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PROJECT NO. 40190

PROJECT RELATING TO ADVANCED METERING ISSUES	§ § §	**BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS**

RESPONSES OF AEP TEXAS CENTRAL COMPANY AND AEP TEXAS NORTH COMPANY TO QUESTIONS SUBMITTED FOR THE AUGUST 21, 2012 PUBLIC FORUM

AEP Texas Central Company (TCC) and AEP Texas North Company (TNC) (collectively, AEP Texas) provides the following responses to the questions submitted by the public and filed by the Public Utility Commission of Texas (Commission) Staff in this project on August 15, 2012, and the additional "Questions for the Transmission and Distribution Utilities" filed by Timothy M. Honeycutt filed in this project on August 15, 2012.

RESPONSES TO QUESTIONS SUBMITTED BY THE PUBLIC

Section One – From State Representative David Simpson

1. What portion of which statute, PUCT rule, settlement agreement, tariff or other document are the TDUs relying on to tell customers that the deployment of smart meters are mandatory without exception?

RESPONSE: In 2005, the Legislature passed HB 2129, urging the adoption of digital meter technology throughout Texas as a means to increase reliability, promote energy conservation, and enable customer choice:

> In recognition that ... new metering and meter information technologies have the potential to increase the reliability of the regional electrical network, encourage dynamic pricing and demand response, make better use of transmission and generation assets, and provide more choices for

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consumers, the legislature encourages the adoption of these technologies by electrical utilities in this state.[1]

Two years later, HB 3693 expressed "the intent of the legislature that net metering and advanced meter data networks be deployed as rapidly as possible to better manage energy use and control costs, and to facilitate demand response initiatives."[2]

Although it did not make digital meters mandatory, the Legislature concluded after an in-depth study that rapid deployment of digital meter systems is the most effective method of achieving the twin goals of "energy efficiency and conservation in Texas."[3] During deliberations on HB 2129 and HB 3693, the Legislature heard testimony from dozens of witnesses regarding the costs and benefits of digital meters, the potential environmental impacts, and the overall efficacy of digital meters for advancing the health and safety of Texans by reducing air emissions.[4] In passing HB 2129 and HB 3693, the Legislature considered the same policy questions now being presented to the Commission in this project, and determined that deploying digital meters was in the best interest of all customers and the environment. These bills and their accompanying committee reports reflect an appropriate balancing of the relevant policy considerations.[5]

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1 Act of May 23, 2005, 79th Leg., R.S., ch. 1095, § 1, 2005 Tex. Gen. Laws 3615, 3618.

2 PURA § 39.107(j).

3 Senate Research Center, Bill Analysis, Tex. H.B. 3693, 80th Leg., R.S. (2007).

4 *See* Witness Lists for HB 2129, available at http://www.legis.state.tx.us/BillLookup/Text.aspx?LegSess=79R&Bill=HB2129, and HB 3693, available at http://www.legis.state.tx.us/billlookup/text.aspx?LegSess=80R&Bill=HB3693#.

5 *See, e.g.*, S.J. of Tex., 79th Leg., R.S. 140-41(May 25, 2005) (adopting rules protecting proprietary customer information recorded by advanced metering systems); Texas House Research Organization, Bill Analysis, Tex. H.B. 2129, 79th Leg., R.S. (2005) (discussing necessity of implementing advanced metering to maximize emissions reductions in response to threat of losing federal highway funds); Texas Senate Research Center, Bill Analysis, Tex. H.B. 2129, 79th Leg., R.S. (2005) (noting intent of bill was "to develop residential and commercial energy efficiency programs that could clean the air and save consumers money"); Senate Research Center, Bill Analysis, Tex. H.B. 3693, 80th Leg., R.S. (2007) (discussing goal of bill to provide "near-term reductions in consumption and demand that should protect the [electricity] reserve margin and avoid crises during the peak"); Regulated Indus. Comm., Bill Analysis, Tex. H.B. 3693, 80th Leg., R.S. (2007) (noting that the bill requires the PUC to adopt rules that "encourage the value of the incentives to be passed on to the end-use consumer").

Those now wanting to opt out of digital meters had the opportunity to present their objections during the individual proceedings through which the Commission approved the deployment plans of AEP Texas, CenterPoint Houston, Oncor, and Texas-New Mexico Power Company. Those proceedings were noticed to the public, drew numerous public and private intervenors, were thoroughly litigated, and resulted in heavily compromised settlements by the parties. Each of those proceedings resulted in final orders which, collectively, required the full deployment of digital meters throughout the service territories of those utilities.[6] Despite ample notice, those few now wanting to opt out chose not to participate in this extensive regulatory process. Instead, they now seek to improperly collaterally attack the Commission's orders—including the compromises embodied therein—long after the deadline for appeal has passed. Re-opening these issues now, at the behest of parties who could have participated before but did not, would upend the finality of the Commission's orders.

Because the parties' support of AEP Texas' digital meter deployment settlement was "expressly contingent upon the Commission's issuing an order that is in all respects consistent with this Stipulation and the attached Proposed Order," an agreement of all parties would be needed to amend that settlement at this late date. Those parties include Commission Staff, the Office of Public Utility Counsel, the Steering Committee of Cities Served by TCC and TNC, the Alliance for Retail Markets, CPL Energy L.P., and WTU Retail Energy L.P., REPower L.L.C., Texas Energy Association for Marketers, Reliant Energy Retail Services LLC, and TXU Energy Retail Company LLC.

2. In the interest of customer service, if a TDU does consider deployment of smart meters mandatory under their settlement agreement, does the TDU have the ability and

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[6] *See, e.g.,* Docket No. 36928, *AEP Texas Central Company's and AEP Texas* North *Company's Request for Approval of Advanced Metering System (AMS) Deployment Plan and Request for Surcharge,* Final Order at 1.

authority to request an opt-out provision for customers who request it under PUCT rule 25.130(d) (10)?

