COMMERCE DEPARTMENT

February 5, 2018 **PUBLIC DOCUMENT**

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 280
St. Paul, Minnesota 55101-2147

RE: **PUBLIC Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E-002/M-17-776

Dear Mr. Wolf:

Attached are the **PUBLIC** Comments of the Minnesota Department of Commerce, Division of Energy Resources (Department), in response to the Notice of Comment Period that the Minnesota Public Utilities Commission (Commission) issued in this proceeding on November 13, 2017.

The Department recommends that the Commission **defer** its decision to certify the Fault Location Identification and Service Restoration (FLISR) project and **require Northern States Power, d/b/a Xcel Energy to provide a benefit cost analysis** that compares the FLISR and Integrated Volt VAr Optimization applications. All of the Department's recommendations are enclosed.

The Department is available to answer any questions that the Commission may have.

Sincerely,

/s/ JOHN KUNDERT
Financial Analyst

JK/lt
Attachment

COMMERCE DEPARTMENT

Before the Minnesota Public Utilities Commission

PUBLIC Comments of the Minnesota Department of Commerce Division of Energy Resources

Docket No. E-002/M-17-776

I. INTRODUCTION

On November 1, 2017 Xcel Energy (Xcel, Company) made three filings related to the modernization of its distribution system:

- In Docket No. E002/M-17-775 Xcel filed a Time of Use Rate (TOU) Pilot petition;
- In Docket No. E002/M-17-776 the Company filed its 2017 Biennial Distribution Grid Modernization Report, and
- In Docket No. E002/M-17-777 Xcel filed its 2017 Hosting Capacity Study.

The 2017 Biennial Distribution Grid Modernization Report (Docket No. 17-776) is the proceeding with the broadest scope. The two remaining petitions, the TOU Pilot (Docket No. 17-775) and the 2017 Hosting Capacity Study (Docket No. 17-777) represent more narrowly focused efforts that discuss more technical aspects of the Company's distribution grid modernization efforts. The Minnesota Department of Commerce's (Department) comments and recommendations on the TOU Pilot and the Hosting Capacity Study are provided separately in those dockets.

The Company also requests that the Commission certify as an eligible project under Minnesota Statute §216B.2425 a proposed distribution project named the Fault Location, Isolation, and Service Restoration effort (FLISR). Such certification would allow Xcel to request recovery of incremental costs of the project under Minnesota Statute §216B.16, subd. 7b, Transmission Cost Adjustment. Finally, Xcel requests that the Commission formally allow the Company to accelerate the biennial filings envisioned under statue such that they become annual filings for the next 5 years.

In its Notice of Comment Period in this proceeding issued on November 13, 2017 the Commission identified the following issue – "Should the Commission accept the 2017 Biennial Report and certify the Fault Location, Isolation, and Service Restoration (FLISR) project?

The Commission also identified four topics as open for comment related to this issue:

- Whether the Commission should certify Xcel's FLISR Project?
- Whether the Commission should authorize Xcel to file a November 1, 2018 Biennial Report Filing?
- Whether the Commission should authorize Grid Modernization and certification requests report (more frequently than statutorily required)?
- Other issues or concerns related to this matter.

The Department notes that distribution modernization is a broad topic that contains a myriad of different potential technologies and services. As such, it can be difficult to define a usable, confined analytical construct for reviewing projects of this nature. For example, it is difficult to provide a recommendation regarding the Company's proposed FLISR project without attempting to identify other distribution modernization projects that may have a more favorable benefit/cost analysis.

For comparison, Public Service of Colorado (PSCo), Xcel's Colorado-based operating company, completed a contested case proceeding before the Colorado Public Utilities Commission on the topic of grid modernization in 2016. In that proceeding Xcel requested approval of an Advanced Metering Infrastructure (AMI) and Integrated Volt-VAr Optimization (IVVO) programs. In addition, PSCo requested approval of "the components of the communications network (known as the Field Area Network or (FAN) that are necessary to support AMI and IVVO".[1] PSCo also discussed the costs and benefits of a FLISR program in Colorado in that proceeding.

The Department relied on information presented in that PSCo proceeding as a point of comparison for Xcel's requests in this Petition.

