

## STAFF REPORT TO THE COMMISSION

### ComEd Smart Meter Fires

August 28, 2013

#### Background

Staff first learned of meter-related fires in Chicago from media reports on August 30, 2012. Staff immediately contacted ComEd, requested responses to 58 multi-part questions, and initiated bi-weekly meetings to discuss ComEd's investigation and findings. Staff provided its November 29, 2012 Staff Report to the Commission describing what had been learned and presenting Staff's analysis and recommendations regarding the fires.

#### Overview of the November 29, 2012 Staff Report

ComEd initially reported that thirty-seven meters had overheated, and all were related to older A-Base and socket-type meter bases: the three A-Base meters involved in the fires, twenty additional A-Base meters found during inspections, and fourteen socket-type meters found with remote temperature scans.



**A-Base Meter**



**Socket Meter**

ComEd attributed the fires and overheated meters to loose connections and corrosion in customer-owned meter bases. (While it was not available to ComEd when Staff first met with them in September through November 2012, further information from results of investigations by two independent engineering firms confirms ComEd's conclusion.) ComEd's system includes 4.2 million meters, of which 128,158 are smart meters. A-Base meter enclosures comprised 5,587 of the 128,158 smart meter installations.

ComEd inspected all the A-Base smart meter installations from its Pilot Program and began performing, and reporting to Staff the results of, daily temperature scans on nearly all smart meters.

ComEd reported that it plans to use improved A-Base meter adaptors and connection blocks when it resumes smart meter installations. When this report refers to meter bases, the reference is to the customer-owned enclosures into which a utility installs an electric meter to supply service to a customer. There are generally two types of meter bases: an A-Base where electrical connections to the meter are hand wired at the time of meter installation and a socket base where electrical connections to the meter are tight slip-fit connections not unlike a wall outlet in a home or business.

For the smart meter Pilot Program, ComEd upgraded forty meter readers to smart meter installers, but gave them substantially less training than a typical meter technician. The three A-Base smart meter fires occurred at installations made by upgraded meter readers with minimal training. ComEd reported plans to develop new training programs for its meter installers.

Staff concluded that ComEd should assume responsibility for the overheating meters and for the fires in meter bases since (1) neither ComEd nor any other utility routinely permits customer access to the interior of meter bases and (2) during the smart meter Pilot Program meter installations, ComEd should have identified and either repaired or replaced the deteriorated equipment inside meter bases that caused smart meters to overheat.<sup>1</sup>

Smart meters were not the cause of the fires or overheating. Any meter installed in a meter base with loose connections and corrosion could have experienced the same overheating. It is essential that meter technicians, at the time of smart meter installation, inspect the meter base, make minor repairs where necessary, and report any unsafe conditions.

### **Current Summary**

Meter overheating and fires at ComEd electric meter installations are not the fault of smart meters, also referred to as advanced metering infrastructure (“AMI”). Staff further concludes that three primary causes are (1) aged and deteriorated meter bases and the electrical connections inside the meter bases that ComEd did not repair, replace, or report; (2) customer tampering; and (3) accidents.

ComEd is taking the correct measures at this time to limit as much as possible the damage done by defective meter bases. Staff believes that ComEd must take every reasonable action to identify individual customer meter bases that may be a fire threat during smart meter installations. ComEd’s plan to inspect A-Base smart meter installations and conduct daily temperature scans is an appropriate response.

ComEd must also investigate every instance where it identifies a smart meter that has overheated, whether or not it has caused a fire. ComEd must (1) determine what caused the meter to overheat; (2) consider whether the cause of the overheating might

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<sup>1</sup> Staff did not conclude ComEd is generally responsible for customer-owned equipment or for problems associated with meter tampering or accidents.

affect other smart meters; and (3) take measures to prevent a recurrence of the cause of overheating in future smart meter installations. According to ComEd's reports to Staff, the utility is taking all these actions.

ComEd is regularly reporting (1) results of remote scans of smart meters to look for hot meters and the results of subsequent field investigations of those hot meters; (2) results of ComEd investigations of reports from police and fire departments of meters that may have been involved in structure fires; and (3) hot, damaged meters that ComEd finds during the course of normal business operations. These three sources have identified a total of eleven hot meters and one structure fire related to a meter. The fire started after a truck backed into an electric meter on May 15, 2013.

