Generation Interconnection

Impact Study Report

for

Queue Project AD2-033

CHASE CITY-LUNENBURG 115 KV

78 MW Capacity / 130 MW Energy

Rev 6, October 2022

Rev 5, June 2022

Rev 4, March 2022

Rev 3, December 2021

Rev 2, December 2021

Rev 1, November, 2021

June, 2019

1 Table of Contents

2 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 Red Brick Solar 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).

3 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 Interconnection Customer. As a requirement for interconnection, the Interconnection Customer 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 Interconnection Customer 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 project developer 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.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

4 Revision 6 Summary – October 2022

This revision is issued to correct cost allocation for this project.

5 Revision 5 Summary- June 2022

This revision is being issued due to withdrawal of AD1-023. Overloaded facilities remain the same however cost allocation was updated with AD1-023 withdrawn.

6 Revision 4 Summary- March 2022

This revision is being issued due to a re-tool that was performed following de-activation of several generators. The Clubhouse transformer and Kerr-GW King Tap tie line to Duke upgrades are no longer required following the updated analysis.

7 Revision 3 Summary- December 2021

This revision is being issued to replace the previously identified network upgrade n6115 with the already approved supplemental project s2614. The scope of s2614 meets the intent of n6115 and addresses the identified overload. The New System Reinforcement table and cost tables were updated to reflect this change.

8 Revision 2 Summary- December 2021

System Impact Study was updated following updates to the retool. Minor changes to the Kerr – GW King Tap 'DVP_P7-1: LN 22-90_B' contingency were made. PJM also confirmed with Dominion that this is a valid P7 contingency. Duke reinforcements table was also updated to match Duke's latest cost estimate.

9 Revision 1 Summary- November 2021

This revision is being issued to incorporate results of a re-tool and the stability study.

10 General

The Interconnection Customer (IC), has proposed a Solar generating facility located east of Chase City in Lunenburg County, Virginia. The installed facilities will have a total capability of 130 MW with 78 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is October 30, 2020. This study does not imply a TO commitment to this in-service date.

Queue Number	**AD2-033**
Project Name	CHASE CITY-LUNENBURG 115 KV
Interconnection Customer	Red Brick Solar, LLC
State	Virginia
County	Lunenburg
Transmission Owner	Dominion
MFO	130
MWE	130
MWC	78
Fuel	Solar
Basecase Study Year	2021

11 Point of Interconnection

AD2-033 will interconnect with the Dominion transmission system at a new three breaker ring bus switching station that connects on the Chase City – Lunenburg 115kV line.

12 Cost Summary

The AD2-033 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$1,550,000
Direct Connection Network Upgrade	$5,500,000
Non Direct Connection Network Upgrades	$ 800,000
Total Costs	**$7,850,000**

In addition, the AD2-033 project may be responsible for a contribution to the following costs:

These costs are for PJM network upgrades:

Description	Total Cost
Cost for New System Reinforcements	$0
Contributions to Previously Identified System Reinforcements	$1,738,057
Total Cost for System Reinforcements	**$1,738,057**

13 Transmission Owner Scope of Work

13.1 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 AD2-033 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.

13.2 Direct Connection Cost Estimate

Substation: Establish the new 115 kV AD2-033 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.

13.3 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.

14 Interconnection Customer Requirements

ITO's Facility Connection 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.

15 Revenue Metering and SCADA Requirements

15.1 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 Section 8 of Attachment O.

15.1.1 Meteorological Data Reporting Requirement

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance
- Forced outage data

16 Network Impacts

The Queue Project AD2-033 was evaluated as a 130 MW (Capacity 78 MW) injection into the Chase City – Lunenburg 115kV line in the Dominion area. Project AD2-033 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-033 was studied with a commercial probability of 100%. Potential network impacts were as follows:

17 Summer Peak Load Flow

17.1 Generation Deliverability

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

None

17.2 Multiple Facility Contingency

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

None

17.3 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)

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT	Appendix
1	242631	05EDAN 1	AEP	242620	05DANVL2	AEP	1	AEP_P4_#11112_05J.FERR 765_A1	LFFB	415.0	101.85	103.32	AC	7.34	1

17.4 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 developer 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 project by fixing 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.

