BEFORE THE
MARYLAND PUBLIC
SERVICE COMMISSION

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IN THE MATTER OF POTOMAC ELECTRIC POWER COMPANY AND DELMARVA POWER & LIGHT COMPANY REQUEST FOR THE DEPLOYMENT OF ADVANCED METERING INFRASTRUCTURE	))))))	Case No. 9207
IN THE MATTER OF BALTIMORE GAS AND ELECTRIC COMPANY FOR AUTHORIZATION TO DEPLOY A SMART GRID INITIATIVE AND TO ESTABLISH A SURCHARGE MECHANISM FOR THE RECOVERY OF COST	)))))))	Case No. 9208
IN THE MATTER OF THE REQUEST OF SOUTHERN MARYLAND ELECTRIC COOPERATIVE, INC. FOR AUTHORIZA- TION TO PROCEED WITH IMPLEMENTA- TIONOF AN ADVANCED METERING INFRASTRUCTURE SYSTEM	))))))	Case No. 9294

Comments of Maryland Smart Meter Awareness Before the Maryland Public Service Commission in Response to the Commission's Notice of August 29, 2012

Introduction

Maryland Smart Meter Awareness (MSMA) appreciates the opportunity to comment on the smart meter overheating and fire issue now before the Commission. Despite Pepco's, BGE's and SMECO's assurances that their smart meters do not pose a fire risk, MSMA's position is that all smart meters pose an overheating and fire risk. Consequently, we are requesting that the Public Service Commission place a moratorium on all smart meter installations until: 1) they have been certified safe by an independent established testing organization that meets ANSI standards, and 2) the Maryland Fire Marshall's Office reviews the

utilities' installation practices particularly in regard to the impact of the installations on the current meter boxes in use.

Technical Analysis

Smart meters are fundamentally different from analog meters both in design and the materials used in their construction. Because of these differences, there is a tremendous potential for overheating and eventual fires. This problem is compounded by the way smart meters rely on radiofrequency (RF) radiation to communicate with each other and to the utility and by the techniques employed by many installers of smart meters. Amazingly, with the over 900 fires linked to wireless smart meters, none of these designs have been certified by UL or any equivalent organization for safety.

Current Analog Meter Based Approach

Our current analog meters are designed to last for twenty-five to thirty years. While they have an outstanding safety record, certain industry practices related to inspecting and maintaining the meter box or meter can have degraded the overall safety of even the current metering system. About 90% of homes have electric service to the meter and meter can using aluminum wires. The wire from the meter box to the circuit breaker or fuse box is also aluminum. As these wires expand and contract, the lugs in the meter box become lose, creating the potential for arcing and overheating. While this is a problem for analog meters, it is a particularly dangerous condition when a smart meter is installed as will be detailed below. In addition, other unrelated factors can degrade the sockets in the meter box. An article by the National Electrical Manufacturers Association describes some of the problems:

> Meter sockets are expected to operate safely for many years. However, 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.[1]

In addition, analog meters are unaffected by unintentional utility feed wire surges, and therefore do not require surge protection. If a surge happens, there can be damage inside the home, but this very rarely results in a fire as the meter components are all metal and they are surrounded by glass.

[1] http://www.nema.org/news/Pages/NEMA-Encourages-Action-to-Expand-Meter-Socket-Lifespan-and-Inspections.aspx

Wireless Smart Meter Approach

There are three fundamental differences between analog meters and wireless smart meters that greatly increase the risk of fires. The first fundamental difference is the way they are designed. Smart meters employ metal-oxide varistors (MOVs) for overvoltage surge protection, but this is often ineffective. Thus the first design problem is the lack of adequate surge protection in smart meters. All electronics require surge protection. (As mentioned above, analog meters being electro-mechanical in nature are not damaged by surges). When an electric charge is traveling down the power utility feed lines, the smart meters are the first to be hit by such a charge.

The Pepco/BGE/SMECO smart meters have surge protection incorporated in the circuit board electronics, advertised to be up to 7,000 Volts. The problem arises from the lack of the heavy heat sinking capacity of the MOVs. This is needed in order to avoid failure due to overheating when they are energized. The physical construction of the smart meters does not allow for the heat generated by the energized MOVs to escape into the environment as there are no metal parts to act as a heat sink. Under the right surge conditions (e.g., surges from thunderstorms often exceed 7,000 volts) the MOVs will fail. The Fire Marshall's report from Toronto in regard the local Canadian utility's smart meters noted overheating and fires associated with MOVs.[2]

One of the failure modes in MOVs is short circuit. This will likely result in MOV ignition inside the smart meter which will result in a fire and the total destruction of the smart meter. This MOV design defect is further exacerbated by the use of a resin based enclosure instead of glass. This insulates the system, but it also traps the excess heat generated by the MOV. Once hot enough, the smart meter will actually support combustion. This fire can easily spread to the circuit breaker/fuse box in the home and further spread to the home contents as well. While BGE and Pepco have remote monitoring capacity to detect smart meter overheating, it will not prevent a catastrophic fire if the overheating is rapid. In fact, in extreme situations, the overheating will disable the remote sensing system.

In one case that only came to our attention yesterday, the meter burned up despite the sensing device. Although no fire occurred, the safety system failed miserably. Mr. and Mrs. Marcum of Hollywood Road in Silver Spring had a Pepco smart meter installed over a year ago. The lights started blinking off and on occasionally. Then in August of this year, the power went out suddenly even though no breakers had been tripped. The power eventually came back on by itself, but with a very low voltage. Mr. Marcum asked his electrician to look into the problem. The electrician checked everything inside the home and found nothing wrong. The electrician then decided to check the meter. Both he and Mr. Marcum could actually hear the meter sizzling as if something was being fried inside it. The electrician was not permitted to break Pepco's seal and open the meter, so he advised Mr. Marcum to call Pepco. Mr. Marcum called Pepco about four times, and finally a Pepco employee came out about a week later.