Ameren's experience and ComEd's experience with mass meter deployments have been quite different as to meter overheating and fires.<sup>2</sup> Staff reported in its first Staff Report (Attachment #1) that Ameren installed 650,000 AMR meters in Illinois (5 times more meters than in ComEd's AMI pilot program) in recent years with zero hot meters as of September 13, 2012.<sup>3</sup> Ameren inspected each customer's meter base during the meter installation and repaired problems found in the meter base.

Florida Power and Light has recently completed installation of over 4 million smart meters. That utility employed methods much like Ameren to find and repair meter base issues during meter deployment. More recently, ComEd told Staff that it has decided that its future smart meter deployment practice will be to inspect each customer meter base and make necessary repairs before installing the new smart meter. Using ComEd paid licensed electricians, ComEd will make minor repairs to customer owned equipment and will notify the customer if more extensive repairs of customer owned equipment is required. ComEd used this new practice during its July smart meter deployment exercise discussed on the next page of this report.

Several decades ago, the Commission approved changes to meter tests, moving from 100 percent evaluation to a sample testing of meters. With the pending elimination of meter readers who actually see the meters and the continued use of sample testing, the risk of missing overheated meters may increase. However, both Ameren and ComEd have told us that they will implement new electric meter inspection programs to help replace the previous routine visits to meter installations for testing and reading purposes.

This report explains the information Staff examined since last November and how Staff reached its conclusions.

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<sup>2</sup> An AMR meter and an AMI meter are made from the same materials and have the same spade connections to the meter base. If an AMR meter or an AMI meter gets hot, the resulting damage to the meter should be the same under identical circumstances. There is no reason for Ameren's and ComEd's experiences to have been different because of the type of meters used.

<sup>3</sup> Staff report to the Commission on the subject of "ComEd's smart meter fires," dated November 29, 2012.

## Analysis

**Additional Meetings with ComEd:** Through February 2013, Staff continued its bi-weekly meetings with ComEd to learn the latest information available on hot meters discovered in the field, revised meter installer training, and meter lab-testing results. Due to the lack of new developments, Staff changed the schedule to monthly meetings and met with ComEd on March 7, April 8, May 28, June 27, and July 23.

**ComEd's Plans to Resume Smart Meter Deployment and ComEd's Melrose Park Smart Meter Deployment Exercise:** ComEd announced on June 6, 2013, that it would resume installation of smart meters in September 2013. Since then, Staff has learned the following.

- ComEd intends to resume deployment on September 3.
- ComEd received test results from two independent laboratories that do not indicate any fire hazards associated with the smart meters that ComEd has installed or intends to install.
- ComEd believes it will have Underwriters Laboratories certification for newly designed terminal blocks and A-Base meter adaptors by the end of August 2013. These new items should reduce fire hazards in old A-Base meter installations.
- ComEd has completed development of its new training program for smart meter installers and has supplied the new training materials to Staff. Staff is currently reviewing the materials, and ComEd expects to begin training with the new program in August 2013.
- By the time ComEd resumes smart meter installations, electricians will be on-call to make repairs to broken connector blocks, corroded connectors, melted conductors, etc.

On July 5, ComEd informed Staff that it planned to install 250 smart meters in Leyden Township near Melrose Park, primarily to demonstrate the effectiveness of new information technology and business processes related to smart meter installation procedures. ComEd began installing smart meters Monday, July 15 and completed the exercise that same week. ComEd's plan is to incorporate lessons learned during that exercise into the wide-scale deployment of smart meters scheduled to begin on September 3. ComEd informed Staff of the changes that it has made to its smart meter installation methods for this exercise and they are listed on Attachment #6 to this report. The changes are listed below.

- Testing the smart meters for safety.
- Meter installer training.
- Inspection of meter bases for corrosion and damage.
- On site inspection of removed meters for signs of overheating and connector damage.
- Electricians on standby to make meter base repairs.
- Installation work quality verification by supervisors.
- Voltage measurements during meter installation.

- A second independent inspection at ComEd's operations center of every removed meter for signs of possible issues in the meter base.
- Scanning each sensor-equipped smart meter every day for hot operating temperatures.

