AMERICAN ELECTRIC POWER

Legal Department

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Ms. Betty McCauley
Director, Administration Department
Secretary to the Commission
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The Public Utilities Commission of Ohio
Ohio Power Siting Board
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January 25, 2013

RE: Letter of Notification
Case No. 13-0171-EL-BLN Trent – Delaware 138kv Line Improvement Project

Dear Ms. McCauley:

Attached for filing in the above-referenced docket, please find additional information in support of the Trent – Delaware 138kv Line Improvement Project. The information was originally included in AEP Ohio Transmission Company's application for a certificate of environmental compatibility and public need for the Vassell Station Project (Case No. 11-1313-EL-BSB). Because the Trent – Delaware 138kv Line Improvement Project is part of the overall modifications to the system related to the Vassell station, the additional information is also being filed in this docket for ease of reference and to provide the Ohio Power Siting Board with additional context when reviewing the Trent – Delaware 138kv Line Improvement Project.

Also enclosed for filing in this docket is a copy of the $2000 check AEP Ohio Transmission Company submitted with its Letter of Notification as payment for the expedited application processing fee.

Should you have any questions, please do not hesitate to contact me.

Respectfully submitted,

/s/ Yazen Alami_____
Yazen Alami

Attachments

4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT

(A) JUSTIFICATION OF NEED

(1) Purpose of the Proposed Facility

The purpose of the Vassell Substation Project and associated transmission line interconnections (two 765 kV extensions, two 345 kV loops, and a 345 kV or 138 kV Bus Tie) is to improve and maintain the quality of electric service and reliability to the Central Ohio area, including AEP's load area. This area includes, but is not limited to the communities of Columbus, Dublin, Upper Arlington, Delaware, Sunbury, Grandview Heights, Hilliard, Grove City, Gahanna, Westerville, New Albany, Pickerington, and others.

(2) System Conditions, Local Requirements and Other Pertinent Factors

The Central Ohio Transmission System provides service to over 4000 MW of peak summer electric demand, and also helps support other neighboring transmission systems. The area load is summer peaking and mainly consists of residential and commercial load, with some industrial load.

Prior to the recession, the electric transmission load historically grew at an annual rate of approximately 4.1%. During the past few years, central Ohio load has grown at a rate of approximately 2.5% annually, though economic indicators project that may increase in the near future. Central Ohio's growth rate has slowed with the recession, but has not been impacted as much as other areas of the state. However, for purposes of this project study, AEP used PJM's forecasted growth projections for AEP, which is 1.1%.

Central Ohio does not have substantial dynamic sources (power plants) to support the system voltage. AEP recently announced generator retirements planned for 2014 at Conesville and Muskingum River Power Plants. Conesville and Muskingum River Plants are the primary dynamic voltage support to Central Ohio. Without this support, the system must rely on less effective dynamic sources further from Central Ohio.

Central Ohio is served by an outer lying 765 kV and 345 kV network feeding an extensive 138 kV network extending to the load stations located throughout Central Ohio. By summer of 2014, the Central Ohio Transmission system is no longer projected to be able to withstand creditable double contingency outages with expected transmission transfers. "Transmission Transfers" are electric power that flows through the transmission system, but is not consumed by local users. This "transfer loading" situation typically peaks during summer periods when local generation, if not adequate for a major load center, and generation/power must be shipped long distances to deliver power to those major load centers. With the projected load growth associated with development in Central Ohio, low voltage and thermal overloads as a result of credible double

contingencies could result in wide spread cascading transmission outages in Central Ohio, and could extend to other portions of Ohio.

AEP proposes to improve transmission reliability by constructing new transmission facilities in the Central Ohio Area. This includes, but is not limited to the following:

- Construct a Static Var System centrally located at Saint Clair Substation.
- Construct Vassell Substation with a 765/345 kV, 2250 kVA transformer, and 345/138 kV, 675 MVA transformer. This substation will integrate into the Central Ohio grid via a 765 kV extension (extending the Kammer – Dumont 765 kV Line less than 1.0 mile), and a 345 kV extension (extending the Hyatt – Corridor 345 kV Line less than 1.0 mile). This will form two 345 kV circuits: Vassell – Hyatt and Vassell – Corridor. Construction of a 2nd Vassell – Corridor Circuit is planned with this project (8.4 miles). This will be done by additional circuits on existing structures designed for multiple circuit use. A Letter of Notification will be submitted for this transmission line project.
- Construction of a 138 kV line from Trent to Vassell Substation is planned and will help form a new 138 kV Vassell – Delaware 138 kV Circuit. This project will be submitted as a separate application for a Certificate of Environmental Compatibility and Public Need. Other details of the project are shown in Figures 02-4 through 02-10 at the end of this chapter.
- Construction of a 345 kV line extension (less than 1.0 mile) is planned to connect Hyatt (Ohio Power) Substation to Hyatt (Columbus Southern Power) Substation to address old Circuit Breakers needing rehabilitation, and make the system better for AEP Operations to manage. This line work will be submitted under separate Letter of Notification in 2013.

(3) Load Flow Studies

Power flow analysis was performed using the PTI PSS/E power system simulator. Load flow analysis identified several double contingency conditions that would result in low voltage and thermal loading criteria violations. Table 02-1 below summarizes the results of the load flow analysis depicting the summer 2014 peak load conditions. The most severe forecasted issues are summarized in this table and the following "PV Curves". The table shows Central Ohio area facility thermal overloads for credible double contingency outage conditions with some associated power transfers through the Central Ohio Transmission System. In order to meet AEP Transmission Planning Criteria, system voltage must be maintained at or above 92% for contingencies, and equipment thermal loadings may not exceed 100% of the equipment's emergency rating. Furthermore, normal system voltages should not go below 95% for steady state conditions.

When voltages dip well below the 92% level, the local area transmission grid may become unstable, and grid voltage collapse could occur. This may lead to large area grid and customer outages, and in the worst case can lead to wider area cascading outages.

Equipment overload with credible double contingencies can lead to similar situations. Loading equipment over its permissible loading during a credible double contingency may lead to cascading equipment overloads and failure, leading to grid instability and potentially cascading outages. If equipment is allowed to remain in service when loaded above its permissible loading, it may produce an unsafe operating condition.