RESPONSE: As described in AEP Texas' response to Question 1 in Section One – From State Representative David Simpson, the parties' support of AEP Texas' digital meter deployment settlement was "expressly contingent upon the Commission's issuing an order that is in all respects consistent with this Stipulation and the attached Proposed Order," an agreement of all parties to that proceeding would be needed to amend that settlement at this late date. Those parties include Commission Staff, the Office of Public Utility Counsel, the Steering Committee of Cities Served by TCC and TNC, the Alliance for Retail Markets, CPL Energy L.P., and WTU Retail Energy L.P., REPower L.L.C., Texas Energy Association for Marketers, Reliant Energy Retail Services LLC, and TXU Energy Retail Company LLC.

3. What provisions or accommodations are being implemented for the small percentage of the population with verifiable medical sensitivity to RFID technology?

RESPONSE: AEP Texas is not aware of individuals who claim medical sensitivity to extremely small radio frequency (RF) fields like those used in advanced meters. Hypersensitivity cases have involved claimed reactions from power frequency electromagnetic fields (EMFs). The fields associated with RF advanced meters are extremely weak and have not been associated to our knowledge with hypersensitivity.

4. What studies or reports are the TDUs relying on to ensure the safety of the cumulative effect of multiple meters in an area transmitting multiple times a day?

RESPONSE: AEP Texas uses the Federal Communications Commission's (FCC) guidelines from the Office of Engineering & Technology (OET) Bulletin 65 for a cumulative effect of multiple meters transmitting multiple times each day. Since signal power from all devices is

linearly additive, the linear sum of all of the signal powers from all devices at a point in space is considered.

A study titled *Radio-Frequency Exposure Levels from Smart Meters: A Case Study of One Model* was prepared by the Electric Power Research Institute (February 2011) (EPRI Report). The study underlying the EPRI Report was conducted on a "meter farm" that contained 7,000 meters attached to structures across a 20-acre area, with each structure consisting of a rack of 10 meters. Measurements were taken from a rack of continually operating meters over a four-day period. EPRI Report at p. 4.[7] The EPRI Report concluded that, for *continuous* operation at one foot from the rack, the exposure was about 8% of the FCC limit, with exposure diminishing roughly as the inverse of the distance from the rack. The FCC regulations govern the impact of RF emissions on infrastructure and the public in general.

The extensive scientific literature reflects that there is no credible evidence of negative health impacts from the low level of RF emissions from digital meters.[8] These same conclusions have been reached recently by the California Council of Science and Technology and the Maine Center for Disease Control and Prevention, both of which issued reports concluding that there is no consistent or convincing scientific evidence to support health claims regarding digital meter emissions or electromagnetic sensitivity.[9]

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7 The EPRI Report notes that "while the meters were specially programmed to operate continuously for the measurement study, when actually deployed they transmit intermittently for very brief periods." EPRI Report at P. 4.

8 *See, e.g.,* World Health Organization, *Electromagnetic Fields and Public Health: Base Stations and Wireless Technologies* (2006), available at http://www.who.int/mediacentre/ factsheets/fs304/en/index.html; and World Health Organization, *Electromagnetic Fields and Public Health: Electromagnetic Hypersensitivity* (2005), available at http://www.who.int/ mediacentre/factsheets/fs296/en/. *See also* International Commission on Non-Ionizing Radiation Protection, *Exposure to High Frequency Electromagnetic Fields, Biological Effects and Health Consequences (100 khz-300 GHz)* (2009), available at http://www.icnirp.org/documents/ RFReview.pdf.

9 *See* California Council of Science and Technology, *Health Impacts of Radio Frequency from Smart Meters* (2011), available at http://www.ccst.us/publications/2011/ 2011smartA.pdf; and Maine Center for Disease Control & Prevention, *Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters* (November 2010), available at https://www.burlingtonelectric.com/ELBO/assets/smartgrid/Maine%20on%20Smart%20Meters.pdf.

5. On average, how many times a day do the currently deployed smart meters transmit any signal?

RESPONSE: The average advanced meter transmits for a total of approximately 96 seconds in a 24-hour day, which is equivalent to only 0.11% of the total day. The average advanced meter transmits 1741 times per day with an average transmission duration of 55 milliseconds per transmission. These transmissions include all synchronization, maintenance, meter reads, meter/system alarms, interactions with back-office systems and expected routings.

Section Two – Questions submitted by meterforum@puc.texas.gov

1. If the TDUs/PUC considers these meters to be safe, effective, and more efficient, why didn't they allow a full review and vote by consumers instead of sneaking over our fences, forcing them on unsuspecting citizens, with threats, intimidation, and bullying?

RESPONSE: AEP Texas' consumers had ample opportunity to participate and provide input in the process that ultimately resulted in the deployment of advanced meters. First, after the Texas Legislature passed a law to encourage the deployment of advanced meters, the Commission conducted a full, comprehensive rulemaking governing the implementation of the Legislature's directive regarding advanced meters (Project No. 31418, *Rulemaking Related to Advanced Metering*). That rulemaking was open to participation by the public, and notice of that rulemaking was posted in the Texas Register and was available on the Commission's website.

Second, with respect to AEP Texas' deployment of advanced meters, public notice of Docket No. 36928, in which AEP Texas' proposed advanced meter deployment plan was filed, was posted in newspapers in every county that AEP Texas serves for four consecutive weeks in 2009. Several individuals did file comments in Docket No. 36928 in response to the public notices provided, and those comments were considered by the Commission. Docket No. 36928

was settled, and that settlement was supported by a broad cross-section of parties, including the Commission Staff, the Office of Public Utility Counsel, the Steering Committee of Cities Served by TCC and TNC, the Alliance for Retail Markets, CPL Energy L.P., and WTU Retail Energy L.P., REPower, L.L.C., Texas Energy Association for Marketers, Reliant Energy Retail Services LLC, and TXU Energy Retail Company LLC.

2. How liable is Oncor for yanking out meters without first considering medical devices and/or A/C units that may be running.causing major electronic damage to appliances, and medical emergencies for Sr's?

RESPONSE: While AEP Texas cannot speak for Oncor, we can speak to AEP Texas' process. The process for changing out meters today is not much different than it has always been, even before advanced meters. AEP Texas personnel and our contractors make every effort to carry out these activities in a safe and efficient manner. At the time of a meter change, attempts are made to notify the consumer that the electric service will be interrupted momentarily, which is typically less than five minutes. AEP Texas employees and contractors inform the consumers that sensitive electronic equipment should be unplugged to avoid potential damage. In general, AEP TCC and TNC's potential liability as it relates to the delivery of service to retail customers is governed by Section 5.2 of the Commission-approved Tariffs for Retail Delivery Service, which are available on the Commission's website.

