Application for a Certificate of Environmental Compatibility and Public Need

Buckeye II Wind Farm

Goshen, Rush, Salem, Union, Urbana, and Wayne Townships - Champaign County, Ohio

Respectfully Submitted To:

The Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215

Applicant:

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Volume II

Exhibit A through Exhibit K

May 2012

Exhibit A
Motion for Waivers

EXHIBIT A

Motion for Waivers

BEFORE THE OHIO POWER SITING BOARD

In the Matter of the Application of Champaign Wind LLC, for a Certificate to Construct a Wind-Powered Electric Generating Facility in Champaign County, Ohio	)))))	**Case No. 12-0160-EL-BGN**

MOTION FOR WAIVERS

Pursuant to Section 4906.06(A)(6), Revised Code and Rule 4906-1-03 of the Ohio Administrative Code, Champaign Wind LLC ("Champaign Wind" or "the Applicant") moves the Ohio Power Siting Board ("Power Siting Board") to grant waivers from Section 4906.06(A)(6), Revised Code and from Chapter 4906-17 of the Ohio Administrative Code for the reasons detailed in the following Memorandum in Support.

Champaign Wind will be filing an application for a wind-powered electric generation facility of more than 5 MW in the above-styled docket. Although the application is being filed in accordance with Chapter 4906-17 of the Ohio Administrative Code, Champaign Wind seeks certain waivers primarily based on the unique nature of a wind-powered electric generation facility. The requested waivers will not impact the Power Siting Board's review and analysis of the proposed generation facility.

WHEREFORE, Champaign Wind respectfully requests that the Power Siting Board grant a waiver from the one-year notice provision of Section 4906.06(A)(6), Revised Code, and waivers in part or in whole from Rules 4906-17-05(A)(4) and 4906-17-05(B)(2)(h) of the Ohio Administrative Code.

Respectfully submitted,

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MEMORANDUM IN SUPPORT

I. Introduction

Champaign Wind LLC, a wholly owned subsidiary of EverPower Wind Holdings, Inc., (hereafter referred to as "the Applicant" or "Champaign Wind") is proposing to construct a wind-powered electric generation facility located in Champaign County. The proposed project consists of up to 56 wind turbines capable of generating up to 140 megawatts ("MW") and associated infrastructure including a new interconnection switch yard and substation. The electricity generated by the facility will be transferred to the transmission grid operated by PJM Interconnection LLC for sale at wholesale or under a power purchase agreement.

Through this motion, Champaign Wind is seeking waivers from certain requirements of the Revised Code and Chapter 4906-17 of the Ohio Administrative Code ("OAC"). Specifically, Champaign Wind is seeking waivers from the one year notice requirement of Section 4906.06(A) of the Revised Code, the requirement to locate test borings pursuant to Rule 4906-17-05(A)(4) of the OAC and the requirement to identify changes in grade elevations resulting from construction pursuant to Rule 4906-17-05(B)(2)(h) of the OAC.

As more fully explained below, these waivers are necessary and good cause exists to grant the waivers. Indeed the Ohio Power Siting Board ("Power Siting Board") has routinely granted similar waivers to wind farm applicants.[1] Accordingly, as more fully set forth below, Champaign Wind seeks a waiver from the one-year notice provision of Section 4906.06(A)(6), Revised Code and waivers in part or in whole from Rules 4906-17-05(A)(4) and 4906-17-05(B)(2)(h) of the OAC.

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[1] See e.g. In re Paulding Wind Farm II LLC, Case No. 10-369-EL-BGN, Entry dated June 21, 2010 (granting waivers of one year notice provision, location of test borings and grade elevations where modified during construction).

II. Section 4906.06(A)(6), Revised Code

Section 4906.06(A)(6), Revised Code indicates that an application filed with the Power Siting Board must be filed not less than one year nor more than five years prior to the planned date of commencement of construction. Either period may be waived by the Power Siting Board for good cause shown. The one-year requirement was associated with electric generation facilities of public utilities -- the financial risk of which under Section 4909.18, Revised Code and the monopoly franchise provision of Section 4933.81, Revised Code rests with the general public who are served in the franchised service area. Since the financial risk of generation facilities owned by independent power producers rests with the non-utility owner, the one-year time frame to assess the public need for the facility is not required. The Power Siting Board for that reason has routinely waived the one-year requirement for such generation facilities.[2]

The Applicant intends to begin construction of the Facility as soon as it is authorized by the Power Siting Board. Without the waiver of the one-year notice provision, Champaign Wind will not be permitted to commence construction at that time. Further, the General Assembly has set a yearly goal of renewable energy, totaling 12.5% by 2025 of which half is to be sited in Ohio. Failure to grant waivers of the one-year minimum for this and similar projects could impair reaching the statutory goal of 6.25% Ohio based renewable generation. Thus, good cause exists for granting the requested waiver.

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[2] See In re: Rolling Hills Generating, LLC, a Subsidiary of Dynegy Power, Case No. 00-1616-EL-BGN, Entry, December 8, 2000; In re: Sun Coke Company, a Division of Sunoco, Case No. 04-1254-EL-BGN, Entry, April 26, 2005; In re: Middletown Coke Company, a Subsidiary of Sun Coke Energy, Case No. 08-281-EL-BGN, Entry, May 28, 2008; In re: Buckeye Wind LLC, Case No. 08-0666-EL-BGN, Entry dated July 31, 2009; In re: Hardin Energy LLC, Case No. 09-479-EL-BGN, Entry dated July 17, 2009; In re: Paulding Wind Farm LLC, Case No. 09-980-EL-BGN, Entry dated February 23, 2010; In re Paulding Wind Farm II LLC, Case No. 10-369-EL-BGN, Entry dated June 21, 2010.

III. Rule 4906-17-05(A)(4) of the Ohio Administrative Code (Test Borings)

Rule 4906-17-05(A)(4) of the Ohio Administrative Code requires the Applicant to provide a map(s) of suitable scale showing the location of proposed test borings. The locations of the test borings will be provided subsequent to the filing of the Application. The delay will permit the geotechnical engineer to review all available desktop information and determine the number and location of the borings to be drilled. In addition, the Applicant anticipates that the Champaign County Engineer will want road borings done. The location and timing of road borings will be done in concert with the Champaign County Engineer.

Thus, the Applicant respectfully requests that the Power Siting Board grant a waiver from the above-cited rule requirement that the location of the test borings be shown on a map. The Applicant will provide responsive information to this requirement and other related data requests when the final selection of ground and road borings are made. The Power Siting Board has granted similar requests for this waiver in other proceedings.[3]

IV. Rule 4906-17-05(B)(2)(h) of the Ohio Administrative Code (Grade Elevations Where Modified During Construction)

Rule 4906-17-05(B)(2)(h) requires an applicant to supply a map of the proposed electric power generating site showing the grade elevations where modified during construction. Unlike a conventional electric generating plant in which a large tract of contiguous acreage property must be graded in order to properly site the generation facility, a wind turbine sits on a relatively small base generally only 50 to 60 feet in diameter. The impact of the grading will be minimal and possibly not known until after construction of the pedestal. Thus, the Applicant requests a waiver of the above-cited rule and agrees in lieu of the rule to generate proposed contours/grade

[3] See In re: Buckeye Wind LLC, Case No. 08-666-EL-BGN, Entry dated July 31, 2009; In re: Paulding Wind Farm LLC, Case No. 09-980-EL-BGN, Entry dated February 23, 2010; and In re: Paulding Wind Farm II LLC, Case No. 10-369-EL-BGN, Entry dated June 21, 2010.

modifications during preparation of the facility construction drawings, which can be provided to the Staff of the Power Siting Board when available. The Power Siting Board has granted similar requests for this waiver in other proceedings.[4]

V. Conclusion

As good cause exists for granting the waivers, Champaign Wind respectfully requests that the Power Siting Board grant a waiver from the one-year notice provision of Section 4906.06(A)(6), Revised Code and waivers in part or in whole from Rules 4906-17-05(A)(4) and 4906-17-05(B)(2)(h) of the OAC.