TABLE 02-1
Proposed Central Ohio Area Transmission System Performance
Summer 2014 Conditions with Existing System

Issue	Incremental Power Transfers	N-2 Outage Scenario	Affected Facility	2014 Base Case Before Improvements
Voltage	South to North 500 MW	Marysville 765/345 kV Transformer + Maliszewski 765/138 kV Transformer	Columbus Area 138 kV Voltages	89%
	West to East 1500 MW	Marysville 765/345 kV Transformer + Maliszewski 765/138 kV Transformer	Columbus Area 138 kV Voltages	89%
	South to North 3000 MW	Delaware - Hyatt 138 kV Line + Berkshire – Trent 138 kV Line	Delaware Station 138 kV Voltage	77%
			Berkshire Station 138 kV Voltage	77%
Thermal	South to North 3000 MW	Marysville 765/345 kV Transformer + Hyatt – Maliszewski 138 kV Line #3	Hyatt – Maliszewski 138 kV Line #2	112%
			Maliszewski – Polaris 138 kV Line	99%

Figure 02-1 (PV curve – Power transfer vs. system Voltage) shows that even with normal system conditions in summer of 2014 and no power transfers (left side of graph), normal voltages are projected to be below 95% (top line). For a double contingency with no transfers (bottom line), the voltages are also forecasted to be 89%, well below the 92% minimum to meet Planning Criteria contingency requirement.

In Figure 02-2, base case power transfer curves are shown illustrating how the potential retirement of Conesville 5 (CV5) and Conesville 6 (CV6) may impact the system. The existing system (bottom line) shows how voltage would further decrease below 94% (below 95% criteria), and how the system voltage could error with increasing area power transfers through Central Ohio. With the complete Vassell project in service by summer of 2014 (top line), the Figure 2-2 shows how strong the system will be, and can withstand the potential retirement of CV5 & CV6.

Figure 02-3 illustrates that once the Vassell Project is completed (top line), the Central Ohio transmission system will be able to maintain acceptable voltage and loading during normal conditions and N-2 events, even if Conesville 5 (CV5) and Conesville 6 (CV6) would retire. Notice that without the Vassell improvements (bottom line), the voltage appears to collapses even without power transfers through Central Ohio.

Voltage performance in the Central Ohio area mentioned in section (3) above was substantiated in load flow analysis. Analysis has shown that voltage levels after the specified double contingency would subject portions of Central Ohio to transmission voltages below the .92 PU planning criteria level for emergency conditions. Allowing voltages to dip well below .92 PU will lead to transmission grid instability and may result in widespread cascading outages to Central Ohio, and beyond.

(4) Base Case Model Data

An electronic copy of the base case will be provided upon request of the OPSB staff.

(5) Base Case Data for Natural Gas Transmission Line

As the proposed Project is an electric substation project, this section does not apply.

(B) EXPANSION PLANS

(1) Long-Term Forecast; and Regional Transmission Planning

(a) Reference in Long Term Forecast

The proposed improvements are outlined in the 2010 "Columbus Southern Power Company and Ohio Power Company Long Term Forecast Report to the Public Utilities Commission of Ohio", Form FE 3-T9.

(b) Explanation if Not Referenced

Not applicable. The proposed facility is referenced in the aforementioned report.

(c) Effect on Regional Expansion Plans

This project is direct mitigation for reliability, voltage and thermal concerns of the central Ohio AEP transmission system and thus should not adversely impact neighboring utilities or regional bulk transmission planning. PJM has approved this project as a Supplemental Project and has studied the impact of the Vassell Project on the Regional Transmission System. PJM has not identified any issues for other neighboring electric utilities. The Vassell Project may in fact help

support portions of other utilities in the event of severe contingencies outside of Central Ohio. This project will help sustain grid reliability in Central Ohio as PJM evaluates the impacts of potential generation retirements and public policy developments (i.e., significant renewable development), which will have significant implications on the regional transmission system.

It is anticipated that with the present forecasted rate of load growth (1.1%), additional EHV sources to the Central Ohio Area will not be needed until 2020 or beyond.

(2) Gas Transmission Lines and Associated Facilities

This application is for an electric substation and associated transmission line interconnections. Therefore this section is not applicable.

(C) SYSTEM ECONOMY AND RELIABILITY

The proposed improvements will reinforce the AEP transmission system in Central Ohio area by providing 765/345 kV and 345/138 kV transformer capacity, an additional 345 kV outlet/connection to Corridor Substation, and another 138 kV outlet/connection to Delaware Substation. These new sources to the area transmission system will result in (1) improved grid reliability by rectifying potential voltage collapse situations (see PV curves), (2) will improve the Central Ohio transmission system voltage profile so voltages are maintained within AEP Planning Criteria, and (3) will rectify forecasted thermal overloads on area transmission lines maintaining equipment loading levels with AEP Planning Criteria.

Table 02-2 compares the existing system (with credible double contingency outage conditions, with various power transfers) to the same system incorporating the proposed transmission system facilities as recommended in this proposal. System voltages will improve, and equipment loadings will decrease significantly with the proposed system upgrades.

TABLE 02-2
Proposed Central Ohio Area Transmission System Performance
Summer 2014 Conditions with 2014 Base Case Before Improvements and 2014 Base Case with the Proposed SVS/Vassell Improvements in Place

Issue	Incremental Power Transfers	N-2 Outage Scenario	Affected Facility	2014 Base Case Before Improvements	2014 Base Case After Improvements
Voltage	South to North 500 MW	Marysville 765/345 kV Transformer + Maliszewski 765/138 kV Transformer	Columbus Area 138 kV Voltages	89%	96%
	West to East 1500 MW	Marysville 765/345 kV Transformer + Maliszewski 765/138 kV Transformer	Columbus Area 138 kV Voltages	89%	96%
	South to North 3000 MW	Delaware – Hyatt 138 kV Line + Berkshire – Trent 138 kV Line	Delaware Station 138 kV Voltage	77%	100%
			Berkshire Station 138 kV Voltage	77%	100%
Thermal	South to North 3000 MW	Marysville 765/345 kV Transformer + Hyatt – Maliszewski 138 kV Line #3	Hyatt – Maliszewski 138 kV Line #2	112%	76%
			Maliszewski – Polaris 138 kV Line	99%	62%

(D) Options to Eliminate the Need for the Proposed Project

Other alternative considered:

- Also considered was the installation of a second 765/138 kV transformer at existing Maliszewski Substation plus related work. This alternative did not provide the necessary voltage support under outages of EHV Transformers at Marysville and Maliszewski when coupled with heavy power transfers through the Central Ohio AEP transmission system. Furthermore, the voltages in Central Ohio area will continue to collapse with additional power transfer levels from south to north exceeding 2,200 MW leaving the area susceptible to potential cascading transmission outages.

