio customer who has a question about their meter data may contact the Company's Call Center to have the meter reading usage data reviewed and analyzed. The customer may request a check reading or meter testing. If the customer requests a test of an AMI meter, it will be tested for accuracy on the customer's premise using portable equipment. The customer may witness a meter test being performed if they desire. Unless the meter is found to be defective the meter will remain on premise. In some cases the meter may be removed and returned to the Meter Laboratory for testing. The customer may witness a meter test being performed at the lab if they desire.

(f) Specifically, the report should address the standards with which the electric utility's AMI meters and the communication of meter data are designed to comply, testing procedures for AMI equipment acceptance, meter installation procedures, and any post-replacement tracking, temporary retention, or testing of removed meters.

- Duke Energy Ohio conducts detailed tests on new AMI meters upon first delivery and sample testing on subsequent deliveries. All test results are stored in the Meter Tracking System. Final readings of old meters and start readings of new meters are validated by various methods including shop validations of removed meters, Meter Data Management and Billing validations of readings (Hi-Low and zero usage).
- Following installation of the AMI meters, Duke Energy Ohio conducts certification testing. This testing includes validation that the meter is correctly configured by the Smart Grid Network team, validation of reading history (consistency of receiving readings from the head-end application), and a billing comparison of the AMI reading and the Itron manual reading. Any meter that does not meet all criteria will require

further testing prior to proceeding with certification. Also, all meters within a premise must be certified simultaneously.

- In addition, meters may be tested after installation due to customer requests or commission requests.