3. Is Oncor bonded for charges that may occur when they blatantly cut off power to homes, causing heat related strokes, auto-immune attacks, loss of food, damages to starter devices in power systems, or fatalities?

RESPONSE: Please see the response to the previous question.

4. What RIGHT do they have to dictate what is in our best interests, using OUR money, creating havoc and illnesses in our lives when we are current on our account and have excellent credit?

RESPONSE: The Commission has previously observed that the policy decision as to the benefits of digital meters was made by the Legislature, noting that "the language in HB 2129 assumes the benefits of advanced metering" and that the legislation makes no provision for further study of the expected benefits.[10] Moreover, the Commission specifically found that there is ample evidence that consumers will substantially benefit from "additional consumption information and specific products, including prepayment and time of use which will allow customers to better manage their energy use."[11] The Commission concluded that digital meter "deployment will be beneficial for both competitive and non-competitive areas in Texas."[12]

In considering the settlements between various intervenors and AEP Texas, CenterPoint Houston, Oncor, and Texas-New Mexico Power Company resulting in the full deployment of digital metering throughout the service territories of those utilities, the Commission specifically found that full deployment of digital meters "will (a) increase the reliability of the regional electrical network; (b) encourage dynamic pricing and demand response; (c) improve the deployment and operation of generation, transmission, and distribution assets; and (d) provide more choices for electric customers."[13]

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[10] *See* Project No. 31418, *Rulemaking Related to Advanced Metering*, Order Adopting New § 25.130 and Amendments to §§ 25.121, 25.123, and 25.346 as Approved at the May 10, 2007 Open Meeting at 27, 33-34.

[11] *Id.* at 28.

[12] *Id.* at 33-34.

[13] Docket No. 36928, *AEP Texas Central Company's and AEP Texas* North *Company's Request for Approval of Advanced Metering System (AMS) Deployment Plan and Request for Surcharge,* Final Order at 5.

These benefits are significant. The installation of smart meters and their associated systems is a building block to achieving a new energy future for Texas.[14] One of the key benefits envisioned from smart meters is that by giving customers better information about their consumption and retail rates, customer demand will be reduced as customers become more efficient in their use of energy and shift consumption to lower-cost hours, thus reducing the need for investment in new peak capacity.[15] Already, retail electric providers (REPs) are beginning to offer service plans with rates that vary by time of day to reflect price variations in the wholesale electricity market.[16] These plans help customers realize substantial savings, while conserving energy and reducing the strain on Texas' electricity grid.[17]

Likewise, digital meter technology allows meters to be read remotely, virtually eliminating the need to go house-to-house to read meters, which means fewer trucks on the road and lower operating costs. Remote connection and disconnection of electrical service also shortens the time it takes to process service orders for most homes and businesses, thereby reducing these transactions' costs. And digital meters will automatically notify utilities about power outages, which facilitates in identifying the extent of an outage and the efficient restoration of service, often without the need to dispatch a service crew.[18] The result will be quicker restoration of service in the case of equipment failures that result in loss of service for dozens of customers following a thunderstorm or thousands of customers following a hurricane or tropical storm.[19] With respect to alleged health concerns relating to digital meters, please

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[14] Public Utility Commission of Texas, *Report to the 82nd Texas Legislature* 4-5 (September 2010), available at http://www.puc.state.tx.us/industry/electric/reports/AMS/Commission_Report_on_Advanced_Metering_2010.pdf.

[15] *Id.* at 5.

[16] *Id.* at 4.

[17] *Id.* at 4-5.

[18] *Id.* at 4.

[19] *Id.*

refer to Questions 11 – 19 in AEP Texas' response to Timothy M. Honeycutt located towards the end of this document.

5. In October 2010, Beijing, China, the annual meeting for power utilities, governments and industry leaders met. The front and center headline for this event was "Zigbee, Control Your World - Smart Metering - It's Not Just For Meter Reading Anymore".

   Please explain why I should want a device to do more than just meter reading on my house.

RESPONSE: The meeting referenced in the question appears to be the World Smart Grid China Focus 2010. AEP Texas did not attend this conference and consequently cannot speak to the subject matter presented. However, AEP Texas can speak to the use of Zigbee in our advanced meter deployment.

The meters used at AEP Texas have a Zigbee radio in the device that can communicate to devices in the home should the consumer choose to install such devices and create what is commonly referred to as a Home Area Network or HAN. AEP Texas does not provide HAN devices such as In Home Displays and Programmable Communicating Thermostats; however, some REPs are beginning to offer these devices as a part of their retail programs. The benefit to consumers is the ability to track the near real time energy usage of their home and adjust their usage habits should they choose. The consumer may also have the opportunity to participate in various pricing products offered by the REPs should they decide to do so. The Zigbee radio in the meter is not active unless requested by the consumers when they want to provision a HAN device to the meter.

6. Is it true that a future goal is to have appliances replaced with those containing RF so that the smart meter can speak to my appliances and turn them off in peak hours?

RESPONSE: It is not a future goal of AEP Texas to replace consumer appliances with "smart" appliances. The Competitive Energy Services rules in Texas prohibit utilities like AEP Texas from providing devices and appliances beyond the meter. Appliance manufacturers are developing appliances that can communicate wirelessly with devices like advanced meters. Whether or not those devices exist in a consumer's home is at the sole discretion of the consumer.

7. Sometime in 2009 or 2010 President Obama told us on national TV that our "energy bills would necessarily skyrocket" when he was speaking about his Cap and Trade bill. How can that be when we are told that smart meters will save us money on our electricity bills?

RESPONSE: Regardless of the price of electricity at any given time, advanced meters can provide consumers current information on their electric consumption, thereby allowing the consumer to take measures to conserve on their usage and lower their electric bills. In Texas, consumers can register their meter at the secure SmartMeterTexas.com website to view their energy consumption data.