(E) FACILITY SELECTION RATIONALE

The plan to establish a new 765/345/138 kV substation (Vassell), 3 - 345 kV circuit (Vassell to Hyatt and two from Vassell to Corridor), 1 – 138 kV circuit (Vassell to Delaware) was selected over the other alternative considered because it was the most effective solution that would address the reliability, voltage and thermal issues on the Central Ohio transmission system. This solution also provides the best long term results given the uncertainty of existing Ohio generation. The other alternative considered was only a partial solution that did not fully address the concerns in the Central Ohio area.

(F) FACILITY SCHEDULE

(1) Schedule Bar Chart

The major scheduled activities associated with the Preferred and Alternate Sites are shown in bar chart form on Figure 02-11.

(2) Delays

Any critical delays that affect the major activities as outlined in the schedule would further delay the in-service date of the project. If the in-service date is delayed beyond June 2014, approximately 4000 MW of load will continue to be at an increased risk of an area-wide extended service interruption and low voltages, while some facilities may fail due to thermal overloads.

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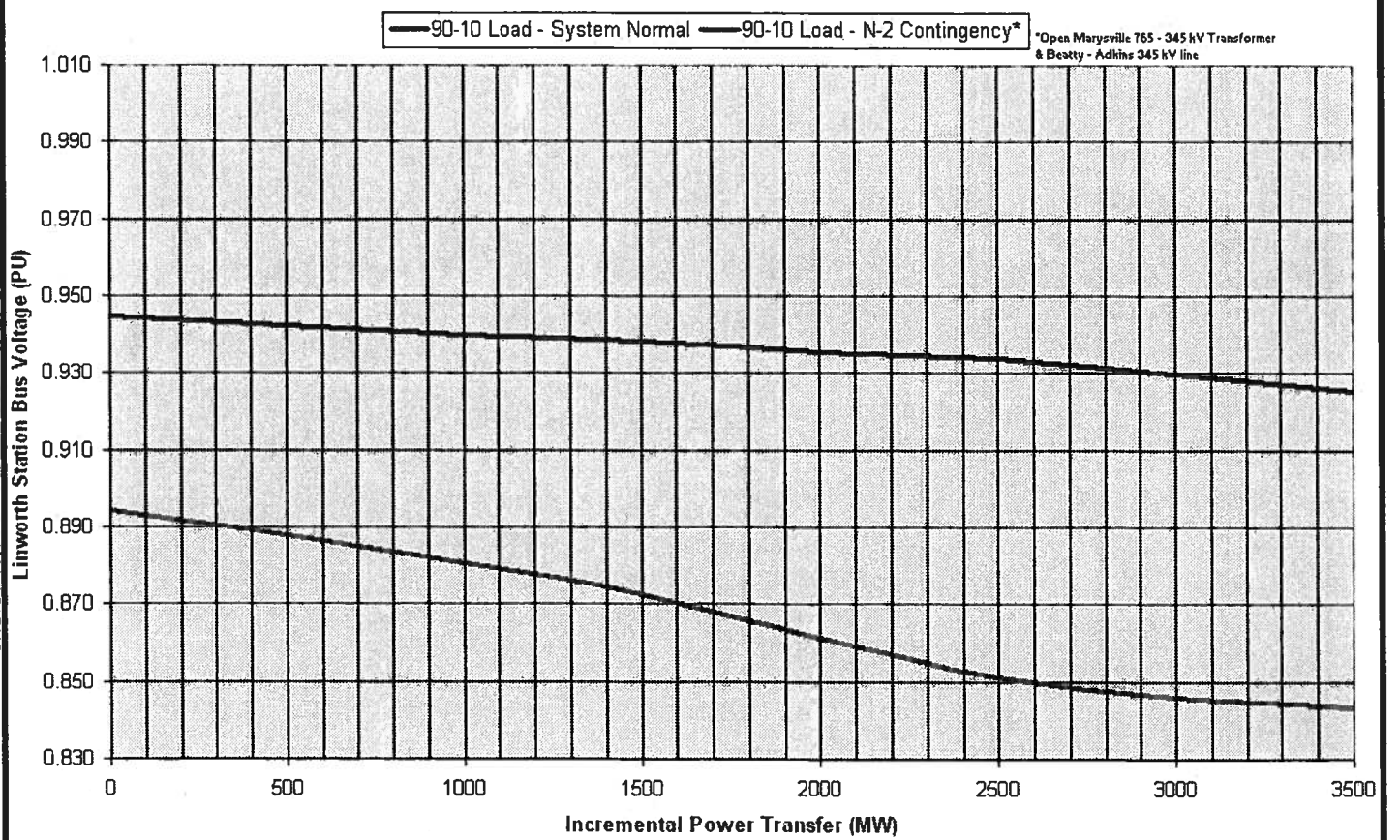
PV Curve: 2014 Base Case with PJM 90-10 Load