Respectfully submitted,

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[4] See In re: Buckeye Wind LLC, Case No. 08-666-EL-BGN, Entry dated July 31, 2009; In re: Paulding Wind Farm LLC, Case No. 09-980-EL-BGN, Entry dated February 23, 2010; and In re: Paulding Wind Farm II LLC, Case No. 10-369-EL-BGN, Entry dated June 21, 2010.

CERTIFICATE OF SERVICE

I certify that a copy of the foregoing document was served by electronic mail and U.S. Mail upon the following persons this 9th day of May, 2012.

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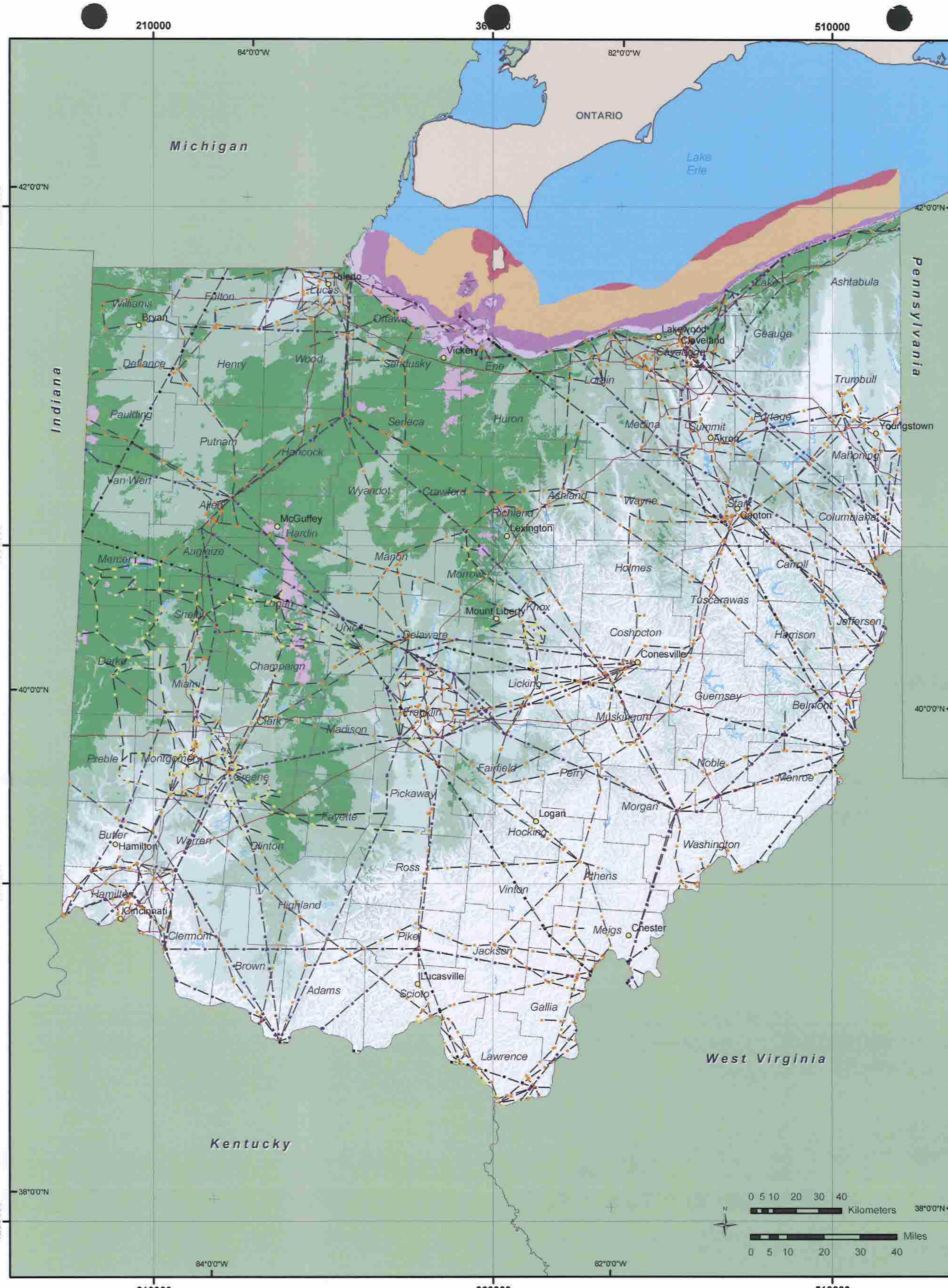
Exhibit B
Wind Resource Map

EXHIBIT B

Wind Resource Map



Wind Resource of Ohio *Mean Annual Wind Speed at 70 Meters*

Features

- City
- Interstate Highway
- County Boundary
- Water Body

Generalized Transmission Line

Category

- Under 100 kV
- 100 kV-161 kV
- 230 kV-287 kV
- 345 kV
- 500 kV
- 735 kV +
- Step-Up
- DC Line

Mean Speed at 70 m

mph	*m/s*
< 12.3	< 5.5
12.3 - 13.4	5.5 - 6.0
13.4 - 14.5	6.0 - 6.5
14.5 - 15.7	6.5 - 7.0
15.7 - 16.8	7.0 - 7.5
16.8 - 17.9	7.5 - 8.0
17.9 - 19.0	8.0 - 8.5
19.0 - 20.1	8.5 - 9.0
20.1 - 21.3	9.0 - 9.5
> 21.3	> 9.5

AWS Truewind

Projection: Tranverse Mercator, UTM Zone 17 WGS84
Spatial Resolution of Wind Resource Data: 200m
This map was created by AWS Truewind using the MesoMap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.
The transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information.

Exhibit C
System Impact Study

EXHIBIT C

System Impact Study

Generation Interconnection System Impact Study Report

PJM Generation Interconnection Request Queue Position R-52

Mechanicsburg – Darby

February 2009

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 System Impact Study is performed.

The System Impact 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.

General

EverPower Ohio, L.L.C., the Interconnection Customer (IC), has proposed a 200 MW (40 MW capacity) wind power generating facility to be located along the Urbana-Darby 138kV line in The Dayton Power and Light Company (Dayton) transmission system. The project will utilize 87 Siemens 2.3 MW wind turbines. R52 was studied as an 200 MW energy and 40 MW Capacity injection at a new substation on the Dayton system. It was evaluated for compliance with reliability criteria for summer peak conditions in 2012. The planned in service date, as stated in the Generation Interconnection Feasibility Study Agreement, is October 1, 2008. That date was not met and a new in-service date has not yet been provided by the IC.