Staff engineer Yassir Rashid witnessed some ComEd smart meter installations during the exercise. Mr. Rashid watched three of the four ComEd meter technicians involved in the exercise install a number of smart meters on July 15 and 17. He witnessed a software malfunction in hand-held data recorders and discovery of some A-Base meters that ComEd's meter records did not identify. ComEd did not replace A-Base meters in the exercise.<sup>4</sup> He witnessed discovery of some instances of possible customer meter tampering and reported that ComEd's meter installers called qualified ComEd meter technicians to investigate those meters. He also witnessed one ComEd meter installer call a standby electrician to make repairs inside a meter base. Mr. Rashid verified that ComEd was incorporating the changes listed on Attachment #6 into its installation procedures except for those changes that were not observable from the field.

On July 23, Staff met with ComEd to discuss the smart meter installation exercise and lessons learned.

- ComEd identified several desirable software modifications for handling meter installation and removal data that it will make before beginning to install smart meters in September.
- ComEd's handheld data entry devices from the 2009 pilot program may need replacement before ComEd begins installing smart meters in September.
- ComEd experienced a 92 percent success rate in automatically processing the meter data from the old meter readouts and the new meter installations. With some modifications to software and a complete switch to General Electric meters, ComEd expects to increase its success rate by a few percentage points.
- The standby electrician was able to make repairs to some meter bases and prevent extended service outages for those customers while maintaining safety.

**Daily Smart Meter Temperature Scans:** The majority of ComEd's AMI meters are equipped with temperature sensors and can report their internal temperature on command. Although the temperature sensor was not designed for that function, ComEd has been working with its vendor to utilize the sensor for proactive temperature monitoring. ComEd began scanning all its smart meters for daily temperature readings well before Staff learned of the hot meter problem. These scans consist of ComEd sending a signal to each smart meter every morning asking each meter to report its current operating temperature. On September 26, 2012, ComEd began reporting to Staff the results of daily smart meter temperature scans and results from field inspections of meters that scans showed to be hot. However, a problem with the scans soon made itself known. The ability of ComEd's smart meters to accurately measure

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<sup>4</sup> ComEd's plan did not include replacement of A-Base meters. ComEd is awaiting UL approval of newly designed A-Base adaptors and connection blocks and will delay replacement of A-Base meters until receiving that approval.

and report their internal temperature is not clear. Apparently, radio frequencies can enter the meter and cause the temperature sensor to report significantly inaccurate measurements.<sup>5</sup> The result has been many false positives indicating hot meters where none actually existed.

ComEd reported to Staff on April 8, 2013, that radio frequencies could enter the smart meter and cause the temperature sensor to report significantly inaccurate measurements. Having noticed the apparent trend in the table below for the number of meters reporting hot internal temperatures to increase as outdoor ambient temperature rises (hot in summer and cold in winter)<sup>6</sup>, Staff asked ComEd to inquire from General Electric, its meter supplier, about the relationship between ambient temperature and false hot temperature reports. General Electric's response, reported by ComEd on July 18, 2013, with additional details on July 30, 2013, indicated that it had not studied the relationship and did not know why it exists.

GE has verified that the meters that ComEd will use in future deployments are not susceptible to RF interference. That should mean that meters that ComEd installs in the future would not provide false positive overheating readings when scanned.

Below are the monthly results of ComEd's smart meter temperature scans since ComEd began reporting them to Staff.<sup>7</sup> ComEd reports that none of these reported hot meters caused any fires.

#### DAILY SMART METER TEMPERATURE SCANS

| Month         | Hot Meters per Scan | Actual Hot Meters Found | Cause of Hot Meter                                |
|---------------|---------------------|-------------------------|---|
| October 2012  | 36                  | 0                       |   |
| November 2012 | 17 <sup>8</sup>     | 1                       | Defective connection jaw in customer's meter base |
| December 2012 | 19                  | 0                       |   |
| January 2013  | 10                  | 0                       |   |
| February 2013 | 12                  | 1                       | Customer tampering                                |
| March 2013    | 12                  | 1                       | Defective connection jaw in customer's meter base |
| April 2013    | 24                  | 0                       |   |
| May 2013      | 35                  | 0                       |   |
| June 2013     | 46                  | 0 <sup>9</sup>          |   |
| <b>Total</b>  | <b>211</b>          | <b>3</b>                |   |