AEP

Vassell Substation

FIGURE 02-1
PV CURVE: 2014 BASE CASE
WITH PJM 90-10 LOAD

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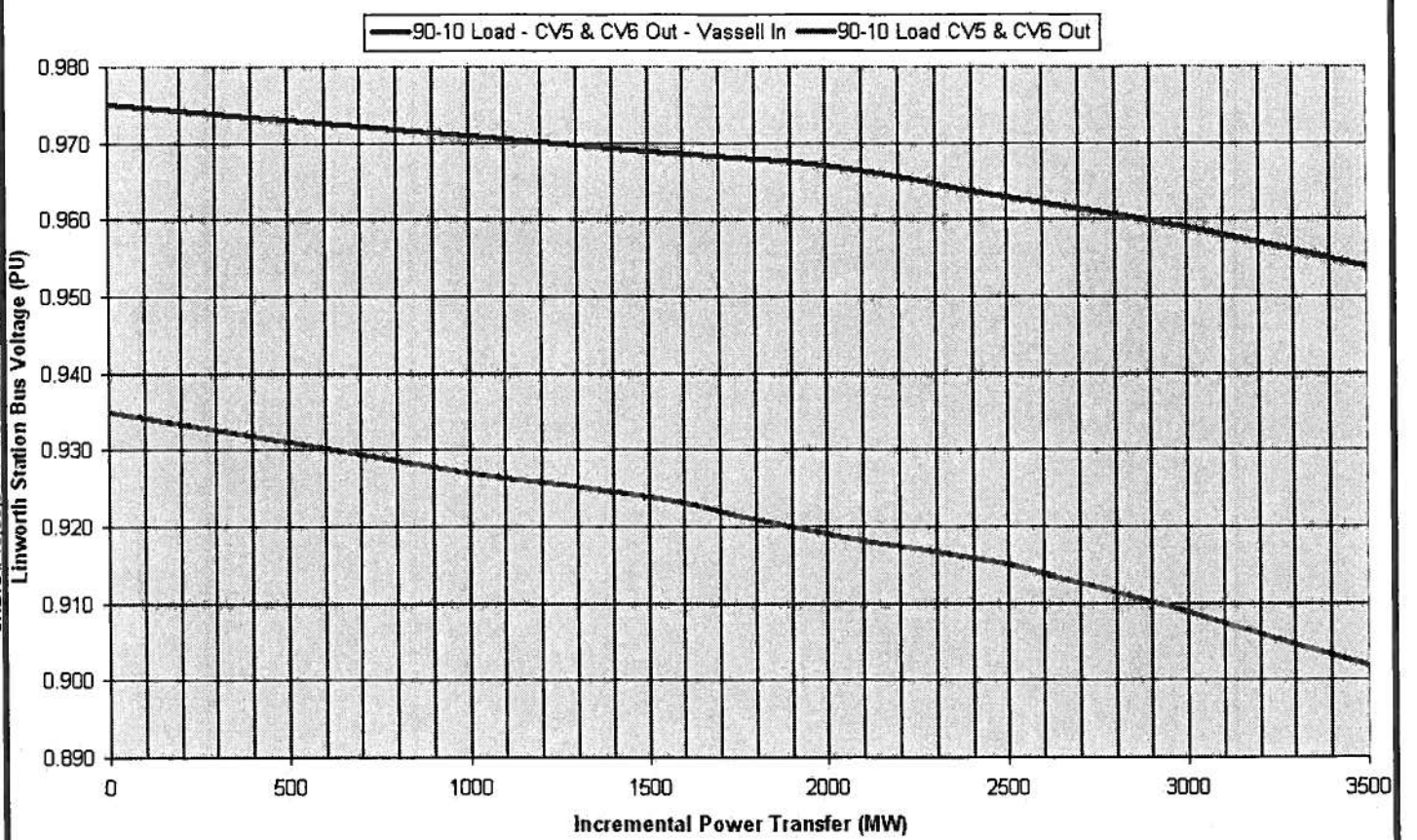
URS

