Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AD1-055

Crystal Hill – Sedge Hill 115kV 15.9 MW Capacity / 20 MW Energy

February / 2018

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 Virginia Electric and Power Company (VEPCO).

Preface

The intent of the Feasibility Study is to determine a plan, with high level estimated cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the IC. The IC may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the IC 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. 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 IC is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by ITO, the costs may be included in the study.

General

The IC has proposed a solar generating facility located in Halifax County, VA. The installed facilities will have a total capability of 64.7 MW with 38.8 MW of this output being recognized by PJM as capacity. This queue request is for an additional 20 MW with 15.9 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is 1/31/2019. **This study does not imply an ITO commitment to this in-service date.**

Point of Interconnection

AD1-055 will interconnect with the ITO transmission system via a new three breaker ring bus switching station that connects on the Crystal Hill - Sedge Hill 115kV line #31.

Cost Summary

The AD1-055 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$0

Description	Total Cost
Direct Connection Network Upgrades	$0
Non Direct Connection Network Upgrades	$0
Total Costs	**$0**

In addition, the AD1-055 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$10,300,000
Previously Identified Upgrades	$0
Total Costs	**$10,300,000**

Cost allocations for these upgrades will be provided in the System Impact Study Report.

Note: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. For New System Upgrades, the cost allocation rule differ depending on whether the minimum amount of upgrades to resolve a single reliability criteria violation will cost less than $5,000,000. For upgrades estimated to cost less than $5,000,000 the allocation of costs will not occur outside of the Queue in which the need for the Network Upgrade was identified. Cost allocation within the Queue will be contingent each Queue projects Distribution Factor on the overloaded facility. For upgrades estimated to cost $5,000,000 or greater the allocation of costs will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

The Feasibility Study is used to make a preliminary determination of the type and scope of Attachment Facilities, Local Upgrades, and Network Upgrades that will be necessary to accommodate the Interconnection Request and to provide the Interconnection Customer a preliminary estimate of the time that will be required to construct any necessary facilities and upgrades and the Interconnection Customer's cost responsibility. The System Impact Study provides refined and comprehensive estimates of cost responsibility and construction lead times for new facilities and system upgrades. Facilities Studies will include, commensurate with the degree of engineering specificity as provided in the Facilities Study Agreement, good faith estimates of the cost, determined in accordance with Section 217 of the Tariff,

(a) to be charged to each affected New Service Customer for the Facilities and System Upgrades that are necessary to accommodate this queue project;
(b) the time required to complete detailed design and construction of the facilities and upgrades; and
(c) a description of any site-specific environmental issues or requirements that could reasonably be anticipated to affect the cost or time required to complete construction of such facilities and upgrades.

Attachment Facilities

The existing AC1-222 scope of work is sufficient to accommodate this queue request from an Attachment Facilities and substation expansion perspective. The single line is shown below in Attachment 1.

Non-Direct Connection Cost Estimate

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.

System Reinforcement

AEP: Reconductor / rebuild **Altavista – Otter – Johnson Mt – New London 138kV line** (6.8 miles), and replace Otter risers (estimated cost $10,300,000). An approximate construction time would be 12 months. No DOMINION mitigation required.

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.

Revenue Metering and SCADA Requirements

PJM Requirements

The IC 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 Sections 24.1 and 24.2.

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

Network Impacts

The Queue Project AD1-055 was evaluated as a 20.0 MW (Capacity 15.9 MW) uprate to the AC1-222 Queue Project which is tapping the Crystal Hill to Halifax 115kV line in the ITO area. Project AD1-055 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-055 was studied with a commercial probability of 53%. Potential network impacts were as follows:

PJM assessed the impact of the proposed Queue Project as an injection into the ITO, for compliance with NERC Reliability Criteria. The system was assessed using the summer 2021 RTEP case. When performing analysis, ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under single contingency (normal and stressed system conditions). A full listing of the ITO's Planning Criteria and interconnection requirements can be found in the ITO's Facility Connection Requirements which are publicly available at: http://www.dom.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically NERC Category C Contingency Conditions (Bus Fault, Tower Line, N-1-1, and Stuck Breaker scenarios) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For ITO Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating. The results of these studies are discussed in more detail below.

