Generation Interconnection

Feasibility Study Report

for

Queue Project AF2-020

CARLL'S CORNER 69 KV

8 MW Capacity / 20 MW Energy

July 2020

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1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is AEC.

2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. 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 impact study is performed.

The Feasibility 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.

3 General

The Interconnection Customer (IC), has proposed a Storage generating facility located in Cumberland County, New Jersey. The installed facilities will have a total capability of 20 MW with 8 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 01, 2021. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-020
Project Name	CARLL'S CORNER 69 KV
State	New Jersey
County	Cumberland
Transmission Owner	AEC
MFO	20

MWE	20
MWC	8
Fuel	Storage
Basecase Study Year	2023

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AF2-020 will interconnect with the AEC transmission system at the Carll's Corner 69 kV substation.

5 Cost Summary

The AF2-020 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$500,000
Total System Network Upgrade Costs	$1,520,000
Total Costs	$2,020,000

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

6 Transmission Owner Scope of Work

The total physical interconnection costs is given in the table below:

Description	Total Cost
Install 69 kV terminal on Carlls Corner #1 69 kV bus for AF2-020.	$500,000
Total Physical Interconnection Costs	$500,000

7 Schedule

Work estimated to take between 12-24 months.

8 Transmission Owner Analysis

None.

9 Interconnection Customer Requirements

Interconnection Customer Scope of Direct Connection Work

The IC 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. Protective relaying and metering design and installation must comply with ACE's applicable standards. 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.

ACE Interconnection Customer Scope of Direct Connection Work Requirements:

- ACE requires that an IC circuit breaker is located within 500 feet of the ACE substation to facilitate the relay protection scheme between ACE and the IC at the Point of Interconnection (POI).

Special Operating Requirements

1. ACE will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by ACE.

2. ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by ACE.

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 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.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.
3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.IV of Schedule H to the Interconnection Service Agreement.

10 Revenue Metering and SCADA Requirements

10.1 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.

10.2 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

A three phase 69 kV revenue metering point will need to be established within the Interconnection Customer Facilities at the Point of Interconnection. The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per ACE's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer and inspected by ACE, while the connections at the metering enclosure will be completed by ACE. The metering control cable and meter cabinets will be supplied by ACE and installed by the Interconnection Customer. The Interconnection Customer will install conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined during construction. The Interconnection Customer will provide 120V power to the meter cabinet. ACE will provide, program, install, and own the primary & backup solid state multi-function meters for the new metering position.

Each meter will be equipped with load profile, telemetry, and DNP outputs. The Interconnection Customer will be provided with one-meter DNP output for each meter. ACE will supply a wireless modem for MV90 interrogation. In the event that a wireless modem is unable to reliably communicate, the IC will be required to make provisions for a POTS (Plain Old Telephone Service) line or equivalent technology approved by ACE within approximately three feet of the ACE metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and ACE require directly to PJM. The Interconnection Customer will grant permission for PJM to send ACE the following

telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

ACE's revenue meters will be the official meters and must be the source for reporting generation output to PJM. The Interconnection Customer is responsible for installing telemetry equipment necessary to obtain the revenue meter data and submitting the data to PJM.

11 Summer Peak - Load Flow Analysis

The Queue Project AF2-020 was evaluated as a 20 MW (Capacity 8.0 MW) injection at the Carll's Corner 69 kV substation in the AEC area. Project AF2-020 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-020 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

11.3 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	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
10151915 9	228714	CNTR L N	69.0	AE	228504	SHLDLY T	69.0	AE	1	AE_P7-1 AE7TOWER	tower	143.0	108.49	109.44	DC	3.08
10151794 0	940000	AE1-240 TAP	69.0	AE	228226	SHRMAN# 2	69.0	AE	1	AE_P4-2 AE46	breaker	93.0	138.03	147.23	DC	8.57

