

PJM Feasibility Study Report

Long-Term Firm Transmission Service

OASIS Assignment Reference 4966477, 4966479, and 4966484

Queue Project AE1-110/AE1-111/AE1-112

January 30, 2019

Network Impacts

The Queue Projects AE1-110, AE1-111, and AE1-112 (OASIS Requests 4966477, 4966479, and 4966484) were evaluated as a combined 300 MW injection from PJM to Duke Energy Carolinas (DUK). Project AE1-110/AE1-111/AE1-112 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-110/AE1-111/AE1-112 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2022

Generator Deliverability

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

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
200839	934610	AD1-087 TAP	DVP	314697	6SEEDGE HILL	DVP	1	DVP_P1-2: LN 570	single	814.98	93.5	97.04	AC	30.03

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
435038	200064	PCHBTM1S	PJM	200004	CNASTONE	PJM	1	PECO_P4_PEACH025	breaker	3525.0	113.19	114.16	AC	35.34
559441	200064	PCHBTM1S	PJM	200004	CNASTONE	PJM	1	PECO_P1-2_5007_S/* \$ CHESCO \$ PECO_P1-2_5007_S \$ L	single	3525.0	106.07	106.82	AC	35.44
200382	314574	6EVERETS	DVP	936530	AD2-068 TAP	DVP	1	DVP_P1-2: LN 570	single	449.32	101.4	104.72	AC	16.16

Contingency Definitions

Contingency Name	Contingency Definition
PECO_P1-2_5007_S/* \$ CHESCO \$ PECO_P1-2_5007_S \$ L	CONTINGENCY 'PECO_P1-2_5007_S/* \$ CHESCO \$ PECO_P1-2_5007_S \$ L' TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1 /* PCHBTM1N 500.00 FUR RUN_500 500.00 \$ CHESCO \$ PECO_P1-2_5007_S \$ L END
DVP_P1-2: LN 570	CONTINGENCY 'DVP_P1-2: LN 570' OPEN BRANCH FROM BUS 304183 TO BUS 918500 CKT 1 /* 8WAKE 500 TT500.00 - AA1-064 TAP 500.00 OPEN BRANCH FROM BUS 314935 TO BUS 918500 CKT 1 /* 8HERITAGE 500.00 - AA1-064 TAP 500.00 OPEN BUS 918500 /* ISLAND: AA1-064 TAP 500.00 END
PECO_P4_PEACH025	CONTINGENCY 'PECO_P4_PEACH025' /* \$ CHESCO \$ PECO_P4_PEACH025 \$ STBK TRIP BRANCH FROM BUS 200065 TO BUS 200066 CKT 1 /* PCHBTM2S 500.00 PCHBTM1N 500.00 \$ CHESCO \$ PECO_P4_PEACH025 \$ STBK TRIP BRANCH FROM BUS 200064 TO BUS 200065 CKT Z1 /* PCHBTM1S 500.00 PCHBTM2S 500.00 \$ CHESCO \$ PECO_P4_PEACH025 \$ STBK TRIP BRANCH FROM BUS 200013 TO BUS 200066 CKT Z1 /* PCHBTM2N 500.00 PCHBTM1N 500.00 \$ CHESCO \$ PECO_P4_PEACH025 \$ STBK TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1 /* PCHBTM1N 500.00 FUR RUN_500 500.00 \$ CHESCO \$ PECO_P4_PEACH025 \$ STBK END

System Reinforcements

ID	Appendix	Facility	Upgrade Description	Cost
200839	1	AD1-087 TAP 230.0 kV - 6SEEDGE HILL 230.0 kV Ckt 1	Description : Wreck & rebuild Line #2068 12 mi, Va CPCN Time Estimate : 30-36 Months Cost : \$30,000,000	\$30,000,000
559441,435038	2	PCHBTM1S 500.0 kV - CNASTONE 500.0 kV Ckt 1	PECO Description : Construct second line between Peach Bottom and Conastone Time Estimate : 84 Months Cost : \$130,500,000 BGE Description : Construct second line between Peach Bottom and Conastone Time Estimate : 84 Months Cost : \$216,800,000	\$347,300,000
200382	3	GEVERETS 230.0 kV - AD2-068 TAP 230.0 kV Ckt 1	Description : Line 218 Rebuild DEV portion for high capacity 17.0 mi Time Estimate : 30-36 Months Cost : \$34,000,000	\$34,000,000
		TOTAL COST	\$411,300,000	

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.