Point of Interconnection

R52 will interconnect with the Dayton Power and Light Company (Dayton) transmission system at a new 138kV substation adjacent to the Urbana - (Givens-Mechanicsburg-Eagle Rd.) - Darby line. Along that line, the new substation will be built at a tap located between Givens and Mechanicsburg, as shown on attachment #1.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The Transmission Owner's (Dayton) scope of includes:

Attachment Facilities

The new substation, to be located at a suitable site near or adjacent to the Urbana-(Givens-Mechanicsburg-Eagle Rd.) – Darby 138 kV circuit, will include three 138 kV breakers, three dead-end structures, ten 138 kV air break switches, and 138 kV interconnection metering. The estimate assumes that site preparation and site grading will be done by DP&L. The station will include a control building to house all protective relaying, metering and all communications equipment, including SCADA RTU facilities. **The estimated cost to construct this 138 kV substation is $2,400,000 in 2009 dollars.**

This estimate does not include any cost for land. The Interconnection Customer will provide the necessary land near or adjacent to the line. This estimate provides cost to terminate the existing lines one span into the substation. If transmission lines of longer distance are required, the estimated cost is $400,000/Mile in 2009 dollars. The construction of a 138kV substation requires Ohio Power Siting approval. The siting approval requires a 6 months – 1 year lead time. The lead time to complete this work is **24 months**. These estimates do not include any tax gross up cost.

DP&L (Dayton) has responsibility for providing specifications for the relaying protection package to be employed on the interconnection breaker terminal at the generation site to assure that the protective relaying equipment will be compatible with that installed on the interconnection breaker terminal at the new switching station. The relaying package will likely include both primary and backup protection. DP&L is also responsible for testing and calibrating all relays protecting the interconnect line and performing all tests to assure that this relaying is properly installed and functional. **The estimated total cost of this engineering and field test effort is $3,000 in 2009 dollars.**

Note: The purchase and installation of protective relaying and associated equipment at the generation site is not included in this scope of work. This work is the responsibility of the IC.

Install transfer trip receiver at Darby substation and install a transfer trip transmitter at Urbana substation. **The estimated cost for this work is $93,000 in 2009 dollars.**

Network Impacts

The Queue Project #R52 was studied as a 200 MW (40 MW Capacity) injection into the Givens – Mechanicsburg 138 kV line in the Dayton area. Project #R52 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were 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, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

1. The Johnson W – NW Urbana 69 kV line (from bus 26470 to bus 26699 ckt 1) loads from 77.2% to 100.1% (AC power flow) of its emergency rating (117 MVA) for the outage of Darby – Eagle – Mechanicsburg – R52 138 kV line and Darby – Delaware 138 kV line for a breaker failure at Darby 138 kV substation (DAY_L13811-2_R52). This project contributes approximately 25.9MW to cause this thermal violation.

2. The Urbana – Johnson WP 69 kV line (from bus 26655 to bus 26470 ckt 1) loads from 82.7% to 107.1% (AC power flow) of its emergency rating (110MVA) for the outage of Darby – Eagle – Mechanicsburg – R52 138 kV line and Darby – Delaware 138 kV line for a breaker failure at Darby 138 kV substation (DAY_L13811-2_R52). This project contributes approximately 25.9MW to cause this thermal violation.

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)

None

Short Circuit

A Short Circuit analysis was performed using a 2012 baseline case. The results were that three breakers were affected by the addition of this generation and must be replaced. These breakers are listed below.

Urbana	Breaker	kV	Rating 2012
1	DB-BH3E	69	12551.1
2	DB-BH3W	69	12551.1
3	DB-BH1	69	12551.1

The breakers to be replaced are all solenoid operating oil circuit breakers ranging in age from 56 to 61 years old, single trip coil design with opening times of 5 to 8 cycles. Upgrading is not practical. All overdutied breakers would be replaced with 3-cycle, 30 kA redundant trip coil gas circuit breakers. Each breaker would take five work days to replace once they are delivered to the site.

A set of transformer fuses and holders on BK-1 at the Logan Substation would also be above their short circuit interrupting rating and need to be replaced.

The total estimated cost for replacement of these breakers is $300,000. More detailed information on each of these breakers, as well as the upgrade costs and timing is provided in Attachment No 2.

New System Reinforcements

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

The following table describes the new system reinforcements/upgrades required:

Circuit	Line Length (Miles)	Upgrades Needed	New Emer Rating MVA	New Line Impedance	Costs $
Urbana-Johnson WP	2.47	Upgrade 800A Line Trap - Urbana Reconductor 636 ACSR w/ 795 ACSR	137	R = 0.6640% X = 3.709%	$900,000
Johnson WP - NW Urbana REA	1.82	Upgrade Line Drop - Urbana Reconductor 636 ACSR w/ 795 ACSR	137	R = 0.48931% X = 2.733%	$650,000

The estimated total cost for the above is $1,550,000 in 2009 dollars.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.)

None

Steady-State Voltage Requirements

Please refer to the LVRT requirement for the turbine VAR requirement.

Stability and Reactive Power Requirements

PJM performed a study addressing the stability assessment for the PJM generator interconnection request – Queue #R52 (Mechanicsburg - Givens 138 kV Tap). The R52 project consists of a new 200 MW wind farm facility. The developer specified the use of 87 units Siemens 2.3 MW variable speed wind turbines. The objective of the study was to determine the system stability for the contingencies around the R52 project as shown in Attachment #3.

All units and their control systems were updated according to the developer's specification; these updates are shown in Attachment #4.

Stability (ECAR Stability Criteria)

Stability analysis was performed at 2013 summer light load condition. The maximum generation output is considered. The range of contingencies evaluated was limited to that necessary to assess expected compliance with ECAR criteria.
This study includes 38 contingencies condition that includes 3-phase faults for normal clearing time contingencies and single line to ground for delayed clearing time due to stuck breaker condition and single line to ground for delayed clearing time due to loss of communication.

Result and Analysis

The turbines are required to include Voltage Control to regulate the voltage at the point of interconnection bus to 1p.u. The Reactive power limits for the machines are Max 0.95 and Min 0.85.
No stability problem was identified. The swing angles do not exceed the transient stability criteria and the transient voltage criteria were also satisfactory for all contingencies scenarios.

Table-1 in Attachment #1 tabulates the clearing times for the some specific contingencies scenarios, also a brief description of the scenario is provided.

Note: While the stability analysis has been performed at expected extreme system conditions, there is a potential that evaluation at a different level of generator MW and/or MVAR output at different system load levels and operating conditions would disclose unforeseen stability problems. The regional reliability analysis routinely performed to test all system changes will include one such evaluation. Any problems uncovered in that or other operating or planning studies will need to be resolved.

