Generation Interconnection
Feasibility Study Report
Queue Position AE2-286

The Interconnection Customer (IC) has proposed a 19.5 MW (7.9 MWC) solar generating facility to be located in Dorchester County, Maryland. PJM studied AE2-286 as a 19.5 MW injection into the Delmarva Power and Light Company (DPL) system at a tap of the Airey to Vienna Local 69 kV circuit and evaluated it for compliance with reliability criteria for summer peak conditions in 2022. AE2-286 was studied with a commercial probability of 53%. The planned in-service date, as requested by the IC during the project kick-off call, is December 31, 2019. This date may is not attainable due to additional required PJM studies and Transmission Owner construction schedule.

Point of Interconnection

The Interconnection Customer requested a distribution level interconnection. Distribution facilities in the area of the AE2-286 project are owned by the Choptank Electric Cooperative (CEC). It is anticipated that the AE2-286 project will connect with the CEC system at a new substation to be constructed by Delmarva Power and Light Company (Supplemental Project #s1790) adjacent to the West Cambridge to Vienna 69 kV circuit. The DPL transmission system will supply the new CEC substation.

Transmission Owner Attachment Facilities Scope of Work

There is no Delmarva Power & Light attachment facility or direct connection work scope other than the construction of the new substation under the PJM Supplemental process. The Interconnection Customer is responsible for contacting the Choptank Electric Cooperative directly for attachment facilities work scope and single line drawing for the distribution interconnection.

Required Relaying and Communications

Per Choptank Electric Cooperative requirments.

Metering

The IC is required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC.

Summer Peak Analysis - 2022

Transmission Network Impacts

Potential transmission network impacts are as follows:

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)

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)

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
7361783	232002	CEDAR CK	DP&L	232013	SILVER RUN	PJM	1	DPL_P7_1_DBL_1NCB-A	tower	679.0	103.79	104.34	DC	8.35
8241806	232100	CHURCH	DP&L	232107	TOWNSEND	DP&L	1	DPL_P7_1_DBL_1NCB-A	tower	348.0	110.86	112.15	DC	4.48
8241855	232107	TOWNSEND	DP&L	232106	MIDLTNTP	DP&L	1	DPL_P7_1_DBL_1NCB-A	tower	348.0	101.93	103.22	DC	4.48
7719394	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	157.17	162.35	DC	4.87
7719395	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP12	breaker	93.0	101.81	106.6	DC	4.46
8089084	232239	SHARPTWN	DP&L	936690	AD2-088 TAP	DP&L	1	DPL_P1_3_COOLSPG AT20	single	42.0	118.93	122.51	DC	1.51
8089085	232239	SHARPTWN	DP&L	936690	AD2-088 TAP	DP&L	1	DPL_P1_2_CKT 6708	single	42.0	116.98	121.55	DC	1.92
8088958	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	DPL_P1_3_COOLSPG AT20	single	42.0	130.83	134.42	DC	1.51
8088959	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	DPL_P1_2_CKT 6708	single	42.0	129.12	133.69	DC	1.92
8088963	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	Base Case	single	42.0	106.34	110.01	DC	1.54

Summer Peak Load Flow Analysis Reinforcements

System Reinforcements

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

ID	Index	Facility	Upgrade Description	Cost
8241806	2	**CHURCH 138.0 kV - TOWNSEND 138.0 kV Ckt 1**	**ds13833r0001 (198)** : **To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements at Church Substation.** **Project Type** : **FAC** **Cost** : **$500,000** **Time Estimate** : **24-36 Months** **ds13833r0002 (199)** : **To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements (on top of**	$700,000

