Generation Interconnection
System Impact Study Report

For

PJM Generation Interconnection Request
Queue Position AB2-169

Pantego – Five Points 115kV
39 MW Capacity / 74 MW Energy

June / 2017

Introduction

This System Impact Study (SIS) has been prepared in accordance with the PJM Open Access Transmission Tariff, Section 205, as well as the System Impact Study Agreement between Invenergy Solar Development LLC, the Interconnection Customer (IC) and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Virginia Electric and Power Company (VEPCO).

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the IC. As a requirement for interconnection, the IC may be responsible for the cost of constructing Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an IC may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The IC is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The IC has proposed a solar generating facility located in Beaufort County, NC. The installed facilities will have a total capability of 74 MW with 39 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is 12/31/2018. **This study does not imply an ITO commitment to this in-service date.**

Point of Interconnection

AB2-169 will interconnect with the ITO transmission system via a new three breaker ring bus switching station that connects at the Pantego – Five Points 115kV line.

Cost Summary

The AB2-169 interconnection request will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$1,550,000
Direct Connection Network Upgrades	$5,500,000
Non Direct Connection Network Upgrades	$ 800,000
Allocation for New System Upgrades	$ 511,217.83
Contribution for Previously Identified Upgrades	$0
Total Costs	**$8,361,217.83**

Attachment Facilities

Generation Substation: Install metering and associated protection equipment. Estimated Cost $550,000.

Transmission: Construct approximately one span of 115 kV Attachment line between the generation substation and a new AB2-169 Switching Station. The estimated cost for this work is $1,000,000.

The estimated total cost of the Attachment Facilities is $1,550,000. It is estimated to take 18-24 months to complete this work. These preliminary cost estimates are based on typical engineering costs. A more detailed engineering cost estimates are normally done when the IC provides an exact site plan location for the generation substation during the Facility Study phase. These costs do not include CIAC Tax Gross-up. The single line is shown below in Attachment 1.

Direct Connection Cost Estimate

Substation: Establish the new 115 kV AB2-169 Switching Substation (interconnection substation). The estimated cost of this work scope is $5,500,000. It is estimated to take 24-36 months to complete this work.

Non-Direct Connection Cost Estimate

Transmission: Install transmission structure in-line with transmission line to allow the proposed interconnection switching station to be interconnected with the transmission system. Estimated cost is $800,000 and is estimated to take 24-30 months to complete.

Remote Terminal Work: During the Facilities Study, ITO's System Protection Engineering Department will review transmission line protection as well as anti-islanding required to accommodate the new generation and interconnection substation. System Protection Engineering will determine the minimal acceptable protection requirements to reliably interconnect the proposed generating facility with the transmission system. The review is based on maintaining system reliability by reviewing ITO's protection requirements with the known transmission system configuration which includes generating facilities in the area. This review may determine that transmission line protection and communication upgrades are required at remote substations.

System Reinforcements

PJM OATT 217.3 outlines cost responsibility for Network Upgrades and as the minimum amount of Network Upgrades required to resolve a single reliability criteria violation will not meet or exceed $5,000,000 such costs shall be allocated to those Interconnection Requests in the New Services Queue that contribute to the need for such upgrades. Such allocations shall be made in proportion to each Interconnection Request's megawatt contribution to the need for these upgrades subject to the rules for minimum cost allocation thresholds in the PJM Manuals. For the purpose of applying the $5,000,000 threshold, each reliability criteria violation shall be considered separately.

Reinforcement: Battleboro – Rocky Mt 115kV: Replace Battleboro substation terminal equipment. Estimated cost is $15,000. AB2-169 didn't meet the cost allocation rules for the

below upgrade. However if the prior projects withdraw, AB2-169 needs to be retooled and could get cost allocation in the future.

Note: Duke/Progress Energy portion of this line will need to be studied under Duke's FERC tariff process.