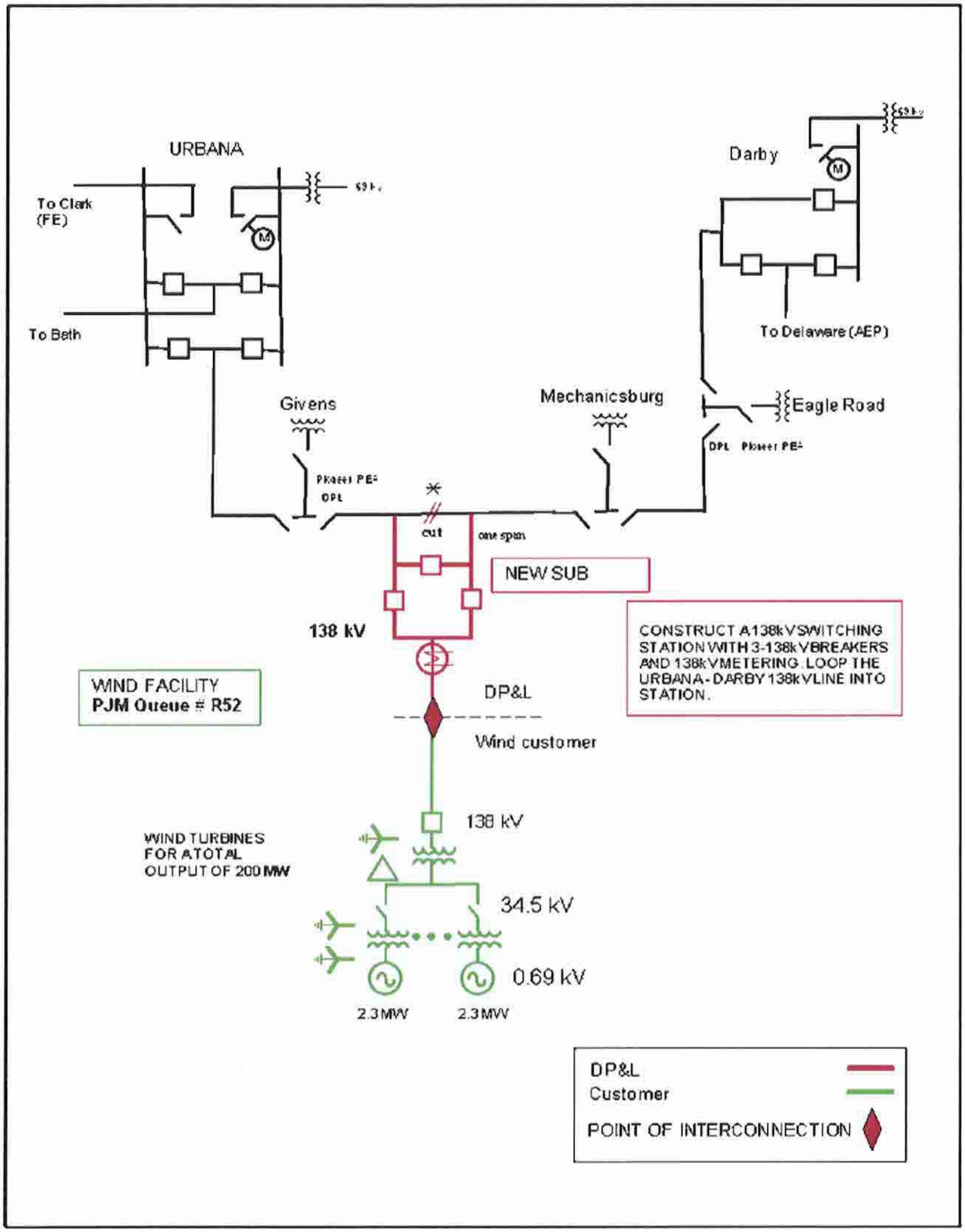
Moreover, when the proposed generating station is designed and plant specific dynamics data for the plant and its controls are available, and if it is different than the data provided for this study, a transient stability analysis at a variety of expected operating conditions using the more accurate data shall be performed to verify impact on the dynamic performance of the system. As more accurate or unit specific dynamics data for the proposed facility, as well as Plant layout become available, it must be forwarded to PJM.

<u>Delivery of Energy Portion of Interconnection Request</u>

PJM also studied the delivery of the energy portion of this interconnection request with all earlier queues at their energy output and the system at peak load with all transmission facilities in service. Any problems identified below may result in operational restrictions to the project under study or other PJM generation. There may also be other conditions causing congestion which were not *studied. The developer can proceed with network upgrades to eliminate the potential congestion at their discretion by submitting a Merchant Transmission Interconnection request now or in the future.*

None

Attachment # 1



Attachment #2

R52

New Over Duty Breakers

Station	Voltage (kV)	Breaker	Queue	Upgrade Cost	Upgrade Time	Upgrade Type
Urbana	69	DB-BH3E	R52	$100,000	5 days does not include lead time	Replace with 30 kA
Urbana	69	DB-BH3W	R52	$100,000	5 days does not include lead time	Replace with 30 kA
Urbana	69	DB-BH1	R52	$100,000	5 days does not include lead time	Replace with 30 kA

Attachment #3

R52

2013 Light Load Stability Faults

BREAKER CLEARING TIMES (CYCLES)

Station	Primary (3ph/slg)	Stuck Breaker (total)	Zone 2 (total)
138kV	7	19.5	37
69kV	10	25.5	70

Table-1: Summary of the recommended maximum clearing time for the different case scenarios.

All cases stable

1a. 3ph @ Kings Creek – Logan 69 kV line
1c. slg @ Kings Creek – Logan 69 kV line, 80% from Kings Creek, Zone 2 clearing

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2a. 3ph @ Kings Creek – Urbana 69 kV line
2c. slg @ Kings Creek – Urbana 69 kV line, 80% from Kings Creek, Zone 2 clearing

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3a. 3ph @ Kings Creek – Marysville 69 kV line
3c. slg @ Kings Creek – Marysville 69 kV line, 80% from Kings Creek, Zone 2 clearing

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4a. 3ph @ Logan – Blue Jacket 69 kV line
4c. slg @ Logan – Blue Jacket 69 kV line, 80% from Logan, Zone 2 clearing

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5a. 3ph @ Logan – Shelby 138 kV line
5c. slg @ Logan – Shelby 138 kV line, 80% from Logan, Zone 2 clearing

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6a. 3ph @ Urbana – Bath 138 kV Line
$6b_1$ slg @ Urbana – Bath 138 kV line, BF @ Urbana
Description: BF-(B) Loss of Urbana Transformer 138/69 kV
$6b_2$ slg @ Urbana – Bath 138 kV line, BF @ Urbana
Description: BF-(D) Loss of Urbana – Clark 138 kV Line
6c. slg @ Urbana – Bath 138 kV line, 80% from Urbana, Zone 2 clearing

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7a. 3ph @ Urbana – Clark 138 kV Line

8a. 3ph @ Urbana – R52A 138 kV Line
$8b_1$ slg @ Urbana – R52A 138 kV line, BF @ Urbana
Description: BF-(A) Loss of Urbana Transformer 138/69 kV
$8b_2$ slg @ Urbana – R52A 138 kV line, BF @ Urbana
Description: BF-(C) Urbana – Clark 138 kV Line