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
DVP_P1-2: LN 31-A	CONTINGENCY 'DVP_P1-2: LN 31-A' OPEN BRANCH FROM BUS 314520 TO BUS 314696 CKT 1 /* 3HALIF_1 115.00 - 3HALIFAX 115.00 OPEN BRANCH FROM BUS 927260 TO BUS 314696 CKT 1 /* AC1-222 TAP 115.00 - 3HALIFAX 115.00 OPEN BUS 314520 /* ISLAND END

Contingency Name	Description
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
DVP_P1-3: 3ALTVSTA-4ALTVSTAA	CONTINGENCY 'DVP_P1-3: 3ALTVSTA-4ALTVSTAA' OPEN BRANCH FROM BUS 314666 TO BUS 314667 CKT 2 END
DVP_P4-2: 3312	CONTINGENCY 'DVP_P4-2: 3312' /* CHASE CITY OPEN BUS 314267 /*CHASE CITY 115KV BUS 3 OPEN BUS 314669 /*LINE 33 BARNS J OPEN BUS 314684 /*LINE 33 MT LAUREL OPEN BUS 314696 /*LINE 33 HALIFAX OPEN BUS 314518 /*SC312 END

Summer Peak Analysis - 2021

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

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Contributions to previously identified circuit breakers found to be over-duty:

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)

	Contingency		Affected		Bus			Power	Loading %		Rating		MW	
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution	Ref
1	LFFB	DVP_P4-2: 3312	DVP - AEP	4ALTVSTA-05OTTER 138 kV line	314667	242741	1	DC	108.21	111.55	ER	245	8.18	1

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
2	LFFB	DVP_P4-2: 3312	AEP - AEP	05JOHNMT-05NEWLDN 138 kV line	242687	242734	1	DC	105.01	108.42	ER	240	8.18	2
3	LFFB	DVP_P4-2: 3312	AEP - AEP	05OTTER-05JOHNMT 138 kV line	242741	242687	1	DC	106.37	109.72	ER	245	8.18	3

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be determined during Impact Study

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined during Impact Study

New System Reinforcements

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

None

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)

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
# 1	4ALTVSTA-05OTTER 138 kV line	**AEP:**	Pending	**$10,300,000**

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
# 2	05JOHNMT-05NEWLDN 138 kV line	(1)Replace Otter risers , estimated cost $100,000 (2) Reconductor / rebuild **Altavista – Otter – Johnson Mt – New London 138kV line** (6.8 miles), expected cost of $10.2 million. An approximate construction time would be 12 months after signing an interconnection agreement. **DVP:** No DOMINION mitigation required.		
# 3	05OTTER-05JOHNMT 138 kV line			
			Total New Network Upgrades	**$10,300,000**

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 IC 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.

	Contingency		Affected		Bus			Power	Loading %		Rating		MW
#	Type	Name	Area	Facility Description	From	To	Circuit	Flow	Initial	Final	Type	MVA	Contribution
4	N-1	DVP_P1-3: 3ALTVSTA - 4ALTVSTAA	DVP - DVP	4ALTVSTA 138/115 kV transformer	314666	314667	1	DC	98.23	100.72	ER	127	3.16
5	N-1	DVP_P1-2: LN 31-A	DVP - DVP	4ALTVSTA 138/115 kV transformer	314666	314667	2	DC	102.2	110.42	ER	130	10.73

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Circuit	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
6	Non	Non	DVP - AEP	4ALTVSTA-05OTTER 138 kV line	314667	242741	1	DC	119.12	119.59	NR	167	1.74
7	N-1	DVP_P1-2: LN 31-A	DVP - AEP	4ALTVSTA-05OTTER 138 kV line	314667	242741	1	DC	107.96	111.3	ER	245	8.18
8	N-1	DVP_P1-2: LN 556	DVP - DVP	6HALIFAX-AC1-221 TAP 230 kV line	314697	927250	1	DC	91.24	92.54	ER	675	8.79
9	N-1	DVP_P1-2: LN 556	DVP - CPLE	AC1-221 TAP-6PERSON230 T 230 kV line	927250	304070	1	DC	94.56	95.69	ER	718	8.79
10	Non	Non	AEP - AEP	05JOHNMT-05NEWLDN 138 kV line	242687	242734	1	DC	111.33	111.81	NR	167	1.74
11	N-1	DVP_P1-2: LN 31-A	AEP - AEP	05JOHNMT-05NEWLDN 138 kV line	242687	242734	1	DC	104.75	108.16	ER	240	8.18
12	Non	Non	AEP - AEP	05OTTER-05JOHNMT 138 kV line	242741	242687	1	DC	116.42	116.9	NR	167	1.74
13	N-1	DVP_P1-2: LN 31-A	AEP - AEP	05OTTER-05JOHNMT 138 kV line	242741	242687	1	DC	106.08	109.43	ER	245	8.18

Light Load Analysis

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Affected System Analysis & Mitigation

Duke, Progress & TVA Impacts:

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

Attachment 1.