PV Curve: 2014 Base Case with PJM 90-10 Load



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AEP

Vassell Substation

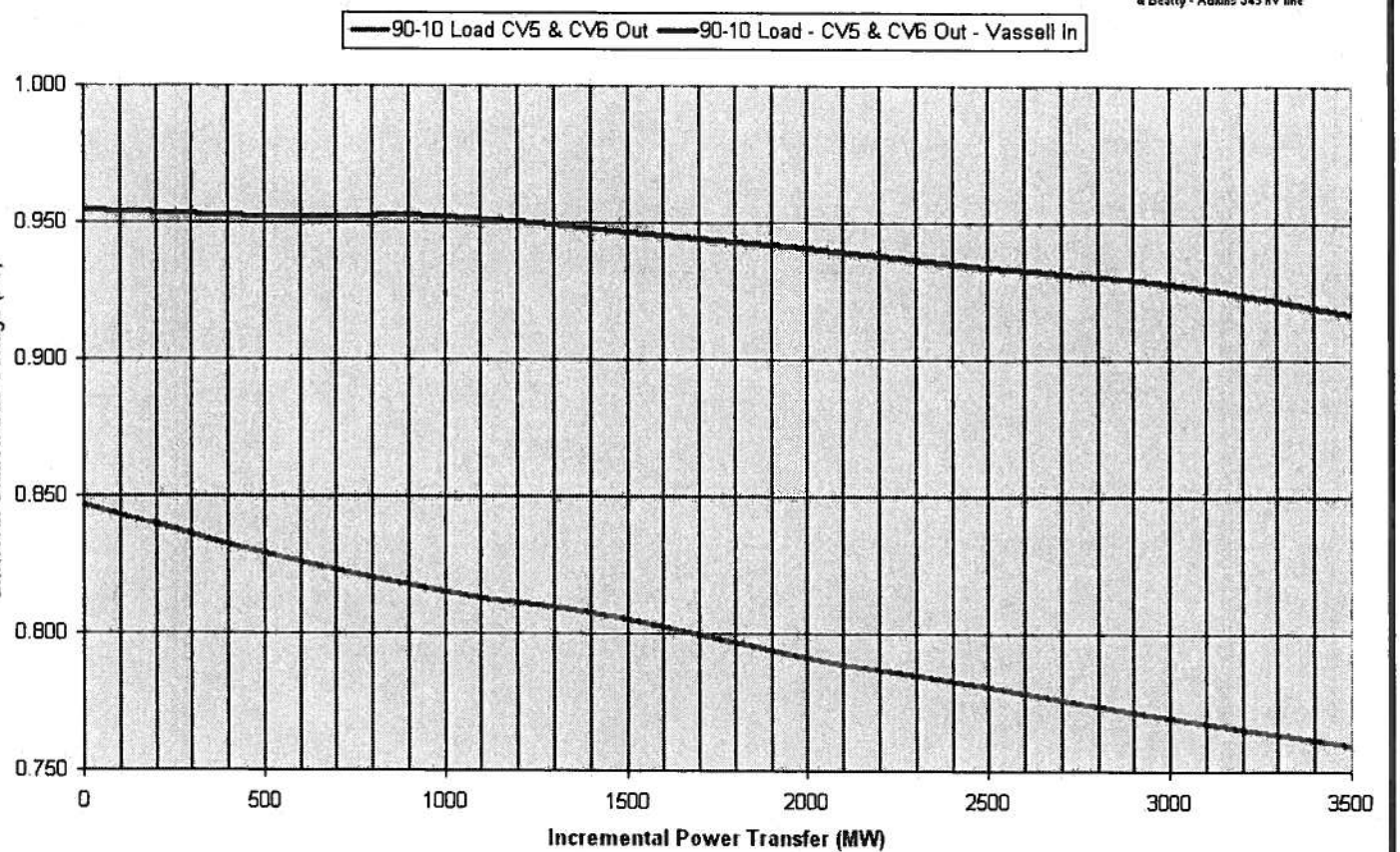
FIGURE 02-2
PV CURVE: 2014 BASE CASE
WITH PJM 90-10 LOAD

JOB NO. 14949884

URS

PV Curve: 2014 N-2 Contingency* with PJM 90-10 Load

*Open Marysville 765 - 345 kV Transformer & Beatty - Adkins 345 kV line



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Vassell Substation

FIGURE 02-3
PV CURVE: 2014 N-2 CONTINGENCY
WITH PJM 90-10 LOAD

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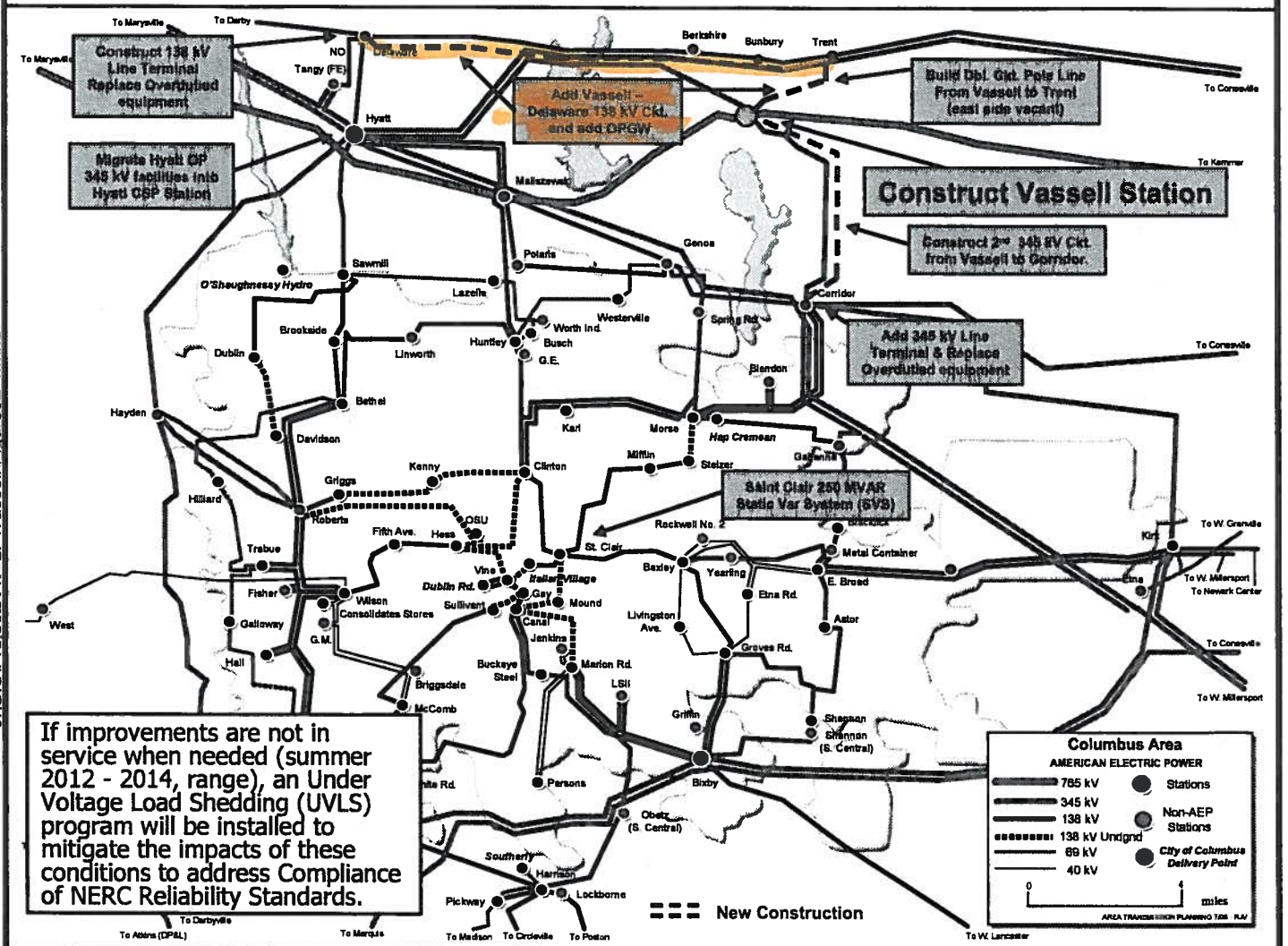