8c. slg @ Urbana – R52A 138 kV line, 80% from Urbana, Zone 2 clearing

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9a. 3ph @ Darby – R52A 138 kV Line
9b$_1$. slg @ Darby – R52A 138 kV line, BF @ Darby
Description: BF-(B) Loss of Darby Transformer 138/69 kV
9b$_2$. slg @ Darby – R52A 138 kV line, BF @ Darby
Description: BF-(F) Loss of Darby – Delaware 138 kV line
9c. slg @ Darby – R52A 138 kV line, 80% from Darby, Zone 2 clearing

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10a. 3ph @ Darby – Delaware 138 kV line
10c. slg @ Darby – Delaware 138 kV line, 80% from Darby, Zone 2 clearing

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11a. 3ph @ R52A– Darby 138 kV line
11c. slg @ R52A– Darby 138 kV line, 80% from R52A, Zone 2 clearing

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12a. 3ph @ R52A– Urbana 138 kV line
12c. slg @ R52A– Urbana 138 kV line, 80% from R52A, Zone 2 clearing

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13a. 3ph @ Logan – Bellefontaine 69 kV line
13c. slg @ Logan – Bellefontaine 69 kV line, 80% from Logan, Zone 2 clearing

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14a. 3ph @ Urbana – Kings Creek 69 kV line
14b. 3ph @ Urbana – Kings Creek 69 kV line, BF @ Urbana
14c. slg @ Urbana – Kings Creek 69 kV line, 80% Urbana, Zone 2 clearing

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15a. 3ph @ Darby – Honda 69 kV Line
15c. slg @ Darby – Honda 69 kV Line, 80% from Darby, Zone 2 clearing

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16a. 3ph @ Darby – Marysville 69 kV line
16c. slg @ Darby – Marysville 69 kV line, 80% from Darby, Zone 2 clearing

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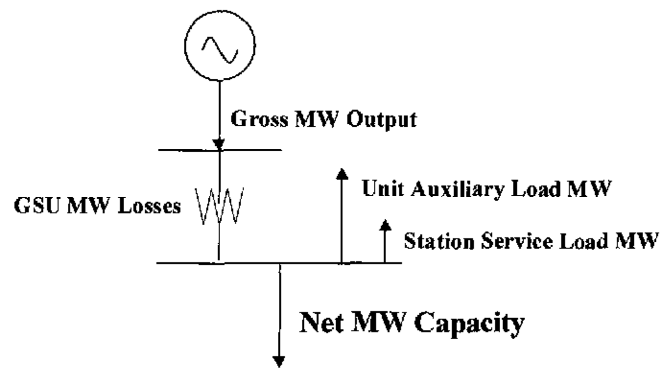
Attachment #4

Unit Capability Data



Net MW Capacity = (Gross MW Output - GSU MW Losses* – Unit Auxiliary Load MW - Station Service Load MW)

Queue Letter/Position/Unit ID: ______________________ R52

Primary Fuel Type: ______________________ Wind /SIEMENS 2.3 MW

Maximum Summer (92° F ambient air temp.) Net MW Output**: ____200/2.3 per turbine

Maximum Summer (92° F ambient air temp.) Gross MW Output: ____200/2.3 per turbine

Minimum Summer (92° F ambient air temp.) Gross MW Output: ________________ 0

Maximum Winter (30° F ambient air temp.) Gross MW Output: _____200/2.3 per turbine

Minimum Winter (30° F ambient air temp.) Gross MW Output: ________________ 0

Gross Reactive Power Capability at Maximum Gross MW Output – Please include Reactive Capability Curve (Leading and Lagging): ______________________ N/A

Individual Unit Auxiliary Load at Maximum Summer MW Output (MW/MVAR): _ N/A

Individual Unit Auxiliary Load at Minimum Summer MW Output (MW/MVAR): _ N/A

Individual Unit Auxiliary Load at Maximum Winter MW Output (MW/MVAR): __ N/A

Individual Unit Auxiliary Load at Minimum Winter MW Output (MW/MVAR): __ N/A

Station Service Load (MW/MVAR):______________________ N/A

* GSU losses are expected to be minimal.

** Your project's declared MW, as first submitted in Attachment N, and later confirmed or modified by the Impact Study Agreement, should be based on either the 92° F Ambient Air Temperature rating of the unit(s) or, if less, the declared Capacity rating of your project.

Unit Generator Dynamics Data

Queue Letter/Position/Unit ID: ________ R52

MVA Base (upon which all reactances, resistance and inertia are calculated): ________ 2.3

Nominal Power Factor: ________ 1.0

Terminal Voltage (kV): ________ 0.69

Unsaturated Reactances **(on MVA Base)**

- Direct Axis Synchronous Reactance, $X_{d(i)}$: ________ N/A
- Direct Axis Transient Reactance, X'd(i): ________ N/A
- Direct Axis Sub-transient Reactance, X"d(i): ________ N/A
- Quadrature Axis Synchronous Reactance, Xq(i): ________ N/A
- Quadrature Axis Transient Reactance, X'q(i): ________ N/A
- Quadrature Axis Sub-transient Reactance, X"q(i): ________ N/A
- Stator Leakage Reactance, Xl: ________ N/A
- Negative Sequence Reactance, X2(i): ________ N/A
- Zero Sequence Reactance, X0: ________ N/A

Saturated Sub-transient Reactance, X"d(v) (on MVA Base): ________ N/A

Armature Resistance, Ra (on MVA Base): ________ N/A

Time Constants (seconds)

- Direct Axis Transient Open Circuit, T'_{do}: ________ N/A
- Direct Axis Sub-transient Open Circuit, T''_{do}: ________ N/A
- Quadrature Axis Transient Open Circuit, T'_{qo}: ________ N/A
- Quadrature Axis Sub-transient Open Circuit, T''_{qo}: ________ N/A
- Inertia, H (kW-sec/kVA, on KVA Base): ________ 1.0927

Speed Damping, D: ________ N/A

Saturation Values at Per-Unit Voltage [S(1.0), S(1.2)]: ________ N/A

Units utilize a Generator model

Unit GSU Data

Queue Letter/Position/Unit ID: ______________________________ R52

Generator Step-up Transformer MVA Base: ______________________________ 2.3

Generator Step-up Transformer Impedance (R+jX, or %, on transformer MVA Base):___j0.063

Generator Step-up Transformer Reactance-to-Resistance Ration (X/R): _________ N/A

Generator Step-up Transformer Rating (MVA): ______________________________ 2.3

Generator Step-up Transformer Low-side Voltage (kV): ______________________ 0.69

Generator Step-up Transformer High-side Voltage (kV): _____________________ 34.5

Generator Step-up Transformer Off-nominal Turns Ratio: ____________________ N/A

Generator Step-up Transformer Number of Taps and Step Size: _______________ N/A

Main Transformer Data

Queue Letter/Position/Unit ID: ______________________________ R52

Generator Step-up Transformer MVA Base: ______________________________ 138

Generator Step-up Transformer Impedance (R+jX, or %, on transformer MVA Base):____j0.15

Generator Step-up Transformer Reactance-to-Resistance Ration (X/R): _________ N/A

Generator Step-up Transformer Rating (MVA): ___________________________34.5/69

Generator Step-up Transformer H-side Voltage (kV): _______________________138

Generator Step-up Transformer X-side Voltage (kV): _______________________ 34.5

Generator Step-up Transformer Off-nominal Turns Ratio: ____________________ N/A

Generator Step-up Transformer Number of Taps and Step Size: _______________ N/A

Exhibit D
Feasibility Study

EXHIBIT D

Feasibility Study

PJM Generation Interconnection Request

Queue R52

Mechanicsburg - Darby 69kV

Feasibility Study

430533v1
September 2007

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an interconnection customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 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.