			ds13833r001) at Church Substation. **Project Type** : FAC **Cost** : $200,000 **Time Estimate** : 24.0 Months	
7361783	1	CEDAR CK 230.0 kV - SILVER RUN 230.0 kV Ckt 1	**dt23030r0001 (250)** : To mitigate the (DPL) Cedar Creek Silver Run 230 kV line 23030 (from bus 232002 to bus 232013 ckt 1) overload, it will require increasing the emergency rating of the Cedar Creek to Silver Run 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. **Project Type** : FAC **Cost** : $17,400,000 **Time Estimate** : 36-42 Months	$17,400,000
8241855	4	TOWNSEND 138.0 kV - MIDLTNTP 138.0 kV Ckt 1	**dt13808r0001 (200)** : To mitigate the (DP&L) TOWNSEND to MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload, it will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Townsend & Middletown Tap Substation. **Project Type** : FAC **Cost** : $700,000 **Time Estimate** : 36-48 Months	$700,000
8089084,8089085	7	SHARPTWN 69.0 kV - AD2-088 TAP 69.0 kV Ckt 1	**n5455 (197)** : Rebuild Line 6705 2 from sharptwn to vienn 69 kV with 1590 ASCR, upgrade all substation equipment to 2000 A **Project Type** : CON **Cost** : $12,469,800 **Time Estimate** : 24-36 Months	$12,469,800
7719395,7719394	6	TODD 69.0 kV - PRESTON 69.0 kV Ckt 1	**ds6716r0001 (192)** : Previously identified in AB2-172, To mitigate the (DP&L) TODD to PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require substation reinforcements at Preston Substation and Todd Substation. Replace 600A Disconnect Switch at each substation. **Project Type** : FAC **Cost** : $67,000 **Time Estimate** : 12.0 Months **ds6716r0002 (193)** : Previously identified in AE1-188, To mitigate the (DP&L) TODD toPRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require substation reinforcements at Preston Substation and Todd Substation. **Project Type** : FAC **Cost** : $39,000 **Time Estimate** : 12.0 Months	$106,000
8088963,8088959,8088958	8	VIENN_69 69.0 kV - SHARPTWN 69.0 kV Ckt 1	**n5455 (197)** : Rebuild Line 6705 2 from sharptwn to vienn 69 kV with 1590 ASCR, upgrade all substation equipment to 2000 A **Project Type** : CON **Cost** : $12,469,800 **Time Estimate** : 24-36 Months	$12,469,800
			TOTAL COST	**$31,375,800**

Short Circuit

No issues identified.

Stability and Reactive Power Requirement

To be performed during later study phases as required.

Light Load Analysis - 2022

To be performed during later study phases (as required by PJM Manual 14B).

Delivery of Energy Portion of Interconnection Request

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. Only the most severely overloaded conditions are listed. 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 will 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
7361393	200051	ROCKSPGS	PJM	200065	PCHBTM2S	PJM	1	PECO_P1-2_5038/* $ CHESCO $ PECO_P1-2_5038 $ L	operation	2905.0	99.98	100.13	DC	9.71
8090009	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P1_2_23085 &13710	operation	93.0	100.92	105.72	DC	4.47
8089078	232239	SHARPTWN	DP&L	936690	AD2-088 TAP	DP&L	1	DPL_P1_2_CKT 6708	operation	42.0	170.66	181.86	DC	4.7
8089083	232239	SHARPTWN	DP&L	936690	AD2-088 TAP	DP&L	1	Base Case	operation	42.0	145.0	153.99	DC	3.78
8088952	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	DPL_P1_2_CKT 6708	operation	42.0	182.8	194.0	DC	4.7
8088957	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	Base Case	operation	42.0	156.9	165.9	DC	3.78
8089902	232241	VIENN_69	DP&L	232838	MARDELA	DP&L	1	DPL_P1_2_CKT 6705	operation	64.0	108.45	114.91	DC	4.14
8089867	232242	VIENNALC	DP&L	232241	VIENN_69	DP&L	1	DPL_P1_2_CKT 6715	operation	95.0	98.59	119.12	DC	19.5
8089643	232270	HEBRON	DP&L	232291	ROCKAWLKN	DP&L	1	DPL_P1_2_CKT 6705	operation	64.0	132.95	139.41	DC	4.14
8089648	232270	HEBRON	DP&L	232291	ROCKAWLKN	DP&L	1	Base Case	operation	64.0	104.53	109.32	DC	3.07
8088922	232291	ROCKAWLKN	DP&L	232271	NSALSBRY	DP&L	1	DPL_P1_2_CKT 6705	operation	58.0	190.44	197.57	DC	4.14
8088927	232291	ROCKAWLKN	DP&L	232271	NSALSBRY	DP&L	1	Base Case	operation	58.0	158.49	163.77	DC	3.07
8089832	232292	BAYLY	DP&L	232237	CAMBRIDG	DP&L	1	Base Case	operation	50.0	113.08	121.96	DC	4.44
8090030	232838	MARDELA	DP&L	232270	HEBRON	DP&L	1	DPL_P1_2_CKT 6705	operation	64.0	98.29	104.76	DC	4.14
8089860	924830	AB2-136 TAP	DP&L	232292	BAYLY	DP&L	1	Base Case	operation	51.0	111.06	119.77	DC	4.44
8089843	942700	AE2-286 TAP	DP&L	232242	VIENNALC	DP&L	1	DPL_P1_2_CKT 6715	operation	95.0	100.07	120.59	DC	19.5

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. 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.