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
2	314559	6CAROLNA 230/115 kV transformer	DVP	314561	6CAROLNA 230/115 kV transformer	DVP	1	DVP_P1-2: LN 1001	operation	240	98.28	101.57	AC	9.88
3	314563	6CLUBHSE	DVP	314435	6SAPONY	DVP	1	DVP_P1-2: LN 2131A	operation	599	109.33	111.34	AC	14.15
4	314914	8MDLTHAN	DVP	314918	8NO ANNA	DVP	1	DVP_P1-2: LN 574	operation	2442	101.9	103.25	AC	28.79
5	927250	AC1-221 TAP	DVP	304070	6PERSON230 T	CPLE	1	DVP_P1-2: LN 556	operation	718.0	98.32	101.89	AC	30.0

17.5 New System Reinforcements

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

None

17.6 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 will be calculated and reported for the Impact Study)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

<table>
<tr><th>Violation #</th><th>Overloaded Facility</th><th>Upgrade Description</th><th>Network Upgrade Number</th><th>Upgrade Cost</th><th>AD2-033 Allocation</th></tr>
<tr><td rowspan="3">#1</td><td rowspan="3">05EDAN 1-05DANVL2</td><td>Increasing the Danville - East Danville 138 kV circuit summer rating to 337/482 MVA will still require us to rebuild the line. The network project has a projected in-service date of 09/01/2023.
<table>
<tr><th>Queue Project</th><th>MW Impact</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AD1-152</td><td>1.03</td><td>2.96%</td><td>$220,245</td></tr>
<tr><td>AD2-023</td><td>9.53</td><td>75.98%</td><td>$5,660,091</td></tr>
<tr><td>AD2-033</td><td>7.34</td><td>21.07%</td><td>$1,569,515</td></tr>
</table></td><td>n6124</td><td>$7,449,851</td><td>$1,569,515</td></tr>
<tr><td>AEPA0021h: Replace 5 Sub cond 2000 AAC 91 Str at Danville2 138kV station
In service: 12-18 months
<table>
<tr><th>Queue Project</th><th>MW Impact</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AD1-152</td><td>1.03</td><td>2.96%</td><td>$14,782</td></tr>
<tr><td>AD2-023</td><td>26.47</td><td>75.98%</td><td>$379,879</td></tr>
<tr><td>AD2-033</td><td>7.34</td><td>21.07%</td><td>$105,339</td></tr>
</table></td><td>n7754.1</td><td>$500,000</td><td>$105,339</td></tr>
<tr><td>AEPA0021g: Replace 3 Sub cond 2000 AAC 91 Str at East Danville 138kV station
In service: 12-18 months
<table>
<tr><th>Queue Project</th><th>MW Impact</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AD1-152</td><td>1.03</td><td>2.96%</td><td>$8,869</td></tr>
<tr><td>AD2-023</td><td>26.47</td><td>75.98%</td><td>$227,928</td></tr>
<tr><td>AD2-033</td><td>7.34</td><td>21.07%</td><td>$63,203</td></tr>
</table></td><td>n7754.2</td><td>$300,000</td><td>$63,203</td></tr>
</table>

Total Cost for Contributions to Previously Identified System Reinforcements	**$1,738,057**

18 Affected Systems

18.1 Duke Energy Progress

No impact

19 Short Circuit

There were no overdutied breakers identified in the study process.

20 Stability Study

Generator Interconnection Request AD2-033 is for a 130 MW Maximum Facility Output (MFO) solar generation plant. AD2-033 consists of 61 × 2.15 MW, SMA Sunny Central 2500 solar PV inverters. The Point of Interconnection (POI) is a tap on Chase City – Lunenburg 115kV circuit 98 in the Dominion Virginia Power (DVP) transmission system, Lunenburg County, Virginia.

This report describes a dynamic simulation analysis of AD2-033 as part of the overall system impact study.