11.4 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	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
10151852 1	228252	CRLS CR2	69.0	AE	940000	AE1-240 TAP	69.0	AE	1	AE_P1-2 ORCH-CUMB	operation	93.0	95.57	104.4	DC	8.22
10151849 9	228256	SHRMAN# 1	69.0	AE	945730	AF1-238 TAP	69.0	AE	1	AE_P1-2 ORCH-CUMB	operation	132.0	102.31	102.93	DC	1.83
99835779	228311	CHAMBERS	230.0	AE	228312	PEDRKTWN	230.0	AE	1	AE_P1-2 ORCHARD XF	operation	552.0	119.17	119.64	DC	5.76
99835699	228312	PEDRKTWN	230.0	AE	228313	BRIDGPRT	230.0	AE	1	AE_P1-2 ORCHARD XF	operation	552.0	136.15	136.62	DC	5.75
99835704	228312	PEDRKTWN	230.0	AE	228313	BRIDGPRT	230.0	AE	1	Base Case	operation	552.0	99.73	100.02	DC	3.55
10151857 2	228703	BUTLER	69.0	AE	228713	VCLP TP	69.0	AE	1	AE_P1-2 SHERM-WVINE-A	operation	132.0	98.55	100.49	DC	2.56
10151852 4	939500	AE1-179 TAP	69.0	AE	228228	SO MVLLE	69.0	AE	1	228226 SHRMAN# 2 69.0 940000 AE1-240 TAP 69.0 1	operation	89.0	100.73	107.46	DC	5.99
10151839 7	940000	AE1-240 TAP	69.0	AE	228226	SHRMAN# 2	69.0	AE	1	AE_P1-2 ORCH-CUMB	operation	93.0	132.67	141.49	DC	8.22
10151840 1	940000	AE1-240 TAP	69.0	AE	228226	SHRMAN# 2	69.0	AE	1	Base Case	operation	82.0	103.1	113.86	DC	8.82
10151847 4	945730	AF1-238 TAP	69.0	AE	228256	SHRMAN# 1	69.0	AE	1	Base Case	operation	119.0	109.95	110.54	DC	1.33

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
101519159	1	**CNTRL N 69.0 kV - SHLDLY T 69.0 kV Ckt 1**	**as0711r0001 (21) : To mitigate the (ACE) Sheildalloy Tap Central Tap 69 kV line (from bus 228504 to bus 228714 ckt 1) overload, terminal reinforcement is required at Central North (Vineland).** **Project Type : FAC** **Cost : $200,000** **Time Estimate : 24-36 Months** **at0711r0001 (100) : To mitigate the (ACE) Sheildalloy Tap Central Tap 69 kV line (from bus 228504 to bus 228714 ckt 1) overload, it will require increasing the emergency rating of the Sheildalloy Tap to Central North (Vineland) 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor.** **Project Type : FAC** **Cost : $1,300,000** **Time Estimate : 24-48 Months**	$1,500,000
101517940	2	**AE1-240 TAP 69.0 kV - SHRMAN#2 69.0 kV Ckt 1**	**ACECCShermr01 (12) : To mitigate the AE1-240 tap to Sherman 69 kV line section oveload a 600 amp disc switch must be upgraded at Sherman** **Project Type : FAC** **Cost : $20,000** **Time Estimate : 6 to 14 Months**	$20,000
			TOTAL COST	**$1,520,000**

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details 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 indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. 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 are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.6.1 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
101519159	228714	CNTRLN	AE	228504	SHLDLYT	AE	1	AE_P7-1 AE7TOWER	tower	143.0	108.49	109.44	DC	3.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
228102	BLE#2 ST (Deactivation : 30/04/2019)	13.6865	Adder	16.1
228201	CARL#2CT	0.7659	50/50	0.7659
228206	SHRMN CT	1.8223	50/50	1.8223
228251	CARLLS#4	0.0825	50/50	0.0825
228260	V4-054C	0.2069	50/50	0.2069
228261	V4-054E	0.9785	50/50	0.9785
228343	QUINTN#1 (Deactivation : 26/04/2020)	0.1124	Adder	0.13
228702	WEST CT	1.2680	50/50	1.2680
228712	V2-041E	0.3227	Adder	0.38
228717	S121	3.2895	50/50	3.2895
228727	W2-039G	2.6662	50/50	2.6662
924531	AB2-102 C	18.8458	Adder	22.17
924532	AB2-102 E	0.4188	Adder	0.49
938781	AE1-104 C O1	11.0475	Adder	13.0
938782	AE1-104 E O1	28.2649	Adder	33.25
939501	AE1-179 C O1	7.4858	50/50	7.4858
939502	AE1-179 E O1	5.2828	50/50	5.2828
940001	AE1-240 C O1	5.8203	50/50	5.8203
940002	AE1-240 E O1	4.1545	50/50	4.1545
945431	AF1-208 C O1	2.8022	Adder	3.3
945432	AF1-208 E O1	1.8681	Adder	2.2
945731	AF1-238 C	13.2243	50/50	13.2243
945732	AF1-238 E	19.8364	50/50	19.8364
945741	AF1-239 C	3.1116	50/50	3.1116
945742	AF1-239 E	4.6674	50/50	4.6674
957251	AF2-019 C	0.7566	Adder	1.68
957252	AF2-019 E	1.1349	Adder	2.52
957261	AF2-020 C	0.5543	Adder	1.23
957262	AF2-020 E	0.8315	Adder	1.85
957281	AF2-022 C	1.1738	Adder	2.61
957282	AF2-022 E	1.7607	Adder	3.91
957321	AF2-026 C	2.0844	50/50	2.0844
957322	AF2-026 E	3.1266	50/50	3.1266
957641	AF2-058	0.3946	50/50	0.3946
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2219	Adder	0.49
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	26.4014	Adder	58.6
958811	AF2-172 C	0.7162	50/50	0.7162
958812	AF2-172 E	1.1685	50/50	1.1685

