Generation Interconnection
Feasibility Study Report
Queue Position AE1-167

The Interconnection Customer (IC) has proposed an 11.0 MW Energy (6.0 MW Capacity) solar generating facility to be located in Wallops Island, Accomack County, Virginia. At the IC's request, PJM studied the AE1-167 project at both a Primary and Secondary Point of Interconnection. The project was studied at a commercial probability of 53% with the results provided below. The planned in-service date, as requested by the IC during the project kick-off call, is June 25, 2021.

Point(s) of Interconnection

The Interconnection Customer requested a distribution level Primary and Secondary Point of Interconnection (POI) be evaluated for the AE1-167 project.

Primary Point of Interconnection

PJM studied the AE1-167 project as an injection into the Delmarva Power and Light Company (DPL) transmission system at the Wattsville 12 kV Substation T1 transformer (PSSE bus # 232648) and evaluated it for compliance with reliability criteria for summer peak conditions in 2022.

Distribution facilities in the area of the AE1-167 project are owned by the A&N Electric Cooperative (ANEC). As a result, AE1-167 will interconnect with the ANEC system at a tap of the ANEC 12 kV feeder from the Wattsville 69/12 Substation T1 transformer. The DPL transmission system feeds the ANEC distribution system.

Transmission Owner Scope of Attachment Facilities Work

There is no DPL Attachment Facility work required for the AE1-167 project. The IC must contact ANEC for the work scope and schedule.

Required Relaying and Communications

DPL does not anticipate any additional relay and communications work for this project.

Metering

Revenue metering specifications will be established by ANEC.

The IC is also 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 assumes full responsibility for design and construction of all facilities associated with the AE1-167 generating facility.

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
460743	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	134.24	134.83	DC	1.2

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
460743	1	**TODD 69.0 kV - PRESTON 69.0 kV Ckt 1**	Description : To mitigate the (DP&L) TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require substation reinforcements at Preston Substation and Todd Substation. Time Estimate : 12.0 Months Cost : $67,000	$67,000
			TOTAL COST	**$67,000**

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
462036	232128	PINEY138	DP&L	232127	LORETTO	DP&L	1	DPL_P1_2_CKT 23002	operation	158.0	81.26	84.32	DC	4.83

Secondary Point of Interconnection

PJM studied the AE1-167 project as an injection into the Delmarva Power and Light Company (DPL) transmission system at the Wattsville 12 kV Substation T2 transformer (PSSE bus # 232649) and evaluated it for compliance with reliability criteria for summer peak conditions in 2022.

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
434129	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	134.35	134.94	DC	1.2

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
435615	232128	PINEY138	DP&L	232127	LORETTO	DP&L	1	DPL_P1_2_CKT 23002	operation	158.0	81.26	84.32	DC	4.83

Primary POI 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.

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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
460743	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	134.24	134.83	DC	1.2

Bus #	Bus	MW Impact
232905	BAYVIEW1	0.21
232907	VN8	3.37
232912	OH NUG1	0.53
232914	OH NUG3	0.53
232915	OH NUG4	0.53
232916	OH NUG5	0.53
232919	VN10	0.32
232921	TASLEY2G	0.36
232926	CRISFLD1	0.18
292089	T-011	0.07
293670	O-025 C	0.12
901003	W1-003 C	0.26
901004	W1-003 E	0.5
901013	W1-004 C	0.26
901014	W1-004 E	0.5
901023	W1-005 C	0.26
901024	W1-005 E	0.5
901033	W1-006 C	0.26
901034	W1-006 E	0.5
904210	V4-022 C	0.21
904212	V4-022 E	0.34
907052	X1-032 E	0.46
910571	X3-008 C	0.44
910572	X3-008 E	4.67
913411	Y1-080 C	0.05
913412	Y1-080 E	0.55
915541	Y3-058 C	0.13
915542	Y3-058 E	1.38
917081	Z2-012 C	0.13
917082	Z2-012 E	1.36
917432	Z2-076 E	0.18
917442	Z2-077 E	0.18
918831	AA1-102	0.67
920321	AA2-130	0.04
924361	AB2-084 C	0.07
924362	AB2-084 E	0.71
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
925091	AB2-166 C	0.04
925092	AB2-166 E	0.45
925151	AB2-172 C	7.15
925152	AB2-172 E	11.67
925261	AB2-180 C	2.08