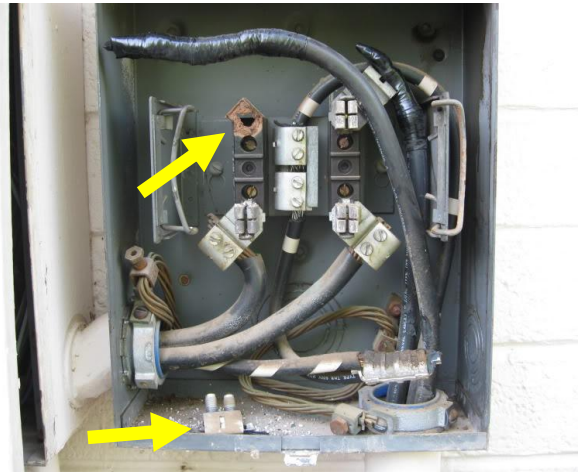
<sup>5</sup> As reported to Roy Buxton by Craig Creamean of ComEd on April 8, 2013.

<sup>6</sup> ComEd's scans flagged 55 meters for investigation in the first 22 days of July.

<sup>7</sup> The daily report e-mails from ComEd are available. Staff also has monthly tables that show the results that ComEd reported each day of each month.

<sup>8</sup> ComEd indicated on August 6, 2013 that this number has changed to 20 due to new data.

<sup>9</sup> ComEd indicated on August 6, 2013 that this number is one due to new data and that the cause was a defective jaw in the customer's meter base.



**Generic Internet Photo of Meter Base With Damaged Top Left Connection Jaw That Is Now Broken Loose and Laying On the Bottom of the Meter Base**



**Generic Internet Photo of Meter Base With All Connectors in Like New Condition**

**Police and Fire Tickets:** On November 14, 2012, ComEd began reporting potential involvement of all ComEd meters (both AMI and non-AMI) in fires as indicated by trouble tickets called in to ComEd by police and fire departments. Below is a table that summarizes what ComEd has reported.<sup>10</sup>

**POLICE AND FIRE TICKETS**

| <b>Month</b>  | <b>Meters Involved in Fire</b> | <b>Actual Fire Caused by Meter</b> | <b>Cause of Fire</b>   |
|---------------|--------------------------------|------------------------------------|--|
| November 2012 | 0                              | 0                                  |  |
| December 2012 | 4                              | 0                                  |  |
| January 2013  | 15                             | 0                                  |  |
| February 2013 | 17                             | 0                                  |  |
| March 2013    | 8                              | 0                                  |  |
| April 2013    | 14                             | 2                                  | Both incidents involved meter tampering.   |
| May 2013      | 12                             | 2                                  | One probable meter socket fire due to bad connections and one due to truck backing into meter. |
| June 2013     | 21                             | 0                                  |  |
| <b>Total</b>  | <b>91</b>                      | <b>4</b>                           |  |

<sup>10</sup> The same detailed information available for smart meter scans as mentioned in footnote 4 is also available for police and fire ticket reports.

**Hot Meters Found Through ComEd’s Normal Business Processes:** ComEd also reported hot meters to Staff that it found through normal business processes involving meter removals and installations.

**HOT METERS FOUND THROUGH NORMAL BUSINESS PROCESSES**

| <b>Month</b>  | <b>Hot Meters</b> | <b>Cause of Hot Meter</b>   |
|---------------|-------------------|---|
| October 2012  | 0                 | .   |
| November 2012 | 1                 | Meter removed and found to have limited heat damage on back. The socket showed issues of fatigued jaws and corroded connections.  |
| December 2012 | 0                 |   |
| January 2013  | 1                 | Non-AMI meter removed and found to have limited heat damage on back. No other information available. <sup>11</sup>  |
| February 2013 | 0                 |   |
| March 2013    | 2                 | 1) The hot meter was the result of a vehicle accident and resulting electrical fault; 2) Found one A-base adapter contained limited damage to the base but no damage to the meter. No other information available. <sup>12</sup>  |
| April 2013    | 1                 | During revenue protection work (investigating possible meter tampering), a technician found a heat-damaged meter melting at its base near the bayonets, and with its bayonets discolored from heat. ComEd also found hacksaw blades in the socket being used as jumpers to short out the meter terminals.   |
| May 2013      | 1                 | ComEd’s field investigation revealed heating on three of the bayonets that resulted in deformation on the base of the meter. Upon arrival, ComEd’s meter technician found the meter sitting on the floor. The customer’s electrician had replaced the socket and both the line and load side conductors. ComEd said that the customer’s electrician stated that he thought the meter and service were overloaded by the customer’s equipment. |
| June 2013     | 1                 | The investigation revealed a fault condition in the customer’s fuse box that caused significant damage to the fuse box and meter fitting.   |
| <b>Total</b>  | <b>7</b>          |   |