II. DEPARTMENT ANALYSIS

The Department addresses the Commission's questions in sequence.

A. SHOULD THE COMMISSION CERTIFY XCEL'S FLISR PROJECT?

The Department doesn't have a sufficient level of information regarding FLISR's benefits and costs compared to other similar grid modernization applications to recommend FLISR for certification at this time. The Department's concern is that the resources Xcel proposes to

[1] Direct Testimony of Alice K. Jackson, lines 18-20 on page 13 in Docket No. 16A-0588E.

expend to implement FLISR may be better used to implement another advanced grid application – IVVO. Until the Department can resolve that question, we have an inadequate level of information to make a recommendation. The Department provides the following, albeit incomplete information regarding FLISR and IVVO in support of its position.

1. FLISR

Xcel provided the following cost estimates for FLISR in Minnesota:

- $65.1 million in direct capital costs for the period from 2018 through 2027;
- $5.4 million in FLISR-related total operations and maintenance costs for that same time period;
- $64.1 million in FLISR-related FAN capital cost; and
- $5.2 million in FAN related O&M costs for that same time period.

Table 1 summarizes this information.

Table 1 – Summary of FLISR Component Costs Total 2018 – 2027 (in $ millions)

Project	Capital Costs	O&M Costs	Notes
FLISR	$65.3	$5.4	Capital Costs – 2018 – 2022 – $21.6, 2023-2027 - $43.6
FAN	$64.1	$5.2	Capital Costs – 2018 – 2022 – $28.5, 2023-2027 - $64.1
Total	$129.1	$10.4	

As to the benefits that the FLISR program would provide, the Company provided a "value-based" benefit/cost analysis in its response to Information Request No. 6 from the Office of the Attorney General – Residential Utilities Division (OAG-RUD). The Company estimated that the FLISR implementation would reduce the annual number of minutes that customers were out of power by 33,225,067 minutes. Xcel also included the value of a Customer Minute Out (CMO) of $0.76/minute.[2] Assuming that Xcel's numbers are correct the Department estimated the annual value of the FLISR program under those assumptions to be $25.3 million annually.[3]

[2] According to Xcel's response to OAG Information Request No. 10, the CMO value "incorporates the studies, analyses, and econometric models done by Freeman, Sullivan & Co., and was designed for electric reliability planners at utilities, government organizations or other entities interested in estimating interruption costs and / or benefits associated with reliability improvement".

[3] 33,225,067 minutes x $0.76/minute = $25,251,051.

However, Xcel's tariff also provides a second implicit CMO value in the Service Quality section of its tariff. In that section the Company states that it will provide a one-time $50 bill credit to individual customers per interruption lasting 24 hours or more. The CMO estimate for that bill credit is equal to $0.035.[4] That actual CMO value is equal to 4.6 percent of Xcel's proposed $0.76 CMO in its benefit/cost analysis.[5] Recalculating FLISR's benefits using that CMO results in estimated annual benefits of $1.16 million.[6] As this example demonstrates, the value of the benefits associated with FLISR depends largely on the value assigned to the Customer Minute Out term in the equation.[7]

While FLISR's implementation may improve reliability on Xcel's electric distribution system, Xcel hasn't shown that its proposed capital expenditure of $129.4 million or the accompanying $10.4 million in annual operating costs represents a reasonable investment and costs to charge to ratepayers.

By contrast, based on the results of the PSCo's advanced grid proceeding, the Department believes that IVVO could provide more direct financial benefits to ratepayers than FLISR.

2. IVVO

As to how IVVO compares to FLISR, PSCo witness Alice Jackson identified FLISR and IVVO as being similar in that they are "advanced applications and associated field devices that will support a more advanced grid" and referred the reader to the Direct Testimony of Mr. Nickell.[8]

PSCO witness Mr. Chad S. Nickell explained IVVO as follows:

> Through IVVO, Public Service can more efficiently and accurately maintain proper voltage levels throughout the electric distribution system, thereby reducing energy usage without requiring active customer usage changes. Historically, utilities have controlled voltage on the distribution system by regulating voltage at the substation. Absent the ability to monitor voltage levels along the feeders, the system is often operated based on the modeling of peak load conditions. IVVO automates and optimizes the operation of the distribution voltage regulating devices located on distribution feeders. This application will enable Public Service to

[4] $50.00 / (24 hours x 60 minutes/hour) = $50/1440 minutes = $0.0347/minute.
[5] $0.0347/minute / $0.76/minute = 4.57%
[6] $0.0347/minute x 33,225,067 minutes/year = $1,152,910/year.
[7] Assuming Xcel's CMO value a customer experiencing a 24 hour outage should be credited $1,094 instead of $50.
[8] Direct Testimony of Alice K. Jackson, lines 1-3 and 22-23 on page 22 in Docket No. 16A-0588E.