Index 1

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
7361783	232002	CEDAR CK	DP&L	232013	SILVER RUN	PJM	1	DPL_P7_1_DBL_1NCB-A	tower	679.0	103.79	104.34	DC	8.35

Bus #	Bus	MW Impact
232813	VAUGHN	0.19
232851	DUP-SFR1	0.57
232900	DEMECSMY	4.01
232904	IR4	22.63
232905	BAYVIEW1	0.67
232910	NRG_G1	2.82
232911	NRG_G2	2.82
232920	IR10	0.88
232921	TASLEY2G	1.02
232922	MR3	22.91
292089	T-011	0.23
293670	O-025 C	0.32
901004	W1-003 E	2.0
901014	W1-004 E	2.0
901024	W1-005 E	2.0
901034	W1-006 E	2.0
901411	W1-062	4.09
907052	X1-032 E	1.76
910572	X3-008 E	5.19
910822	X3-066 E	1.23
913362	Y1-079 E	2.19
913412	Y1-080 E	0.9
915542	Y3-058 E	4.08
917081	Z2-012 C	0.41
917082	Z2-012 E	5.46
917431	Z2-076 C	0.22
917432	Z2-076 E	0.9
917441	Z2-077 C	0.22
917442	Z2-077 E	0.9
919831	AA2-069	101.29

923921	AB2-032 C	4.17
923922	AB2-032 E	1.96
923951	AB2-036 C	12.4
923952	AB2-036 E	20.29
923961	AB2-037 C	31.17
923962	AB2-037 E	50.92
924191	AB2-063 C	2.51
924192	AB2-063 E	4.1
924681	AB2-120 C	16.75
924682	AB2-120 E	27.32
924781	AB2-130 C O1	14.6
924782	AB2-130 E O1	23.82
924801	AB2-133 C O1	7.65
924802	AB2-133 E O1	9.71
924821	AB2-135 C	10.92
924822	AB2-135 E	12.46
924831	AB2-136 C	10.51
924832	AB2-136 E	11.15
924971	AB2-153 C	2.33
924972	AB2-153 E	3.8
925151	AB2-172 C	7.95
925152	AB2-172 E	12.96
925261	AB2-180 C	6.14
925262	AB2-180 E	2.63
925271	AB2-185 C	4.93
925272	AB2-185 E	2.11
926131	AC1-091 C	5.78
926132	AC1-091 E	9.49
926141	AC1-092 C	5.78
926142	AC1-092 E	9.49
926151	AC1-093 C	5.48
926152	AC1-093 E	9.02
926161	AC1-094 C	4.63
926162	AC1-094 E	7.63
926171	AC1-095 C	2.93
926172	AC1-095 E	4.7
926911	AC1-177	1.75
927031	AC1-190 C	14.68
927032	AC1-190 E	6.29
927191	AC1-213 C	1.41
927192	AC1-213 E	0.93
930201	AB1-056 C O1	3.52
930202	AB1-056 E O1	82.31
930881	AB1-137 C	1.89
930882	AB1-137 E	0.81
930921	AB1-141 C	4.13
930922	AB1-141 E	1.93
930931	AB1-142 C	4.13
930932	AB1-142 E	1.93
931111	AB1-162 C	2.1
931112	AB1-162 E	3.43
931261	AB1-176 C	1.13
931262	AB1-176 E	1.85

