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Assistant General Counsel

March 31, 2011

VIA OVERNIGHT MAIL

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MAR 31 2011
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

Re: Duquesne Light Company Petition for Approval of Smart Meter Procurement and Installation Plan
Docket No: M-2009-2123948

Dear Secretary Chiavetta:

Enclosed for filing and approval please find one (1) original and three (3) copies of the Establishment of Network Design for the Duquesne Light Smart Meter Program.

Duquesne is also including as Section XII of the attached filing an update on the Grace Period Smart Meter Budget and incurred Expenses as of February 2011, along with a confirmation of the previous projected cost range for the total Smart Meter project.

Sincerely yours,

Gary A. Jack
Assistant General Counsel

Enclosures

cc: Service List (via Electronic Mail and United States First Class Mail)

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MAR 31 2011

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DUQUESNE LIGHT COMPANY	:	
Smart Meter Procurement and	:	Docket No. M-2009-2123948
Installation Program	:	

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the Establishment of Network Design of Duquesne Light Company in the above-referenced proceeding has been served upon the following persons, in the manner indicated, in accordance with the requirements of § 1.54 (relating to service by a participant):

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Dated: March 31, 2011

Establishment of Network Designs PUC Filing - March 31, 2011

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I. Introduction

Pursuant to Act 129 of 2008, signed into law by Governor Rendell on November 14, 2008, and the Smart Meter Procurement and Installation Implementation Order (Docket No. M-2009-2092655) issued on June 24, 2009 by the Commission, Duquesne Light submitted a Smart Meter Procurement and Installation Plan ("SMPI Plan" or "Plan") on August 14, 2009. See *Duquesne Light Smart Meter Procurement and Installation Program, PUC Commission Docket No. M-2009-2123948, August 14, 2009.* This Plan was approved by the Commission on May 11, 2010, and Duquesne Light subsequently submitted an amended Smart Meter Plan on June 10, 2010, to comply with the issues addressed in PUC's approval order. See *Smart Meter Plan, Revision 1, Docket No. M-2009-2123948, June 10, 2010.*

Pursuant to the approved Plan, Duquesne is required to provide the Commission with periodic updates and make filings for approvals on its Smart Meter Procurement and Installation Program, including an Establishment of Network Designs ("Network Design") update, which is the purpose of this filing.

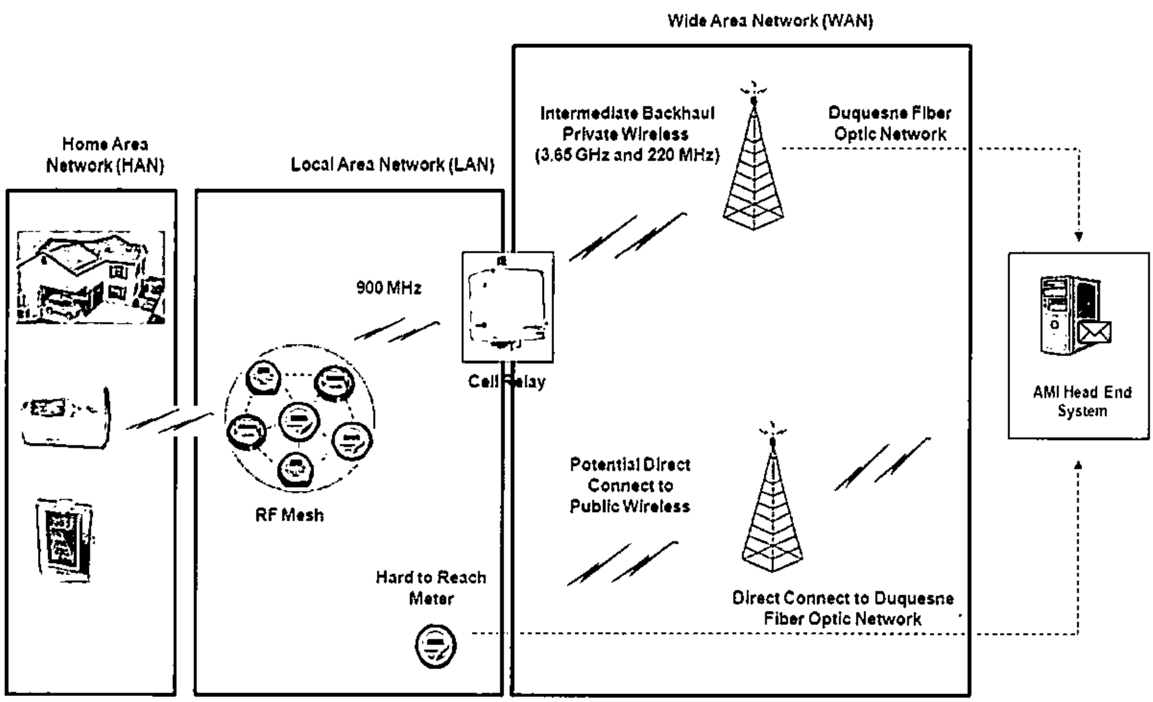
Duquesne worked with consultant, SAIC, to conduct a Network Design Study ("Study") to analyze two-way AMI data connectivity solutions available and optimally suited for Duquesne's Smart Meter deployment, further described in this filing as the Local Area Network ("LAN") and Intermediate Backhaul Solutions. Additionally, a number of radio technologies and vendors were reviewed as potential candidates for deployment. The specific technologies outlined in this filing, as well as others, will be further analyzed by Duquesne prior to final vendor selection and deployment. It should be noted that a detailed propagation analysis is required to solidify the Study conclusions and the design is subject to change should other viable and cost effective technologies become available prior to the Smart Meter deployment.