Vassell Substation

FIGURE 02-4
OVERVIEW OF VASSELL SUBSTATION PROJECT
AND MAJOR CONSTRUCTION ITEMS

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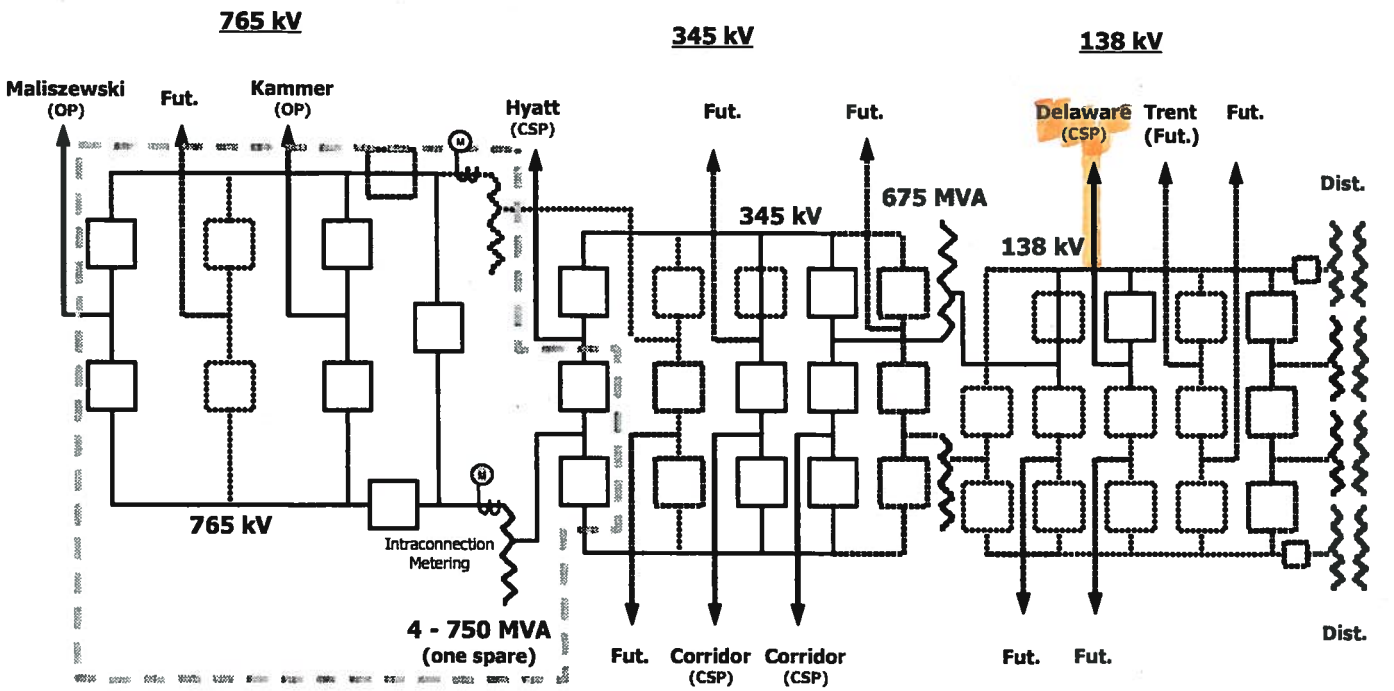
Vassell Substation



Vassell Substation

FIGURE 02-5
SIMPLIFIED VASSELL SUBSTATION ONE-LINE DIAGRAM, PROPOSED CONSTRUCTION

JOB NO. 14949884

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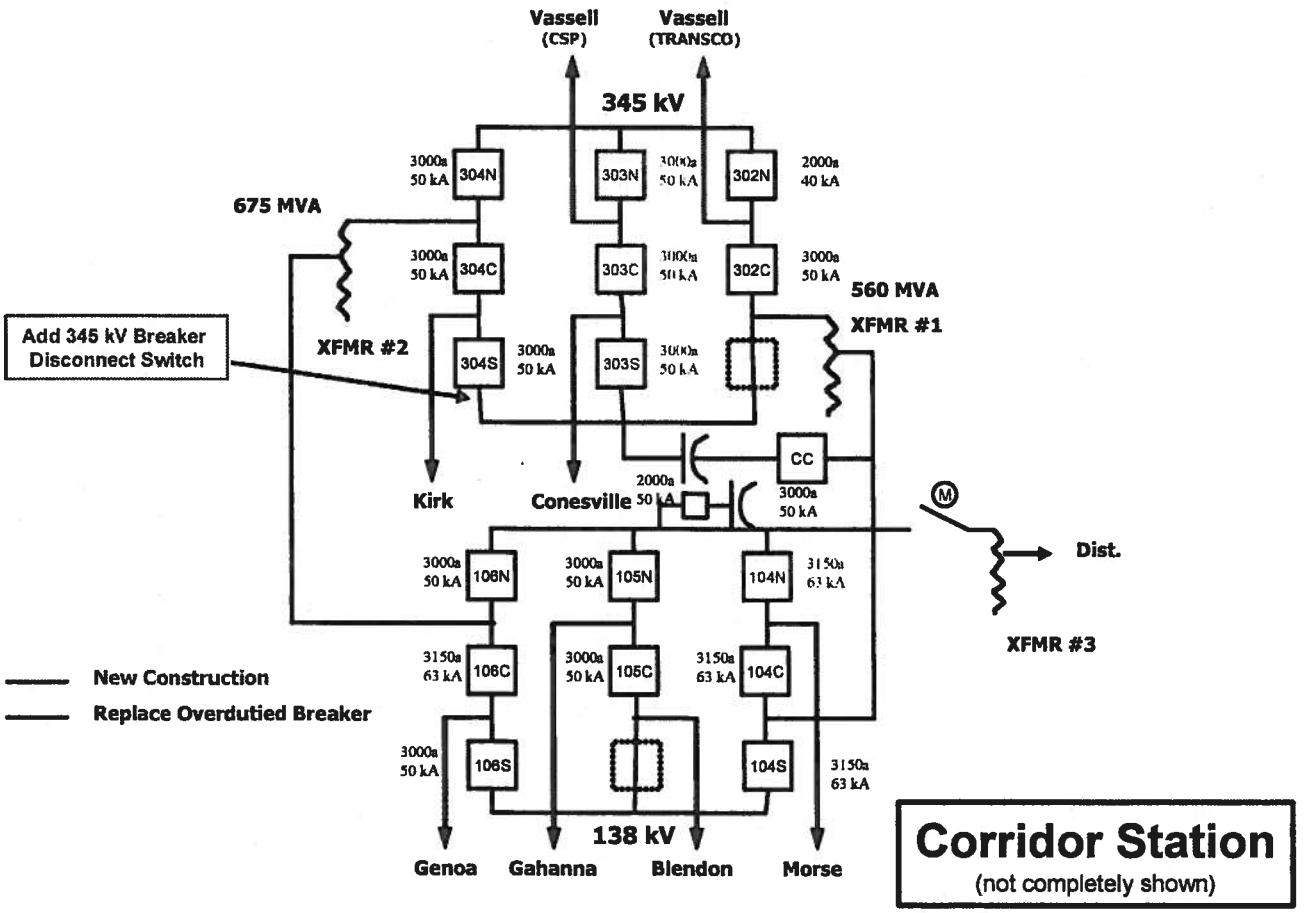

