

January 8, 2015

Dan P. Wolf  
Executive Secretary  
Minnesota Public Utilities Commission  
121 7th Place East, Suite 350  
St. Paul, Minnesota 55101-2147

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**  
Docket No. E002/M-14-1043

Dear Mr. Wolf:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources, in the following matter:

Petition for Approval of the First Amendment to the Interconnection Agreement with  
Best Power Intl., LLC

The petition was filed on December 19, 2014 by:

Paul J. Lehman  
Manager, Regulatory Compliance & Filings  
Xcel Energy  
414 Nicollet Mall  
Minneapolis, MN 55401

The Department recommends approval of the Amended Interconnection Agreement. The Department is available to answer any questions the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ SAMIR OUANES  
Rates Analyst

SO/ja  
Attachment

**BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION**

**COMMENTS OF THE  
MINNESOTA DEPARTMENT OF COMMERCE  
DIVISION OF ENERGY RESOURCES**

DOCKET NO. E002/M-14-1043

**I. SUMMARY OF XCEL ENERGY'S PETITION**

On December 19, 2014, Northern States Power Company, d/b/a Xcel Energy (Xcel or the Company) filed a *Petition for Approval of the First Amendment to the Interconnection Agreement (First IA Amendment) with Best Power Intl, LLC (Best Power)* and the Order of St. Benedict at St John's Abbey (St. John's).

Best Power owns and operates a 400 kW solar photovoltaic electrical generation facility (Best Power project) located at St John's in Stearns County in Collegeville, Minnesota.

As discussed further below, the Minnesota Public Utilities Commission (Commission) recently approved a Renewable Development Fund (RDF) cycle four grant award for the extension (Project) of the Best Power project. Best Power will be using a new technology to add 198 kW to the existing 400 kW solar facility.<sup>1</sup>

**II. BACKGROUND**

The Best Power project was selected by the RDF Board through the RDF third funding cycle request for proposal process. The RDF itself was established to further the statutory goal of renewable energy development. On April 1, 2008, the Commission approved the Best Power project for funding, as recommended by the RDF Board.<sup>2</sup>

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<sup>1</sup> As explained by Xcel, the generation output of the Best Power project will be limited by the 500 kW rating of the existing inverter.

<sup>2</sup> Source: *Order Approving Selected RDF Projects with Exceptions and Revising Procedures for Future Cycles*, Docket No. E-002/M-07-675.

On December 30, 2009, the Company filed a petition for approval of a Power Purchase Agreement for solar power with Best Power (PPA).<sup>3</sup> Xcel also requested approval of an interconnection agreement with Best Power and the Order of St. John's.

On June 25, 2010, the Commission approved the Company's petition.

On November 29, 2012, Xcel filed a notice of its intent to proceed with the fourth funding cycle of its RDF program and a petition for approval of standard grant contracts for certain RDF projects.<sup>4</sup>

On February 6, 2013, the Commission issued its *Order Approving Requests for Proposals (RFP) and Standard Contracts as Modified (2013 Order)*. The 2013 Order set several requirements for the RFP process and required Xcel to submit its final project selections to the Commission for approval.

Xcel issued its RFP on February 15, 2013, and accepted proposals through April 15, 2013. The Company received 67 qualifying proposals with a combined funding request of \$133.5 million, more than four times the available funding.

On July 29, 2013, Xcel filed its RDF Cycle 4 selection report, recommending 20 projects with a total price tag of \$30 million. Xcel requested that the Commission approve its recommended grant awards and list of reserve projects. Xcel also requested authority to terminate contract negotiations that the Company reasonably believed had reached an impasse and to move forward with a reserve project.

On January 20, 2014, Xcel filed a letter stating that additional funds had accumulated in the RDF account during 2013 and recommending that the Commission approve another \$12 million to fund reserve projects and increase higher-education grants.

On March 11, 2014, the Commission issued its *Order Approving RDF Grant Recommendations, Establishing Funding Procedures, and Requiring Compliance Filings (2014 Order)*. In its 2014 Order, the Commission approved Xcel's December 12, 2013 selection of energy production (EP) and research and development (R&D) projects, recommendations for block grant awards to institutions of higher education, and reserve list. The Commission also required Xcel to apply the additional funding proposed in Xcel's January 20, 2014 letter to fund the projects numbered 1-9 on Xcel's reserve list.

As shown in Attachment C of the 2014 Order, the Project is ranked number 9 on Xcel's reserve list. The 4<sup>th</sup> RDF cycle funding amount granted to the Project is \$172,213. The Company described the Project as follows:<sup>5</sup>

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<sup>3</sup> Docket No. E002/M-09-1481.

<sup>4</sup> Docket No. E002/M-12-1278.

**Project Goal:** To expand the St. John's Solar Farm and incorporate an on-site side-by side comparison of competing solar technologies: linear axis tracker technology currently in place and fixed tilt technology of the new array.

**Project Description:** A static, ground-mounted photovoltaic (PV) facility will be constructed adjacent to the existing St. John's Solar Farm in Collegeville, Minnesota. The project will be an expansion of an existing 400 kW<sub>DC</sub> PV facility that was funded from the 3rd RDF cycle and was completed in 2009. The array will utilize approximately 660 panels which will be mounted on racking supported by driven galvanized steel piles. The new array will utilize the existing interconnect agreement and existing PPA with Xcel Energy. These agreements as well as the existing inverter were originally planned and permitted to deliver a maximum power rate of 500 kW<sub>AC</sub>. The existing capacity is currently 400 kW<sub>DC</sub> or 320 kW<sub>AC</sub>. The incremental capacity added to the system will be 198 kW<sub>DC</sub> or 158 kW<sub>AC</sub> which will result in a total installed capacity of 478 kW<sub>AC</sub> when the addition is completed.