8. I am confused about the ongoing concern for energy scarcity when the Feds are closing power plants and refusing permits for new ones. Seems like the Feds are the ones creating the scarcity. Who is responsible for these decisions to close power plants and then restrict what's left?

RESPONSE: AEP Texas does not operate power plants and is not responsible for the decisions related to the closure of power plants.

9. Most citizens don't understand the full extent of the technology and capabilities of the smart meter. Why haven't these capabilities been fully disclosed?

RESPONSE: Consumer Education is essential in order for electric consumers to receive the full benefits from advanced meters. AEP Texas has developed many communication tools in an effort to reach consumers and inform them about our Advanced Metering System (AMS).

Since AEP Texas has a service area of approximately 97,000-square-miles in north and south Texas, it developed a mobile technology education display that travels throughout its service area prior to and during advanced meter deployment. The display is essentially a triple-wide trailer that has interactive displays that not only explain AMS but also inform consumers how to conserve on their electric bills and shop for a REP. The company's strategy is to move the trailer to large community events and trade shows that are well attended by the targeted audience.

AEP Texas has a three-tiered approached in its public outreach strategy. In addition to customer outreach, it also makes a concerted effort to make sure community leaders and elected officials are in the communication loop about AMS and when the advanced meters will be deployed in their area so they will be knowledgeable about AMS if approached by their constituents. Finally, AEP Texas ensures its employees are kept up to date about AMS since the general public also looks to them for information about AMS.

Prior to installation within a community, AEP Texas notifies consumers through door hangers that list the benefits and reasons for installing advanced meters. Once the meters are installed, another door hanger is left at the residence to reaffirm previous messages and encourage consumers to register their meters at SmartMeterTexas.com.

Additional communication tools include:

- A television and radio advertising campaign (in English and Spanish)
- Billboards.
- Speakers Bureau presentations
- Presentations to senior centers and community service organizations
- Competitive Retailer Workshops to ensure REPs are up to date about AMS deployment.
- Bill inserts
- Pamphlets for field personnel to distribute
- Website (aeptexas.com/gridSMART)
- Social media
- Press releases and editorial opinions
- FAQs
- Brochures

AEP Texas has held a news media event and had its experts on hand to answer questions to help consumers better understand how the advanced meters work. The company has made a commitment to hold future media events anywhere in our service territory where there is a need for further consumer outreach.

10. Do smart meters have anything whatsoever to do with the United Nations' Agenda 21 and Sustainable Development recommendation? Is there any correlation or connection at all?

RESPONSE: AEP Texas' response to both questions is "No."

11. With all of the backlash from the public about smart meters, why in the world is the PUC still pushing so hard for their installations? Why are the companies like Oncor

pounding us into submission? This tactic seems awfully heavy-handed for Americans. After all, we don't live in Russia or China or North Korea....

RESPONSE: AEP Texas offers no response to this question as it appears to be directed to the PUC and Oncor.

12. What must I do to get the smart meter off of my house? The tactics Oncor used to get it there were downright unethical - a complete transgression of all that is right and decent in this country - a total disregard for civility and courtesy. After having indicating to me that I did not have to have a smart meter installed without my consent, Oncor did it anyway.

RESPONSE: AEP Texas offers no response to this question as it appears to be directed to Oncor.

13. Regarding the easement (is it the Tariff for Retail Delivery?) that Oncor references: Surely some limitations exist on just how much Oncor can do to my property. Will someone explain what this easement allows and disallows? The document is 178 pages long and I am struggling to decipher it.

RESPONSE: The Tariff for Retail Delivery Service is separated into different chapters that describe the rules that a utility must operate under. In regard to easements, Chapter 5.4.5 Provisions For Company Facilities and Equipment and the Meter, states that the retail customer must grant any rights-of-way or easements on property necessary for the utility to install its electric delivery equipment. Additionally, Chapter 5.4.8 Access To Retail Customer Premises, states that the utility's representatives have the right of access to the customer's premises at all reasonable hours to inspect, erect, install, maintain, upgrade, convert, remove, or replace wiring apparatus and other facilities; read the meter; and perform other activities necessary to provide

electric delivery service. These provisions mean that the utility has the authorization to enter the retail customer's property and access the utility's electric delivery equipment, including the meter.

14. In locating Wireless Tower Antennas and Smart Meter Routers, how big of an area do they cover?

RESPONSE: Coverage from the collector radios and routers varies depending on terrain and other physical factors; however, the design criterion varies on density with typical coverage for routers being five square miles and typical coverage for collectors is from 30 – 50 square miles.

15. The frequencies from routers, antennas and other wireless infrastructure are going through building materials, fire separations and hitting anything in their path. Can the utility provide the attenuation coefficients for the building materials including electrical/mechanical systems as well as documentation from engineers showing attenuation (elimination) of the frequencies inside buildings?

RESPONSE: Attenuation of radio signals is dependent on the frequency and the medium upon which it is traversing. Metal, brick wood and other building materials generally provide an attenuation of anywhere from 3 to 27 dB or ½ the original power to 1/512 of the original power. A combination of materials would provide the total attenuation of the signal, which is best measured in the field due to the variance of the materials and signal levels.

The advanced meters and related equipment deployed by AEP Texas are compliant with FCC regulations for communications within the unlicensed RF bands. The FCC regulations govern the impact of RF emissions on infrastructure and the public in general.

16. Can the utility please show documentation that the Smart Meters were tested for accuracy under full load EMF of the routers, antennas and other wireless infrastructure?

RESPONSE: Accuracy testing of the advanced meters being deployed by AEP Texas is performed under conditions, via a custom software program, that result in the radio module generating continuous communications transmissions. Consequently, the American National Standards Institute (ANSI) qualification test data for meter accuracy is obtained under what is considered to be continuous or "maximum case" RF conditions. The radio transmitter antenna under the meter cover is in very close proximity (a few inches) to the measurement circuitry. Consequently, the highest levels of RF presented to the measurement circuitry are generated by this internal antenna during testing. RF signal levels generated by an "external" wireless infrastructure such as from a wireless router would normally be only a small fraction of the RF signal magnitude generated by the internal radio because the internal radio would be the closest RF source to the metrology circuitry.