932161	AC2-023 C	11.58
932162	AC2-023 E	8.44
933631	AC2-185 C	11.72
933632	AC2-185 E	19.13
933641	AC2-186 C	9.62
933642	AC2-186 E	15.7
936611	AD2-076 C O1	5.9
936612	AD2-076 E O1	9.63
936691	AD2-088 C O1	8.13
936692	AD2-088 E O1	5.42
938251	AE1-038 C O1	1.89
938252	AE1-038 E O1	2.61
938651	AE1-087 C	3.55
938652	AE1-087 E	0.89
938891	AE1-117 C O1	21.59
938892	AE1-117 E O1	57.58
938901	AE1-118 C O1	21.59
938902	AE1-118 E O1	57.58
939151	AE1-145 C1	5.29
939152	AE1-145 C2	3.53
939153	AE1-145 E	0.09
939361	AE1-167 C O1	2.64
939362	AE1-167 E O1	2.2
939621	AE1-192 C O1	20.71
939622	AE1-192 E O1	10.13
941021	AE2-093 C	7.62
941022	AE2-093 E	12.1
941181	AE2-112 C	2.41
941182	AE2-112 E	3.93
941971	AE2-209 C	14.09
941972	AE2-209 E	9.82
942441	AE2-257 C O1	14.85
942442	AE2-257 E O1	39.14
942701	AE2-286 C	3.4
942702	AE2-286 E	4.95
942821	AE2-301 C	1.75
942822	AE2-301 E	2.68
BLUEG	BLUEG	2.08
CALDERWOOD	CALDERWOOD	0.23
CANNELTON	CANNELTON	0.13
CARR	CARR	0.17
CATAWBA	CATAWBA	0.14
CHEOAH	CHEOAH	0.21
CHILHOWEE	CHILHOWEE	0.07
COFFEEN	COFFEEN	0.22
COTTONWOOD	COTTONWOOD	0.87
DUCKCREEK	DUCKCREEK	0.48
EDWARDS	EDWARDS	0.22
ELMERSMITH	ELMERSMITH	0.22
FARMERCITY	FARMERCITY	0.15
G-007	G-007	0.51
GIBSON	GIBSON	0.09
HAMLET	HAMLET	0.24

NEWTON	NEWTON	0.58
O-066	O-066	3.17
PRAIRIE	PRAIRIE	1.07
RENSSELAER	RENSSELAER	0.13
SANTEETLA	SANTEETLA	0.06
SMITHLAND	SMITHLAND	0.09
TATANKA	TATANKA	0.26
TILTON	TILTON	0.26
TRIMBLE	TRIMBLE	0.23
TVA	TVA	0.73
UNIONPOWER	UNIONPOWER	0.32

Index 2

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
8241806	232100	CHURCH	DP&L	232107	TOWNSEND	DP&L	1	DPL_P7_1_DBL_1NCB-A	tower	348.0	110.86	112.15	DC	4.48

Bus #	Bus	MW Impact
232813	VAUGHN	0.08
232902	EASTMUNI	2.61
232907	VN8	4.17
232910	NRG_G1	1.29
232911	NRG_G2	1.29
232916	OH NUG5	0.68
232919	VN10	0.24
232922	MR3	10.61
232926	CRISFLD1	0.25
293670	O-025 C	0.15
901003	W1-003 C	0.38
901004	W1-003 E	0.91
901013	W1-004 C	0.38
901014	W1-004 E	0.91
901023	W1-005 C	0.38
901024	W1-005 E	0.91
901033	W1-006 C	0.38
901034	W1-006 E	0.91
907052	X1-032 E	0.81
910571	X3-008 C	0.23
910572	X3-008 E	3.07
910821	X3-066 C	0.12
910822	X3-066 E	1.58
913361	Y1-079 C	0.17
913362	Y1-079 E	2.3
913411	Y1-080 C	0.04
913412	Y1-080 E	0.49
915541	Y3-058 C	0.15
915542	Y3-058 E	1.94
917082	Z2-012 E	2.48
917432	Z2-076 E	0.38

917442	Z2-077 E	0.38
918831	AA1-102	0.93
919831	AA2-069	46.93
920321	AA2-130	0.05
923921	AB2-032 C	6.29
923922	AB2-032 E	2.96
923951	AB2-036 C	12.67
923952	AB2-036 E	20.72
923961	AB2-037 C	19.91
923962	AB2-037 E	32.52
924191	AB2-063 C	3.22
924192	AB2-063 E	5.26
924681	AB2-120 C	7.58
924682	AB2-120 E	12.37
924781	AB2-130 C O1	6.47
924782	AB2-130 E O1	10.56
924801	AB2-133 C O1	11.61
924802	AB2-133 E O1	14.73
924821	AB2-135 C	12.37
924822	AB2-135 E	14.11
924831	AB2-136 C	5.89
924832	AB2-136 E	6.25
924971	AB2-153 C	3.52
924972	AB2-153 E	5.74
925151	AB2-172 C	4.7
925152	AB2-172 E	7.67
925261	AB2-180 C	2.93
925262	AB2-180 E	1.25
925271	AB2-185 C	5.2
925272	AB2-185 E	2.23
926911	AC1-177	0.82
927031	AC1-190 C	8.58
927032	AC1-190 E	3.68
927191	AC1-213 C	0.65
927192	AC1-213 E	0.43
930202	AB1-056 E O1	33.09
930881	AB1-137 C	0.77
930882	AB1-137 E	0.33
930921	AB1-141 C	6.24
930922	AB1-141 E	2.91
930931	AB1-142 C	6.24
930932	AB1-142 E	2.91
931111	AB1-162 C	2.69
931112	AB1-162 E	4.39
931261	AB1-176 C	1.44
931262	AB1-176 E	2.37
932161	AC2-023 C	5.63
932162	AC2-023 E	4.1
933641	AC2-186 C	3.69
933642	AC2-186 E	6.01
936611	AD2-076 C O1	8.21
936612	AD2-076 E O1	13.4
936691	AD2-088 C O1	3.61