The St. John's Solar Park will continue to be owned, operated and maintained by Best Power Int'l, LLC (BPI). BPI has a 20-year lease in place with St. John's Abby. BPI currently has a valid PPA with Xcel Energy which will expire in 2030 to sell the energy produced by the entire facility up to 500 kW. Data obtained from the two arrays will be made public to allow researchers and developers to evaluate which technology is best suited for energy needs and constraints of a particular interconnection location.

On June 11, 2014, Xcel filed a petition for Approval of the First Amendment to a Power Purchase Agreement (Amended PPA) with Best Power.<sup>5</sup> The Amended PPA proposed to increase the Best Power project's committed nameplate capacity from 400 kW to 500 kW.

On September 8, 2014, the Commission approved the Amended PPA.

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<sup>5</sup> Source: Attachment E (page 7 of 60) of Xcel's July 29, 2013 Selection Report in Docket No. E002/M-12-1278.

<sup>6</sup> Docket No. E002/M-14-490.

On October 2, 2014, Xcel filed the Project's executed grant contract with Best Power pursuant to the 2014 Order.<sup>7</sup> This grant contract was filed with the Commission for informational purposes only as it contains no changes from the Commission-approved standard grant contract for energy production projects.

### III. DEPARTMENT ANALYSIS

The Department recommends approval of Xcel's petition for the following reasons.

As identified in the previous section, the Commission approved:

- the Interconnection Agreement to allow Best Power to interconnect and operate a generation system with a total nameplate capacity of 400 kW or less in parallel with Xcel,<sup>8</sup>
- the fourth cycle RDF grant to expand the Best Power project from 400 kW connected to 500 kW connected, and
- the Amended PPA to increase the Best Power project's committed nameplate capacity from 400 kW to 500 kW.

The Commission-approved Interconnection Agreement was specific to a solar generation system limited to a nameplate capacity of 400 kW. As a result, the Interconnection Agreement would need to be amended to allow for the interconnection of a solar generation system of up to 500 kW.<sup>9</sup>

In its review of the First IA Amendment, the Department noted that it was incomplete. Following discovery from the Department, Xcel provided and the Department attached to these comments the complete First IA Amendment.<sup>10</sup>

The Department's review indicated that the changes made to the Commission-approved Interconnection Agreement reflect the need to allow for the interconnection of a solar generation system of up to 500 kW.

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<sup>7</sup> Docket No. E002/M-12-1278.

<sup>8</sup> Source: Article I.A of the Interconnection Agreement (page 1 of Attachment 2), Xcel's March 3, 2010 corrected petition in Docket No. E002/M-09-1481 (page 47 of 86).

<sup>9</sup> Source: Xcel's December 19, 2014 petition in Docket No. E002/M-14-1043 (page 9 of 18).

<sup>10</sup> See Attachment 1 to these comments.

The Department also notes that the First IA Amendment clearly specifies that:<sup>11</sup>

Interconnection Customer [Best Power] will be responsible for any costs incurred by Xcel Energy to modify the Xcel Energy distribution system, including any upgrades to metering, as a result of increasing the Nameplate Capacity of the Generation System from 400 kW to 500 kW.

Therefore, the Department recommends that the Commission approve the proposed First IA Amendment attached to these comments.

#### **IV. DEPARTMENT RECOMMENDATION**

The Department recommends that the Commission approve the proposed First IA Amendment attached to these comments.

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<sup>11</sup> Source: Attachment 1 to these comments, page 2 of 7.

## Attachment 1

Complete First Amendment to the Interconnection Agreement *with* Best Power  
and St. John's

**FIRST AMENDMENT  
TO INTERCONNECTION AGREEMENT**

**For the Interconnection of Extended Parallel Distributed Generation Systems With  
Electric Utilities**

**THIS FIRST AMENDMENT TO INTERCONNECTION AGREEMENT (“First Amendment”)** is entered into among Northern States Power Company, a Minnesota corporation (“Xcel Energy”), Best Power Intl., LLC, a Minnesota limited liability company (“Interconnection Customer”) and Order of Saint Benedict, a Minnesota nonprofit corporation (“Local EPS Operator”). Xcel Energy, Interconnection Customer, and Local EPS Operator are hereinafter referred to individually as a “Party” and collectively as the “Parties.”

**WITNESSETH:**

**WHEREAS**, Xcel Energy, Interconnection Customer and Local EPS Operator are parties to that certain Interconnection Agreement signed in December 2009 as previously approved by the Minnesota Public Utilities Commission (“MPUC”) in Docket No. E002/M-09-1481 by order dated June 25, 2010 (the “Interconnection Agreement”);

**WHEREAS**, Interconnection Customer and Local EPS Operator desire to increase the nameplate capacity of the facility’s Nameplate Capacity from 400 to 500 kW of solar generation and have entered into an amendment to the Power Purchase Agreement with Xcel Energy which was approved by the MPUC in Docket No. E002/M-14-490 by order dated September 8, 2014;

**WHEREAS**, the Interconnection Agreement is specific to a solar Generation System limited to a Nameplate Capacity of 400 kW and that to implement the amended Power Purchase Agreement the Interconnection Agreement needs to be amended to allow for interconnection of a solar Generation System of up to 500 kW;

**NOW, THEREFORE**, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the Parties, and intending to be legally bound hereby, the Parties agree as follows:

1. **Capitalized Terms.** Capitalized terms used but not defined herein shall have the meanings set forth in the Interconnection Agreement.
2. **Modification of limit on Nameplate Capacity.**
  - (a) Article I.A of the Interconnection Agreement is amended by deleting the prior Article I.A and substituting a new Article I.A which is as follows:
    - A. Establishment of Point of Common Coupling. This Agreement is intended to provide for the Interconnection Customer to interconnect and operate a



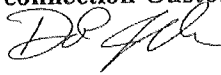
Generation System with a total Nameplate Capacity of 500 kW or less in parallel with Xcel Energy at the location identified in Exhibit C and shown in the Exhibit A one-line diagram.