> operate its feeders at the lower end of the acceptable voltage ranges.[9]

IVVO would perform a similar function on Xcel's system in Minnesota. For example, Mr. Nickell noted that IVVO could:

- Reduce distribution electrical losses;
- Reduce electrical demand; and
- Reduce energy consumption.[10]

As a result, IVVO could provide direct financial benefits to ratepayers, without any change in customer behavior. Further, these factors do not require imputing a value for customer outage minutes to estimate a "value-based" benefit. Instead, Xcel's costs and ratepayers' bills would be directly lower as a result of IVVO.

On page 48 of his testimony Mr. Nickell provided this additional discussion on IVVO:

> There are numerous published accounts regarding the success of IVVO-type programs. The U.S. Department of Energy indicated in its December 2012 report ("DOE VVO Report") that reducing feeder voltages reduces energy consumption proportionately. Without IVVO, Public Service would rely on the current method of controlling voltage levels on the distribution system. However, recent technological advances in sensors, communications, and information processing and control technologies have made it possible to monitor and control voltages throughout the distribution system using intelligent field devices.
> As noted in the DOE VVO Report, 26 utilities that received smart grid investment grants ("SGIG") implemented advanced VAr optimization technologies, [footnote omitted], including peer investor-owned utilities such as Consolidated Edison of New York, Florida Power and Light, a subsidiary of NextEra Energy; PECO Energy Company, a subsidiary of Exelon Corporation; and the utility operating company subsidiaries of Southern Company.

The DOE VVO Report recognized the following benefits from IVVO-projects:

[9] Direct Testimony of Chad S. Nickell, line 18 page 3 through line 3 page 4 in Docket No. 16A-0588E.
[10] Direct Testimony of Chad S. Nickell, lines 5 - 7 page 29 in Docket No. 16A-0588E.

- Deferred capital expenditures and improved capital asset utilization;
- Reduced electricity generation and environmental impacts; and
- More efficient utility operations, greater flexibility to address resiliency, and more opportunities to keep rates affordable [footnote omitted].

Also in his testimony Mr. Nickell estimated an average energy savings of 2.06 percent per feeder on the feeders where IVVO was scheduled to be deployed initially, which would then degrade to 1.83% by 2022.[11]

From the Department's perspective, the idea of a 2 percent or even 1 percent decrease in energy use on the distribution system that requires no behavior change on the part of customers is appealing. As a result, the Department asked the Company two information requests regarding IVVO in Minnesota.

In Department Information Request No. 1 the Department noted the Colorado proceeding and asked "What are the Company's [plans] regarding the installation of an IVVO system in Minnesota." Xcel responded at length, with the upshot that, due to the existence of a smaller VAr optimization program and other technical factors, Xcel was not proposing to install IVVO in Minnesota.[12]

Department Information Request No. 3 asked if the Company or a third party had performed a cost benefit or business case analysis of IVVO.

Xcel provided a number of files in its non-public response. The most interesting was **[TRADE SECRET DATA HAS BEEN EXCISED].**[13]

The Department believes that there is a material error with Xcel's analysis. Specifically, the Company's analysis fails to account for the facts that the Company's current revenue stream is: 1) fully decoupled for weather-affected classes and 2) subject to an annual sales revenue adjustment, pursuant to the settlement in Xcel's multi-year rate case. **[TRADE SECRET DATA HAS BEEN EXCISED].**

Returning to the Colorado preceding discussed earlier, PSCo witness Samuel J. Hancock provided several highly developed benefit/cost analyses in his Direct and Rebuttal Testimony. Mr. Hancock's benefit/cost analyses identified significantly more costs and benefits than the

[11] Direct Testimony of Chad S. Nickell, lines 18 page 3 through lines 49 page 63 in Docket No. 16A-0588E.
[12] The Department has included this information request response in Attachment A.
[13] Xcel stated repeatedly in its response to DOC IR #4 that **[TRADE SECRET DATA HAS BEEN EXCISED]**. With that caveat, it is the Department's impression that Xcel's capital cost estimate for IVVO may have declined since 2015.

simple analysis provided in Xcel's response to DOC IR No. 4 referenced earlier. Some of Mr. Hancock's analyses in his Rebuttal Testimony identified a net benefit related to the installation of IVVO in Colorado.