Rebuild the AB2-100 TAP-Clubhouse 230kV line (2 miles) to increase its line rating to a minimum of 600 MVA. It is estimated to take 24-28 months to permit and construct a Virginia CPCN will most likely be required for this rebuild, the estimated cost is $5,000,000 to resolve this deficiency.

Queue	MW contribution	Percentage of Cost	Cost($5M)	Contingency Name	Contingency Type
AB2-128	59.12	78.26%	$3,981,976.04	**239T2141'**	breaker
AB2-169	7.59	10.22%	$511,217.83	**239T2141'**	breaker
AB2-171	7.5245	9.96%	$506,806.13	**239T2141'**	breaker

Outage scheduling and coordination will impact the actual completion dates for the various identified network upgrades.

Interconnection Customer Requirements

ITO's Facility Interconnection Requirements as posted on PJM's website
http://www.pjm.com/~/media/planning/plan-standards/private-dominion/facility-connection-requirements1.ashx

Voltage Ride Through Requirements - The Customer Facility shall be designed to remain in service (not trip) for voltages and times as specified for the Eastern Interconnection in Attachment 1 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low voltage conditions, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

Frequency Ride Through Requirements - The Customer Facility shall be designed to remain in service (not trip) for frequencies and times as specified in Attachment 2 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low frequency condition, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

Reactive Power - The Generation Interconnection Customer shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading to 0.95 lagging measured at the generator's terminals.

Meteorological Data Reporting Requirement - The solar generation facility shall, at a minimum, be required to provide the Transmission Provider with site-specific meteorological data including:

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance

- Forced outage data

Revenue Metering and SCADA Requirements

PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

Interconnected Transmission Owner Requirements

Metering and SCADA/Communication equipment must meet the requirements outlined in section 3.1.6 Metering and Telecommunications of ITO's Facility Connection Requirement NERC Standard FAC-001 which is publically available at www.dom.com.

Network Impacts

The Queue Project AB2-169 was evaluated as a 74.0 MW (Capacity 39.0 MW) injection as tapping into Five Points-Pantego 115kV in the ITO area. Project AB2-169 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB2-169 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
246T2034_A	CONTINGENCY '246T2034_A' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1 /* 246 AA1-138 TAP OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 246 - NUCOR OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1 /* TROWBRIDGE TX #1&2 END
LN 2020	CONTINGENCY 'LN 2020' OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND OPEN BUS 314639 /* ISLAND OPEN BUS 913391 /* ISLAND OPEN BUS 913392 /* ISLAND END
LN 2058-2181	CONTINGENCY 'LN 2058-2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END

Contingency Name	Description
LN 246_B	CONTINGENCY 'LN 246_B' OPEN BRANCH FROM BUS 314537 TO BUS 921571 CKT 1 /* 6SUFFOLK 230.00 - AA1-138 TAP END

Summer Peak Analysis – 2020

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output).

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
1	LFFB	246T2034_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	AC	99.73	101.58	ER	459	8.9	1

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Contributions to previously identified circuit breakers found to be over-duty:

None

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

#	Contingency	Affected	Facility Description	Bus	Cir.	Power	Loading %	Rating	MW	Ref

	Type	Name	Area		From	To		Flow	Initial	Final	Type	MVA	Contribution	
2	DCTL	LN 2058-2181	DVP - CPLE	3BTLEBRO-3ROCKYMT115T 115 kV line	314554	304223	1	AC	121.08	123.47	ER	164	4.76	2

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

None

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

No mitigations required.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this interconnection request)