Appendix 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
200839	934610	AD1-087 TAP	DVP	314697	6SEGE HILL	DVP	1	DVP_P1-2: LN 570	single	814.98	93.5	97.04	AC	30.03

Bus #	Bus	MW Impact
314421	6WINCHST	0.05
314507	3THOMPSN	0.12
315090	1YORKTN1	10.65
315091	1YORKTN2	11.05
315092	1YORKTN3	8.11
315098	1CHESPKA	0.16
315099	1CHESPKB	0.4
315102	1BRUNSWICKG1	5.2
315103	1BRUNSWICKG2	5.2
315104	1BRUNSWICKG3	5.2
315105	1BRUNSWICKS1	10.81
315108	1ELIZAR1	1.17
315109	1ELIZAR2	1.15
315110	1ELIZAR3	1.19
315153	1CLOVER1	20.5
315154	1CLOVER2	20.23
315191	1BEARGRDN G1	1.56
315192	1BEARGRDN G2	1.56
315193	1BEARGRDN S1	3.2
315233	1SURRY 2	9.43
315260	1GOSPORTA	0.13
315261	1GOSPORTB	0.16
315262	1GOSPORTC	0.14
916191	Z1-068 C	0.02
916301	Z1-086 C	30.38
920291	AA2-127	0.32
924031	AB2-045 C	0.19
925521	AC1-027 C	0.12
926661	AC1-147 C	0.13

Bus #	Bus	MW Impact
926751	AC1-161 C O1	13.14
926761	AC1-162 C	29.88
932041	AC2-012 C	3.97
932511	AC2-071 C	0.19
932823	AC2-107 BAT	25.76
933291	AC2-141 C	13.14
933731	AC2-196 C	0.1
934061	AD1-033 C	2.86
934233	AD1-050 BAT	5.08
934611	AD1-087 C O1	20.5
934621	AD1-088 C	17.85
935171	AD1-152 C O1	20.38
937251	AD2-164	1.77
937481	AD2-202 C O1	5.65
938181	AE1-027 C	0.87
938191	AE1-028 C	0.51
938461	AE1-065 C O1	10.92
938471	AE1-066 C O1	11.22
938481	AE1-067 C O1	10.2
938491	AE1-068 C O1	38.25
938501	AE1-069 C O1	30.94
939311	AE1-162 C	0.81
939411	AE1-173 C	43.25
AC1-133	AC1-133	39.05
AE1-112	AE1-112	30.03
BAYOU	BAYOU	6.18
BIG_CAJUN1	BIG_CAJUN1	9.74
BIG_CAJUN2	BIG_CAJUN2	19.59
BLUEG	BLUEG	18.5
CALDERWOOD	CALDERWOOD	3.67
CANNELTON	CANNELTON	1.25
CATAWBA	CATAWBA	3.52
CBM-N	CBM-N	0.67
CHEOAH	CHEOAH	3.42
CHILHOWEE	CHILHOWEE	1.19
CHOCTAW	CHOCTAW	6.63
COFFEEN	COFFEEN	2.13
COTTONWOOD	COTTONWOOD	24.22

Bus #	Bus	MW Impact
DEARBORN	DEARBORN	2.29
DUCKCREEK	DUCKCREEK	4.37
EDWARDS	EDWARDS	1.96
ELMERSMITH	ELMERSMITH	2.2
FARMERCITY	FARMERCITY	1.53
G-007A	G-007A	3.01
GIBSON	GIBSON	0.79
HAMLET	HAMLET	13.25
NEWTON	NEWTON	5.54
NYISO	NYISO	2.91
O-066A	O-066A	1.38
PRAIRIE	PRAIRIE	11.51
SANTEETLA	SANTEETLA	1.02
SMITHLAND	SMITHLAND	1.02
TATANKA	TATANKA	2.59
TILTON	TILTON	2.32
TRIMBLE	TRIMBLE	2.03
TVA	TVA	10.31
UNIONPOWER	UNIONPOWER	5.07
VFT	VFT	8.01

Appendix 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
435038	200064	PCHBTM15	PJM	200004	CNASTONE	PJM	1	PECO_P4_PEACH025	breaker	3525.0	113.19	114.16	AC	35.34