The Department concludes that the Commission should have a benefit/cost analysis that compares FLISR to IVVO at a similar or higher level of detail than the information provided in the Colorado proceeding before it makes its decision whether to certify FLISR. As a result, the Department recommends that the Commission defer its decision on certifying FLISR until Xcel provides an updated benefit/cost analysis that includes current costs for IVVO and compares FLISR and IVVO on a similar basis.

B. SHOULD THE COMMISSION SHOULD AUTHORIZE XCEL TO FILE A NOVEMBER 1, 2018 BIENNIAL REPORT FILING?

The Department's short answer is yes, with a condition. Xcel should be allowed to file a November 1, 2018 Biennial Report Filing requesting certification for projects only if those projects demonstrate a benefit/cost ratio that is greater than one from a ratepayer perspective. In the filing Xcel asks repeatedly to be "allowed" to make a November 1, 2018 filing and cites the potential of new technologies associated with grid modernization as a reason why the Commission should allow the Company to request certification for its projects on a more frequent basis than allowed in statute. To ensure that ratepayers are not harmed by allowing frequent rate increases through Xcel's TCR rider, the Department recommends that the Commission allow Xcel to advance implementation of grid modernization projects with a benefit/cost analyses demonstrating net savings for ratepayers. (*i.e*., a benefit/cost ratio greater than one). If a project's benefit/cost ratio is below one, there is no need to accelerate the certification and cost recovery process.

C. SHOULD THE COMMISSION AUTHORIZE GRID MODERNIZATION AND CERTIFICATION REQUESTS REPORT (MORE FREQUENTLY THAN STATUTORILY REQUIRED)?

This question appears to generalize the previous question. The Department's response is the same.

D. COMMENTS ON OTHER ISSUES OR CONCERNS RELATED TO THIS MATTER

Since ratepayers are already paying Xcel for all costs of the Company's distribution system, there is uncertainty as to what "incremental" distribution costs should be charged to ratepayers in addition to the distribution costs that will continue to be charged to the Company's ratepayers through Xcel's base rates. This question will need to be addressed on a project-by-project basis.

Further, in choosing a grid modernization project, the Commission should consider the extent to which grid modernization equipment reduces costs being charged in Xcel's rates. If there are cost reductions, those reductions should be netted against costs of the distribution equipment. If there are no cost reductions, Xcel should explain why such projects should be pursued.

III. RECOMMENDATIONS

The Department recommends that the Commission defer its decision to certify FLISR at this time. Instead, the Department recommends that the Commission direct Xcel to develop a thorough benefit/cost analysis that compares the costs and benefits of FLISR and IVVO for Xcel's Minnesota system.

In addition, the Department recommends that the Commission allow Xcel to file a November 1, 2018 Biennial Report Filing if the projects included in that report have benefit/cost ratios that are greater than one.

The Department echoes that recommendation for regarding the Commission's question as to whether it should authorize Grid Modernization and certification requests report (more frequently than statutorily required).

Finally, when a grid modernization project is selected, rate recovery considerations should include determining the costs that are incremental and netting certain benefits of the projects from cost recovery.

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☐ **Public Document – Not Public Data Has Been Excised**
☒ **Public Document**

Xcel Energy
Docket No.: E002/M-17-776
Response To: Department of Commerce Information Request No. 1

Requestor: John Kundert
Date Received: January 5, 2018

Question:
Topic: Integrated Volt-VAr Optimization System
Reference(s): Colorado Public Utilities Commission Docket No. 16A-0588E

Xcel Energy discussed the costs and benefits of Integrated Volt-VAr Optimization (IVVO) technology at length in this proceeding. What are the Company's regarding the installation of an IVVO system in Minnesota.