General

Everpower Ohio, LLC (Everpower) has proposed a 300 MW (60 MW capacity) wind generating facility to be studied as interconnected at two locations in the Dayton system. 100 MW (20 MW capacity) has been studied as injecting into the Kings Creek 69 kV substation. 200 MW (40 MW capacity) has been studied as injection into the Mechanicsburg to Givens section of the Urbana – Mechanicsburg - Darby 138 kV circuit. Project #R52 was evaluated for compliance with reliability criteria for summer peak conditions in 2011. The proposed in-service date for this project is October 1, 2008.

This Generation Interconnection Feasibility Study provides analysis results to aid the Interconnection Customer in assessing the practicality and cost of incorporating the facility into the PJM system. This study was limited to short-circuit analyses as well as load flow analyses of probable contingencies. PJM has provided preliminary estimates of the type, scope, cost, and lead time for construction of facilities. If the interconnection customer elects to pursue a System Impact Study, a more comprehensive analysis will be performed.

Attachment Facilities

The proposed wind generation project will interconnect at the two locations stated above. The interconnection to Kings Creek will require a new terminal addition (Figure 1). A new Switching-Station would be required the 138 kV line interconnection as illustrated in Figure 2. The new station will be configured as a three breaker bus. Dayton Power and Light (Dayton) will construct the switching stations on property provided by Everpower. Everpower will construct facilities to interconnect the wind turbine generators through collection systems and step up transformation to 69 kV and 138 kV at the Point of Interconnection.

Everpower's generation must also not cause the system harmonics level to exceed Standard IEEE 519 limits.

The scope of Dayton's work and estimated cost by project segment are listed below:

<u>69 kV interconnection:</u>

Construct a new line terminal at the Dayton of the Kings Creek 69 kV substation including:

- One 69 kV circuit breaker
- Disconnect switches
- 69 kV metering units
- Relaying.
- Site preparation and grading.
- Perform a protection coordination review of the Dayton System area surrounding the switching-station to determine if relaying modifications or relay-setting changes are required.

This estimate assumes the developer will build the transmission line to the DP&L take-off structure at Kings Creek substation. The lead time to complete this work is 9 months. These estimates do not include any tax gross up cost.

Estimated Cost: $790,000 in 2009 dollars.

Direct Connection Network Upgrades

138 kV interconnection:

Construct a new switching station interconnected to the Dayton Mechanicsburg to Givens section of the Urbana – Mechanicsburg - Darby 138 kV circuit including:

- Three dead-end structures
- Three 138 kV circuit breakers
- Ten 138 kV air break switches
- 138 kV metering units
- Site preparation and grading
- A control building to house protective relaying, metering and communications equipment, including SCADA RTU facilities.
- Relaying.

Estimated Cost: $2,400,000 in 2009 dollars.

This estimate does not include any cost for land. It is assumed that the developer will provide the necessary land near or adjacent to the line. This estimate provides cost to terminate the existing lines one span into the substation. If transmission lines of longer distance are required, the estimated cost is **$400,000/Mile in 2009 dollars.** The construction of a 138kV substation requires Ohio Power Siting approval. The siting approval requires a 6 months – 1 year lead time. **The lead time to complete this work as estimated above is 24 months.** These estimates do not include any tax gross up cost.

Additionally Dayton will provide specifications for the relaying protection package to be employed on the interconnection breaker terminal at the generation site to assure that the protective relaying equipment will be compatible with that installed on the interconnection breaker terminal at the new switching station. The relaying package will likely include both primary and backup protection. DP&L is also responsible for testing and calibrating all relays protecting the interconnect line and performing all tests to assure that this relaying is properly installed and functional.

The estimated total cost of this engineering and field test effort is **$3,000 in 2009 dollars.**

Note: Purchase and installation of protective relaying and associated equipment at the generation site is not included in this scope of work. This phase of work is the responsibility of the customer.

- Prepare right of way as needed and install new line facilities required to loop the Dayton Mechanicsburg to Givens section of the Urbana – Mechanicsburg - Darby 138 kV circuit transmission line into the proposed new switching-station for the interconnection.

  Estimated Cost: (assumed by PJM to be part of the $2.4M above)

- Install transfer trip receiver at Darby substation and install a transfer trip transmitter at Urbana substation.

  The estimated cost for this work is **$93,000 in 2009 dollars.**

<u>**Non Direct Connection Network Upgrades**</u>

Generator Deliverability
No problems were identified.

Multiple Facility Contingency

1. The Kings Creek - Logan 69 kV line is loaded from 85% to 123% of its emergency rating (72 MVA) for the **tower** outage of Sidney - Shelby 138 kV line and Shelby- E. Sidney-Quincy-Logan 138 kV line and Logan 138/69 kV transformer. This project contributes approximately 27 MW to cause the thermal violation.

Contribution to Previously Identified Overloads

The R52 project contributes 42 MW to the Kammer transformer overload. This project may have a cost allocation for the reinforcement. This will be determined during the System Impact Study.

New System Reinforcements
The Kingscreek-Logan 69 kV Circuit was identified as requiring an upgrade to mitigate reliability criteria violations with the proposed wind farm in place.

The estimated cost to upgrade the limiting breaker/CT on this circuit is approximately **$75,000** and the lead time would be approximately one month, given DP&L has an inventory of spare breakers.

Contribution to Previously Identified System Reinforcements
To be determined at the System Impact Study.

Short Circuit
The following 4 breakers were over-duty as a result of Queue R52 generation:

1. Urbana 69kV breakers DB-BH1, DB-BL7, DB-BH3E, and DB-BH3W

New System Reinforcements

All of the over-duty breakers are solenoid operating oil circuit breakers with single trip coil design and opening times of 5 to 8 cycles. Upgrading these breakers, which range in age from 56 to 61 years, would not be practical. All over-duty breakers should be replaced with 3 cycle, 40kA redundant trip coil gas circuit breakers. The installed cost of each breaker would be approximately **$85,000**, and the estimated installation time is about 5 work days per breaker.

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.