In addition to ANSI accuracy testing, at manufacturing, Landis+Gyr, the maker of the advanced meters that AEP Texas is deploying, audits 4% of all meters produced and tests for accuracy while meters are RF enabled and transmitting (looking for a network). This sample test data is made available to Landis+Gyr's customers as part of their normal sample test policy and procedure.

In addition, the advanced meters used by AEP Texas were evaluated by Navigant Consulting, with the results of that investigation appearing in the *Evaluation of Advanced Metering System (AMS) Deployment in Texas*, filed in Project No. 38053 on July 30, 2010.

17. Is the utility aware the dangers of frequencies is now lectured in medical academia for Continuing Education (CE) credits doctors, nurses, etc. require for licensing and applicable in all 50 states?

RESPONSE: AEP Texas is not aware that medical curriculums include advanced meter RF frequencies. These are non-ionizing frequencies. These frequencies are low power and do not have the strength to disrupt cellular DNA. AEP Texas is aware that these curriculums do include health implications of overexposure to ionizing radiation like X-rays, Gamma, rays and UV.

18. How many billions of times per second can structures and fire separations be vibrated before the building is not compliant with building code.

RESPONSE: AEP Texas does not have the requested information available. However, the advanced meters and related equipment deployed by AEP Texas comply with FCC regulations for communications within the unlicensed RF bands. The FCC has the responsibility to determine the appropriate functioning of RF devices to ensure public health and safety, and its regulations were adopted to govern the impact of RF emissions on infrastructure and the public in general. The RF signals emitted from the advanced meters deployed by AEP Texas are well below those of other common devices, including cellular telephones, baby monitors, and microwaves.

19. The Public Utility's electrical grid runs at 60 Hz, what would be a worst case scenario if the 60 Hz changed? Would the utility allow their electrical grid to be induced by foreign frequencies? Why?

RESPONSE: The RF signals produced by the smart meters will have no impact on AEP Texas' electrical system or the ability to operate that system at 60 Hz. The RF signals emitted from the advanced meters deployed by AEP Texas are well below those of other common devices,

including cell phones, baby monitors, and microwaves, and any RF signal induction on the 60 Hz electrical grid is virtually undetectable. Other RF emissions, such as television signals and police radios, have existed for decades in harmony with AEP Texas' electrical grid and have had no impact on the operation of the grid.

20. List all the frequencies and electrical information of human biological systems, bees, birds, pollinators, ecosystems were employed in frequency interaction equations? Include the routers, antennas and meters.

RESPONSE: It is unclear to AEP Texas as to the meaning of the word "frequencies" as used in the context of the question; therefore, no answer can be provided without further clarification.

21. The frequencies from Smart Meter Routers, antennas and other wireless infrastructure are hitting buildings from top to bottom while communicating with the meters. Can the utility provide the attenuation coefficients of everything touched by the different frequencies including bees, birds, bats, bugs, butterflies, trees, humans, pets, angles, any other biological systems, and all material objects of any kind?

RESPONSE: AEP Texas does have that information.

22. Is it true that: While microwatts aren't capable of burning tissue, frequencies penetrating the body at any depth/angle have serious consequences: Electromagnetic induction of an unprotected human electrical grid, causing nerve and muscle stimulation, 180 degree polarization of molecules at 1.8 billion times per second for 900 MHz which is twice the frequency speed. Electromagnetic induction produces heat, will high speed polarization billions of times per second break DNA as well as produce heat?

RESPONSE: AEP Texas is not aware of any studies that prove that DNA is broken down by radio frequency transmissions at levels that are produced by AMS equipment. The frequencies used in AMS, 900 MHz and 2.4 GHz, are non-ionizing and they do not have enough energy to break molecular bonds as related to their frequency.

23. Pacemaker recipients and health monitoring equipment aren't designed to be in an electromagnetic field. Is the utility aware of the liability of taking the electromagnetic field to the patients?

RESPONSE: Implantable medical devices (IMDs) are designed to operate in fields of up to 1 gauss magnetic field, or 6kV/M electric field (including safety factor) without any disruption. The field emitted by the advanced meters, listed as different units of measure, is well below that level and there are no concerns of that field interrupting IMDs. RF fields are already emitted by cell phones and other communication devices at higher levels than those encountered by advanced meters.

AEP Texas' potential liability as it relates to the delivery of service to its retail customers is governed by Section 5.2 of the Commission-approved Tariffs for Retail Delivery Service of TCC and TNC, which are publicly available on the Commission's website.

Section Three – Questions filed in Project 40190 from Cindy Carriger

Oncor- Please answer the questions below, providing documentation if such does exist.

1. Regarding the Navigant Report:

Meters with Event Code 2118 were found to be inaccurate, and in most cases, reading HIGH. Below: excerpt Navigant Report code. As a result, customers who had one of the 439 Rev D advanced meters identified to date that have displayed the 2118 event code, which have

now been removed from service, could have received one or more electric bills from their REP that included electric usage in Kilowatt hours that was not accurate. And, in many cases, the recorded electric usage is likely higher than it should have been.

The report says the meters were removed from service. However, I see no documentation that those whose meters were exchanged, received any refund for the amount of any overages paid to Oncor. Please give the PUC and present on August 21 proof that such overages in charges were paid back to the affected consumer.

RESPONSE: AEP Texas offers no response to this question because it does not apply to AEP Texas.

2. Do the smart meters collect data such as 'Load Signatures', as do the ones in Colo. According to a report they put out called "Smart Metering and Privacy: Existing Law and Competing Policies. If you say they do NOT, how can we be sure that they don't. Is there any documentation? If not, I ask that an independent 'lab' be allowed to perform a test to determine if the load signatures are collected or not. (link to document: http://www.dora.state.co.us/puc/docketsdecisions/DocketFilings/091-593EG/091-593EGSprine2009Report-SmartGridPrivacy.pdf

RESPONSE: While AEP Texas cannot speak for Oncor or to the situation in Colorado referenced in the question, we can speak to the type of data we collect. "Load signature" is typically defined as the unique consumption pattern intrinsic to each individual electrical appliance or piece of equipment. AEP Texas collects aggregate energy usage data for the entire premise at 15-minute intervals, not individual appliance data. Collecting individual appliance energy usage information would require a much more elaborate metering scheme than the advanced meters used by AEP Texas are capable of providing.