<table>
<tr><th>Violation #</th><th>Overloaded Facility</th><th>Upgrade Description</th><th>Network Upgrade Number</th><th>Upgrade Cost</th><th>AB2-169 Allocation</th></tr>
<tr><td># 1</td><td>AB2-100 TAP-Clubhouse 230kV line</td><td>Rebuild the AB2-100 TAP-Clubhouse 230kV line (2 miles) to increase its line rating to a minimum of 600 MVA. It is estimated to take 24-28 months to permit and construct a Virginia CPCN will most likely be required.
<table>
<tr><th>Queue</th><th>Impact (MW)</th><th>Cost</th></tr>
<tr><td>AB2-128</td><td>59.12</td><td>$3,981,976.04</td></tr>
<tr><td>AB2-169</td><td>7.59</td><td>$511,217.83</td></tr>
<tr><td>AB2-171</td><td>7.5245</td><td>$506,806.13</td></tr>
</table>
</td><td>Pending</td><td>$5,000,000</td><td>$511,217.83</td></tr>
</table>

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost	AB2-169 Allocation
			Total New Network Upgrades		**$511,217.83**

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which is calculated and reported for in the Impact Study)

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost	AB2-169] Allocation
# 2	3BTLEBRO-3ROCKYMT115T 115 kV line	Upgrade Battleboro terminal equipment	Pending	$15,000	**$0**
			Total New Network Upgrades		**$0**

Queue	Impact (MW)	Cost
AB2-040	7.18	**$1,860**
AB2-059	24.577	**$6,360**
AB2-100	7.96	**$2,060**
AB2-128	6.37	**$1,650**
AB2-171	5.12	**$1,320**
AB2-174	6.80	**$1,760**

Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The IC can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this interconnection request by addressing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

	Contingency		Affected		Bus			Power	Loading %		Rating		MW
#	Type	Name	Area	Facility Description	From	To	Circuit	Flow	Initial	Final	Type	MVA	Contribution
3	N-1	LN 2020	DVP - DVP	6SUNBURY-6SUFFOLK 230 kV line	314648	314537	1	AC	107.18	110.51	ER	449	15.03
4	N-1	LN 2020	DVP - DVP	W1-029-6SUNBURY 230 kV line	901080	314648	1	AC	111.76	115.09	ER	449	15.03
5	N-1	LN 246_B	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	AC	114.15	116.79	ER	375	10.54

Light Load Analysis in 2020

Not required

ITO Analysis

ITO assessed the impact of the proposed Queue Project #AB2-169 interconnection of 74 MW of energy (Capacity 39 MW) for compliance with reliability criteria on ITO's Transmission System. The system was assessed using the summer 2020 RTEP case provided to ITO by PJM. When performing a generation analysis, ITO's main analysis will be load flow study results under single contingency and multiple facility contingency (both normal and stressed system conditions). ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of ITO's Planning Criteria and interconnection requirements can be found in the ITO's Facility Connection Requirements which are publicly available at: http://www.dom.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed interconnection request under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically NERC Category C Contingency Conditions (Bus Fault, Tower Line, N-1-1, and Stuck Breaker scenarios) allow for re-dispatch of generating units to resolve potential

reliability deficiencies. For ITO Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating.

As part of its generation impact analysis ITO routinely evaluates the impact that a proposed new generation resource will have under maximum generation conditions, stress system conditions and import/export system conditions (greater than 20 MW). The results of these studies are discussed in more detail below.

Category B Analysis (Single Contingency):

- System Normal – Same as PJM analysis
- Critical System Condition (No Surry 230 kV Unit) – Same as PJM analysis.

Category C Analysis: (Multiple Facility Contingency)

- Bus Fault - No deficiencies identified
- Line Stuck Breaker - No deficiencies identified
- Tower Line – No deficiencies identified

As part of its generation impact analysis ITO routinely evaluates the impact that a proposed new generation resource (greater than 20 MW) will have under maximum generation conditions, stress system conditions and import/export system conditions. The results of these studies are discussed in Table A and B below.