936692	AD2-088 E O1	2.41
938251	AE1-038 C O1	0.87
938252	AE1-038 E O1	1.21
938651	AE1-087 C	3.96
938652	AE1-087 E	0.99
938891	AE1-117 C O1	8.81
938892	AE1-117 E O1	23.49
938901	AE1-118 C O1	8.81
938902	AE1-118 E O1	23.51
939151	AE1-145 C1	2.39
939152	AE1-145 C2	1.6
939153	AE1-145 E	0.04
939361	AE1-167 C O1	1.2
939362	AE1-167 E O1	1.0
939621	AE1-192 C O1	9.39
939622	AE1-192 E O1	4.6
941021	AE2-093 C	5.93
941022	AE2-093 E	9.42
941181	AE2-112 C	3.35
941182	AE2-112 E	5.47
941971	AE2-209 C	7.65
941972	AE2-209 E	5.33
942441	AE2-257 C O1	6.04
942442	AE2-257 E O1	15.93
942701	AE2-286 C	1.83
942702	AE2-286 E	2.65
942821	AE2-301 C	0.82
942822	AE2-301 E	1.24
BLUEG	BLUEG	0.96
CALDERWOOD	CALDERWOOD	0.1
CANNELTON	CANNELTON	0.06
CARR	CARR	0.05
CATAWBA	CATAWBA	0.07
CHEOAH	CHEOAH	0.1
CHILHOWEE	CHILHOWEE	0.03
COFFEEN	COFFEEN	0.1
COTTONWOOD	COTTONWOOD	0.4
DUCKCREEK	DUCKCREEK	0.22
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.1
FARMERCITY	FARMERCITY	0.07
G-007	G-007	0.07
GIBSON	GIBSON	0.04
HAMLET	HAMLET	0.11
NEWTON	NEWTON	0.26
O-066	O-066	0.65
PRAIRIE	PRAIRIE	0.49
RENSSELAER	RENSSELAER	0.04
SANTEETLA	SANTEETLA	0.03
SMITHLAND	SMITHLAND	0.04
TATANKA	TATANKA	0.12
TILTON	TILTON	0.12
TRIMBLE	TRIMBLE	0.11

TVA	TVA	0.34
UNIONPOWER	UNIONPOWER	0.15

Index 4

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
8241855	232107	TOWNSEND	DP&L	232106	MIDLTNTP	DP&L	1	DPL_P7_1_DBL_1NCB-A	tower	348.0	101.93	103.22	DC	4.48

Bus #	Bus	MW Impact
232813	VAUGHN	0.08
232902	EASTMUNI	2.61
232907	VN8	4.17
232910	NRG_G1	1.29
232911	NRG_G2	1.29
232916	OH NUG5	0.68
232919	VN10	0.24
232926	CRISFLD1	0.25
293670	O-025 C	0.15
901003	W1-003 C	0.38
901004	W1-003 E	0.91
901013	W1-004 C	0.38
901014	W1-004 E	0.91
901023	W1-005 C	0.38
901024	W1-005 E	0.91
901033	W1-006 C	0.38
901034	W1-006 E	0.91
907052	X1-032 E	0.81
910571	X3-008 C	0.23
910572	X3-008 E	3.07
910821	X3-066 C	0.12
910822	X3-066 E	1.58
913361	Y1-079 C	0.17
913362	Y1-079 E	2.3
913411	Y1-080 C	0.04
913412	Y1-080 E	0.49
915541	Y3-058 C	0.15
915542	Y3-058 E	1.94
917082	Z2-012 E	2.48
917432	Z2-076 E	0.38
917442	Z2-077 E	0.38
918831	AA1-102	0.93
920321	AA2-130	0.05
923921	AB2-032 C	6.29
923922	AB2-032 E	2.96
923951	AB2-036 C	12.67
923952	AB2-036 E	20.72
923961	AB2-037 C	19.91
923962	AB2-037 E	32.52
924191	AB2-063 C	3.22