3. If our data belongs to US the consumer here in Texas, why have the consumer's been denied an opportunity to make an informed decision before the Utility and PUC, ERCOT etc. assumed we consent just because we want to have electricity. Of course we understand that our usage TOTALS must be collected. However, the data collected goes way beyond this limit, so why was one was informed of the changes in how our electricity would be monitored and recorded, so they could make an 'informed decision'?

RESPONSE: Please see response in Section Two – Questions submitted by meterforum@puc.texas.gov, Question 1.

4. What are the procedure and timetable, per neighborhood and individual residence for notification of the installation of the smart meters? Experiences of consumers have been anything but consistent regarding procedures followed for installation. I also have not heard of one case where an installer knocked on the door, and presented their badge, which is what the Tariff states they must do to gain entry to the property. Why is this acceptable?

RESPONSE: While AEP Texas cannot speak for Oncor or to the experience of consumers in Oncor's service area, we can speak to AEP Texas' deployment plan. AEP Texas' website, aeptexas.com, has an advanced meter link where an installation schedule is included. The communities we serve are listed in alphabetical order and the year in which advanced meters will be installed is identified.

Shortly before deployment in a community, AEP Texas utilizes the various media outlets in that community to notify consumers of the upcoming deployment. Two to four weeks prior to advanced meter deployment in a specific neighborhood, AEP Texas employees go door-to-door leaving an educational flyer giving consumers more information about the advanced meters. On

the day of installation, the contractor installing the advanced meters for AEP Texas knock on the door of the consumer to advise that the meter exchange is taking place. Each contractor wears a badge that is clearly visible. Once the meter exchange has been completed, the contractor leaves another brochure with the consumer or on the door step if the consumer is not at home, which provides even more information about the new meter. AEP employees personally observe the contractors through periodic audits to ensure these procedures are followed.

5. What studies were done prior to deciding to deploy smart meters to determine that they were ready for installations on people's homes, regarding: Health, Safety, Cyber-Security, and Privacy?

RESPONSE: The advanced meters used by AEP Texas are compliant with FCC regulations for communications within the unlicensed RF bands. The FCC regulations govern the impact of RF emissions on infrastructure and the public in general. The RF signals emitted from the advanced meters deployed by AEP Texas are well below those of other common devices, including cellular telephones, baby monitors, and microwaves.

The advanced meter system deployed by AEP Texas includes a multi-layered security architecture compliant with industry standards such as NSA Suite B for cryptography. Landis+Gyr, the maker of AEP Texas' advanced meters, also engages leading security partners such as RSA and Safenet for critical elements of the architecture. Landis +Gyr's advanced meter systems are routinely subjected to penetration tests by third party vendors including IBM and Lockheed Martin to ensure ongoing improvement of the Landis+Gyr security architecture. Full audit logging at both network and operator levels enables traceability of any security incident.

AEP Texas continuously assesses the various components of our advanced meter implementation to ensure that we are providing the highest degree of security possible.

Additionally, AEP Texas conducts a thorough analysis if there is an update or change of technology to determine if any risks could potentially be introduced.

AEP Texas is very concerned about consumers' privacy and takes every step possible to ensure that confidential consumer information is not available to unauthorized persons. Consumer information is encrypted from the meter to the AEP Texas system utilizing industry standard encryption technologies. AEP Texas meets and exceeds regulatory requirements to ensure protection of consumer information.

As previously mentioned, the advanced meters used by AEP Texas were evaluated by Navigant Consulting, with the results of that investigation appearing in the *Evaluation of Advanced Metering System (AMS) Deployment in Texas*, filed in Project No. 38053 on July 30, 2010. The web portal associated with AEP Texas' advanced meter deployment plan has been subject to a security audit by an independent third party. In addition, AEP Texas' meters comply with ANSI Standard C12.19.

6. How can Oncor representatives (such as Richard Sorrell), sit in a family's living room of a child who has experienced seizures and other complications from the installation of smart meters in her neighborhood, as well as from being in close proximity to a smart meter in her Dr.'s office, who has a Dr.'s letter explaining the child's condition and susceptibility to emissions smart meter, and not be able to tell the mother that they would refrain from installing a smart meter on her home. To my knowledge, the Oncor representatives made promises to her 3 times that were all broken. What kind of uncaring human beings can actually do something like this to anyone? This seems like shameful behavior by any service company, but shows how much not having any competition emboldens a corporation to just do anything they please, as what recourse does a consumer have? They can't choose another TDU, they are stuck with you.

RESPONSE: AEP Texas offers no response to this question because it appears to be directed to Oncor.

RESPONSES TO QUESTIONS FROM TIMOTHY M. HONEYCUTT

1. What is the maximum theoretical power output of the WAN transmitter used in the smart meters? WAN stands for a wide area network.

RESPONSE: The use of the term "WAN" is inaccurate; however, it is assumed the question is regarding a radio transmitter that is located in the meter. The following data is provided regarding the radios in the advanced meters deployed by AEP Texas:

- Endpoints (electric)
- Typical Rf output power = +26.5 dBm or 450 mW (conducted)
- Maximum Rf output power =+27.4 dBm or 560 mW (conducted)

2. What is the licensed maximum power output of the WAN transmitter used in the smart meters?

RESPONSE: AEP Texas' advanced meters have the following licensing limit for the operating environment:

- Licensed maximum output power= +30 dBm or 1W (conducted)

3. Do the deployed smart meters include both a WAN transmitter and a HAN transmitter? HAN stands for home area network (where an oven or other appliance is linked via radiation to the smart meter). If yes, are the HAN transmitters on by default?

RESPONSE: The electric smart meters do include the WAN and HAN transmitter. The HAN transmitter is ON only when the endpoint is successfully joined to a HAN network. The consumer must initiate this joining.

4. What is the current duty cycle (i.e., how long is the smart meter emitting radiation every24 hours) range for the WAN transmitters of deployed smart meters? Is this figure expected to increase over time? If so, to what levels?

RESPONSE: The typical duty cycle for meters is approximately 0.11% today. While it is possible this could increase with new functionality added to the system, the duty cycle is expected to remain significantly below 0.5%. This new functionality would be enabled at the discretion of the consumer.