959111	AF2-202 C	0.1759	50/50	0.1759
959112	AF2-202 E	0.2408	50/50	0.2408
NEWTON	NEWTON	0.0527	Confirmed LTF	0.0527
FARMERCITY	FARMERCITY	0.0027	Confirmed LTF	0.0027
CALDERWOOD	CALDERWOOD	0.0244	Confirmed LTF	0.0244
NY	NY	0.0426	Confirmed LTF	0.0426
PRAIRIE	PRAIRIE	0.1266	Confirmed LTF	0.1266
O-066	O-066	0.5779	Confirmed LTF	0.5779
CHEOAH	CHEOAH	0.0245	Confirmed LTF	0.0245
EDWARDS	EDWARDS	0.0172	Confirmed LTF	0.0172
TILTON	TILTON	0.0309	Confirmed LTF	0.0309
G-007	G-007	0.0666	Confirmed LTF	0.0666
MADISON	MADISON	0.0020	Confirmed LTF	0.0020
GIBSON	GIBSON	0.0268	Confirmed LTF	0.0268
BLUEG	BLUEG	0.0851	Confirmed LTF	0.0851
TRIMBLE	TRIMBLE	0.0273	Confirmed LTF	0.0273
CATAWBA	CATAWBA	0.0168	Confirmed LTF	0.0168

11.6.2 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
101517940	940000	AE1-240 TAP	AE	228226	SHRMAN#2	AE	1	AE_P4-2 AE46	breaker	93.0	138.03	147.23	DC	8.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
228200	CARL#1CT	2.0154	50/50	2.0154
228201	CARL#2CT	2.1333	50/50	2.1333
228251	CARLLS#4	0.2308	50/50	0.2308
228260	V4-054C	0.3406	50/50	0.3406
228261	V4-054E	1.6109	50/50	1.6109
228334	MANNMILG	0.6930	Adder	0.82
228343	**QUINTN#1 (Deactivation : 26/04/2020)**	**0.3260**	**50/50**	**0.3260**
228351	V2-046C	0.1285	50/50	0.1285
228357	V2-046E	1.3727	50/50	1.3727
938871	AE1-115 C	0.5038	Adder	0.59
938872	AE1-115 E	0.5038	Adder	0.59
940001	AE1-240 C O1	20.6996	50/50	20.6996
940002	AE1-240 E O1	14.7752	50/50	14.7752
942571	AE2-272	0.0147	50/50	0.0147
945431	AF1-208 C O1	8.1116	50/50	8.1116
945432	AF1-208 E O1	5.4077	50/50	5.4077
945733	AF1-238 BAT	17.1921	50/50	17.1921
945743	AF1-239 BAT	4.0452	50/50	4.0452
957223	AF2-016 BAT	5.4696	Merchant Transmission	5.4696
957253	AF2-019 BAT	1.4149	Merchant Transmission	1.4149
957261	AF2-020 C	3.4272	50/50	3.4272
957262	AF2-020 E	5.1408	50/50	5.1408
957283	AF2-022 BAT	2.4595	Merchant Transmission	2.4595
957291	AF2-023 C O1	0.5365	Adder	1.19
957292	AF2-023 E O1	0.8048	Adder	1.79
957323	AF2-026 BAT	3.4767	50/50	3.4767
957641	AF2-058	0.6496	50/50	0.6496
958811	AF2-172 C	0.4088	50/50	0.4088
958812	AF2-172 E	0.6669	50/50	0.6669
959111	AF2-202 C	0.4920	50/50	0.4920
959112	AF2-202 E	0.6733	50/50	0.6733
NEWTON	NEWTON	0.0054	Confirmed LTF	0.0054
FARMERCITY	FARMERCITY	0.0003	Confirmed LTF	0.0003
CALDERWOOD	CALDERWOOD	0.0025	Confirmed LTF	0.0025
NY	NY	0.0310	Confirmed LTF	0.0310
PRAIRIE	PRAIRIE	0.0129	Confirmed LTF	0.0129
O-066	O-066	0.5510	Confirmed LTF	0.5510
CHEOAH	CHEOAH	0.0025	Confirmed LTF	0.0025
EDWARDS	EDWARDS	0.0017	Confirmed LTF	0.0017
TILTON	TILTON	0.0031	Confirmed LTF	0.0031
G-007	G-007	0.2049	Confirmed LTF	0.2049