- (b) Articles II.F, II.H, and II.P of the Interconnection Agreement are amended by deleting the prior Articles II.F, II.H, and II.P and substituting new Articles II.F, II.H and II.P which are as follows:
    - F. “Generation” is the 500 kW solar photovoltaic electrical generation facility owned by Interconnection Customer at the location described in Exhibits A and C.
    - H. “Generation System” is the 500 kW solar photovoltaic generation facility, controls, relays, switches, breaks, transformers, inverters and associated wiring and cables, including the Generator Transmission Facility, up to the Point of Interconnection owned by Interconnection Customer.
    - P. “Nameplate Capacity” is the 500 kW total nameplate capacity rating of the Generation included in the Generation System.
  - (c) Exhibit A to the Interconnection Agreement is amended by deleting the Exhibit A attached thereto and replacing it with the attached Exhibit A-1.
  - (d) Exhibit C to the Interconnection Agreement is amended by supplementing the Exhibit C with the attached Exhibit C-1.
  - (e) Interconnection Customer will be responsible for any costs incurred by Xcel Energy to modify the Xcel Energy distribution system, including any upgrades to metering, as a result of increasing the Nameplate Capacity of the Generation System from 400 kW to 500 kW.
3. **MPUC Approval.** This First Amendment is subject to review and approval by the MPUC. The Parties agree to support and defend this First Amendment including preparing responses to any information requests and filing any supporting documents and testimony. This First Amendment shall be contingent on MPUC approval of this First Amendment without any material modifications or change.
4. **No Other Amendments.** Except as specifically provided in this First Amendment and subject to MPUC Approval, no other amendments, revisions or changes are made or have been made to the Interconnection Agreement. All other terms and conditions of the Interconnection Agreement remain in full force and effect, and the Parties hereby ratify and confirm their rights and obligations under the Interconnection Agreement, as amended hereby.
7. **Conforming References.** Upon the effectiveness of this First Amendment, each reference in the Interconnection Agreement to “this Agreement” or words of like import, shall mean and be a reference to the Interconnection Agreement as amended hereby.


8. **Counterparts.** This First Amendment may be executed in one or more counterparts, each of which shall be considered an original instrument, but all of which shall be considered one and the same agreement, and shall become binding when one or more counterparts have been signed by each of the Parties and delivered to each of them.
9. **Applicable Law.** Subject to applicable federal law, this First Amendment shall be governed by the laws of the State of Minnesota.

IN WITNESS WHEREOF, the Parties have caused this First Amendment to be executed as of the day and year shown below.

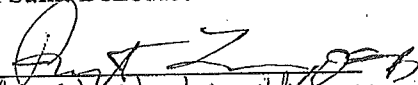
**Interconnection Customer**

By:   
Name: Dwight Jelle  
Title: President  
Date: 12/15/14

**NORTHERN STATES POWER  
COMPANY, a Minnesota Corporation,  
Xcel Energy Services Inc. as agent for  
Northern States Power Company**

By:   
Name: Joel Limberg  
Title: Area Engineering Mgr  
Date: 12/15/2014

**Order of Saint Benedict**

By:   
Name: benedict Lew  
Title: Treasurer  
Date: 12/15/2014



ST. JOHN'S SOLAR FARM 2014  
Collegeville, Minnesota

PRELIMINARY CD SET  
ISSUED NOT FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE: PAUL BISSON LICENSE # 26752 DATE: 8-13-14

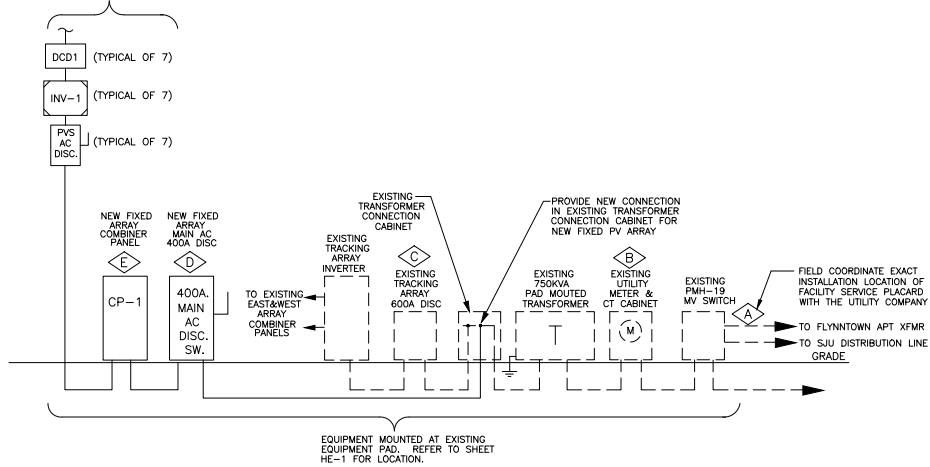
NO.	REVISION	DATE
	REVISED XCEL SET	8-18-14
	REVISED UTI METER LABEL	9-11-14
	ELECTRICAL CONST. SET	10-8-14