5. What is the frequency range for the WAN transmitters used in the smart meters?

RESPONSE: The operating frequency range for the radio transmitter in AEP Texas' advanced meters is 902.2MHz to 927.9MHz.

6. Is the WAN transmitter used on the smart meters omnidirectional (i.e., shoots in all directions) or directional (i.e., shoots principally in one direction). If directional, about how wide is the cone of radiation at 3 and 10 feet? If directional, is there a way for a consumer to tell which direction the meter WAN transmitter is pointing and thus try to stay out of the beam?

RESPONSE: The transmitter on the endpoints (electric) is directional due to the presence of a metal socket behind the meter. The peak radiation is primarily towards the front of the meter and the 3dB beam width is ~130 deg in azimuth and elevation plane.

7. Are the deployed smart meters arranged in mesh networks? If yes, what is the duty cycle range for those meters configured as collection nodes (i.e., a smart meter that acts a collector of radiation from many surrounding smart meters and a more frequent transmitter of radiation to a neighborhood receiver)? Are there any outward markings that identify a smart meter as a collection node smart meter and that would enable a consumer to know

that he has a collection node smart meter. Have those consumers who have been or are slated to be burdened with a collection node meter been informed by the electric providers (or anyone else) that their smart meter is operating as a collection node? If not, will they be?

RESPONSE: Yes, the smart meters are deployed as part of a mesh network. By design, a mesh network allows for efficient distribution of communications traffic along multiple paths and routing characteristics are dynamic. Thus, while no meters in the network are configured as "collection nodes," the routing among individual meters does vary to some degree depending on the characteristics of the surrounding mesh. As such, the specific duty cycle range for individual meters cannot be determined without analysis of the relevant mesh and there are no markings on the meters to determine any differences in routing of messages.

Nevertheless, all meters will perform in accordance with the information provided in the response to Honeycutt Question 4 above and all meters communicating in AEP Texas' AMS system operate within the allowable FCC regulations for unlicensed band communications regardless of the duty cycle.

8. Would it be possible for a hacker to gain access to a smart meter or mesh network?

RESPONSE: Landis+Gyr systems employ industry leading security architecture to severely limit this capability and provide audit logging to manage any risk. Likewise, AEP Texas uses the best security measures available to protect our network and devises.

AEP Texas takes cyber security very seriously, and in addition to providing good security today, AEP Texas has a practice and philosophy of continual improvement. AEP Texas employed IBM to provide an initial assessment of the security of the advanced metering system

and AEP has created a roadmap for continual improvement over time as better methods, tools, processes, and best practices evolve.

AEP Texas actively participates in the NIST security standards development and incorporates continual improvement as the industry improves. There are several measures in place to protect the security of AEP Texas' advanced meter network: (1) AEP Texas' overall advanced metering system design uses security designs and techniques that are comparable to systems used by global banking institutions to protect sensitive customer data and prevent intrusion; (2) AEP Texas' smart metering communication system uses fully encrypted (256-bit) security; and (3) a full-time security team continually monitors the system to ensure no smart meter data security issues arise.. These measures minimize the chances of a hacker gaining access to the smart meter network and are designed to limit the hacker's ability to affect the system if they do gain access.

9. If the answer to question 8 is yes, then would it be possible for the hacker to do any of the following:

   a. increase the duty cycle of the meter WAN transmitter to 100% (i.e., set it so that it emits microwave radiation constantly)?

RESPONSE: To the best of AEP Texas' knowledge, there has been no proven ability to do this.

   b. shut off the consumer's power?

RESPONSE: AEP Texas has taken steps to limit the potential for an unauthorized person to shut off a consumer's power.

c. cause the smart meter to overheat (by manipulating the meter's voltage regulator or by other means)?

RESPONSE To the best of AEP Texas' knowledge, there has been no proven ability to do this.

10. If the answer to questions 8 and 9 is no, then why not?

RESPONSE: Not applicable.

AEP Texas' responses to Questions 11 -19 are provided after the questions are listed.

11. Do clusters of smart meters, such as those present on apartment buildings and other group living environments all over Texas, emit greater levels of microwave radiation than single-family unit smart meters?

12. Do smart meters arranged in clusters, such as those present on apartment buildings and other group living environments all over Texas, ever emit microwaves that constructively interfere (like two ocean waves colliding and producing a much bigger wave), and by superposition produce radiation beams of greater intensity? Have any of the sources of information relied upon by the electric providers as allegedly establishing the safety of smart meters considered clustered meter radiation? If so then please identify.

13. Given the demographics of many apartment dwellers in urban areas of Texas, does the prevalence of clusters of smart meters on such apartments mean that minorities and other disadvantaged citizens in Texas are being subjected to greater levels of microwave radiation than non-minorities or more affluent citizens? Would the electric providers' deployment of and the Texas PUC's mandate for the smart meters in such circumstances constitute a violation of the Fair Housing Act of 1968? Would the

electric providers' deployment of and the Texas PUC's mandate for the smart meters in such circumstances constitute a violation of the 14th Amendment Equal Protection Clause?

14. In response to some consumer complaints about smart meters, the TX PUC has cited to a paper published by the Electric Power Research Institute entitled "A Perspective on Radio-Frequency Exposure Associated with Residential Automatic Meter Reading Technology." In that paper, the Electric Power Research Institute noted that lab studies on "lab animals" have found that microwave radiation exposure above a certain level resulted in "behavior disruption" in the lab animals. The paper does not identify the type of lab animals. Given that behavior in rats and monkeys is, as in humans, governed by the brain, does that suggest that microwave radiation can have other than merely thermal impacts on the human brain as well? Given the greater complexity of the human brain versus the brain of a rat or monkey, is it possible that the radiation effects could be more profound in the human brain than the monkey brain? How about the brain of a human child?

15. What is the relevance of the FCC standards for microwave radiation thermal effects (specific absorption rate, etc.) to the risks of chronic diseases, such as cancer, miscarriage, birth defects, semen quality, autoimmune diseases, etc. from chronic (24/7), localized microwave radiation (i.e., from smart meters)? Did the FCC study or have studied the effects of chronic, localized microwave radiation on the human body before issuing that standard in 1996?