**Inspection and Repair of Meter Bases During Smart Meter Installation:** Staff reported in its November 2012 report that Ameren inspected each customer’s meter base before installing 650,000 AMR meters and, when it found damage, either made repairs to meter bases or called its own on-call electricians to make the repairs to meter

<sup>11</sup> On August 6, 2013, ComEd indicated that the meter box was found open and sparking when the fire department arrived. A ComEd trouble man found illegal jumpers installed and cut service at the pole.

<sup>12</sup> On August 6, 2013, ComEd indicated that the SLP Adapter was replaced with a 4900 series adapter. The minor damage to the adapter was indicative of the known issue with the SLP adapter.



bases before installing its AMR meters. ComEd has not claimed to have conducted this type of inspection or to have made repairs to meter bases.

Florida Power and Light (FPL) has completed installation of about 4.3 million smart meters over five years ending in 2013 and that the utility employed methods much like Ameren Illinois to address and repair meter base issues found during meter deployment. FPL hired licensed electricians to repair damaged meter bases and added the repair costs to the meter deployment program cost. Staff has provided some information on FPL's smart meter deployment in Attachments #2 and #3.

ComEd has recently decided to change its smart meter installation procedures. In Attachment #5, ComEd states that it will use trained, skilled technicians to install smart meters in the future. ComEd states that it will perform inspections of the inside of meter bases during smart meter installation and call ComEd-paid on-call electricians to make minor repairs as necessary before installing the meters. If major repairs are necessary and if there is an immediate safety risk, ComEd will not install the meter, will terminate service to the customer, and will notify the customer to hire an electrician to make those major repairs before ComEd installs the smart meter and restores service. The Commission in Docket 13-0475 just approved ComEd's request to file a tariff to clarify the repair process. ComEd recently stated that it would have its on-call electricians on board before it begins installing smart meters this September.

**No More Inspections by Meter Readers:** Smart meters provide information to utilities via radio signals. When and where Illinois utilities have completed their smart meter installation programs, they will have no further need for meter readers. With the loss of meter readers, monthly utility visits to meters and meter bases will also end. Meter readers have always provided at least a visual, if superficial, monthly inspection of the exterior of meters and meter bases. Meter readers are not meter experts or meter technicians, but they may identify unsafe conditions visible from the outside of the meter base, such as obvious signs of an accident and any overheating serious enough to cause discoloring of the outside of the equipment. These casual inspections by meter readers were the last remaining inspection opportunities after adoption of sample testing of meters, as explained below, and, for reasons identified below, Staff is concerned about their passing into history. The Ameren and ComEd meter inspection programs discussed in the next section of this report will not replace monthly meter reader visits to every meter.

NEMA, the association of electrical equipment and medical imaging manufacturers (a recognized long-standing authority for almost 90 years), is also concerned about the end of monthly meter inspections by meter readers. In a press release titled, "NEMA Encourages Action to Expand Meter Socket Lifespan and Inspections," on March 1, 2012, NEMA stated that, "the safe operating life of the meter socket may be reduced by many factors including (but not limited to) excessive moisture, environmental contaminants, frequent changing of meters, excessive electrical load (overload or short circuit), vandalism, ground settling, storm damage, and other conditions." NEMA went

on to say that it “strongly recommends that all existing meter sockets be thoroughly inspected when new electrical meters are installed.”

**Sample Testing of Meters:** About forty years ago, the Commission began approving utility requests for exemptions from the Commission’s rules to allow sample testing of electric meters for accuracy. Up until the year 2000, the Commission’s electric meter testing rule required accuracy testing of every meter on a set schedule (for example, eight years for residential meters), but that rule was changed in 2000 to explicitly permit sample testing. Staff supported all the utility requests for sample accuracy-testing exemptions that the Commission approved over the last several decades and supported the Commission’s latest rules that allow sample testing without the need for exemptions. [See Section 410.180 of the Commission’s Standards of Service for Electric Utilities and Alternative Retail Electric Suppliers [83 Ill. Adm. Code 410]. However, recent events involving old and aging meter bases has made clear that sample testing of meters may have been a policy change that has had unforeseen and unintended negative consequences.