II. Background

As outlined in the Plan, Duquesne plans to deploy an Advanced Metering Infrastructure ("AMI") system, which will include approximately 612,000 residential and commercial Smart Meters, which will report data to a number of AMI data relays ("Cell Relays") located throughout Duquesne's service territory. The data communication path (meter to Cell Relay) is referred to herein as LAN. The Cell Relay also requires a means of communication to transport the AMI data to and from Duquesne's existing data centers (by employing either wireless or wire-line linkage to fiber –optic take out points that lead to the AMI head end system located at the utility office). This two-way communication path (from Cell Relay to fiber take-out points) is referred to herein as the Intermediate Backhaul Solution. Both the Intermediate Backhaul Solution and the last mile Fiber Optic Network make up the Wide Area Network ("WAN").

The figure below outlines the proposed communication network components.

Duquesne's Proposed Smart Meter Communication Network



III. Study Methodology

The first step of the Study was a review Duquesne's existing communication infrastructure available for use with the Smart Meter deployment, including Duquesne's existing leased- fiber network and any utility-owned frequency spectrum.

The second step of the Study was to review the selected AMI solution's network and communication infrastructure including the LAN, Home Area Network ("HAN") and Wide Area Network ("WAN") supported to ensure its interoperability between the LAN, WAN, and Intermediate Backhaul Solution.

The next step of the Study was to identify all available private wireless (licensed and unlicensed) and public wireless communication solutions (including frequency spectrum and technologies) available to backhaul the AMI data from the LAN (or from the Cell Relay) to the fiber take-out points (via the Intermediate Backhaul Solution) or directly from the LAN Cell Relay to the AMI Head-end System (bypassing the Intermediate Backhaul Solution, if required, in certain instances due to hard to reach meters).

Our analysis included a review of the following:

- Operating Frequencies Available in the Duquesne Service Territory
- Radio Technologies/Vendors
- Solution Cost (upfront and ongoing)
- Expected Capacity, Bandwidth, Latency and Reliability of the solution
- Security Provisions (public versus private wireless communication)
- Advantage/Disadvantages of the available solutions

Our review included analysis of both public and private (licensed and unlicensed) solutions. The table below outlines the available solutions analyzed. A further discussion of the two key solutions selected is outlined in this filing.

	Bandwidth Frequency	**Key Advantages**	**Key Disadvantages**
Private Wireless (Licensed)	150 -174 MHz		• Cost of spectrum • Availability of spectrum • Narrowband
	216-220 MHz	• Privilege of licensed operation post purchase of spectrum • Long Range • Good coverage characteristics (100%) • Not subject to the FCC's current narrowbanding mandate –free to select carrier size • Enhance Capacity by frequency re-use • No high recurring cost • Some technologies offer: Data Compression and FIPS certification	• Upfront cost of spectrum Narrowband • Some Technologies lack Security Compliance
	406-512 MHz		• Cost of spectrum