Response:
We understand the question to be asking whether we have plans to implement IVVO in Minnesota, and have responded accordingly. In summary, yes, we plan to use the IVVO application within our Advanced Distribution Management System (ADMS) in Minnesota – however, running in a different operational mode than in our Public Service of Colorado (PSCo) Operating Company affiliate's service area.

The concept of voltage/VAr management or control is essential to electrical utilities' ability to deliver power within appropriate voltage limits so that consumers' equipment operates properly – and to deliver power at an optimal power factor to minimize system losses. These concepts are affected by a variety of technical factors throughout the distribution network including: substation bus voltages; length of feeders; conductor sizing; type, size, and location of different loads (resistive, capacitive, inductive, or a combination of these); and the type, size, and location of distributed energy resources (photovoltaics, distributed wind, various storage technologies, etc.), among others.

The complexity and dynamic nature of these characteristics make the task of managing electrical distribution networks challenging. While voltage regulation and VAr regulation are often referenced in combination (i.e. Volt/VAr control), they are easier to understand if described as two separate, but interrelated concepts.

Voltage Regulation. Feeder voltage regulation refers to the management of voltages on a feeder with varying load conditions. Regardless of nominal operating voltage, a utility distribution system is designed to deliver power to consumers within a predefined voltage range. Under normal conditions, the service and utilization voltages must remain within ANSI standard C84.1-2011 limits, defined as Range A. On a 120V base, this service range is defined as 114–126V and utilization range is 110-126V. During high load conditions, the source voltage at the substation is at the higher end of this range and the service voltages at the end of the feeder are at the lower end of the range.

VAR Regulation. Nearly all power system loads require a combination of real power (watts) and reactive power (VARs). Real power must be supplied by a generator while reactive power can be supplied either by a generator with VAr capabilities, or a local VAR supply, traditionally a capacitor. Delivery of reactive power from a remote VAR supply results in additional feeder voltage drop and losses due to increased current flow, so utilities prefer to deliver reactive power from a local source. Since demand for reactive power is higher during heavy load conditions than light load conditions, VAR supply on a distribution feeder is regulated or controlled by switching capacitors on during periods of high demand and off during periods of low demand. As with voltage control, there are both feeder design considerations and operating considerations.

The ADMS that we are in the process of implementing is capable of running the IVVO application in several different operating modes: Voltage Control, Peak Reduction, VAr Control, and Conservation Voltage Reduction (CVR), which we explain below.

- *Voltage Control mode* functions to optimize voltage on the feeder around standard operating voltages – maintaining adequate service voltage for all customers. This mode is generally a secondary operating mode of IVVO, and only used to establish the voltage boundaries within which the other operating modes must stay within. As penetration of Distributed Energy Resources (DER) grows, Voltage Control will become more common as a primary control mode to manage the expanded range of distribution system voltage caused by DER. Traditionally, with only load on a feeder, the Voltage Control objective was to raise voltage at times of heavy load in order for voltage to remain within the acceptable range. With DER causing reverse power flow and raising voltages during times of light loading, voltage control schemes must now both raise and lower voltage.
- *Peak Reduction mode* serves to reduce load only during peak load events. It is a manually triggered mode that reduces system voltage to a targeted value to reduce load on the system for a short duration – typically one or two hours.

This peak reduction tool can be used in large operating regions, such as Minnesota as a whole, or tactically by feeder, substation, or other targeted area.

- *VAr Control mode* seeks to reduce system losses and save energy by optimizing power factor on each distribution feeder.
- *CVR mode* seeks energy savings through reduced operating voltages. CVR mode uses the Load Tap Changer (LTC) or Voltage Regulator inside the substation to lower voltage on the feeder. This lower operating voltage results in small energy savings for most customers on a feeder. In CVR mode, the system is often also run in VAr Control mode – hence the term, "Integrated Volt/VAr Optimization" or IVVO.

In PSCo, we will be using CVR as the primary operational mode, as is discussed in the PSCo docket, with VAr Control as the secondary mode. However, IVVO can be any combination of the four operating modes.