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Vassell Substation

FIGURE 02-6
SIMPLIFIED CORRIDOR SUBSTATION ONE-LINE DIAGRAM WITH PROPOSED CONSTRUCTION

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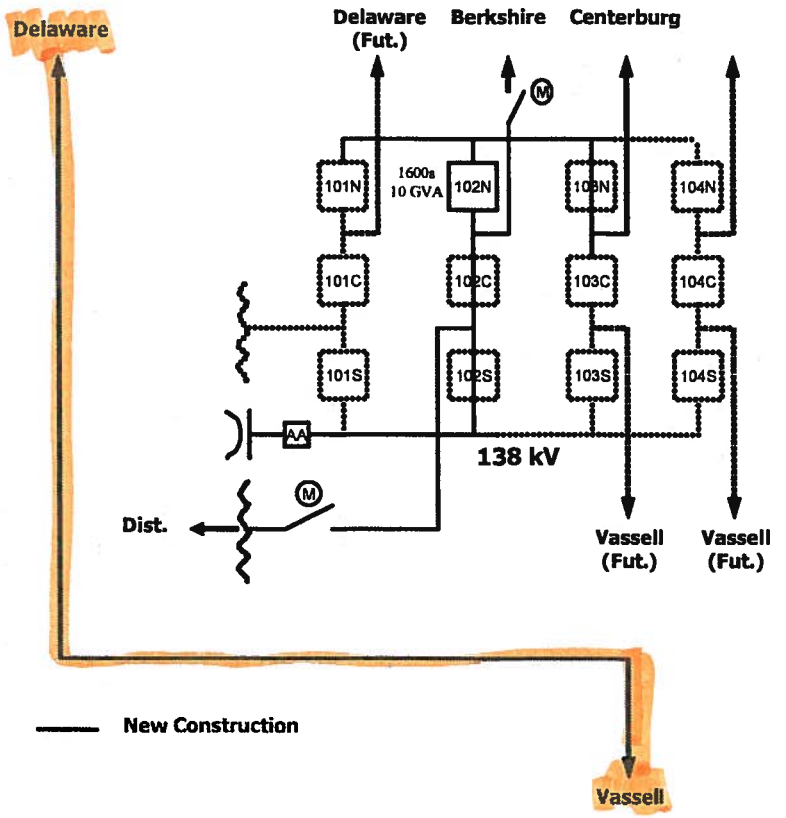

Trent Station (138 kV)
(not completely shown)

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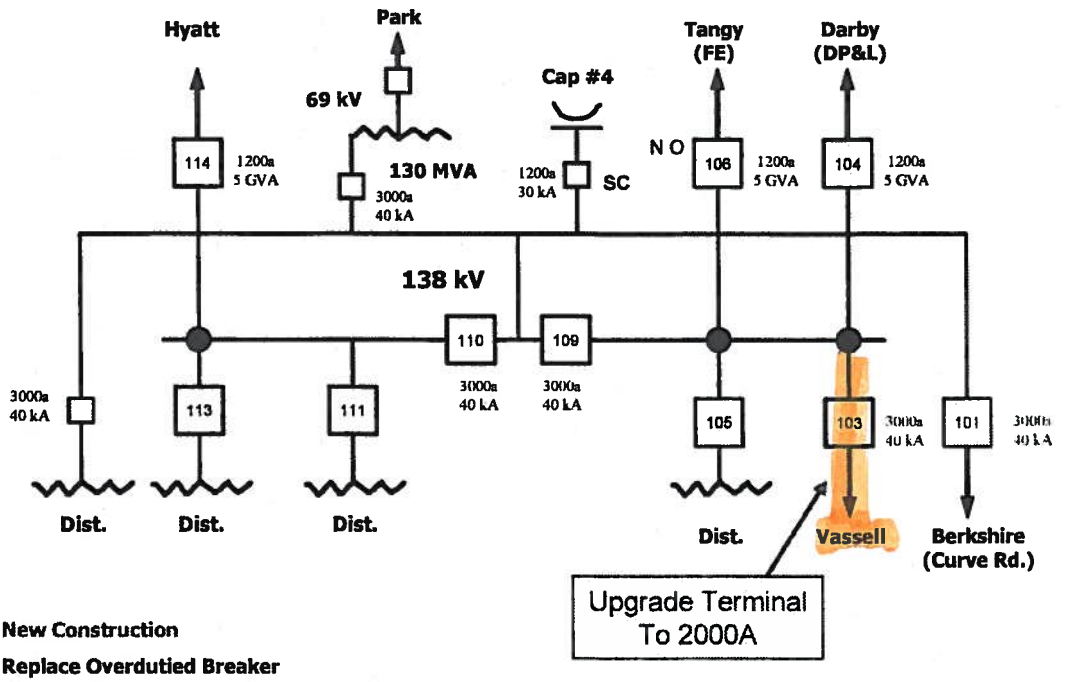
Vassell Substation

FIGURE 02-7
SIMPLIFIED TRENT SUBSTATION
ONE-LINE DIAGRAM SHOWING
PROPOSED TRENT-VASSELL 138 kV LINE
PASSING THROUGH TRENT SUBSTATION

JOB NO. 14949884



Delaware Station (138 kV
(not completely shown)