924192	AB2-063 E	5.26
924681	AB2-120 C	7.58
924682	AB2-120 E	12.37
924781	AB2-130 C O1	6.47
924782	AB2-130 E O1	10.56
924801	AB2-133 C O1	11.61
924802	AB2-133 E O1	14.73
924821	AB2-135 C	12.37
924822	AB2-135 E	14.11
924831	AB2-136 C	5.89
924832	AB2-136 E	6.25
924971	AB2-153 C	3.52
924972	AB2-153 E	5.74
925151	AB2-172 C	4.7
925152	AB2-172 E	7.67
925251	AB2-179 C	26.92
925252	AB2-179 E	8.88
925261	AB2-180 C	2.93
925262	AB2-180 E	1.25
925271	AB2-185 C	5.2
925272	AB2-185 E	2.23
926911	AC1-177	0.82
927031	AC1-190 C	8.58
927032	AC1-190 E	3.68
927191	AC1-213 C	0.65
927192	AC1-213 E	0.43
930202	AB1-056 E O1	33.09
930881	AB1-137 C	0.77
930882	AB1-137 E	0.33
930921	AB1-141 C	6.24
930922	AB1-141 E	2.91
930931	AB1-142 C	6.24
930932	AB1-142 E	2.91
931111	AB1-162 C	2.69
931112	AB1-162 E	4.39
931261	AB1-176 C	1.44
931262	AB1-176 E	2.37
932161	AC2-023 C	5.63
932162	AC2-023 E	4.1
933641	AC2-186 C	3.69
933642	AC2-186 E	6.01
936611	AD2-076 C O1	8.21
936612	AD2-076 E O1	13.4
936691	AD2-088 C O1	3.61
936692	AD2-088 E O1	2.41
938651	AE1-087 C	3.96
938652	AE1-087 E	0.99
938891	AE1-117 C O1	8.81
938892	AE1-117 E O1	23.49
938901	AE1-118 C O1	8.81
938902	AE1-118 E O1	23.51
939151	AE1-145 C1	2.39
939152	AE1-145 C2	1.6

939153	AE1-145 E	0.04
939361	AE1-167 C O1	1.2
939362	AE1-167 E O1	1.0
939621	AE1-192 C O1	9.39
939622	AE1-192 E O1	4.6
941021	AE2-093 C	5.93
941022	AE2-093 E	9.42
941181	AE2-112 C	3.35
941182	AE2-112 E	5.47
941971	AE2-209 C	7.65
941972	AE2-209 E	5.33
942441	AE2-257 C O1	6.04
942442	AE2-257 E O1	15.93
942701	AE2-286 C	1.83
942702	AE2-286 E	2.65
942821	AE2-301 C	0.82
942822	AE2-301 E	1.24
BLUEG	BLUEG	0.96
CALDERWOOD	CALDERWOOD	0.1
CANNELTON	CANNELTON	0.06
CARR	CARR	0.05
CATAWBA	CATAWBA	0.07
CHEOAH	CHEOAH	0.1
CHILHOWEE	CHILHOWEE	0.03
COFFEEN	COFFEEN	0.1
COTTONWOOD	COTTONWOOD	0.4
DUCKCREEK	DUCKCREEK	0.22
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.1
FARMERCITY	FARMERCITY	0.07
G-007	G-007	0.07
GIBSON	GIBSON	0.04
HAMLET	HAMLET	0.11
NEWTON	NEWTON	0.26
O-066	O-066	0.65
PRAIRIE	PRAIRIE	0.49
RENSSELAER	RENSSELAER	0.04
SANTEETLA	SANTEETLA	0.03
SMITHLAND	SMITHLAND	0.04
TATANKA	TATANKA	0.12
TILTON	TILTON	0.12
TRIMBLE	TRIMBLE	0.11
TVA	TVA	0.34
UNIONPOWER	UNIONPOWER	0.15

Index 6

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
7719394	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	157.17	162.35	DC	4.87