**PV SYSTEM ONE-LINE WIRING DIAGRAM**

JOB NO: 589103DE  
DATE: 8-13-2014  
DESIGN: SJD  
CHECKED: D.P.B./D.E.  
SCALE: AS NOTED  
SHEET:

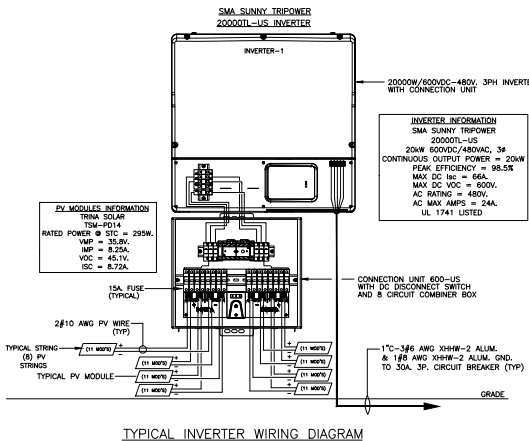
SYSTEM SUMMARY	
MODULE MODEL	TRINA SOLAR TSM-PD14
MODULE STC DC RATING	295 WATTS
MODULE PER SOURCE CIRCUIT	11 MODULES PER STRING
TOTAL MODULE COUNT	616
DC SYSTEM VOLTAGE	600V.
MAXIMUM SYSTEM VOLTAGE	480V.
TOTAL STC-DC SYSTEM SIZE	181,720 W.
TOTAL AC SYSTEM SIZE	140,000W.
INVERTER MODEL NO.	SMA SUNNY TRIPOWER 20000TL-US (OR EQUIVALENT)
TOTAL INVERTER COUNT	7
RACKING SYSTEM	DPW
AZIMUTH ANGLE	0°
MODULE TILT ANGLE	35°

(7) DC CONNECTION UNIT/INVERTERS  
(8) STRINGS PER DC CONNECTION UNIT  
(11) MODULES PER STRING  
(88) TOTAL MODULES PER INVERTER (EQUIPMENT LOCATED AT ARRAY)