The load flow scenario for the analysis was based on the RTEP 2021 peak load case, modified to include applicable queue projects. AD2-033 has been dispatched online at maximum power output, with 1.0 p.u. voltage at the generator bus.

AD2-033 was tested for compliance with NERC, PJM, Transmission Owner and other applicable criteria. Steady-state condition and 72 contingencies were studied, each with a 20 second simulation time period. Studied faults included:

a) Steady state operation (30 second);

b) Three-phase faults with normal clearing time;

c) Single-phase faults with stuck breaker;

d) Single-phase faults placed at 80% of the line with delayed (Zone 2) clearing at line end remote from the fault due to primary communications/relay failure;

e) Single phase faults with loss of multi-circuit towers.

No relevant bus or high speed reclosing contingencies were identified.

For all simulations, the queue project under study along with the rest of the PJM system were required to maintain synchronism and with all states returning to an acceptable new condition following the disturbance.

For all of the fault contingencies tested on the 2021 peak load case:

a) AD2-033 was able to ride through all faults in the contingencies (except for faults where protective action trips a generator(s)),

b) AD2-033 Post-contingency oscillations were positively damped with a damping margin of at least 3% for interarea modes and 4% for local modes.

c) Following fault clearing, all bus voltages recovered to a minimum of 0.7 per unit after 2.5 seconds (except where protective action isolates that bus).

d) No transmission element tripped, other than those either directly connected or designed to trip as a consequence of that fault.

It was found that:

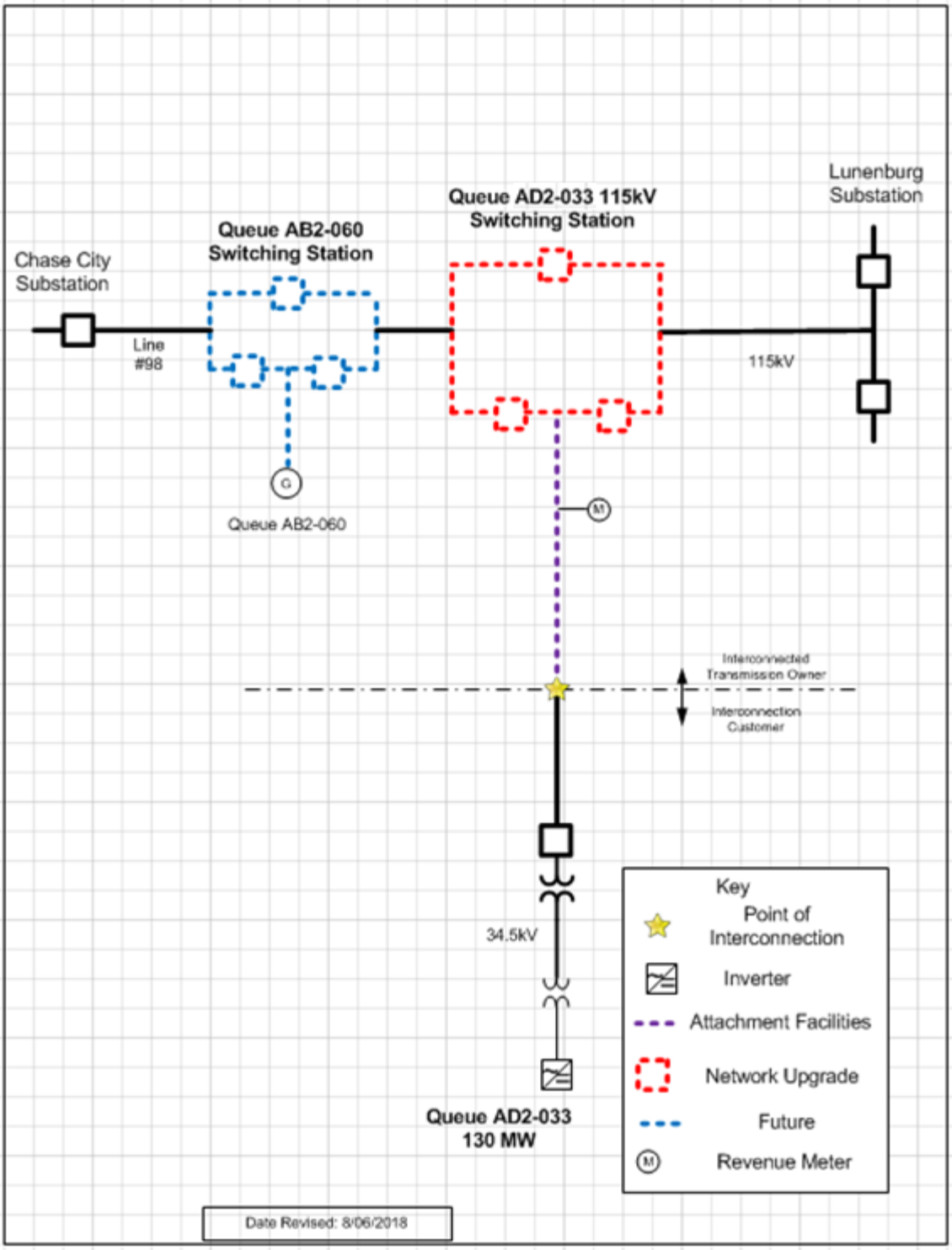
- AD2-033 trips HV instantaneous VTGTPAT setting for contingencies P1.06 and P1.09 due to the high voltage spike right after the fault was cleared. Such voltage spike was driven by its own reactive power injection beyond its reactive power capability. Aforementioned contingencies were re-simulated with delayed relay time, 0.001seconds to 0.033 seconds, and confirmed the stable post-fault recovery. Since the high voltage spike upon fault clearance is fictitious and a known issue and did not cause any stability issues, no further action is required.
- AB2-043 tripps frequency FRQDCAT settings for contingencies P1.07, P1.09 – p1.15 due to fictitious frequency response at generator terminal bus. The pick up times for instance 92402411 and 92402415 were increased from 0.01s to 20 s to disable the relay.
- AB2-043 trips low VTGTPAT settings for contingencies P4.04, P4.05, P4.08 - P4.15, and P5.08. When these same contingencies were re-simulated with a fault impedance obtained from the 2021 Short Circuit base case AB2-043 no longer trips. Therefore, no further action is required on this.