16. Does the Government Accounting Office's recent formal request for the FCC to revisit its radiation safety levels impact the electric providers' reliance on the FCC standards?

17. Have any of the sources of information relied upon by the electric providers as allegedly establishing the safety of smart meters considered the non-thermal effects on the human body of chronic, localized microwave radiation from smart meters? If so then please identify.

18. It took decades for the scientific community to work out some of the mechanisms linking tobacco to cancer formation and Agent Orange to cancer formation. During those decades the relevant industries (tobacco, the Pentagon) argued tobacco and Agent Orange did not cause disease. Given the absence of scientific study on the non-thermal effects of microwave radiation, is it possible that, as in the cases of tobacco and Agent Orange, evidence of disease will take time to manifest itself?

19. The International Agency for Research on Cancer, a branch of the World Health Organization, last year deemed radio-frequency radiation, which is emitted by cell phones, smart meters and many other devices, a "possible carcinogen." Do the electric providers consider this finding wrong? If so, on what basis?

RESPONSE: A number of questions assume, with no evidence, that the RF emissions from advanced meters pose a health hazard to customers. RF emissions from all sources, including advanced meters, are regulated by the FCC. The FCC has developed comprehensive RF safety standards with input from independent organizations such as the Environmental Protection Agency, the World Health Organization, American National Standards Institute Committee, and the National Council on Radiation Protection and Measurements.

Advanced meter emissions are well below FCC standards and are minimal compared to the RF emissions of many commonly used household devices.[20] The extensive scientific literature reflects that there is no credible evidence of negative health impacts from the low level of RF emissions from advanced meters.[21] These same conclusions have been reached recently by the California Council of Science and Technology and the Maine Center for Disease Control and Prevention, both of which issued reports concluding that there is no consistent or convincing scientific evidence to support health claims like those alleged by a few individuals regarding advanced meter emissions or electromagnetic sensitivity.[22]

Advanced meters employ commonplace radio technology similar to that used in a variety of devices that are used in homes, businesses, and public facilities. Exposure to RF emissions from advanced meters is considerably less than the exposure from other commercial radio devices in widespread use, including:

- Televisions and remote controls
- Cellular telephones
- Bluetooth earpieces and USB devices
- Cordless telephones
- Laptop computers
- WiFi routers and base stations

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[20] *See* PUC of Texas, *Customer Facts Smart Meter Safety* (2012), available at http://www.puc.state.tx.us/consumer/facts/factsheets/elecfacts/smartmetersafety.pdf.

[21] *See, e.g.,* World Health Organization, *Electromagnetic Fields and Public Health: Base Stations and Wireless Technologies* (2006), available at http://www.who.int/mediacentre/ factsheets/fs304/en/index.html; and World Health Organization, *Electromagnetic Fields and Public Health: Electromagnetic Hypersensitivity* (2005), available at http://www.who.int/ mediacentre/factsheets/fs296/en/. *See also* International Commission on Non-Ionizing Radiation Protection, *Exposure to High Frequency Electromagnetic Fields, Biological Effects and Health Consequences (100 khz-300 GHz)* (2009), available at http://www.icnirp.org/documents/ RFReview.pdf.

[22] *See* California Council of Science and Technology, *Health Impacts of Radio Frequency from Smart Meters* (2011), available at http://www.ccst.us/publications/2011/ 2011smartA.pdf; and Maine Center for Disease Control & Prevention, *Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters* (November 2010), available at https://www.burlingtonelectric.com/ELBO/assets/smartgrid/Maine%20on%20Smart%20Meters.pdf.

- Wireless smoke detectors
- Microwave ovens
- Remote garage door openers
- Remote keyless automobile systems
- Motion detectors
- Hair dryers
- Wireless baby monitors

Studies have shown that these and many other similar devices emit RF transmissions for longer periods of time, broadcast more frequently, cause greater exposure, and operate in closer proximity to humans than advanced meters.[23]

Likewise, the studies have concluded that the placement of advanced meters on the outside of homes greatly minimizes exposure to RF emissions. RF exposure drops rapidly with distance.[24] For advanced meters, the RF fields at 10 feet or beyond measure less than 0.1 microwatts per square centimeter for the 900 MHz band. This level of exposure at 10 feet is approximately one six-thousandth of the safety limits set by the FCC. Under normal circumstances, advanced meters operate less than one minute per day, yielding RF emissions that are only 3% of the FCC exposure guidelines.[25] However, as the California Commission on Science and Technology observed, even if an advanced meter transmitted 24 hours a day, "the

[23] *See* California Council of Science and Technology Report at 20; and Ex. 9, Edison Electric Institute, *A Discussion of Smart Meters and RF Exposure Issues* 11 (2011), available at http://www.eei.org/ourissues/electricitydistribution/Documents/Smart_Meters_RF_exposure.pdf.

[24] *See* California Council on Science and Technology Report at 20.

[25] *See id.* at 22.

maximum exposure would be about 60% of the FCC limit, which provides a wide safety margin from known thermal effects of RF emissions."[26]

In short, there is simply no meaningful scientific evidence that advanced meters pose any significant threat to public health. There is also no evidence that the advanced meter technology being deployed in Texas fails to meet the FCC's rigorous safety standards or that those standards are inadequate. Accordingly, assertions concerning the purported health impact of advanced meters do not support initiation of an opt-out program.

20. At least the states of Vermont, California, Maine, Nevada and Oregon allow consumers to opt-out of smart meters. Were the governments of those states wrong to give consumers the choice to opt-out? If so, why?

RESPONSE: AEP Texas did not participate in those proceedings or evaluations relating to advanced meter opt-out programs and does not provide electric transmission or distribution service in those states. Moreover, the structure of Texas' electric market is distinct from the structure of electric markets in other states. Therefore, policies adopted in other states may not be appropriate for the Texas electric market.

21. Is it equitable to charge a consumer a monetary penalty to not have a product at her home that she never wanted in the first place?

[26] *See id.*

RESPONSE: It is equitable to require the customers who choose to participate in an opt-out program to bear the costs associated with implementing that program. To do otherwise would have the effect of inappropriately shifting the costs of the opt-out program to those customers who choose not to participate in the opt-out program.

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