			• Availability of spectrum • Narrowband • Some Technologies lack Security Compliance
	700 MHz		• Cost of spectrum • Some Technologies not broadband • Niche Products
	800-900 MHz		• Cost of spectrum • Availability of spectrum • Narrowband • Some Technologies lack Security Compliance
	1.427 – 1.432 GHz		• Cost of spectrum • Narrow band (typically 50 kHz or less)
	2.496 -2.690 GHz		• Cost of spectrum • Availability of spectrum • Cost of equipment
	3.3 – 3.5 GHz		• Cost of spectrum • Availability of spectrum • Cost of equipment
	3.65 -3.7 GHz	• Simple licensing, low cost • Relatively lightly used band • High speed • Wideband /Good Coverage (~46%) • Some technologies offer: FIPS certification, Optional on-board 802.11b/g AP • Highly desirable for the interconnection of the remote access points or mobile users (such as mobile workforce systems) • Future standard of IEEE 802.16j (Multihop Relay)	• Non-exclusive spectrum access (sharing) • Contention-based access • Operation prohibited in exclusion zones • Some technologies have relatively limited /short range
Private Wireless (Unlicensed)	54-698 MHz		• Access on secondary basis to broadcast TV • Non-exclusive spectrum access (sharing) • Technologies still in development
	902-928 MHz		• Secondary to government systems in interference resolution • Non-exclusive spectrum access (sharing) • Some Technologies lack Security Compliance • Some Technologies have low data rates and are not broadband. • Possibility of interference with AMI LAN
	2.4 -2.483 GHz		• Non-exclusive spectrum access (sharing) • Only 3 non-overlapping channels • Contention-based access (possibility of jitter) • Heavily used band (interference)

			• Relatively limited range products
	5 GHz		• Non-exclusive spectrum access (sharing) • Contention-based access (possibility of jitter) • Typically, short range
Public Wireless	AT&T	• 100% coverage (2G and 3G) • Migrating to 3GPP (3rd Generation Partnership Project) LTE (Long Term Evolution) standards • High Speed Packet Access (HSPA) • Future ability to operate in *700 MHz* (excellent propagation properties) • DA device provisioning • High data rates • Adequate Security	• Not capable of QoS/CoS (currently). • Expensive to utilize /cost volatility
	Verizon	• Migrating to 3GPP (3rd Generation Partnership Project) LTE (Long Term Evolution) standards • Future ability to operate in 700 MHz (excellent propagation properties) • DA device provisioning • High data rates • Adequate Security	• Incompatible with High Speed Packet Access (HSPA) • Not capable of QoS/CoS (currently) • Expensive to utilize /cost volatility

Included in each of the frequency bands identified above, at least two technologies and vendors were analyzed to determine potential cost effective radio solutions to convey metering data that meet Duquesne's anticipated capabilities, functions and security requirements. Further technology and vendor information is discussed in Section IX "Radio Technologies/Vendors".

A preliminary radio frequency ("RF") study was conducted based on conceptual Cell Relay numbers and radio specifications for the above mentioned solutions, estimated AMI and network data throughput and Cell Relay location assumptions as well as the location of Duquesne's existing tower assets and leased fiber-optic locations. This provided an estimate of communication coverage for each Intermediate Backhaul Solution and the hardware required for the deployment. Further study parameters and results are outlined in this filing.

The preliminary selected Intermediate Backhaul solutions will be further analyzed in a subsequent detailed design and propagation analysis prior to the Smart Meter deployment. This is expected to be submitted to the PUC in Duquesne's December 31, 2011 submittal of its final Smart Meter Plan.

IV. Study Results

The Study completed by SAIC concludes the following:

- Based on the results of our preliminary analysis and Duquesne's existing communication network architecture, it was determined a hybrid solution offered the highest technical viability and would be most cost effective. The hybrid solution of implementing two wireless frequencies both maximizes the bandwidth and maximizes the range (distance) or bandwidth availability for data backhaul.
- One solution to maximize the bandwidth, and the other to maximize the range (distance) or bandwidth availability.
- The Intermediate Backhaul Solution selected from the Study consists of two private wireless radio solutions, operating in the 3.65 Gigahertz ("GHz") and 217-219 Megahertz ("MHz") frequency bands. This is based on the attributes of each (estimated coverage, solution cost, radio features and capabilities, speed and available capacity/bandwidth).
- Duquesne may face access impediments in using the 217-219 MHz frequency band; therefore, Duquesne is considering an alternate solution, the narrowband Personal Communications Service ("PCS") 900 MHz, should the 217-219 MHz option be found later not to be available.
- Duquesne's existing leased fiber-optic network will be used, where possible, to complete the AMI data connectivity from the private wireless radio/fiber take-out points to the AMI head end system, and for direct connect meters in hard to reach locations.
- Public Wireless, operating in the cellular (800 MHz) and PCS (1800/1900 MHz bands), will be utilized as a back-up communication for the Cell Relays or for future Distribution Automation ("DA") device connectivity due to its high operating costs and inability of data control (public network).
- According to our preliminary analysis, 3.65 GHz band will provide adequate coverage to approximately 46% of the Cell Relays; therefore, the remaining 64% of the Cell Relays will be connected to the 217-219 MHz narrowband solution.
- It is possible to cover 100% of the Cell Relays with the 217-220 MHz solution; however this solution is not optimal, as this is a narrowband solution and would not be cost effective due to the amount of infrastructure required. The coverage for narrowband PCS will be analyzed in the detailed design if the 217-219 MHz solution is not available for use.
- For actual equipment, the GE MDS Mercury 3650 radio is the leading candidate for the 3.65 GHz band.
- For the 217-220 MHz band, the GE MDS/SD 2 and CalAmp Viper radios are the leading candidates for deployment.

- Duquesne will continue to analyze other technology vendors not mentioned in this filing and conduct lab tests to confirm performance and suitability before making its final selection and proposal to the PUC in December 2011.

V. Itron's AMI Communication Infrastructure Architecture (the LAN and HAN)

Itron's OpenWay AMI solution is a wireless RF mesh solution whose LAN operates in the Industrial, Scientific and Medical ("ISM") bands at frequencies from 902 MHz to 928 MHz (from meter to Cell Relay) and HAN from 2,400 MHz to 2,483 MHz (for ZigBee meter to HAN communication). The Itron solution was provided to the PUC in Duquesne's December 2010 and January 2011 filings in this proceeding. The AMI Cell Relay incorporates both the public and private wireless communication devices. Other wired or wireless backhaul connectivity options are also supported by Itron's OpenWay AMI Solution. The OpenWay equipment has been certified to operate by the Federal Communications Commission ("FCC").

VI. Design Requirements

In designing the communication network for transmission of the AMI data, we analyzed both private (licensed and unlicensed) and public communication solutions. At a minimum, the preliminary Intermediate Backhaul Solution is designed to provide:

1. Connectivity to the AMI Cell Relays and sufficient bandwidth
2. Support point-to-multipoint operation
3. Capable of interfacing to the AMI and LAN via Ethernet/IP
4. Robust security
5. Resilience
6. Scalability
7. Low latency for critical data
8. Service-neutrality for enabling future services such as mobile workforce management system communication

Duquesne's AMI Traffic Requirements

The following estimates were calculated for the amount of data load in the AMI network and used in the basis of our design to ensure sufficient bandwidth:

1. Peak instantaneous data rate per Cell Relay is approximately 15 kilobits per second ("kbps").
2. Total monthly volume of data is approximately 1,500 Gigabytes ("GB").

Peak instantaneous data rate as used in the study is the traffic load in kbps that one Cell Relay communication is estimated to produce in the channel at times of coinciding AMI and non-AMI (e.g. network management) transmissions. It is assumed that during these occasions, all Cell Relays sharing the channel are concurrently generating equal amount of traffic, and the data need to reach the receiver within the required delivery periods.

VII. Available Backhaul Communication Solutions

This section addresses the available backhaul communication options, including the use of the Duquesne's existing leased fiber-optic network for WAN backhaul and hard to reach meter locations, as well as the Private and Public Intermediate Backhaul Solutions considered.

Intermediate Backhaul Communication Options

The Intermediate Backhaul Solution is the communication path from the LAN Cell Relay to the fiber takeout points that lead to the AMI head end system.

Private Wireless Option

The available Private backhaul solutions mainly differ in terms of operational frequencies, channel rates, and licensing requirements, which were all considered in our design analysis. Duquesne's AMI system is heterogeneous, with varying densities of Smart Meters, Cell Relays, distances to fiber take-out points, land coverage, terrain profiles, etc. Therefore, the Intermediate Backhaul Solution design includes two primary solutions: one to maximize bandwidth, and the other to maximize the range (distance) or bandwidth availability. Both wideband and narrowband licensed radios were analyzed.