The reactive power capability of AD2-033 meets the 0.95 lagging and leading PF requirement at the high side of the main transformer.

Few contingencies showed a slow recovery of reactive power which can be fixed by tuning the PI controller gain.

No mitigations were found to be required.

21 Attachment 1: Project System Configuration



22 Flow Gate Details

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. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the Appendices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the Appendices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators.

It should be noted the project/generator MW contributions presented in the body of the report and appendices sections are full contributions, whereas the loading percentages reported in the body of the report, take into consideration the commercial probability of each project as well as the ramping impact of "Adder" contributions.

22.1 Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Contingency Definition
AEP_P4_#11112_05J.FERR 765_A1	CONTINGENCY 'AEP_P4_#11112_05J.FERR 765_A1' OPEN BRANCH FROM BUS 242511 TO BUS 242514 CKT 1 / 242511 05BROADF 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1 OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1 OPEN BRANCH FROM BUS 242566 TO BUS 242567 CKT ZB / 242566 05BROADF 138 242567 05BROADX 138 ZB END
DVP_P1-2: LN 1001	CONTINGENCY 'DVP_P1-2: LN 1001' OPEN BRANCH FROM BUS 313719 TO BUS 314623 CKT 1 /* 3CHESTNUT 115.00 - 3WITAKRS 115.00 OPEN BRANCH FROM BUS 314554 TO BUS 314623 CKT 1 /* 3BTLEBRO 115.00 - 3WITAKRS 115.00 OPEN BUS 314623 /* ISLAND: 3WITAKRS 115.00 OPEN BUS 917341 /* ISLAND: Z2-044 C 115.00 OPEN BUS 917342 /* ISLAND: Z2-044 E 115.00 END
DVP_P1-2: LN 2131A	CONTINGENCY 'DVP_P1-2: LN 2131A' OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND END
DVP_P1-2: LN 574	CONTINGENCY 'DVP_P1-2: LN 574' OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LDYSMTH 500.00 END
DVP_P1-2: LN 556	CONTINGENCY 'DVP_P1-2: LN 556'

	OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 1 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 2 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 3 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314906 TO BUS 314936 CKT 1 /* 8CLOVER 500.00 - 8RAWLINGS 500.00 OPEN BUS 314906 /* ISLAND END

22.2 Appendix 1

(AEP - AEP) The 05EDAN 1-05DANVL2 138 kV line (from bus 242631 to bus 242620 ckt 1) loads from 102.27% to 103.74% (AC power flow) of its emergency rating (415 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#11112_05J.FERR 765_A1'. This project contributes approximately 7.34 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#11112_05J.FERR 765_A1'
OPEN BRANCH FROM BUS 242511 TO BUS 242514 CKT 1 / 242511 05BROADF 765 242514 05J.FERR 765 1
OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1
OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1
OPEN BRANCH FROM BUS 242566 TO BUS 242567 CKT ZB / 242566 05BROADF 138 242567 05BROADX 138 ZB
END

Bus Number	*Bus Name*	*Full Contribution*
244012	*05PINNACLE*	*-2.13*
315131	*1EDGECMA*	*3.59*
315132	*1EDGECMB*	*3.59*
314557	*3BETHELC*	*0.34*
314554	*3BTLEBRO*	*0.36*
314572	*3EMPORIA*	*0.13*
314578	*3HORNRTN*	*1.17*
314582	*3KELFORD*	*0.29*
314603	*3SCOT NK*	*1.21*
314617	*3TUNIS*	*0.27*
314620	*6CASHIE*	*0.26*
314574	*6EVERETS*	*0.95*
932631	*AC2-084 C*	*2.49*
932632	*AC2-084 E*	*1.23*
932761	*AC2-100 C*	*3.59*
932762	*AC2-100 E*	*1.75*
932991	*AC2-123 C*	*-2.41*
933941	*AD1-017 C*	*0.79*
933942	*AD1-017 E*	*1.28*
933991	*AD1-022 C*	*2.63*
933992	*AD1-022 E*	*1.43*
934311	*AD1-055 C*	*1.01*
934312	*AD1-055 E*	*0.26*
934331	*AD1-057 C O1*	*4.*
934332	*AD1-057 E O1*	*2.13*
934341	*AD1-058 C*	*3.91*

934342	*AD1-058 E*	*0.99*
934521	*AD1-076 C O1*	*16.09*
934522	*AD1-076 E O1*	*8.19*
934611	*AD1-087 C O1*	*2.95*
934612	*AD1-087 E O1*	*1.38*
934621	*AD1-088 C*	*3.61*
934622	*AD1-088 E*	*1.7*
934991	*AD1-131 C*	*1.28*
934992	*AD1-131 E*	*0.86*
935171	*AD1-152 C O1*	*3.24*
935172	*AD1-152 E O1*	*2.16*
936161	*AD2-022 C O1*	*10.59*
936162	*AD2-022 E O1*	*6.35*
936171	*AD2-023 C O1*	*6.18*
936172	*AD2-023 E O1*	*3.35*
936261	*AD2-033 C*	*4.41*
936262	*AD2-033 E*	*2.94*
936361	*AD2-046 C O1*	*3.71*
936362	*AD2-046 E O1*	*1.7*
936401	*AD2-051 C O1*	*2.8*
936402	*AD2-051 E O1*	*1.2*
936481	*AD2-063 C O1*	*5.35*
936482	*AD2-063 E O1*	*3.54*
937481	*AD2-202 C O1*	*0.81*
937482	*AD2-202 E O1*	*0.46*
LTF	*AMIL*	*0.06*
LTF	*BLUEG*	*1.46*
LTF	*CANNELTON*	*0.15*
LTF	*CARR*	*0.08*
LTF	*CBM-S1*	*2.66*
LTF	*CBM-S2*	*17.22*
LTF	*CBM-W2*	*9.95*
LTF	*CLIFTY*	*8.83*
LTF	*CPLE*	*5.55*
LTF	*EDWARDS*	*0.28*
LTF	*ELMERSMITH*	*0.37*
LTF	*G-007A*	*0.52*
LTF	*GIBSON*	*0.38*
LTF	*NEWTON*	*0.49*
LTF	*RENSSELAER*	*0.06*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.4*
LTF	*TRIMBLE*	*0.29*
900672	*V4-068 E*	*0.09*
LTF	*VFT*	*1.37*