Table A: Import Study Results

Import Study Results			
Area	Summer 2020	Summer 2020 with AB2-169	Limiting Element
AEP	2000+	2000+	None
APS	2000+	2000+	None
CPL	2000+	2000+	None
PJM	2000+	2000+	None

Table B: Export Study Results

Export Study Results			
Area	Summer 2020	Summer 2020 with AB2-169	Limiting Element
AEP	2000+	2000+	None
APS	2000+	2000+	None
CPL	2000+	2000+	None
PJM	2000+	2000+	None

ITO's Planning Criteria indicates a need to have approximately 2000 MW of import and export capability. The results of these import and export studies indicate that the proposed AB2-169 (Transfer) will not impact ITO's import or export capability

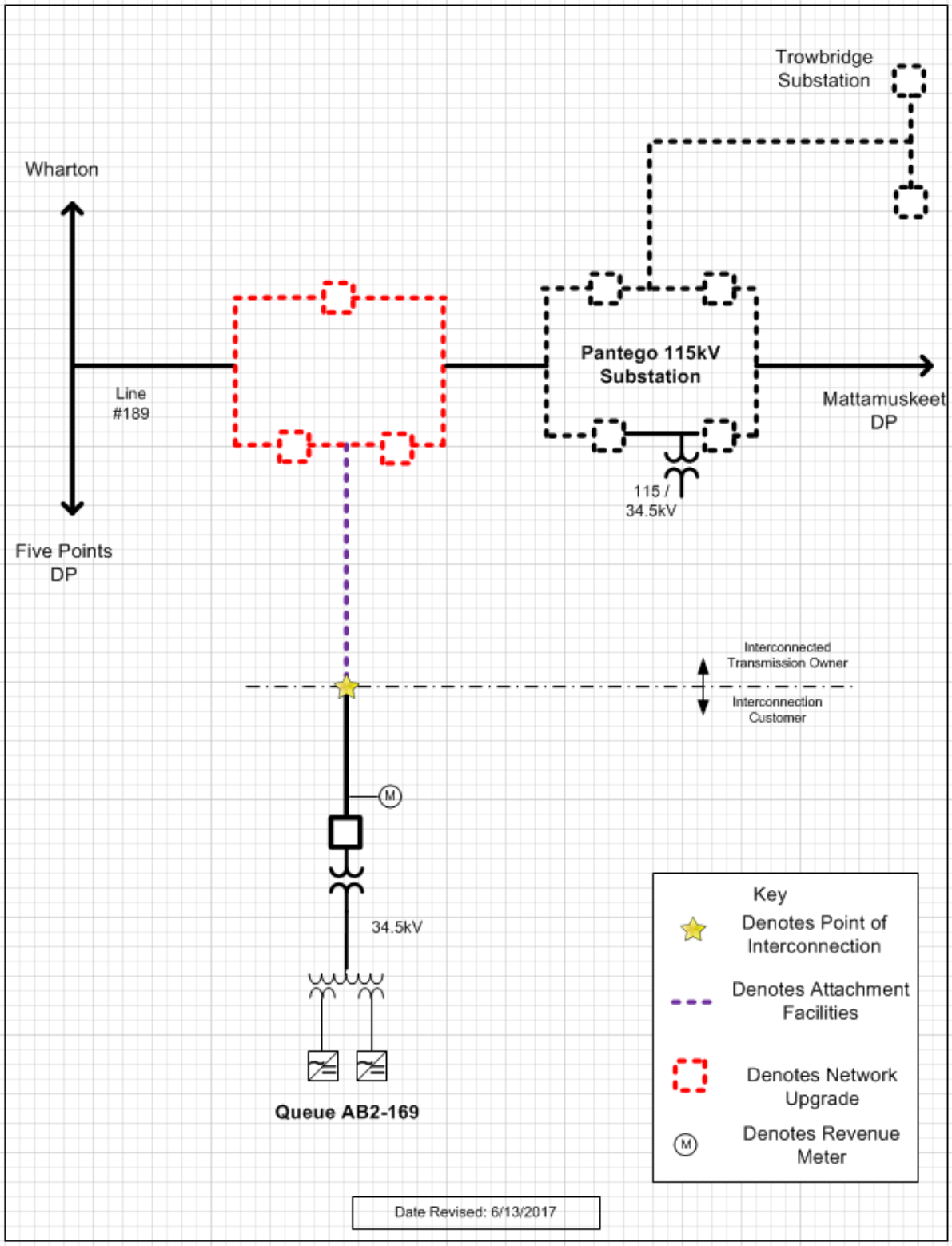
Affected System Analysis & Mitigation

Duke Energy:

Enter into an Affected System Facilities Study agreement with Duke / Progress Energy (DEP) to determine how to mitigate Battleboro - Rocky Mt.115kV overload. The upgrade will likely be a complete reconductor, probably replacing structures. The estimated cost $15million with an ISD of 6/1/2020.

Attachment 1.

System Configuration



Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Appendix 1

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 99.73% to 101.58% (AC power flow) of its emergency rating (459 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 8.9 MW to the thermal violation.

```
CONTINGENCY '246T2034_A'                                    /* EARLEYS
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1           /* 246
  OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1           /* 246 AA1-138
TAP
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1           /* 246 - NUCOR
  OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1           /* 2034
  OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1           /* 2034
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1           /* TROWBRIDGE
TX #1&2
  END
```

Bus Number	Bus Name	Full Contribution
315131	1EDGECMA	2.24
315132	1EDGECMB	2.24
315139	1GASTONA	8.64
315141	1GASTONB	8.64
315126	1ROARAP2	1.85
315128	1ROARAP4	1.78
315134	1ROAVALA	12.
315135	1ROAVALB	3.2
315136	1ROSEMG1	5.8
315138	1ROSEMG2	2.72
315137	1ROSEMS1	3.6
900671	V4-068 C	0.1
900672	V4-068 E	0.28
917331	Z2-043 C	0.61
917332	Z2-043 E	1.27
917341	Z2-044 C	0.31
917342	Z2-044 E	0.65
917511	Z2-088 C OP1	1.11
917512	Z2-088 E OP1	8.88
917591	Z2-099 C	0.16
917592	Z2-099 E	0.34
918411	AA1-050	0.94
LTF	AA1-058	0.53
921162	AA1-063AC	1.68
921163	AA1-063AE	3.89

918511	AA1-065 C OP	2.67
918512	AA1-065 E OP	6.44
921182	AA1-067 C	0.37
921183	AA1-067 E	0.78
918561	AA1-072 C	0.09
918562	AA1-072 E	0.21
921562	AA1-135 C	11.71
921563	AA1-135 E	5.02
921752	AA2-053 C	10.04
921753	AA2-053 E	4.31
921762	AA2-057 C	8.11
921763	AA2-057 E	4.05
921862	AA2-068 C	2.57
921863	AA2-068 E	1.18
LTF	AA2-074	2.29
920021	AA2-086 C	0.08
920022	AA2-086 E	0.18
921982	AA2-088 C	4.8
921983	AA2-088 E	7.83
922442	AA2-165 C	1.11
922443	AA2-165 E	0.53
922472	AA2-169 C	1.51
922473	AA2-169 E	0.69
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
922722	AB1-053 C	2.3
922723	AB1-053 E	1.29
922922	AB1-081 C OP	10.1
922923	AB1-081 E OP	4.33
923262	AB1-132 C OP	32.28
923263	AB1-132 E OP	13.83
923941	AB2-035 C	0.39
923942	AB2-035 E	0.17
924151	AB2-059 C	11.9
924152	AB2-059 E	6.13
924381	AB2-087 C	0.76
924382	AB2-087 E	0.36
924391	AB2-088 C	0.5
924392	AB2-088 E	0.24
924491	AB2-098 C	0.61
924492	AB2-098 E	0.26
924501	AB2-099 C	0.73
924502	AB2-099 E	0.31
924511	AB2-100 C	43.34
924512	AB2-100 E	21.35

924761	AB2-128 C	37.13
924762	AB2-128 E	14.62
925121	AB2-169 C	4.69
925122	AB2-169 E	4.21
925141	AB2-171 C OP	2.86
925142	AB2-171 E OP	4.67

Appendix 2

(DVP - CPLE) The 3BTLEBRO-3ROCKYMT115T 115 kV line (from bus 314554 to bus 304223 ckt 1) loads from 121.08% to 123.47% (AC power flow) of its emergency rating (164 MVA) for the tower line contingency outage of 'LN 2058-2181'. This project contributes approximately 4.76 MW to the thermal violation.