Flowgate Appendices – Option 1

Appendices

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. When a flowgate is identified in multiple analysis the appendix is presented for only the analysis with the greatest overload.

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

(DVP - AEP) The 4ALTVSTA-05OTTER 138 kV line (from bus 314667 to bus 242741 ckt 1) loads from 108.21% to 111.55% (**DC power flow**) of its emergency rating (245 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 3312'. This project contributes approximately 8.18 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 3312'                    /* CHASE CITY
  OPEN BUS 314267                              /*CHASE CITY 115KV BUS 3
  OPEN BUS 314669                              /*LINE 33 BARNS J
  OPEN BUS 314684                              /*LINE 33 MT LAUREL
  OPEN BUS 314696                              /*LINE 33 HALIFAX
  OPEN BUS 314518                              /*SC312
  END
```

Bus Number	*Bus Name*	*Full Contribution*
247284	*05LEESVG*	*2.68*
246843	*05SMG1*	*1.73*
246844	*05SMG2*	*4.56*
246845	*05SMG3*	*2.67*
246846	*05SMG4*	*4.71*
246847	*05SMG5*	*1.78*
315156	*1HALLBR1*	*4.82*
315165	*1HURT 1*	*3.33*
315166	*1HURT 2*	*3.33*
932821	*AC2-107 C*	*27.86*
932822	*AC2-107 E*	*13.05*
933941	*AD1-017 C*	*0.73*
933942	*AD1-017 E*	*1.19*
934311	*AD1-055 C*	*6.5*
934312	*AD1-055 E*	*1.68*
LTF	*AMIL*	*0.02*
LTF	*BLUEG*	*0.16*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.04*
LTF	*CBM-S1*	*0.02*
LTF	*CBM-S2*	*1.05*
LTF	*CLIFTY*	*0.8*
LTF	*CPLE*	*0.4*
LTF	*DEARBORN*	*0.09*

LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.09*
LTF	*GIBSON*	*0.05*
LTF	*NEWTON*	*0.09*
LTF	*O-066*	*0.3*
LTF	*PRAIRIE*	*0.11*
LTF	*RENSSELAER*	*0.03*
LTF	*ROSETON*	*0.2*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.04*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.03*
919841	*AA2-070*	*4.41*
924572	*AB2-109 E*	*-0.65*
925661	*AC1-042 C*	*6.79*
925662	*AC1-042 E*	*11.08*
925991	*AC1-075 C*	*15.67*
925992	*AC1-075 E*	*8.88*
926021	*AC1-080 C*	*5.24*
926022	*AC1-080 E*	*2.95*
926051	*AC1-083 C*	*3.65*
926052	*AC1-083 E*	*5.95*
926641	*AC1-145 C*	*8.09*
926642	*AC1-145 E*	*13.19*
927261	*AC1-222 C*	*9.37*
927262	*AC1-222 E*	*8.92*

Appendix 2

(AEP - AEP) The 05JOHNMT-05NEWLDN 138 kV line (from bus 242687 to bus 242734 ckt 1) loads from 105.01% to 108.42% (**DC power flow**) of its emergency rating (240 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 3312'. This project contributes approximately 8.18 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 3312'                    /* CHASE CITY
  OPEN BUS 314267                               /*CHASE CITY 115KV BUS 3
  OPEN BUS 314669                               /*LINE 33 BARNS J
  OPEN BUS 314684                               /*LINE 33 MT LAUREL
  OPEN BUS 314696                               /*LINE 33 HALIFAX
  OPEN BUS 314518                               /*SC312
  END
```