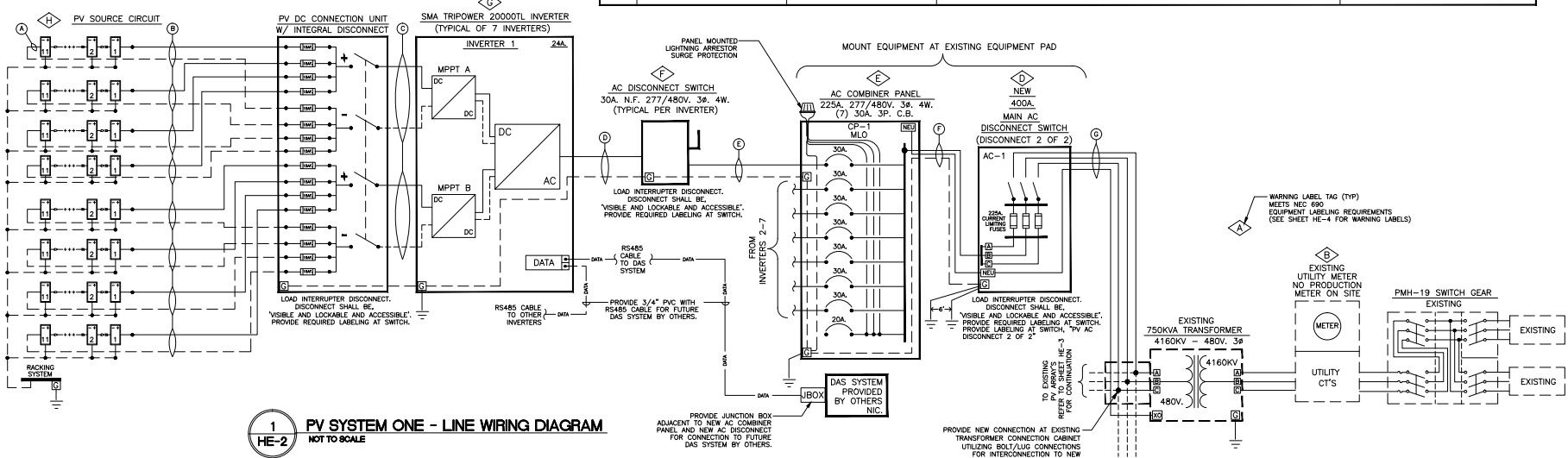


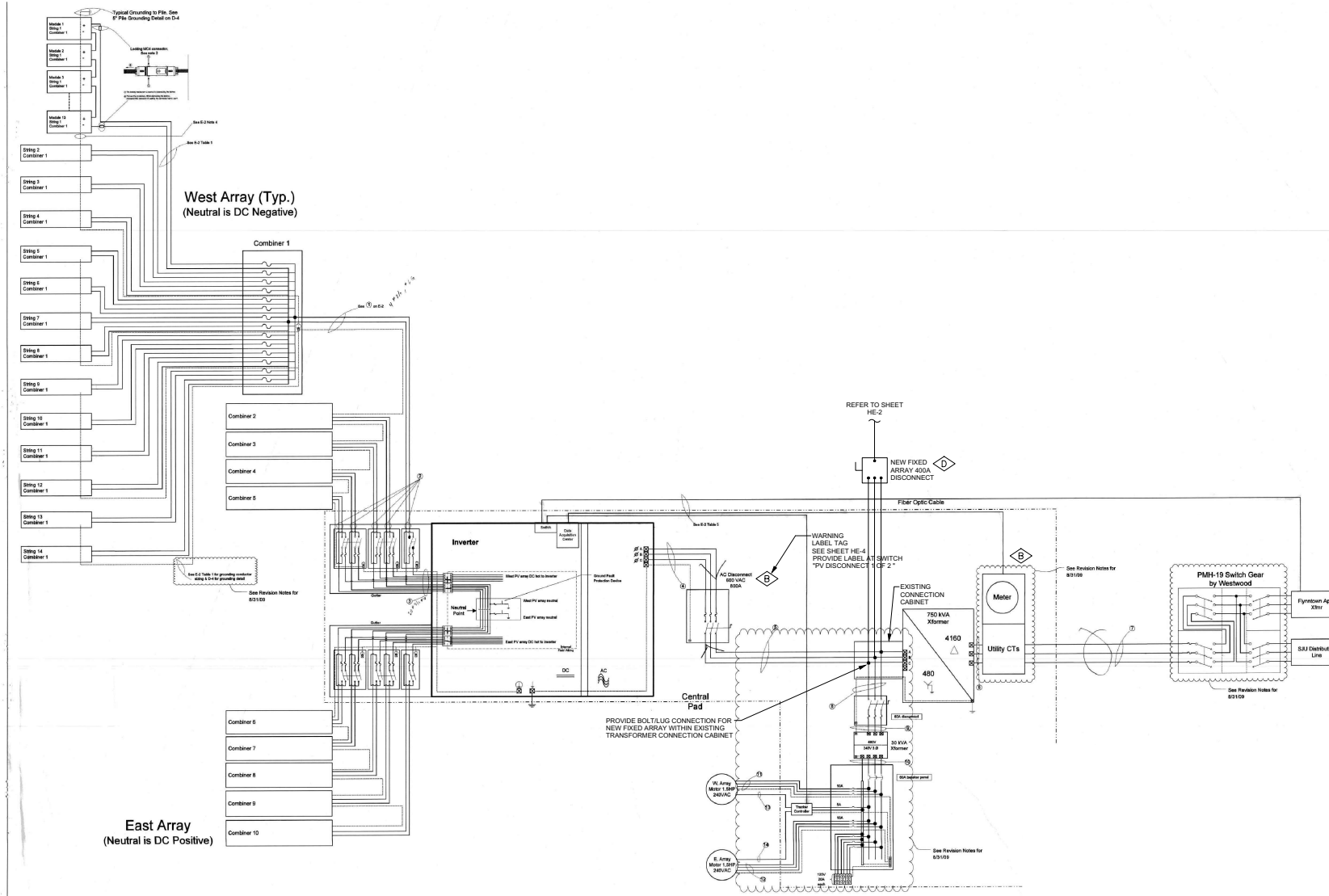
**2 PV SYSTEM EQUIPMENT RISER DIAGRAM**  
HE-2 NOT TO SCALE

PV SYSTEM WIRE SCHEDULE				
ID	DESCRIPTION	FEEDER & CONDUIT SIZES	NOTES	
(A)	STRING WIRING	#10 AWG PV WIRE	PROVIDE WARNING LABELLING PER NEC REQ.	
(B)	MODULES	(2) #10 AWG PV WIRE	PROVIDE WARNING LABELLING PER NEC REQ.	
(C)	DC CONNECTION UNIT	(2) #10 AWG THHW-2 CU, (1) #10 AWG CU GND.	PROVIDE WARNING LABELLING PER NEC REQ.	
(D)	INVERTERS 1-7	1" C, (3) #6 AWG XHHW-2 ALUM, (1) #8 AWG ALUM GND.		
(E)	AC DISCONNECT SWITCH	1" C, (3) #6 AWG XHHW-2 ALUM, (1) #8 AWG ALUM GND.	* (7) INVERTERS FED TO PV COMBINER PANEL	
(F)	AC COMBINER PANEL CP-1	3 1/2" C, (3) #300 AWG XHHW-2 ALUM, (1) #300 AWG XHHW-2 NEU, (1) #2 AWG ALUM GND.		
(G)	MAIN AC DISCONNECT SWITCH	3 1/2" C, (3) #300 AWG XHHW-2 ALUM, (1) #300 AWG XHHW-2 NEU, (1) #2 AWG ALUM GND.	* FEEDER SIZE BASED ON 2% VOLTAGE DROP	



**1 PV SYSTEM ONE - LINE WIRING DIAGRAM**  
HE-2 NOT TO SCALE





**1** EXISTING PV SYSTEM - ELECTRICAL SCHEMATIC  
HE-3 NOT TO SCALE

**NOTE:**  
DRAWING PROVIDED FOR REFERENCE ONLY.  
DOCUMENT NOT PRODUCED BY HUNT ELECTRIC

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE: PAUL EYSSON  
LICENSE # 26752 DATE: 8-13-14

NO.	REVISION	DATE
	REVISED XCEL SET	8-18-14
	REVISED UT METER LABEL	9-11-14
	ELECTRICAL CONST. SET	10-8-14

THESE DOCUMENTS HAVE BEEN PREPARED BY HUNT ELECTRIC CORPORATION WITH THE EXPRESS UNDERSTANDING THAT THE QUALITY OF THE WORK REPRESENTED HEREIN IS THE RESPONSIBILITY OF THE CLIENT. CONSULTATION OF THESE DOCUMENTS WITHOUT THE ASSISTANCE OF HUNT ELECTRIC CORPORATION OR WITHOUT THE ASSISTANCE OF ANY OTHER PROFESSIONAL ENGINEER IS PROHIBITED.