Bus #	Bus	MW Impact
200034	PCHBTM 2	109.94
200035	PCHBTM 3	108.78
200054	ROCKSP 3	9.49
200055	ROCKSP 4	9.49
200192	DELTA CT1	10.76
200193	DELTA CT2	10.76
200194	DELTA CT3	10.76
200195	DELTA ST	16.62
901004	W1-003 E	1.83
901014	W1-004 E	1.83
901024	W1-005 E	1.83
901034	W1-006 E	1.83
904210	V4-022 C	0.77
904212	V4-022 E	1.25
907052	X1-032 E	1.62
910572	X3-008 E	5.0
910822	X3-066 E	1.47
913271	Y1-065 C	76.56
913362	Y1-079 E	2.47
913412	Y1-080 E	0.85
915191	Y3-043	71.46
915542	Y3-058 E	3.76
917082	Z2-012 E	5.01
917432	Z2-076 E	0.81
917442	Z2-077 E	0.81
917582	Z2-097 E	0.58
918192	AA1-034 E	28.07
919831	AA2-069	182.61
923921	AB2-032 C	5.37
923922	AB2-032 E	2.53
923951	AB2-036 C	13.94

Bus #	Bus	MW Impact
923952	AB2-036 E	22.8
923961	AB2-037 C	31.03
923962	AB2-037 E	50.69
924191	AB2-063 C	3.01
924192	AB2-063 E	4.92
924362	AB2-084 E	2.5
924681	AB2-120 C	15.35
924682	AB2-120 E	25.05
924781	AB2-130 C O1	13.04
924782	AB2-130 E O1	21.28
924801	AB2-133 C O1	9.7
924802	AB2-133 E O1	12.3
924821	AB2-135 C	11.84
924822	AB2-135 E	13.5
924831	AB2-136 C	10.0
924832	AB2-136 E	10.61
924971	AB2-153 C	3.0
924972	AB2-153 E	4.9
925092	AB2-166 E	1.41
925151	AB2-172 C	7.66
925152	AB2-172 E	12.49
925191	AB2-175 1	1.88
925201	AB2-175 2	1.86
925251	AB2-179 C	14.45
925252	AB2-179 E	4.77
925261	AB2-180 C	5.65
925262	AB2-180 E	2.42
925271	AB2-185 C	5.58
925272	AB2-185 E	2.39
925731	AC1-049 C	0.61
925732	AC1-049 E	0.99
926131	AC1-091 C	3.03
926132	AC1-091 E	4.98
926141	AC1-092 C	3.03
926142	AC1-092 E	4.98
926151	AC1-093 C	2.87
926152	AC1-093 E	4.73
926161	AC1-094 C	2.43

Bus #	Bus	MW Impact
926162	AC1-094 E	4.0
926171	AC1-095 C	1.54
926172	AC1-095 E	2.47
926911	AC1-177	1.62
927031	AC1-190 C	14.11
927032	AC1-190 E	6.05
927152	AC1-209 E	2.8
927191	AC1-213 C	1.29
927192	AC1-213 E	0.85
927321	AC1-229 C	1.54
927322	AC1-229 E	2.46
930202	AB1-056 E O1	74.13
930881	AB1-137 C	1.7
930882	AB1-137 E	0.73
930921	AB1-141 C	5.33
930922	AB1-141 E	2.49
930931	AB1-142 C	5.33
930932	AB1-142 E	2.49
931111	AB1-162 C	2.51
931112	AB1-162 E	4.11
931261	AB1-176 C	1.35
931262	AB1-176 E	2.22
932082	AC2-018 E1	13.81
932092	AC2-018 E2	13.81
932161	AC2-023 C	10.7
932162	AC2-023 E	7.79
933631	AC2-185 C	6.15
933632	AC2-185 E	10.03
933641	AC2-186 C	7.66
933642	AC2-186 E	12.5
935121	AD1-145	3.88
936351	AD2-045 C O1	4.84
936352	AD2-045 E O1	3.09
936611	AD2-076 C O1	7.37
936612	AD2-076 E O1	12.03
936691	AD2-088 C O1	7.27
936692	AD2-088 E O1	4.85
937281	AD2-167	27.62