As a result of the aggregate energy resources in the area, the following violations were identified:

1. Contribution of 37 MW further congests the 765/500 kV Kammer transformer from 130% to 133% of its emergency rating (2094 MVA) for the outage of the Harrison-Belmont 500 kV line. The monitored facility was first congested by project P37.
2. Contribution of 5 MW further congests the Belmont - Harrison 500 kV line within from 123% to 125% of its emergency rating (2285 MVA) for the outage of the 502 Junction-Kammer 500 kV line. The monitored facility was first congested by project Q75.
3. Contribution of 34 MW further congests the Cabot - Keystone 500 kV line from 122% to 125% of its emergency rating (2598 MVA) for the outage of the Keystone-South Bend kV line. The monitored facility was first congested by project Q75.
4. Contribution of 28 MW further congests the South Bend - Keystone 500 kV line from 116% to 118% of its emergency rating (3013 MVA) for the outage of the Keystone-Cabot 500 kV line. The monitored facility was first congested by project Q75.
5. Contribution of 31 MW further congests the Harrison - Prunty Town 500 kV line from 112% to 114% of its emergency rating (3502 MVA) for the outage of the 500 kV three-terminal line 502 J.-Kammer-Harrison-G30_W51. The monitored facility was first congested by project Q75.
6. Contribution of 10 MW causes congestion on the Woodstock-Marysville 69 kV for the loss of the 138/69 kV Darby transformer. Pre-and-post-R52 loadings on the monitored element are 99% and 119%, respectively.
7. Contribution of 47 MW causes congestion on the Kings Creek-Logan 69 kV for the loss of the 345/138 kV Shelby transformer. Pre-and-post-R52 loadings on the monitored element are 90% and 138%, respectively.

COST AND TIMING SUMMARY

Total Estimated Cost for interconnection is **$3,701,000 in 2009 dollars**.
This assumes the Reliant will construct the transmission line.

This project will require **24 months** to complete from the date of receipt of a signed Construction Service Agreement (CSA). This project will require an Impact and Facilities Study and with the time expected to complete these studies the Interconnection Customer's required backfeed date cannot be met without pursuing an Interim ISA. The Interconnection Customer, Dayton and PJM should discuss the schedule and options.

This estimate does not include tax gross up. The figures above do not include construction of the line required to interconnect the customer's proposed new generating facilities with the Dayton system. Route selection, line design, right of way acquisition and construction of these lines will be entirely the responsibility of the interconnection customer. The cost figures are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Any change to the scope of work will require that the estimates be revisited.

Figure 1.

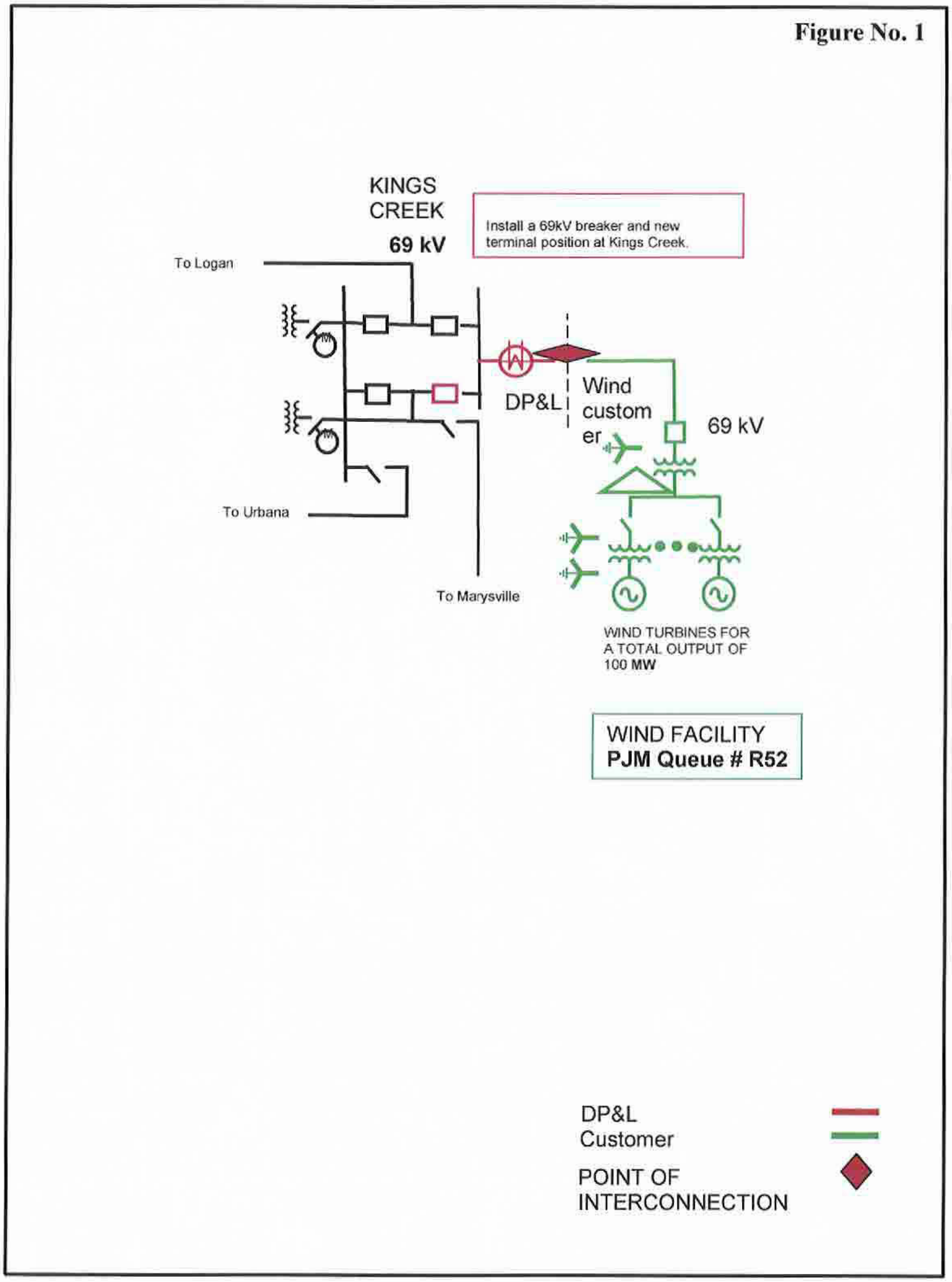


Figure No. 1
KINGS CREEK
69 kV
Install a 69kV breaker and new terminal position at Kings Creek.
To Logan
DP&L
Wind customer
69 kV
To Urbana
To Marysville
WIND TURBINES FOR A TOTAL OUTPUT OF 100 MW
WIND FACILITY
PJM Queue # R52
DP&L
Customer
POINT OF INTERCONNECTION