Since 2010, we have been doing VAr Control through our SmartVAR program in Minnesota, which has provided benefits to the grid and our customers.[1] SmartVAR is presently managed through a specific system and will ultimately be transitioned to our ADMS, where we will technically have the ability to implement other IVVO objectives on the Minnesota system. However, there are important considerations involved in determining IVVO application on the system – some of which are technical, and others are about maximizing value for customers.

While the preliminary analysis we have done on the Minnesota system shows that CVR mode may deliver energy savings comparable to the PSCo system, our analysis did not examine the breadth of CVR Factors that vary feeder by feeder; rather, it relied on a representative CVR Factor and a simple extrapolation of the Wilson Substation information to the entire Minnesota system. We know that the different types of voltage control are affected by a variety of factors throughout the distribution network. The following key differences in feeder design between Minnesota and Colorado have factored into our decision thus far to deploy IVVO differently in these two operating areas:

- *The system design in Colorado uses shorter feeders with larger conductor to support a denser load.* Larger conductor size has lower impedance, which means that the voltage drop across the wire is reduced – making the system more capable of CVR; higher load density on each feeder means that the net impact from IVVO on a

[1] *See* IN THE MATTER OF THE PETITION OF NORTHERN STATES POWER COMPANY, A MINNESOTA CORPORATION, FOR APPROVAL OF TWO PROPOSED ENERGY INNOVATION CORRIDOR PROJECTS IN THE CENTRAL CORRIDOR UTILITY ZONE AND DEFERRED ACCOUNTING TREATMENT FOR COSTS INCURRED AFTER JANUARY 1, 2010 (Docket No. E002/M-09-1488).

per-feeder basis can be greater. As a result, the PSCo feeder design is more amenable to CVR.

- *The standard substation bus voltage is different.* In PSCo, the standard bus voltage is 125V, which is at the very high end of the ANSI C84.1 standard for distribution voltage. This higher starting voltage allows for a greater range of voltage reduction to be done with IVVO, giving more opportunity for energy savings while maintaining adequate service quality to customers. In the NSP-Minnesota service area, average bus voltage is typically 123.5 volts. This, along with smaller wire size, reduces the potential impact of CVR for Minnesota.
- *AMI is a beneficial component of IVVO.* AMI meters used as 'bellwether' meters are the least cost method to provide voltage inputs to ADMS at key locations across the grid. For IVVO to be successfully and safely operated, voltage endpoints are necessary at ten end points on each feeder; without AMI, this data would need to be gathered in other ways. The preliminary Minnesota analysis we provide with our response to Department Information Request No. 3 shows the use of Voltage Sensors, which are approximately ten times the cost per unit than an AMI meter. Our PSCo implementation of IVVO relies on AMI as a critical part of the deployment to minimize costs and provide the voltage data.
- *Additional considerations.* Our sample set, using a simple average generated from the Wilson Substation pilot, may not be representative of the potentially wide range of CVR Factors existing on the system.[2] This study also did not take into account higher anticipated levels of DER, as we explained in CEO-55, attached as Attachment E to Department Information Request No. 3 in this docket. And, the analysis did not take into consideration the declining use per customer driven by organic and explicit conservation measures; declining customer use diminishes the potential benefits of IVVO.

For these reasons, we have not proposed IVVO at this time for Minnesota. As we have expressed over time, we are committed to implementing grid modernization at the speed of value for our customers. For the reasons we have discussed, we believe our customers will realize greater value from the Fault Location Isolation and Restoration (FLISR) project and the Time of Use Rate Pilot we have proposed – and continuing to reap the benefits of the present Minnesota IVVO – Voltage Control/SmartVAR functionality.

[2] CVR Factors on NSP-Minnesota feeders vary widely and can range from 0.4 to 1.5, depending on the type of load on the feeder. Commercial and industrial are on the lower end of this range and highly resistive loads such as old lighting are on the higher end. With the transition to LED lighting and other constant power devices, the CVR Factor is expected to decline year-over-year as customers make the transition to more energy efficient equipment.

Preparer: John D. Lee
Title: Senior Director
Department: Distribution Electric Engineering
Telephone: (303) 571-3515
Date: January 19, 2018

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Public Comments

Docket No. E002/M-17-776

Dated this 5th day of February 2018

/s/Sharon Ferguson

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