Bus #	Bus	MW Impact
938251	AE1-038 C O1	3.4
938252	AE1-038 E O1	4.7
938651	AE1-087 C	6.45
938652	AE1-087 E	1.61
938811	AE1-107 C	11.93
938812	AE1-107 E	8.5
938891	AE1-117 C O1	19.4
938892	AE1-117 E O1	51.73
938901	AE1-118 C O1	19.4
938902	AE1-118 E O1	51.73
939151	AE1-145 C1	4.85
939152	AE1-145 C2	3.23
939153	AE1-145 E	0.08
939361	AE1-167 C O1	2.42
939362	AE1-167 E O1	2.02
939621	AE1-192 C O1	18.99
939622	AE1-192 E O1	9.29
AC1-056	AC1-056	10.62
AC1-133	AC1-133	36.71
AD2-098	AD2-098	0.73
AE1-080A	AE1-080A	31.89
AE1-112	AE1-112	35.34
BAYOU	BAYOU	11.59
BIG_CAJUN1	BIG_CAJUN1	17.89
BIG_CAJUN2	BIG_CAJUN2	36.01
BLUEG	BLUEG	52.99
CALDERWOOD	CALDERWOOD	6.14
CANNELTON	CANNELTON	3.25
CATAWBA	CATAWBA	4.13
CBM-N	CBM-N	12.02
CHEOAH	CHEOAH	5.64
CHILHOWEE	CHILHOWEE	2.01
CHOCTAW	CHOCTAW	11.96
COFFEEN	COFFEEN	5.61
COTTONWOOD	COTTONWOOD	45.89
DEARBORN	DEARBORN	8.69
DUCKCREEK	DUCKCREEK	12.13
EDWARDS	EDWARDS	5.52

Bus #	Bus	MW Impact
ELMERSMITH	ELMERSMITH	5.61
FARMERCITY	FARMERCITY	3.74
G-007A	G-007A	61.43
GIBSON	GIBSON	2.19
HAMLET	HAMLET	13.94
NEWTON	NEWTON	14.67
NYISO	NYISO	52.01
O-066A	O-066A	26.41
PRAIRIE	PRAIRIE	27.67
SANTEETLA	SANTEETLA	1.66
SMITHLAND	SMITHLAND	2.24
TATANKA	TATANKA	6.69
TILTON	TILTON	6.63
TRIMBLE	TRIMBLE	5.88
TVA	TVA	19.37
UNIONPOWER	UNIONPOWER	8.7
VFT	VFT	156.05

Appendix 3

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
200382	314574	6EVERETS	DVP	936530	AD2- 068 TAP	DVP	1	DVP_P1- 2: LN 570	single	449.32	101.4	104.72	AC	16.16

Bus #	Bus	MW Impact
314589	3MURPHYS	0.05
314638	6ELIZ CT	0.09
314639	6TANGLEW	0.18
314643	3O INLET	0.16
315115	1S HAMPT1	0.63
315139	1GASTONA	1.21
315141	1GASTONB	1.21
315292	1DOMTR78	1.44
315293	1DOMTR9	1.17
315294	1DOMTR10	2.13
901081	W1-029 C	0.53
916041	Z1-036 C	0.64
917331	Z2-043 C	0.25
917511	Z2-088 C OP1	1.69
918491	AA1-063AC OP	0.77
918511	AA1-065 C OP	1.44
918531	AA1-067 C	0.45
918561	AA1-072 C	0.04
919691	AA2-053 C	0.68
920041	AA2-088 C OP	0.49
920671	AA2-174 C	0.03
920691	AA2-178 C	1.2
923801	AB2-015 C O1	3.81
923831	AB2-022 C	0.15
923911	AB2-031 C O1	0.79
923941	AB2-035 C	0.23
924391	AB2-088 C	0.3
924491	AB2-098 C	0.99
924501	AB2-099 C	0.47