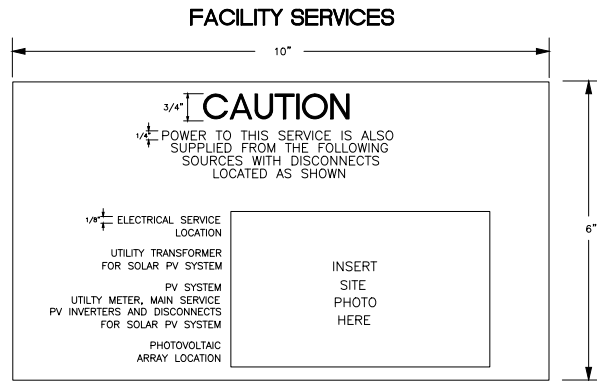
**EXISTING PV SYSTEM ELECTRICAL SCHEMATIC**

JOB NO:	59910DE
DATE:	8-13-2014
DESIGN:	BJD
CHECKED:	D.P.B./D.E.
SCALE:	AS NOTED
SHEET:	

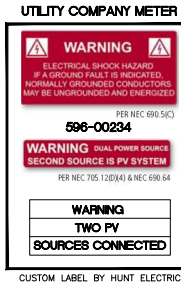


ST. JOHN'S SOLAR FARM 2014  
Collegeville, Minnesota

PRELIMINARY CD SET  
ISSUED NOT FOR CONSTRUCTION



CUSTOM SIGN PRODUCED BY HUNT ELECTRIC

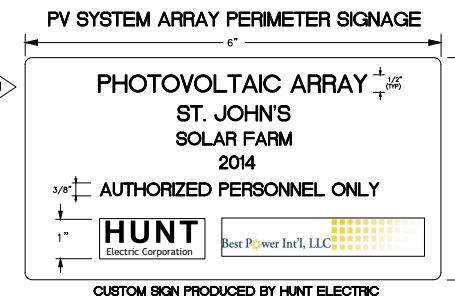
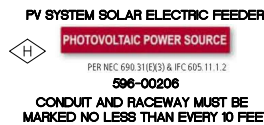
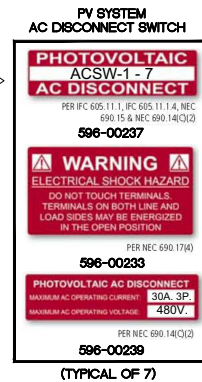


LABEL AND MARKINGS GENERAL NOTE:

A. SIGNS PRODUCED BY HUNT ELECTRIC TO BE A IMPACT ACRYLIC SIGN WITH BLACK PRINTED LETTERS. TYPICAL. ALL OTHER LABELS TO BE PRE-PRINTED SOLAR LABELS RED BACKING WITH WHITE LETTERS.

LABEL AND MARKINGS LEGEND:

- ◇ A PROVIDES THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC DISCONNECTING MEANS. THIS PLAQUE SHALL BE APPLIED AT THE MAIN PHOTOVOLTAIC AC SERVICE DISCONNECTING MEANS; 1 PER POCC (1 TOTAL).
- ◇ B WARNING LABEL FOR UTILITY COMPANY METER; 1 PER UTILITY METER. (1 TOTAL).
- ◇ C EXISTING PHOTOVOLTAIC SYSTEM MAIN AC DISCONNECT SWITCH WARNING LABEL WITH SYSTEM SPECIFICATIONS, APPLIED TO PHOTOVOLTAIC MAIN AC DISCONNECTS; 1 PER AC DISCONNECT (1 TOTAL).
- ◇ D NEW PHOTOVOLTAIC SYSTEM MAIN AC DISCONNECT SWITCH WARNING LABEL WITH SYSTEM SPECIFICATIONS, APPLIED TO PHOTOVOLTAIC MAIN AC DISCONNECTS; 1 PER AC DISCONNECT (1 TOTAL).
- ◇ E PHOTOVOLTAIC SYSTEM AC COMBINER PANEL WARNING LABEL, APPLIED TO THE AC COMBINER PANEL; 1 PER PANEL (1 TOTAL).
- ◇ F PHOTOVOLTAIC SYSTEM AC DISCONNECT WARNING LABEL WITH SYSTEM SPECIFICATIONS, APPLIED TO ALL PHOTOVOLTAIC AC DISCONNECTS; 1 PER AC DISCONNECT (7 TOTAL).
- ◇ G PHOTOVOLTAIC INVERTER WARNING LABELS APPLIED TO ALL INVERTERS; 1 PER INVERTER (7 TOTAL).
- ◇ H PHOTOVOLTAIC ELECTRICAL SYSTEM WARNING, IDENTIFYING ENERGIZED ELECTRICAL LINES THAT CONNECT THE SOLAR MODULES TO THE INVERTER. ELECTRICAL SHOCK HAZARD, DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM MAY BE ENERGIZED. 1 PER CONCEALED FEEDER MARKED EVERY 10 FEET.
- ◇ J LABEL FOR SECURITY OF PV SYSTEM ARRAY PERIMETER; INSTALL SIGNAGE AT PERIMETER OF ARRAY.