Bus #	Bus	MW Impact
232905	BAYVIEW1	0.17
232907	VN8	2.68
232914	OH NUG3	0.37
232915	OH NUG4	0.37
232916	OH NUG5	0.37
232919	VN10	0.22
232921	TASLEY2G	0.25
232926	CRISFLD1	0.14
292089	T-011	0.06
293670	O-025 C	0.09
901003	W1-003 C	0.21
901004	W1-003 E	0.5
901013	W1-004 C	0.21
901014	W1-004 E	0.5
901023	W1-005 C	0.21
901024	W1-005 E	0.5
901033	W1-006 C	0.21
901034	W1-006 E	0.5
907052	X1-032 E	0.46
910571	X3-008 C	0.35
910572	X3-008 E	4.67
913411	Y1-080 C	0.04
913412	Y1-080 E	0.55
915541	Y3-058 C	0.1
915542	Y3-058 E	1.38
917081	Z2-012 C	0.1
917082	Z2-012 E	1.36
917432	Z2-076 E	0.18
917442	Z2-077 E	0.18
918831	AA1-102	0.53
920321	AA2-130	0.03
924681	AB2-120 C	4.15
924682	AB2-120 E	6.77
924781	AB2-130 C O1	4.04
924782	AB2-130 E O1	6.59
924831	AB2-136 C	7.56
924832	AB2-136 E	8.02
925151	AB2-172 C	7.15
925152	AB2-172 E	11.67
925261	AB2-180 C	2.08
925262	AB2-180 E	0.89
926911	AC1-177	0.46
927031	AC1-190 C	12.58
927032	AC1-190 E	5.39
927191	AC1-213 C	0.41
927192	AC1-213 E	0.27
930202	AB1-056 E O1	13.59
930881	AB1-137 C	0.33
930882	AB1-137 E	0.14
932161	AC2-023 C	4.29
932162	AC2-023 E	3.13

936691	AD2-088 C O1	2.27
936692	AD2-088 E O1	1.51
938651	AE1-087 C	6.02
938652	AE1-087 E	1.51
938891	AE1-117 C O1	3.83
938892	AE1-117 E O1	10.21
938901	AE1-118 C O1	3.85
938902	AE1-118 E O1	10.25
939151	AE1-145 C1	1.31
939152	AE1-145 C2	0.88
939153	AE1-145 E	0.02
939361	AE1-167 C O1	0.66
939362	AE1-167 E O1	0.55
939621	AE1-192 C O1	5.15
939622	AE1-192 E O1	2.52
941971	AE2-209 C	8.71
941972	AE2-209 E	6.07
942441	AE2-257 C O1	2.61
942442	AE2-257 E O1	6.88
942701	AE2-286 C	1.98
942702	AE2-286 E	2.88
942821	AE2-301 C	0.46
942822	AE2-301 E	0.71
BLUEG	BLUEG	0.38
CALDERWOOD	CALDERWOOD	0.04
CANNELTON	CANNELTON	0.02
CARR	CARR	0.02
CATAWBA	CATAWBA	0.03
CHEOAH	CHEOAH	0.04
CHILHOWEE	CHILHOWEE	0.01
COFFEEN	COFFEEN	0.04
COTTONWOOD	COTTONWOOD	0.16
DUCKCREEK	DUCKCREEK	0.09
EDWARDS	EDWARDS	0.04
ELMERSMITH	ELMERSMITH	0.04
FARMERCITY	FARMERCITY	0.03
G-007	G-007	0.04
GIBSON	GIBSON	0.02
HAMLET	HAMLET	0.04
NEWTON	NEWTON	0.1
O-066	O-066	0.32
PRAIRIE	PRAIRIE	0.19
RENSSELAER	RENSSELAER	0.02
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.02
TATANKA	TATANKA	0.05
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.04
TVA	TVA	0.13
UNIONPOWER	UNIONPOWER	0.06

Index 7

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
8089084	232239	SHARPTWN	DP&L	936690	AD2-088 TAP	DP&L	1	DPL_P1_3_COOLSPG AT20	single	42.0	118.93	122.51	DC	1.51