Narrowband licensed radios typically have the farthest reach, especially in the lower part of the spectrum, but they have limited throughput and require a license to operate, which can be costly. Moreover, the FCC has initiated a re-farming (also known as re-banding) effort with the purpose to migrate the Land Mobile Radio ("LMR") users to narrower channels (ultimately, to 6.25 kilohertz ("kHz")), which affects achievable data throughput per link in application to services subject to the mandate.

Wideband licensed radios can provide broadband speeds, but they typically operate on higher frequencies, limiting usable range (distance). The cost to lease spectrum can also be high; with the exclusion of the quasi-licensed 3.65-3.7 GHz band where licenses can be easily obtained at a low cost. The license would not be exclusive to Duquesne; it would be shared. For AMI meter data, where steady delay and constant throughput are not a requirement, competition for bandwidth and occasional interference are not considered to be prohibiting factors.

3.65 GHz Frequency Band

The FCC recently adopted the rules for conventional use of the 3.65 to 3.7 GHz spectrum on a nation-wide, non-exclusive, and licensed basis. Duquesne must honor the exclusion zones the FCC has established for the protection of grandfathered satellite earth stations ("SES") and government radio-location sites; however, operation within these zones is now possible with Duquesne coordination with the incumbents. The equipment to operate in the band must be FCC-certified and must support contention avoidance-protocols. Two versions are defined – restricted and unrestricted. The restricted protocol is capable of recognizing and permitting non-interfering operation with systems of the same type. These systems are limited to operation within the lower 25 MHz of the band. Systems that support the unrestricted contention-avoidance protocol are able to detect and share spectrum with dissimilar radiators. These systems are allowed to operate anywhere within all 50 MHz.

Duquesne's service territory is within the 150 kilometer ("km") exclusion zone of two grandfathered satellite earth stations, owned by AT&T and located at Albright and Rowlesburg, West Virginia. Coordination in the use of the frequencies with these earth stations is required prior to applying for the license with the FCC. Our preliminary analysis shows that interference to these two (2) grandfathered SES from Duquesne's operation in 3.65 GHz is not anticipated.

217-219 MHz Frequency Band

The 217-219 MHz frequency spectrum offers very good coverage characteristics for Duquesne. The band is typically licensed as an Automated Maritime Telecommunications System ("AMTS") service under Part 80 (Maritime Communications) of the FCC Rules. However, there exist legal ways to obtain licenses to operate as Part 90 (Industrial/Business), which is more applicable for Duquesne. As both Part 80 and

Part 90 regulations establish similar technical requirements, the radio equipment typically has dual compliance. The spectrum is not subject to the FCC's current narrowbanding mandate and the owner is free in their choice of carrier size selections. There is also no limit in re-using the frequencies by assigning sectors to orthogonal polarities to enhance the system capacity. The frequencies typically require initial outlay cost; however, upon the transition, the buying party becomes the owner of the frequencies. No high recurring cost to use the frequencies will ensue. Periodic payments to renew the license (once in 10-15 years) will be necessary, but the cost is expected to be nominal.

In the event the 217-219 MHz band is not available, the 900 MHz Narrowband PCS spectrum is a viable alternate. This band is somewhat inferior in propagation characteristics, but allows much higher power levels, wider bandwidth and is expected to provide the same or better coverage.

Public Wireless

Two major Public Wireless operators were considered, AT&T and Verizon Wireless.

Modern Public Wireless solutions provide unprecedented data rates and the ability to achieve long distances. Security measures for confidentiality, integrity, and authenticity of communications in the 3G family of Universal Mobile Telecommunication System ("UMTS") standards meet industry standards for transmission of AMI data. In the upcoming 4G standard, the efficiency, capabilities, and security protection are expected to be further enhanced.

Generally, Public Wireless solutions have high ongoing costs resulting in part from surges in traffic volumes. Preliminary estimates suggest the capital cost of the Private Wireless Solution (with virtually no or very low ongoing costs) is substantially lower than the annual cost of Public Wireless over the 20 year life of the AMI system, making the payoff of the Private Wireless Solution much more financially desirable to Duquesne in the long run. Duquesne will also not have control over the Public Wireless equipment through which the data will flow. Additionally, the Public Wireless operators typically perform system maintenance during the hours when much of the AMI data would be collected, making data collection difficult. For these reasons, this solution was not selected as a primary mode of Intermediate Backhaul communication. It will be used as a Cell Relay back-up communication, as needed for one-off installations not covered by the Intermediate Backhaul Solution or for potential customer requests before the AMI system and communication network are fully in place. Duquesne expects to deploy the latest technology available at the time of deployment.