I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DANIEL PAUL BISSARD LICENSE # 28752 DATE: 8-13-14

NO.	REVISION	DATE
	REVISED XCEL SET	8-18-14
	REVISED UT METER LABEL	9-11-14
	ELECTRICAL CONST. SET	10-8-14

WARNING LABEL SHEET

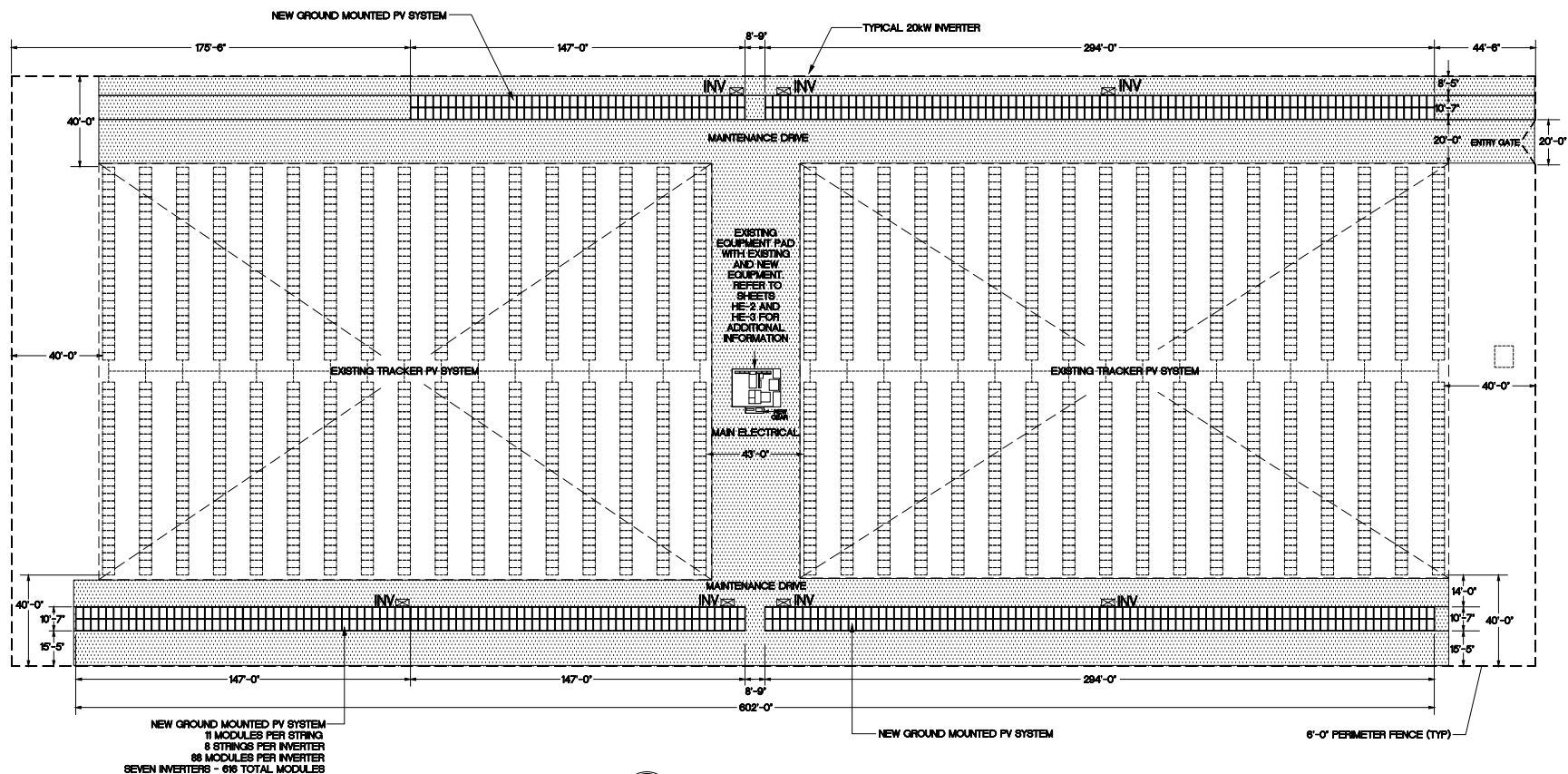
JOB NO. 599150E  
DATE: 8-13-2014  
DESIGN: SJG  
CHECKED: D.P.B.D.E.  
SCALE: AS NOTED  
SHEET:



**GENERAL NOTES**

- REFER TO DETAIL 2/HE-2 (PV SYSTEM RISER) FOR BASIC SCOPE OF WORK SHOWING INTERCONNECTION OF EXISTING AND NEW PV SYSTEMS.
- REFER TO DETAIL 1/HE-2 (PV SYSTEM ONE-LINE) FOR DETAILED INFORMATION INCLUDING FIXED PV ARRAY, CABLING AND EQUIPMENT.
- REFER TO SHEET HE-3 (ISSUED FOR REFERENCE ONLY) FOR EXISTING TRACKING PV SYSTEM AND AC EQUIPMENT INFORMATION.
- REFER TO DIM RACKING DRAWINGS FOR RACKING LAYOUT DIMENSIONS. INFORMATION ON THIS SHEET FOR SITE LAYOUT ARE APPROXIMATE.