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Vassell Substation

FIGURE 02-8
SIMPLIFIED DELAWARE SUBSTATION ONE-LINE DIAGRAM WITH PROPOSED CONSTRUCTION

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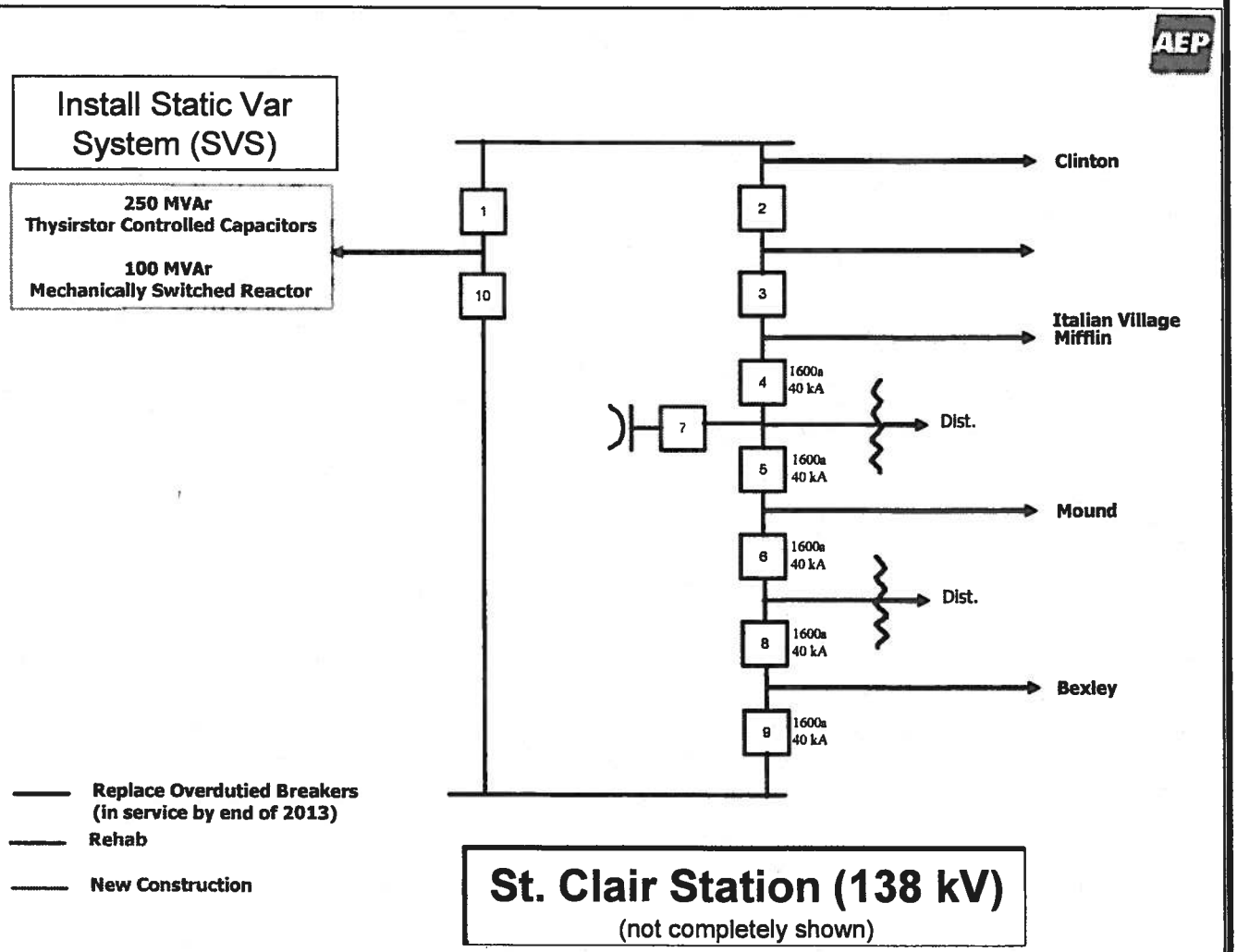

Vassell Substation

FIGURE 02-9
SIMPLIFIED ST. CLAIR SUBSTATION ONE-LINE DIAGRAM WITH PROPOSED CONSTRUCTION

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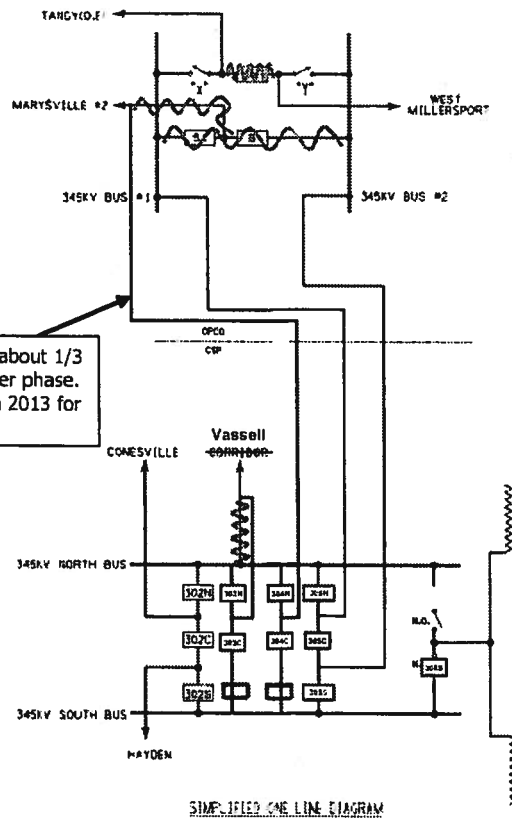

New 345 kV single Circuit, about 1/3 mile, 2-954 ACSR (45/7) per phase. File Letter of Notification in 2013 for this line project.

138 kV CB's 101C, 103C, 103S, 104N, 104C, 104S, 105N & 105C to be replaced as part of TP-2009-120

SIMPLIFIED ONE LINE DIAGRAM

Rehab

Remove/Retire assets

New Construction

Hyatt 345 kV Station (CSP & OP)

(not completely shown)

37

Vassell Substation

FIGURE 02-10
SIMPLIFIED HYATT (OHIO POWER & COLUMBUS SOUTHERN POWER) SUBSTATION ONE-LINE DIAGRAM WITH PROPOSED CONSTRUCTION

JOB NO. 14949884

FINANCE SERVICES
2013 JAN 23 AM 8:40

VICTORIA L DUNFEE
TRANSMISSION ROW
700 MORRISON RD
GAHANNA, OH 43230-6642

7080007769249 0169
2-1/710

Jan 22, 2013

PAY TO THE ORDER OF Treasurer State of Ohio-Siting Board $ 2,000.00

Two Thousand Dollars 00/100 DOLLARS

JPMorganChase
CHICAGO, ILLINOIS 60670

MEMO Case # 13-171-EL-BLN Victoria L Dunfee

⑆071000013⑆ 9026851⑈ 0169

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in

Case No(s). 13-0171-EL-BLN

Summary: Correspondence including additional information for the Trent – Delaware 138kV Line Improvement Project electronically filed by Mr. Yazen Alami on behalf of AEP Ohio Transmission Company