[2] "Utility 'Smart Meters'", Office of the Fire Marshal Fire Investigation Service, June 15, 2012.

What this clearly demonstrates is that the remote sensing system the utilities are relying on is hardly foolproof. One can only imagine what would have happened if there had been a real fire. It also shows how nonresponsive Pepco was to a life threatening emergency. The Pepco employee who finally arrived informed the Marcums that the meter had burned up inside. During the week Pepco delayed responding, there could have been a catastrophic fire at that home.

The second fundamental difference between the two meter approaches is that the smart meter approach relies upon RF radiation to communicate information to other smart meters, the utility and eventually to the ratepayer's appliances. It now appears that the RF radiation degrades the contacts, causing corrosion resulting in resistance, overheating and ultimately a fire.[3] So in addition to increased risk of fire from the inability of the MOVs to dissipate heat, we have a threat from the corrosion of the meter box from the RF radiation.

The final fundamental major difference between the two approaches is the way the meters are being installed. The analog meters are installed by highly competent electricians who carefully inspect the meter box before installing the meter. In sharp contrast, the smart meter deployment puts a very high premium on each installer swapping out large numbers of meters on a daily basis. In many cases, the meter boxes need to be repaired or replaced before smart meter installation, but it appears that the installers are not carefully examining each box before the swap takes place. In a perfect world, the ratepayers would periodically have their meter boxes checked for corrosion, loose lugs and other problems, but the most ratepayers are not even remotely aware of these issues. Thus the safety of the ratepayer depends upon a contractor with a large quota of meters to install.

The meter box problems are further compounded by the installers 'hot switching' the electric meters. The installers swap out the meter while it is under load. This would clearly be a violation of the safety code if this were done by the ratepayer's electrician, but the utilities are doing this anyway. One of the consequences of this 'method' of swapping meters is that the contacts in the meter box become pitted further degrading the meter box. This results in increased resistance and ultimately overheating.

One totally separate design problem caused by the RF radiation is interference with the functioning of ground fault circuit interrupter (GFCI) and arc-fault circuit interrupter (AFCI) type sockets. These sockets are usually installed in close proximity to water (e.g., kitchen, laundry room, deck, bathroom). They are designed to trip long before the circuit breaker trips. The circuit breaker is designed to protect the appliances and wiring in the home. GFCI and AFCI sockets are designed to protect people from shocks. The RF radiation appears to be interfering with their function and undermines the personal safety protection these sockets are intended to provide, and it appears that this failure to trip may have led to some fires.

[3] Electromagnetic Radiation Effects on Corrosion, Joe H. Payer, Nathan Ida, Xi Shan, Karin Bodnar, Department of Electrical and Computer Engineering, The University of Akron

Summary

The three issues presented in the Technical Analysis section all independently present a fire hazard. The MOVs cannot adequately dissipate heat, the RF radiation degrades the meter box, and the questionable installation practices further raise the fire threat level. While there have been no reports of actual home fires in the service areas covered by Pepco, BGE and SMECO, it is only a question of time before the problems listed above start causing catastrophic fires. It is certainly encouraging that the utilities do have some overheating monitoring capacity, but that monitoring is hardly foolproof. There is no alarm on the meter to warn the ratepayers if the meter begins overheating. We have to instead rely on the utility getting the signal and acting on it quickly enough to prevent a fire. The ratepayers are not even being warned what trouble signs to look for. This is a prescription for tragedy.

One creative solution that is worth exploring is putting the meters somewhere other than on the walls of the ratepayer's dwelling. The utilities admit that because of the limitations of wireless transmission, there will be times when they will have to 'create' usage data based upon reasonable assumptions. In addition, because of the impact of time of use issues, reading the meter attached to one's home to determine/confirm billing will probably be a meaningless exercise. Therefore there may no longer be any need to put the meter on the side of the home or apartment. Instead, the utilities should consider placing the meters on the utility pole or the underground feed transformer boxes. This would keep any fires away from the home should they occur. It would also somewhat mitigate the strength of the RF radiation coming into the home with all its health implications.

Conclusion

While some smart meters pose a greater fire risk than others, it is clear that all of them present a significant fire risk. The PECO type meters touched off fires almost immediately upon installation. They represent some of the worst meters produced by the industry. But all wireless smart meters place the ratepayer at risk of a fire. It is just that many of these fires will not occur until the MOVs overheat or the meter box contacts become sufficiently corroded to cause overheating .

MSMA, despite its opposition to smart meters, has tried to come up with realistic compromise solutions in dealing with smart meters from opt outs to fiber optic options. But after sifting through the issues a number of times, we must conclude at this point in time that there is no such thing as a safe smart meter. We therefore urge this Commission to order the following:

1) Order an immediate moratorium on all smart meter installations until they can be proven safe by an established testing service meeting ANSI standards and the utilities' installation practices are reviewed by the Maryland State Fire Marshall's Office; and

2) Order Pepco, BGE and SMECO to formally notify each of their ratepayers who have received a smart meter of the fire risk, describe what symptom to look for, direct

concerned ratepayers to a hotline within their respective utilities and offer each of these customers an opt out from the smart meter program.

As we stated in our comments of August 16, 2012, on the opt out proposal, using a fiber optic approach instead of a wireless approach would eliminate the health problems caused by the radiofrequency radiation. In regard to fires, it would also limit the damage to the meter box contacts and reduce, but not eliminate the fire risk. While a moratorium is needed now, as a longer term solution, MSMA again urges the PSC to give serious consideration to the fiber optic alternative.

Respectfully submitted,

MARYLAND SMART METER AWARENESS

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