SYSTEM SUMMARY	
MODULE MODEL	TRINA SOLAR TSM-PD14
MODULE STC DC RATING	295 WATTS
MODULE PER SOURCE CIRCUIT	11 MODULES PER STRING
TOTAL MODULE COUNT	616
DC SYSTEM VOLTAGE	600V.
MAXIMUM SYSTEM VOLTAGE	480V.
TOTAL STC-DC SYSTEM SIZE	181,720 W.
TOTAL AC SYSTEM SIZE	140,000W.
INVERTER MODEL NO.	SMA SUNNY TRIPOWER 2000TL-US (OR EQUIVALENT)
TOTAL INVERTER COUNT	7
RACKING SYSTEM	DFW
AZIMUTH ANGLE	0°
MODULE TILT ANGLE	35°



NEW GROUND MOUNTED PV SYSTEM  
11 MODULES PER STRING  
8 STRINGS PER INVERTER  
88 MODULES PER INVERTER  
SEVEN INVERTERS - 616 TOTAL MODULES

1 PV ARRAY LAYOUT  
SCALE: 1" = 20'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE: PAUL BISSON  
LICENSE # 26752 DATE: 8-13-14

NO.	REVISION	DATE
	REVISED XCEL SET	8-18-14
	REVISED UT METER LABEL	9-11-14
	ELECTRICAL CONST SET	10-8-14

THESE DOCUMENTS HAVE BEEN PREPARED BY AN ENGINEER OR ARCHITECT REGISTERED WITH THE MINNESOTA BOARD OF PROFESSIONAL ENGINEERS AND ARCHITECTS. THE QUALITY OF THE WORK REPRESENTED HEREIN IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT. DISTRIBUTION OF THIS WORK UNDER ANY OTHER CIRCUMSTANCES IS PROHIBITED.

PV ARRAY LAYOUT

JOB NO.	59910DE
DATE	8-13-2014
DESIGN	SJD
CHECKED	D.P.B.D.E.
SCALE	AS NOTED
SHEET	



## 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  
Comments**

**Docket No. E002/M-14-1043**

Dated this 8<sup>th</sup> day of January 2015

**/s/Sharon Ferguson**

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Christopher	Anderson	canderson@allete.com	Minnesota Power	30 W Superior St  Duluth, MN 558022191	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Julia	Anderson	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota St St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_14-1043_M-14-1043
James J.	Bertrand	james.bertrand@leonard.com	Leonard Street & Deinard	150 South Fifth Street, Suite 2300  Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Michael	Bradley	mike.bradley@lawmoss.com	Moss & Barnett	150 S. 5th Street, #1200  Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Jeffrey A.	Daugherty	jeffrey.daugherty@centerpointenergy.com	CenterPoint Energy	800 LaSalle Ave  Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
James	Denniston	james.r.denniston@xcenergy.com	Xcel Energy Services, Inc.	414 Nicollet Mall, Fifth Floor  Minneapolis, MN 55401	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Ian	Dobson	ian.dobson@ag.state.mn.us	Office of the Attorney General-RUD	Antitrust and Utilities Division 445 Minnesota Street, BRM Tower St. Paul, MN 55101	Electronic Service 1400	No	OFF_SL_14-1043_M-14-1043
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 500  Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Burl W.	Haar	burl.haar@state.mn.us	Public Utilities Commission	Suite 350 121 7th Place East St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_14-1043_M-14-1043
Michael	Hoppe	il23@mtn.org	Local Union 23, I.B.E.W.	932 Payne Avenue  St. Paul, MN 55130	Electronic Service	No	OFF_SL_14-1043_M-14-1043



First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tiffany	Hughes	Regulatory.Records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7  Minneapolis, MN 554011993	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Alan	Jenkins	aj@jenkinsatlaw.com	Jenkins at Law	2265 Roswell Road Suite 100 Marietta, GA 30062	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Richard	Johnson	Rick.Johnson@lawmoss.com	Moss & Barnett	150 S. 5th Street Suite 1200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Mark J.	Kaufman	mkaufman@ibewlocal949.org	IBEW Local Union 949	12908 Nicollet Avenue South  Burnsville, MN 55337	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Thomas G.	Koehler	TGK@IBEW160.org	Local Union #160, IBEW	2909 Anthony Ln  St Anthony Village, MN 55418-3238	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Douglas	Larson	dlarson@dakotaelectric.com	Dakota Electric Association	4300 220th St W  Farmington, MN 55024	Electronic Service	No	OFF_SL_14-1043_M-14-1043
John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	OFF_SL_14-1043_M-14-1043
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E  St. Paul, MN 55106	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Andrew	Moratzka	apmoratzka@stoel.com	Stoel Rives LLP	33 South Sixth Street Suite 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
David W.	Niles	david.niles@avantenergy.com	Minnesota Municipal Power Agency	Suite 300 200 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Richard	Savelkoul	rsavelkoul@martinsquires.com	Martin & Squires, P.A.	332 Minnesota Street Ste W2750  St. Paul, MN 55101	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Ken	Smith	ken.smith@districtenergy.com	District Energy St. Paul Inc.	76 W Kellogg Blvd  St. Paul, MN 55102	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Ron	Spangler, Jr.	rlspangler@otpc.com	Otter Tail Power Company	215 So. Cascade St. PO Box 496 Fergus Falls, MN 565380496	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Byron E.	Starns	byron.starns@leonard.com	Leonard Street and Deinard	150 South 5th Street Suite 2300 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
James M.	Strommen	jstrommen@kennedy-graven.com	Kennedy & Graven, Chartered	470 U.S. Bank Plaza 200 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Eric	Swanson	eswanson@winthrop.com	Winthrop Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_14-1043_M-14-1043
Lisa	Veith	lisa.veith@ci.stpaul.mn.us	City of St. Paul	400 City Hall and Courthouse 15 West Kellogg Blvd. St. Paul, MN 55102	Electronic Service	No	OFF_SL_14-1043_M-14-1043