Bus #	Bus	MW Impact
925262	AB2-180 E	0.89
925731	AC1-049 C	0.13
925732	AC1-049 E	0.21
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
927321	AC1-229 C	0.3
927322	AC1-229 E	0.48
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
935121	AD1-145	1.05
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	3.84
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
BAYOU	BAYOU	0.08
BIG_CAJUN1	BIG_CAJUN1	0.12
BIG_CAJUN2	BIG_CAJUN2	0.25
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
CHOCTAW	CHOCTAW	0.08
COFFEEN	COFFEEN	0.04
COTTONWOOD	COTTONWOOD	0.32
DEARBORN	DEARBORN	0.07
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	0.09

Bus #	Bus	MW Impact
NEWTON	NEWTON	0.11
O-066	O-066	0.17
PRAIRIE	PRAIRIE	0.2
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

Contingency Name	Contingency Definition
DPL_P1_2_CKT 23002	CONTINGENCY 'DPL_P1_2_CKT 23002' DISCONNECT BUS 232007 /INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20 XFMER 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

Secondary POI Flow Gate Details

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
434129	232234	TODD	DP&L	232233	PRESTON	DP&L	1	DPL_P4-2_DP11	breaker	93.0	134.35	134.94	DC	1.2

Bus #	Bus	MW Impact
232905	BAYVIEW1	0.21
232907	VN8	3.37
232912	OH NUG1	0.53
232914	OH NUG3	0.53
232915	OH NUG4	0.53
232916	OH NUG5	0.53
232919	VN10	0.32

Bus #	Bus	MW Impact
232921	TASLEY2G	0.36
232926	CRISFLD1	0.18
292089	T-011	0.07
293670	O-025 C	0.12
901003	W1-003 C	0.26
901004	W1-003 E	0.5
901013	W1-004 C	0.26
901014	W1-004 E	0.5
901023	W1-005 C	0.26
901024	W1-005 E	0.5
901033	W1-006 C	0.26
901034	W1-006 E	0.5
904210	V4-022 C	0.21
904212	V4-022 E	0.34
907052	X1-032 E	0.46
910571	X3-008 C	0.44
910572	X3-008 E	4.67
913411	Y1-080 C	0.05
913412	Y1-080 E	0.55
915541	Y3-058 C	0.13
915542	Y3-058 E	1.38
917081	Z2-012 C	0.13
917082	Z2-012 E	1.36
917432	Z2-076 E	0.18
917442	Z2-077 E	0.18
918831	AA1-102	0.67
920321	AA2-130	0.04
924361	AB2-084 C	0.07
924362	AB2-084 E	0.71
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
925091	AB2-166 C	0.04
925092	AB2-166 E	0.45
925151	AB2-172 C	7.15
925152	AB2-172 E	11.67
925261	AB2-180 C	2.08
925262	AB2-180 E	0.89
925731	AC1-049 C	0.13
925732	AC1-049 E	0.21
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
927321	AC1-229 C	0.3
927322	AC1-229 E	0.48
930202	AB1-056 E O1	13.59
930881	AB1-137 C	0.33

Bus #	Bus	MW Impact
930882	AB1-137 E	0.14
932161	AC2-023 C	4.29
932162	AC2-023 E	3.13
935121	AD1-145	1.05
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 O2	3.88
938892	AE1-117 E O2	10.34
938901	AE1-118 C O2	3.86
938902	AE1-118 E O2	10.3
939151	AE1-145 C1	1.31
939152	AE1-145 C2	0.88
939153	AE1-145 E	0.02
939361	AE1-167 C O2	0.66
939362	AE1-167 E O2	0.55
939621	AE1-192 C O2	5.15
939622	AE1-192 E O2	2.52
BAYOU	BAYOU	0.08
BIG_CAJUN1	BIG_CAJUN1	0.12
BIG_CAJUN2	BIG_CAJUN2	0.25
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
CHOCTAW	CHOCTAW	0.08
COFFEEN	COFFEEN	0.04
COTTONWOOD	COTTONWOOD	0.32
DEARBORN	DEARBORN	0.07
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	0.09
NEWTON	NEWTON	0.11
O-066	O-066	0.17
PRAIRIE	PRAIRIE	0.2
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

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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