With 100% accuracy testing of every meter in service, a utility meter technician would visit every electric meter in a utility’s service area at least once every eight years to remove the meter for testing, inspect the inside of the meter base, install a different meter, and return the removed meter to the meter shop for testing, adjustment as necessary, and redeployment or retirement. With sample testing, an electric utility may never inspect a typical meter and its associated meter base, except for meter readers’ casual inspections from the outside of the locked meter base cover. The number of meters in annual meter samples for testing is quite small compared to the total number of meters on a utility’s system.

As mentioned above, customers and their electricians have never routinely inspected electric meter bases because they have no access to the inside of the meter base. The wire seals that utilities place on meter base latches prevent unauthorized entry into the meter base and prevent building owners and their electricians from inspecting the inside of a meter base. Therefore, the result is that neither a utility nor a customer that owns a meter base is likely to inspect the inside of the meter base during its service life.

A switch from full testing to sample testing of meters removed any significant likelihood that anyone will inspect or even see the equipment inside a meter base during the entire service life of the meter.

Old electric meter bases can get very hot and may catch fire when electrical connections inside the meter base exhibit high resistance due to age, damage, corrosion, customer tampering, or other factors. Overheated meter bases can cause fires. Staff believes that the absence of inspections by fully trained and qualified meter technicians increases the possibility of meter base fires.

Staff is not suggesting that the Commission should reconsider its decision to allow sample testing of electric meters for accuracy. Rather, utilities must continue to perform

periodic inspections of meter installations. Several decades ago, the Commission adopted the National Electrical Safety Code (“NESC”).<sup>13</sup> Rule 214.A.2 of the NESC states that, “[l]ines and equipment shall be inspected at such intervals as experience has shown to be necessary.” On April 16, 2013, Staff asked Ameren and ComEd to explain how they intend to comply with this rule. Both Ameren and ComEd responded with information about inspection plans for meters and meter bases. Ameren’s inspection interval is ten years and ComEd’s inspection interval is four years. Ameren’s response is Attachment #4, and ComEd’s response is Attachment #5. When ComEd inspected the inside of 233 meter bases during its July 2013 smart meter deployment exercise, it found three meter bases that required repairs by its standby electrician. These 233 meters are a very small sample to represent all the 4,000,000 meters on the ComEd system and the 233 meters were not randomly selected, but the implications are hard to ignore despite the unscientific sample. Three meter bases requiring repairs out of 233 meter bases inspected is 1.29 percent of the meters. 1.29 percent of 4,000,000 meter bases on the ComEd system is 51,600 meter bases potentially requiring repairs. That calculation does not include allowance for additional minor repairs or adjustments that ComEd meter technicians made themselves during the deployment exercise instead of calling in the electrician.

ComEd’s daily reports to the Commission since October 2012 also indicate a significant number of meter bases with internal connection issues. The Daily Smart Meter Temperature Scans table shown earlier in this report indicates that ComEd found three meter bases: one in November 2012, one in March 2013, and one in June 2013, that had defective connection jaws causing a meter to overheat. The Police and Fire Tickets table shows three meter bases with bad connections that caused fires in April and May 2013. Those three do not count the meter base damaged by a truck accident. The Hot Meters Found Through Normal Business Processes table shows seven meter bases exhibiting damage from bad connections in the meter base, with some of the meter bases showing signs of tampering. The total count since October 2012 is 13 meter bases with bad connections inside, and those are just the ones that have gotten hot enough to make themselves known.

ComEd has indicated to Staff that it will provide customers access to their meters upon request of a customer or a customer’s electrician or contractor and that it would help make arrangements with a customer that wished to inspect the inside of the meter base. However, it is not at all clear that ComEd’s customers understand that there may be a need for customers to look inside their meter bases or that such an opportunity is available to them.

## **Conclusions**

Staff has not changed any of the conclusions it reported in its November 2012 Staff report.

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<sup>13</sup> Rules for the “Construction of Electric Power and Communications Lines” [83 Ill. Adm. Code 305].