CONTINGENCY 'LN 2058-2181'
OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00
OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00
OPEN BUS 314591 /* ISLAND: 6NASH 230.00
OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00
END

Bus Number	Bus Name	Full Contribution
315131	1EDGECMA	2.75
315132	1EDGECMB	2.75
315139	1GASTONA	2.61
315141	1GASTONB	2.61
315126	1ROARAP2	1.08
315128	1ROARAP4	1.04
315134	1ROAVALA	3.69
315135	1ROAVALB	0.99
315136	1ROSEMG1	2.11
315138	1ROSEMG2	0.99
315137	1ROSEMS1	1.31
314541	3WATKINS	0.26
900672	V4-068 E	0.15
917331	Z2-043 C	0.39
917332	Z2-043 E	0.83
917341	Z2-044 C	0.6
917342	Z2-044 E	1.25
917511	Z2-088 C OP1	0.76
917512	Z2-088 E OP1	6.09
917592	Z2-099 E	0.2
918411	AA1-050	0.64
LTF	AA1-055	9.55
921163	AA1-063AE	2.3

918512	AA1-065 E OP	1.96
921183	AA1-067 E	0.31
918561	AA1-072 C	0.06
918562	AA1-072 E	0.14
921562	AA1-135 C	4.03
921563	AA1-135 E	1.73
921752	AA2-053 C	5.42
921753	AA2-053 E	2.33
921762	AA2-057 C	12.88
921763	AA2-057 E	6.44
921862	AA2-068 C	3.3
921863	AA2-068 E	1.52
920022	AA2-086 E	0.11
921982	AA2-088 C	2.94
921983	AA2-088 E	4.8
922442	AA2-165 C	1.76
922443	AA2-165 E	0.85
922512	AA2-174 C	0.25
922513	AA2-174 E	0.27
922722	AB1-053 C	0.84
922723	AB1-053 E	0.47
922922	AB1-081 C OP	20.07
922923	AB1-081 E OP	8.6
923262	AB1-132 C OP	9.75
923263	AB1-132 E OP	4.18
923572	AB1-173 C OP	1.21
923573	AB1-173 E OP	0.57
923582	AB1-173AC OP	1.21
923583	AB1-173AE OP	0.57
923911	AB2-031 C OP	1.2
923912	AB2-031 E OP	0.59
923941	AB2-035 C	0.37
923942	AB2-035 E	0.16
923991	AB2-040 C OP	3.95
923992	AB2-040 E OP	3.23
924151	AB2-059 C	23.66
924152	AB2-059 E	12.19
924381	AB2-087 C	0.31
924382	AB2-087 E	0.15
924391	AB2-088 C	0.47
924392	AB2-088 E	0.23
924491	AB2-098 C	0.24
924492	AB2-098 E	0.1
924501	AB2-099 C	0.32
924502	AB2-099 E	0.14

924511	AB2-100 C	5.34
924512	AB2-100 E	2.63
924761	AB2-128 C	4.57
924762	AB2-128 E	1.8
924931	AB2-147 C	1.14
924932	AB2-147 E	1.86
924951	AB2-150 C OP	1.14
924952	AB2-150 E OP	1.86
925121	AB2-169 C	2.51
925122	AB2-169 E	2.25
925141	AB2-171 C OP	1.95
925142	AB2-171 E OP	3.18
925171	AB2-174 C OP	3.57
925172	AB2-174 E OP	3.23