Bus Number	*Bus Name*	*Full Contribution*
247284	*05LEESVG*	*2.68*
246843	*05SMG1*	*1.73*
246844	*05SMG2*	*4.56*
246845	*05SMG3*	*2.67*
246846	*05SMG4*	*4.71*
246847	*05SMG5*	*1.78*
315156	*1HALLBR1*	*4.82*
315165	*1HURT 1*	*3.33*
315166	*1HURT 2*	*3.33*
932821	*AC2-107 C*	*27.86*
932822	*AC2-107 E*	*13.05*
933941	*AD1-017 C*	*0.73*
933942	*AD1-017 E*	*1.19*
934311	*AD1-055 C*	*6.5*
934312	*AD1-055 E*	*1.68*
LTF	*AMIL*	*0.02*
LTF	*BLUEG*	*0.16*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.04*
LTF	*CBM-S1*	*0.02*
LTF	*CBM-S2*	*1.05*
LTF	*CLIFTY*	*0.8*
LTF	*CPLE*	*0.4*
LTF	*DEARBORN*	*0.09*

LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.09*
LTF	*GIBSON*	*0.05*
LTF	*NEWTON*	*0.09*
LTF	*O-066*	*0.3*
LTF	*PRAIRIE*	*0.11*
LTF	*RENSSELAER*	*0.03*
LTF	*ROSETON*	*0.2*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.04*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.03*
919841	*AA2-070*	*4.41*
924572	*AB2-109 E*	*-0.65*
925661	*AC1-042 C*	*6.79*
925662	*AC1-042 E*	*11.08*
925991	*AC1-075 C*	*15.67*
925992	*AC1-075 E*	*8.88*
926021	*AC1-080 C*	*5.24*
926022	*AC1-080 E*	*2.95*
926051	*AC1-083 C*	*3.65*
926052	*AC1-083 E*	*5.95*
926641	*AC1-145 C*	*8.09*
926642	*AC1-145 E*	*13.19*
927261	*AC1-222 C*	*9.37*
927262	*AC1-222 E*	*8.92*

Appendix 3

(AEP - AEP) The 05OTTER-05JOHNMT 138 kV line (from bus 242741 to bus 242687 ckt 1) loads from 106.37% to 109.72% (**DC power flow**) of its emergency rating (245 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 3312'. This project contributes approximately 8.18 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 3312'                    /* CHASE CITY
  OPEN BUS 314267                               /*CHASE CITY 115KV BUS 3
  OPEN BUS 314669                               /*LINE 33 BARNS J
  OPEN BUS 314684                               /*LINE 33 MT LAUREL
  OPEN BUS 314696                               /*LINE 33 HALIFAX
  OPEN BUS 314518                               /*SC312
  END
```

Bus Number	*Bus Name*	*Full Contribution*
247284	*05LEESVG*	*2.68*
246843	*05SMG1*	*1.73*
246844	*05SMG2*	*4.56*
246845	*05SMG3*	*2.67*
246846	*05SMG4*	*4.71*
246847	*05SMG5*	*1.78*
315156	*1HALLBR1*	*4.82*
315165	*1HURT 1*	*3.33*
315166	*1HURT 2*	*3.33*
932821	*AC2-107 C*	*27.86*
932822	*AC2-107 E*	*13.05*
933941	*AD1-017 C*	*0.73*
933942	*AD1-017 E*	*1.19*
934311	*AD1-055 C*	*6.5*
934312	*AD1-055 E*	*1.68*
LTF	*AMIL*	*0.02*
LTF	*BLUEG*	*0.16*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.04*
LTF	*CBM-S1*	*0.02*
LTF	*CBM-S2*	*1.05*
LTF	*CLIFTY*	*0.8*
LTF	*CPLE*	*0.4*
LTF	*DEARBORN*	*0.09*

LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.09*
LTF	*GIBSON*	*0.05*
LTF	*NEWTON*	*0.09*
LTF	*O-066*	*0.3*
LTF	*PRAIRIE*	*0.11*
LTF	*RENSSELAER*	*0.03*
LTF	*ROSETON*	*0.2*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.04*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.03*
919841	*AA2-070*	*4.41*
924572	*AB2-109 E*	*-0.65*
925661	*AC1-042 C*	*6.79*
925662	*AC1-042 E*	*11.08*
925991	*AC1-075 C*	*15.67*
925992	*AC1-075 E*	*8.88*
926021	*AC1-080 C*	*5.24*
926022	*AC1-080 E*	*2.95*
926051	*AC1-083 C*	*3.65*
926052	*AC1-083 E*	*5.95*
926641	*AC1-145 C*	*8.09*
926642	*AC1-145 E*	*13.19*
927261	*AC1-222 C*	*9.37*
927262	*AC1-222 E*	*8.92*