GIBSON	GIBSON	0.0027	Confirmed LTF	0.0027
BLUEG	BLUEG	0.0087	Confirmed LTF	0.0087
TRIMBLE	TRIMBLE	0.0028	Confirmed LTF	0.0028
CATAWBA	CATAWBA	0.0017	Confirmed LTF	0.0017

11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AB2-102	Cumberland 230kV	Active
AE1-104	BL England 138 kV	Active
AE1-115	Churchtown 69 kV	Active
AE1-179	South Millville-Newport 69 kV	Active
AE1-240	Carlls Corner-Sherman Avenue 69 kV	Active
AE2-272	Woodstown 12 kV	In Service
AF1-208	Quinton-Roadstown 69 kV	Active
AF1-238	Sherman Ave. 69 kV	Active
AF1-239	Sherman Ave-Vineland 69 kV	Active
AF2-016	Lewis 138 kV	Active
AF2-019	Rio Grande 69 kV	Active
AF2-020	Carll's Corner 69 kV	Active
AF2-022	Cumberland 138 kV	Active
AF2-023	Churchtown 69 kV	Active
AF2-026	Sherman Ave 138 kV	Active
AF2-058	Fairton 12 kV	Active
AF2-169	BL England 138 kV	Withdrawn
AF2-172	Whibco 12 kV	Active
AF2-202	Landis 12 V	Active
V2-041	Clayville 12kV	In Service
V2-046	Pilesgrove Township 12kV	In Service
V4-054	Fairfield Township 12kV	In Service
W2-039	Clayville 69kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
AE_P1-2 SHERM-W VINE-A	CONTINGENCY 'AE_P1-2 SHERM-W VINE-A' OPEN LINE FROM BUS 228256 TO BUS 945730 CIRCUIT 1 / END
228226 SHRMAN#2 69.0 940000 AE1-240 TAP 69.0 1	CONTINGENCY '228226 SHRMAN#2 69.0 940000 AE1-240 TAP 69.0 1' OPEN BRANCH FROM BUS 228226 TO BUS 940000 CKT 1 END
AE_P7-1 AE7TOWER	CONTINGENCY 'AE_P7-1 AE7TOWER' DISCONNECT BUS 227905 /* #1 BLE TO SCULL TO MILL 138 KV DISCONNECT BUS 227929 /* #1 SCULL 12 KV DISCONNECT BUS 227906 /* #2 BLE TO SCULL TO MILL 138 KV DISCONNECT BUS 227930 /* #2 SCULL 12 KV DISCONNECT BUS 227903 /* #1 MILL TO LEWIS 138 KV DISCONNECT BUS 227904 /* #2 MILL TO LEWIS 138 KV END
AE_P1-2 ORCH-CUMB	CONTINGENCY 'AE_P1-2 ORCH-CUMB' OPEN LINE FROM BUS 228002 TO BUS 228207 CIRCUIT 1 / END
AE_P4-2 AE46	CONTINGENCY 'AE_P4-2 AE46' /*ORCHARD 230 BUS BREAKER D DISCONNECT BRANCH FROM BUS 228002 TO BUS 228310 CKT 1 /* ORCHARD TO CHURCHTOWN 230 230 DISCONNECT BRANCH FROM BUS 200063 TO BUS 228002 CKT 1 /*ORCHARD ORCHARD 500 230 T1 END
AE_P4-2 AE47	CONTINGENCY 'AE_P4-2 AE47' /*ORCHARD 230 BUS BREAKER NEW2 DISCONNECT BRANCH FROM BUS 228002 TO BUS 228310 CKT 1 /* ORCHARD TO CHURCHTOWN 230 230 DISCONNECT BRANCH FROM BUS 228002 TO BUS 228207 CKT 1 /* ORCHARD TO CUMBERLAND 230 230 END
AE_P1-2 ORCHARD XF	CONTINGENCY 'AE_P1-2 ORCHARD XF' OPEN LINE FROM BUS 200063 TO BUS 228002 CIRCUIT 1 / END
Base Case	

12 Short Circuit Analysis

The following Breakers are overdutied:

None

13 Affected Systems

None

14 Attachment 1: One Line Diagram