Bus #	Bus	MW Impact
925121	AB2-169 C	1.3
925281	AB2-186 C	0.34
925291	AB2-188 C O1	1.93
926071	AC1-086 C	8.9
926201	AC1-098 C	2.58
926211	AC1-099 C	0.87
927021	AC1-189 C	12.0
930861	AB1-132 C O1	0.93
932631	AC2-084 C	3.68
933991	AD1-023 C	12.68
934201	AD1-047 C	2.84
934521	AD1-076 C	50.94
936401	AD2-051 C O1	7.58
936701	AD2-089 C	5.03
936711	AD2-090 C O1	3.34
937221	AD2-160 C O1	2.04
937541	AD2-215 C	0.59
937571	AD2-169 C	3.66
938171	AE1-026 C1 O	27.5
938172	AE1-026 C2 O	3.98
938221	AE1-035 C	2.35
938531	AE1-072 C O1	6.6
938661	AE1-088	4.36
938771	AE1-103 C O1	1.57
939041	AE1-133 C	16.44
AC1-133	AC1-133	27.7
AE1-112	AE1-112	16.16
BAYOU	BAYOU	3.38
BIG_CAJUN1	BIG_CAJUN1	5.35
BIG_CAJUN2	BIG_CAJUN2	10.76
BLUEG	BLUEG	9.15
CALDERWOOD	CALDERWOOD	1.99
CANNELTON	CANNELTON	0.63
CATAWBA	CATAWBA	1.96
CBM-N	CBM-N	0.29
CHEOAH	CHEOAH	1.86
CHILHOWEE	CHILHOWEE	0.64
CHOCTAW	CHOCTAW	3.64

Bus #	Bus	MW Impact
COFFEEN	COFFEEN	1.09
COTTONWOOD	COTTONWOOD	13.22
DEARBORN	DEARBORN	1.12
DUCKCREEK	DUCKCREEK	2.22
EDWARDS	EDWARDS	0.99
ELMERSMITH	ELMERSMITH	1.12
FARMERCITY	FARMERCITY	0.79
G-007A	G-007A	1.32
GIBSON	GIBSON	0.4
HAMLET	HAMLET	8.46
NEWTON	NEWTON	2.82
NYISO	NYISO	1.25
O-066A	O-066A	0.61
PRAIRIE	PRAIRIE	5.99
SANTEETLA	SANTEETLA	0.55
SMITHLAND	SMITHLAND	0.54
TATANKA	TATANKA	1.33
TILTON	TILTON	1.16
TRIMBLE	TRIMBLE	1.0
TVA	TVA	5.57
UNIONPOWER	UNIONPOWER	2.77
VFT	VFT	3.51



January 30, 2019

Dear Ms. Kochonies,

Re:

OASIS ID	START	STOP	PATH	PRODUCT	MW	PROVIDER COMMENTS
4966477	01/01/25 00	01/01/30 00	PJM-DUK	year-FIRM	100	AE1-110
4966479	01/01/25 00	01/01/31 00	PJM-DUK	year-FIRM	100	AE1-111
4966484	01/01/25 00	01/01/32 00	PJM-DUK	year-FIRM	100	AE1-112

PJM Interconnection, L.L.C. has completed the analysis of your requests for long-term firm point-to-point transmission service on the **PJM-DUK** path.

PJM has determined that we are **unable** to grant your service requests at this time. Please see the enclosed Firm Transmission Feasibility Study report for more details.

Options available to you at this time include:

- Request monthly firm service for those months with available transfer capability.
- Request non-firm willing to pay congestion service.
- Request non-firm not willing to pay congestion service.
- If you would like PJM to complete the System Impact Study (SIS) to determine the system upgrades required to ensure that your request(s) can be accommodated at a future date, please respond to PJM within 30 days of receipt of this letter.

Pursuant to Section 204.1 of the PJM Open Access Transmission Tariff (OATT), enclosed is a copy of the System Impact Study Agreement (SISA) for your consideration. The executed SISA and deposit must be received by PJM within thirty days (**by 3/1/2019**) to maintain the projects' positions in the queue. The executed SISA should be returned with the required study deposit (\$50,000) to:

Jeannette Mittan
PJM Interconnection, L.L.C.
2750 Monroe Blvd.
Audubon, PA 19403
Phone: (610) 666-3158
FAX: (610) 666-2296

The following information is provided for wire transfers: Bank: PNC Bank, NA, New Jersey; ABA Number: 031-207-607; Account Number: 8013589826. Please e-mail Jeannette Mittan at jeannette.mittan@pjm.com with the project name, queue number, date and amount of wire.

The expected completion date of the System Impact Study is August 29, 2019. That date is set forth in the attached System Impact Study Agreement.

Should you have any questions regarding your requests, please utilize my contact information below. A meeting or teleconference can be arranged at your convenience.

Sincerely,

Rich Recklau
Transmission Service Department
Hotline: (610) 666-8980, LTFAdmin@pjm.com
PJM Interconnection | 2750 Monroe Blvd. | Audubon, PA 19403

Enclosures – PJM Feasibility Study Report; System Impact Study Agreement