Bus #	Bus	MW Impact
232919	VN10	0.21
910571	X3-008 C	0.15
913411	Y1-080 C	0.03
924831	AB2-136 C	4.35
925151	AB2-172 C	2.99
927031	AC1-190 C	5.65
932161	AC2-023 C	2.15
938651	AE1-087 C	2.52
941971	AE2-209 C	6.13
942701	AE2-286 C	1.51
BLUEG	BLUEG	0.01
CALDERWOOD	CALDERWOOD	0.0
CANNELTON	CANNELTON	0.0
CARR	CARR	0.0
CATAWBA	CATAWBA	0.0
CHEOAH	CHEOAH	0.0
CHILHOWEE	CHILHOWEE	0.0
COFFEEN	COFFEEN	0.0
COTTONWOOD	COTTONWOOD	0.0
DUCKCREEK	DUCKCREEK	0.0
EDWARDS	EDWARDS	0.0
ELMERSMITH	ELMERSMITH	0.0
FARMERCITY	FARMERCITY	0.0
GIBSON	GIBSON	0.0
HAMLET	HAMLET	0.0
NEWTON	NEWTON	0.0
PRAIRIE	PRAIRIE	0.0
RENSSELAER	RENSSELAER	0.0
SANTEETLA	SANTEETLA	0.0
SMITHLAND	SMITHLAND	0.0
TATANKA	TATANKA	0.0
TILTON	TILTON	0.0
TRIMBLE	TRIMBLE	0.0
TVA	TVA	0.0
UNIONPOWER	UNIONPOWER	0.0

Index 8

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
8088958	232241	VIENN_69	DP&L	232239	SHARPTWN	DP&L	1	DPL_P1_3_COOLSPG AT20	single	42.0	130.83	134.42	DC	1.51

Bus #	Bus	MW Impact
232919	VN10	0.21

910571	X3-008 C	0.15
913411	Y1-080 C	0.03
924831	AB2-136 C	4.35
925151	AB2-172 C	2.99
927031	AC1-190 C	5.65
932161	AC2-023 C	2.15
938651	AE1-087 C	2.52
941971	AE2-209 C	6.13
942701	AE2-286 C	1.51
BLUEG	BLUEG	0.01
CALDERWOOD	CALDERWOOD	0.0
CANNELTON	CANNELTON	0.0
CARR	CARR	0.0
CATAWBA	CATAWBA	0.0
CHEOAH	CHEOAH	0.0
CHILHOWEE	CHILHOWEE	0.0
COFFEEN	COFFEEN	0.0
COTTONWOOD	COTTONWOOD	0.0
DUCKCREEK	DUCKCREEK	0.0
EDWARDS	EDWARDS	0.0
ELMERSMITH	ELMERSMITH	0.0
FARMERCITY	FARMERCITY	0.0
GIBSON	GIBSON	0.0
HAMLET	HAMLET	0.0
NEWTON	NEWTON	0.0
PRAIRIE	PRAIRIE	0.0
RENSSELAER	RENSSELAER	0.0
SANTEETLA	SANTEETLA	0.0
SMITHLAND	SMITHLAND	0.0
TATANKA	TATANKA	0.0
TILTON	TILTON	0.0
TRIMBLE	TRIMBLE	0.0
TVA	TVA	0.0
UNIONPOWER	UNIONPOWER	0.0

Contingency Name	Contingency Definition
DPL_P4-2_DP12	CONTINGENCY 'DPL_P4-2_DP12' /*STEELE BUS BREAKER TO VIENNA DISCONNECT BRANCH FROM BUS 232000 TO BUS 232103 CKT 2 /*STEELE STEELE 230 138 AT21 DISCONNECT BRANCH FROM BUS 232000 TO BUS 232005 CKT 1 /*STEELE VIENNA 230 230 END
DPL_P4-2_DP11	CONTINGENCY 'DPL_P4-2_DP11' /*STEELE BUS BREAKER TO MILFORD DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1 /*MILFORD STEELE 230 230 DISCONNECT BRANCH FROM BUS 232000 TO BUS 232005 CKT 1 /*STEELE VIENNA 230 230 END
DPL_P1_2_CKT 6708	CONTINGENCY 'DPL_P1_2_CKT 6708' DISCONNECT BUS 232270 / MARDELA - HEBRON 69 & HEBRON XFMR DISCONNECT BUS 232838 / VIENNA - MARDELA 69 DISCONNECT BUS 232644 / HEBRON 1 12 DISCONNECT BUS 232653 / HEBRON 2 12 DISCONNECT BUS 232291 / ROCKAWALKIN - NORTH SALISBURY 69 END

DPL_P1_3_COOLSPG AT20	CONTINGENCY 'DPL_P1_3_COOLSPG AT20' OPEN LINE FROM BUS 232001 TO BUS 232269 CIRCUIT 1 /COOL SPRINGS AT20 230/69 END
DPL_P7_1_DBL_1NCB-A	CONTINGENCY 'DPL_P7_1_DBL_1NCB-A' /* #1 & #2 KEENEY-STEELE 230 OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1 OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2 END
Base Case	