Last Mile WAN

After the data is transferred from the cell relays to the intermediate points in the Wide Area Network, the data has to be transferred the "last mile" from the intermediate points to Duquesne's AMI Head End System. Several options were evaluated by Duquesne. After careful review of the three primary options, Duquesne proposes to utilize its existing leased fiber network for data communication from the Intermediate Backhaul Solution to its AMI Head End System.

Using the Fiber-Optic Network for the last mile of WAN enables optimum use of existing assets, which are already leased with no additional costs to be incurred, and allows extensive control of the AMI data flow. Under the existing Lease Agreement Duquesne has with Duquesne Communications, existing leased facilities used for SCADA and other operational communications can be utilized for Smart Meters at no additional leased cost for fiber; although there will be build-out costs to segregate Smart Meter fiber from existing SCADA fiber. Therefore, this option of using existing leased fiber is the preferred option.

There are two other WAN alternatives. Those alternatives include (1) obtaining fiber services from other third party sources in the area or (2) utilizing a Private or Public Wireless solution from the Cell Relay to the Head End System, bypassing the Duquesne leased Fiber-Optic Network. For the first option, utilizing fiber from other third party sources would require both additional build out costs and ongoing leasing costs. For the second option, the use of Private Wireless would require a substantial amount of additional infrastructure to enable data communication all the way from the Cell Relay to the Head End System, when the already lease Duquesne fiber network can be leveraged at no additional lease costs. Public Wireless could also be used; however, additional ongoing costs and the inability to control the AMI data make leveraging Duquesne's existing leased fiber network highly desirable.

Additionally, a small number of meters in the downtown area of Pittsburgh have disadvantageous locations for wireless access and may be hard to reach by radio; therefore, Duquesne plans to directly connect these meters to its Fiber-Optic Network in those instances; thus the fiber would be the entire WAN solution for those hard to reach meters. In some places, new lit fiber to connect hard to reach meters would need to be leased from other sources/entities with fiber in that specific location, e.g., existing fiber within large office buildings. This solution can be expensive; however, it is the only option for some meters due to connectivity impediments. This aspect will be further reviewed in the detailed propagation study and design and filed with the Commission as part of the December 31, 2011 full cost filing.

VIII. Preliminary RF Coverage Estimates

Preliminary RF planning was conducted to estimate the Cell Relay locations covered (or determine the level of signal reception covered) in the 3.65 GHz and 217-219 MHz frequency ranges, assuming Duquesne's existing towers would be used for placement of the radios.

The results of the preliminary propagation study conclude it is possible to connect 100% of the Cell Relay in 217-219 MHz frequency band; however, it is beneficial to use the broadband 3.65 GHz wherever possible due to cost savings and additional bandwidth. According to our preliminary analysis, 3.65 GHz band will provide adequate coverage to approximately 46% of the Cell Relays; therefore, the remaining 64% of the Cell Relays will be connected to the 217-219 MHz narrowband. If the PCS band is selected as an alternate to the 217-219 MHz band, it is expected to have the same or better coverage.

IX. Radio Technologies/Vendors

The following section identifies the radio technologies reviewed for each frequency band. In the detailed design, Duquesne will select a single technology from the leading candidates identified below, to operate in each frequency band.

3.65 GHz

Of a number of radios that can operate in the 3.65 GHz, the Redline AN80i, RuggedCom WiN7237, and GE MDS Mercury 3650 were chosen for detailed comparison based on initial research and evaluation of Duquesne's requirements.

Redline AN80i has a successful record of reliable field installations and is a strong performer. However, it uses a proprietary (as opposed to open-standard) protocol, offers fewer installation options (e.g., can't be put inside an enclosure for collocation with a Cell Relay), does not have support for WiFi or industrial communication protocols such as Modbus and DNP3, and does not have the scale of exposure to the utilities market that the other vendors do. RuggedCom equipment in general is regarded as well suited to operation in harsh environments such as those found in electrical substations and distribution facilities. Duquesne is operating various RuggedCom products, but does not have experience with the 3.65 GHz WiN7237. Although the WiN7237 is based on an open standard and offers different mounting configurations, it still lacks the feature diversity of the Mercury 3650. The GE MDMS Mercury 3650 is the strongest candidate due to the following attributes: technical maturity, experience in the utility market, installation options, security, upgradability, automatic fail-over and interoperability. In addition, it has various options including WiFi, VLAN and traffic prioritization and communication protocols such as Modbus and DNP3, short frame durations to minimize the latency, ability to assign a greater time share of the channel to the uplink direction to better suit the asymmetric nature of AMI data traffic flow and it is attractively priced.