- In addition to the three fires mentioned in the earlier staff report, the Police and Fire Tickets table shown in this report lists one meter base with bad internal connections that caused a fire in May 2013.
- ComEd's smart meters did not contribute to meter fires in ComEd's service area. Instead, customer meter bases with aged, corroded, and perhaps damaged electrical connections caused the fires, in part because ComEd smart meter installers did not recognize and repair or report customer meter bases in poor condition.
- Smart Meter deployment is an opportunity to inspect, identify, and repair these conditions. Doing so represents an area of improvement for ComEd.
- ComEd is taking steps to limit as much as possible the damage done by hot meters.
- Ameren's program of inspecting and repairing meter bases as it installed its AMR meters a few years ago was the key reason that Ameren customers did not experience any meter-related fires after the 650,000 AMR meters were installed.
- ComEd has stated an intention to inspect and repair meter bases as it installs smart meters beginning this September. If ComEd conducts adequate inspections and makes all necessary repairs, then fires associated with smart meter installation should no longer threaten ComEd customers. However, proper training of ComEd's smart meter installers will be critical to its success. Staff is currently reviewing the ComEd training program.
- The Melrose Park smart meter deployment exercise enabled ComEd to learn how its new information technology systems and business systems worked. Staff's direct observation of the exercise indicated that ComEd's meter installers performed well and were supported by supervision in the field, meter installation procedures included appropriate inspections, and the standby electrician provided support for the meter installers as intended.

A lack of meter inspections due to adoption of sample testing of meter accuracy and the future absence of meter readers because of ubiquitous AMI installation reduce the number of opportunities for utility employees to observe signs of and evaluate the potential for future meter base overheating. Both Ameren and ComEd have stated that they currently or will employ cyclic meter inspection programs to meet inspection requirements of NESC Rule 214.A.2. The proposed Ameren and ComEd meter inspection programs will go beyond superficial observation of meter base exteriors by meter readers and will be performed by technicians specifically trained in meter inspections with specialized equipment for that purpose. The inspection programs may partially replace the monthly visits by meter readers and the 8-year-cycle residential meter accuracy testing previously required by Commission rule. The inspection programs will not, however, provide the same frequency of routine, if superficial, meter reader observations or the thorough inspections previously possible during accuracy testing of all meters. The issue bears attention going forward per Recommendation (6) below.

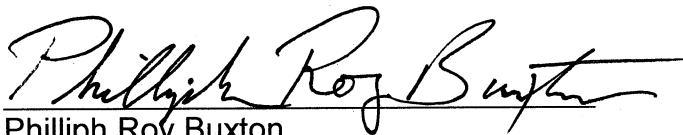
## Recommendations

ComEd is planning a new smart meter deployment that will once again have many meter installers in the field installing millions more smart meters. These smart meter installers will disturb connections in old meter bases. It is imperative that smart meter installers have adequate training to identify hazardous equipment conditions inside a meter base that could lead to overheating of meters and fires and the ability to ensure that any hazardous equipment conditions they identify are repaired and eliminated.

Staff recommends that the Commission request that ComEd and Ameren make presentations at a Commission meeting to explain and describe:

1. The meter fires and overheated smart meters related to ComEd's pilot program and all the contributing factors to the fires and the overheating;
2. The ways in which Ameren's experience during its AMR meter deployment (no meter fires) differs from ComEd's experience during its smart meter pilot program;
3. What actions ComEd has taken to date to prevent future meter-related fires associated with its planned future smart meter deployments;
4. The extent to which both Ameren and ComEd accept responsibility for making sure that any future AMI meter installations contribute to the continued safe delivery of electric service;
5. The future meter base inspection interval, both inside and outside the meter base, dictated by ComEd's and Ameren's experience with meters and meter bases; and
6. The specific actions ComEd and Ameren will take going forward, in an environment of sample accuracy testing of meters and the absence of periodic meter reader visits, to assure the Commission and their customers that customer meter installations remain safe.

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- Attachment #1, Staff Report To The Commission, November 29, 2012, ComEd Smart Meter Fires.
- Attachment #2, Wall Street Journal, April 24, 2013, FPL Marks Completion of DOE-Supported Electric Grid Enhancements and 4.5 Million Smart Meter Installations in Florida.
- Attachment #3, Order, Florida Public Service Commission, Docket No. 110033-EI, Order No. PSC-11-0194-DS-EI, April 13, 2011.
- Attachment #4, Ameren Illinois Response to Staff Question, May 1, 2013.
- Attachment #5, ComEd Response to Staff Question, May 23, 2013.
- Attachment #6, ComEd List of Smart Meter Installation Procedure Enhancements, supplied to Staff in July 12, 2013.