917332	*Z2-043 E*	*0.34*
917342	*Z2-044 E*	*0.25*
917512	*Z2-088 E OP1*	*1.63*
918492	*AA1-063AE OP*	*1.32*
918512	*AA1-065 E OP*	*1.41*
918532	*AA1-067 E*	*0.29*
918562	*AA1-072 E*	*0.06*
919692	*AA2-053 E*	*1.29*
919702	*AA2-057 E*	*1.47*
LTF	*AA2-074*	*3.77*
920042	*AA2-088 E*	*3.15*
920592	*AA2-165 E*	*0.19*
920672	*AA2-174 E*	*0.15*
930402	*AB1-081 E*	*1.72*
930861	*AB1-132 C*	*4.77*
930862	*AB1-132 E*	*2.05*
931231	*AB1-173 C*	*0.75*
931232	*AB1-173 E*	*0.35*
931241	*AB1-173AC*	*0.75*
931242	*AB1-173AE*	*0.35*
923911	*AB2-031 C O1*	*0.74*
923912	*AB2-031 E O1*	*0.36*
923991	*AB2-040 C O1*	*2.43*
923992	*AB2-040 E O1*	*1.99*
924021	*AB2-043 C O1*	*1.17*
924022	*AB2-043 E O1*	*1.91*
924151	*AB2-059 C O1*	*4.72*
924152	*AB2-059 E O1*	*2.43*
924161	*AB2-060 C O1*	*3.34*
924162	*AB2-060 E O1*	*1.57*
924301	*AB2-077 C O1*	*0.75*
924302	*AB2-077 E O1*	*0.5*
924311	*AB2-078 C O1*	*0.75*
924312	*AB2-078 E O1*	*0.5*
924321	*AB2-079 C O1*	*0.75*
924322	*AB2-079 E O1*	*0.5*
924501	*AB2-099 C*	*0.19*
924502	*AB2-099 E*	*0.08*
924511	*AB2-100 C*	*3.36*
924512	*AB2-100 E*	*1.66*
925121	*AB2-169 C*	*2.19*
925122	*AB2-169 E*	*1.97*
925171	*AB2-174 C O1*	*2.29*
925172	*AB2-174 E O1*	*2.08*
925591	*AC1-034 C*	*3.06*

925592	*AC1-034 E*	*2.31*
925612	*AC1-036 E*	*0.52*
925781	*AC1-054 C*	*2.93*
925782	*AC1-054 E*	*1.35*
926051	*AC1-083 C*	*3.93*
926052	*AC1-083 E*	*6.41*
926071	*AC1-086 C*	*7.03*
926072	*AC1-086 E*	*3.2*
926201	*AC1-098 C*	*2.33*
926202	*AC1-098 E*	*1.39*
926211	*AC1-099 C*	*0.78*
926212	*AC1-099 E*	*0.46*
926271	*AC1-105 C*	*2.29*
926272	*AC1-105 E*	*1.14*
927021	*AC1-189 C*	*3.54*
927022	*AC1-189 E*	*1.77*
927141	*AC1-208 C*	*3.44*
927142	*AC1-208 E*	*1.53*
927251	*AC1-221 C*	*1.56*
927252	*AC1-221 E*	*1.56*
927261	*AC1-222 C*	*1.46*
927262	*AC1-222 E*	*1.39*