217-219 MHz

Similarly to the 3.65 GHz products, a number of 217-219 MHz radio systems available from several different manufacturers were considered and upon the preliminary evaluation for relevance to Duquesne's requirements, condensed to two choices: the CalAmp Data Radio Viper 220 MHz and GE MDS SD2. The CalAmp Data Radio Viper 220 MHz is strong due to the following attributes: its support of traffic compression and hence greater data rates, high receive sensitivity, high-power transmitter, complies with the FIPS 140-2 requirements, selectable router mode of operation, and Duquesne currently uses CalAmp Viper and is therefore experienced with the operation of the radio and its capabilities.

The GE MDS SD2 possesses certain competitive qualities as well: the Network Management System ("NMS") can be unified with the Mercury 3650, decent RF characteristics, terminal server mode of operation, and sophisticated built-in congestion avoidance mechanisms. The Viper, on the other hand, appears to be capable of supporting terminal server operation for Modbus and DNP3 as well, but may be inferior to the SD2 in the efficiency of medium sharing. Duquesne plans to compare the radio transmitters and receivers in a test lab to confirm the better performance and suitability before making its final selection.

If 217-219 MHz is not an available solution due to inability to access, which is presently being determined, DLC will utilize narrowband PCS radios, which can typically support a wider carrier bandwidth.

X. Final Network Integration

Once a detailed design/propagation study is complete, Duquesne will develop a comprehensive integration/ deployment plan to coordinate the incremental roll-out of Smart Meters. These final integration plans will be included in the full cost filing to the Commission in December 2011.

XI. Design Conclusions

Duquesne's Intermediate Backhaul Solution is proposed to be a hybrid solution including two Private Wireless solutions, operating in the quasi-licensed 3.65 GHz and licensed narrow-band 217-219 MHz frequency bands. An alternate to the 217-219 MHz band is the narrowband PCS operating in 900 MHz range, which is continuing to be analyzed.

Public Wireless is planned to be utilized primarily as a back-up communication in the Cell Relay or for future DA device connectivity. Duquesne's existing leased fiber-optic network will be used to backhaul the AMI data from the intermediate private wireless radio/fiber take-out points in the WAN to the AMI Head End System. In a few instances, the leased fiber, or third party owned fiber, will directly connect to the meters due to difficult meter locations which impede utilizing the private wireless radio system.

Private Licensed Wireless was selected due to the ability for the user to control its operation, usage, data flow, transmission latencies and costs. Private wireless also provides adequate bandwidth and coverage. The 3.65 GHz band was selected due to its high speeds and virtually no cost spectrum. The 217-219 MHz was selected due to its ability to reach greater distances. The narrowband nature of 217-219 MHz, bandwidth capacity limitations and the bandwidth outlay costs make this option less suitable for connecting large amounts of Cell Relays; however, it is a good solution to support a small amount of remote radio transmitters and receivers. The 900 MHz Narrowband PCS spectrum can be evaluated as an alternate due to potential access problems with the preferred 217-219 MHz selection and provides high power levels and good coverage (the same or better than 217-219 MHz). Though the Study results anticipate 100% coverage on the 217-219 MHz band, it is not an optimal and most cost effective solution for Duquesne. It is estimated that the 3.65 GHz solution will cover approximately 46% of the Cell Relay locations and the 217-219 MHz solution will cover the remainder to minimize cost and provide a suitable amount of bandwidth and speed. Subsequent iterations of the RF study will optimize the configuration to try to increase the 3.65 GHz coverage to the greatest extent due to its low cost.

Based on the radio technologies available in each frequency band and our comparative analysis, the GE MDMS Mercury 3650 radio is the leading candidate for the 3.65 GHz band. For the 217-220 MHz band, both the GE MDS/SD 2 and CalAmp Viper radios are leading candidates. Duquesne will test various radios in a lab to determine performance and suitability before making its final selection. Additional vendors may be analyzed during the detailed design.

Public Wireless service is a viable back-up solution from the perspective of technical capabilities and security provisions, but because of the high ongoing data costs and inability to control the data flow; this solution will not be used as the primary communication medium but can provide back-up communication for Cell Relays or grid device connectivity.

In the near future, new standards and products are expected to become available. The two notable standards that have the potential to more cost-effectively enhance the broadband coverage of the Duquesne's service territory are the IEEE 802.22 (TV Band Devices) and 802.16j (WiMax multi-hop relay). With these on the horizon, it is imperative the then-current design is reviewed with the purpose of considering adoption of the latest technology to increase the capabilities at a (possibly) reduced cost.

It should be noted that a detailed propagation analysis is to be performed to solidify these Study conclusions. The design is subject to change based on further findings or should other viable technologies become available. Duquesne will continue to explore technology vendors in each frequency range to determine the best and most cost effective solution.

XII. Smart Meter Program Grace Period Budget and Cost Update

Although an in depth cost evaluation for the Wide Area Network described in this filing won't be available until Duquesne Light completes a detailed propagation study of our service territory, which will be filed for review and PUC approval in December 2011, we are able to reconfirm a total estimated cost for our Smart Meter Program to be in the range of $125 to $240 million. The low-end of the range provides base functionality that complies with the requirements of Act 129 whereas the high-end of the range also addresses all of the additional requirements in the PUC order. Previous filings included cost estimates for some additional requirements such as the remote disconnect switch that are not included in the calculation of the low-end of the range.

In addition, Duquesne Light is able to reconfirm its Grace Period cost estimate of approximately $38 million. However, the categorization of these costs between each of the components of our Smart

Meter Program as well as the classification of these costs by type of expenditure have changed since our original budget was filed for approval with the PUC in August 2009. Attachment A to this filing provides a summary of these changes along with the costs that have been spent to date through February 2011.

The original budget filed with the PUC in August 2009 categorized all costs related to business process changes in support of new Smart Meter Technology as part of Component 2 – Smart Meter Program Infrastructure as part of the Grace Period budget. In addition, the cost related to the purchase and implementation of a Meter Data Management system was categorized as part of Component 2 of the Grace Period Budget. The revised budget re-categorizes these two significant costs to be part of Component 1 – Customer and Metering System Upgrades since this work is part of the Oracle systems being installed as part of Component 1.

Additionally, there is a shift of dollars within each component from Internal Resources to Outside Services. The original budget classified the incremental costs to augment and back-fill existing staff as Internal Resources. These costs for consulting resources are more appropriately classified as Outside Services and therefore have been moved or re-classified to Outside Services. They represent the incremental resource requirements needed to implement the foundation components of the Duquesne Light Smart Meter Program.

The attached revised budget re-categorizes costs in order to more accurately reflect the incremental spend needed by the company to upgrade back-office systems and processes in order to meet the requirements of ACT 129. The majority of this spend, which includes a re-classification of supplemental and back-fill consulting resources as outside services, will occur during the grace period whereas the majority of the Smart Meter Technology Infrastructure spend (i.e., Component 2) will occur after the grace period when Duquesne has received approval of its full-cost filing that will be submitted at the end of this year.

Respectfully Submitted,

Duquesne Light Company

Submitted March 31, 2011

Duquesne Light Smart Meter Program - Grace Period Budget

Component 1 - Billing & Metering System Upgrades	Original	Revised	Difference	Spent-to-Date thru 02-2011
Internal Resources	3,200,000	3,360,000	160,000	830,000
Infrastucture	1,900,000	5,246,250	3,346,250	1,680,000
Outside Services	12,100,000	22,643,750	10,543,750	3,667,500
Total - Component 1	**$17,200,000**	**$31,250,000**	**$14,050,000**	**$6,177,500**

Component 2 - Smart Meter Technology Infrastructure	Original	Revised	Difference	Spent-to-Date thru 02-2011
Internal Resources	5,294,500	625,000	(4,669,500)	190,000
Infrastucture	6,225,500	2,768,750	(3,456,750)	50,000
Outside Services	9,280,000	3,356,250	(5,923,750)	802,500
Total - Component 2	**$20,800,000**	**$6,750,000**	**($14,050,000)**	**$1,042,500**

Total - Smart Meters Program	Original	Revised	Difference	Spent-to-Date thru 02-2011
Internal Resources	8,494,500	3,985,000	(4,509,500)	1,020,000
Infrastucture	8,125,500	8,015,000	(110,500)	1,730,000
Outside Services	21,380,000	26,000,000	4,620,000	4,470,000
Total - Smart Meters Program	**$38,000,000**	**$38,000,000**	($0)	**$7,220,000**

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