Figure 2

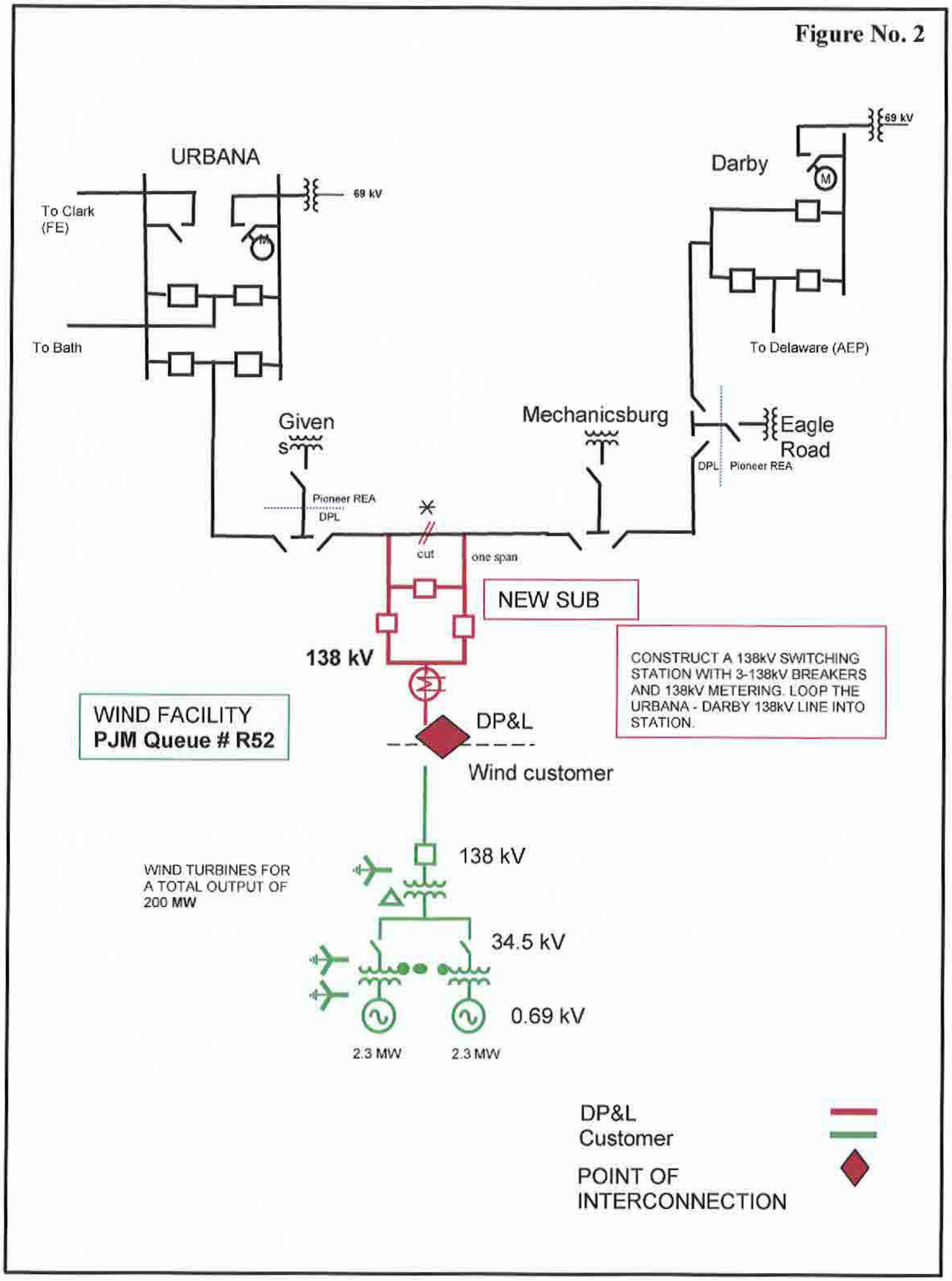


Figure No. 2
URBANA
69 kV
To Clark (FE)
To Bath
Darby
69 kV
To Delaware (AEP)
Given
Mechanicsburg
Eagle Road
DPL
Pioneer REA
Pioneer REA
DPL
cut
one span
NEW SUB
138 kV
CONSTRUCT A 138kV SWITCHING STATION WITH 3-138kV BREAKERS AND 138kV METERING. LOOP THE URBANA - DARBY 138kV LINE INTO STATION.
WIND FACILITY
PJM Queue # R52
DP&L
Wind customer
138 kV
WIND TURBINES FOR A TOTAL OUTPUT OF 200 MW
34.5 kV
0.69 kV
2.3 MW
2.3 MW
DP&L
Customer
POINT OF INTERCONNECTION

From: mancik@pjm.com [mailto:mancik@pjm.com]
Sent: Thursday, October 23, 2008 3:01 PM
To: cvogel@everpower.com; Hertzel.Shamash@DPLINC.com
Cc: michael.hurd@dplinc.com; inter&gen_plan@pjm.com
Subject: R-52 Split

This is to formally notify all parties involved with this project that, from this point forward in the process, it will be split into two separate projects. The larger of the two will retain the queue number of "R-52." This is the 200 MWE, 40 MWC wind farm that will interconnect into the Givens-Mechanicsburg line. The smaller project created by this split will be named "R-52A." It is the 100 MWE, 20 MWC wind farm that will connect into Kings Creek.

The next step in this project was to have been the creation of the System Impact Study. As a result of this split, there will now be two system impact studies, and two of every other study or document as each project will require, including the preparation of two Interconnection Service Agreements.

If you have any questions about this change, please contact me at the number shown below.

Ken Mancini
PJM Interconnection
Office: 610.666.4306, Cell: 215.519.4720
mancik@pjm.com

Exhibit E
Route Evaluation Study

EXHIBIT E

Route Evaluation Study

ROUTE EVALUATION STUDY

CHAMPAIGN WIND LLC

FOR THE:
BUCKEYE II WIND FARM
CHAMPAIGN COUNTY, OHIO

PREPARED FOR:
CHAMPAIGN WIND LLC
129 South Main Street
Bellefontaine, OH 43311

PREPARED BY:
HULL & ASSOCIATES, INC.
6397 EMERALD PARKWAY, SUITE 200
DUBLIN, OHIO 43016

FEBRUARY 2012

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1.0 INTRODUCTION AND EVALUATION CRITERIA

1.1 Project Description and Purpose

Champaign Wind LLC, a wholly owned subsidiary of EverPower Wind Holdings, Inc., is planning development of the Buckeye II Wind Farm, a wind-powered electric generation facility in west central Ohio. The Buckeye II Wind Farm will be located in Champaign County within the townships of Salem, Wayne, Rush, Urbana, Union, and Goshen. This area of Ohio has been demonstrated to have among the highest potentials in the state for wind power development because of its elevation, orientation, and other factors.

The Buckeye II Wind Farm will consist of approximately 56 wind turbine generators, each with a nameplate capacity of 1.6 to 2.5 megawatts (MW), access roads collection lines, associated substations and all other associated equipment. For the purpose of this report, the following definitions have been used when describing the project: [Please note, for consistency purposes the Ohio Power Siting Board's OAC rules (Chapter 4906-17) have been used to define the Project Area and Facility.]

- **Project Area** (pursuant to Ohio Administrative Code (OAC) rule 4906-17-01(B)(1)) is all components of the wind-powered electric generation facility, plus associated setbacks. Based on OAC rule 4906-17-08(C)(1)(c), each of the turbine Sites will have an established setback to the nearest habitable residential structure located on adjacent properties at the time of the certification application.

- **Facility** (pursuant to rule 4906-17-01(B)(2)) includes the turbines, collection lines, access roads, any associated substations, and all other associated equipment.

- The **Study Area** is defined by the applicant as the region outside of the Project Area that was included during database searches of available public information.

The turbines will be located at various locations across the Project Area, and access to the proposed turbine sites for construction and operation will be from county roads and, where necessary, new gravel access roads. Construction of the Facility will cause temporary increases in truck traffic on area roadways due to the delivery of materials and equipment. The purpose of this evaluation is to identify probable equipment delivery routes; investigate current roadway infrastructure limits; and identify preliminary constraints that would require roadway improvements. This evaluation also describes the types of road impacts that are typical for the development of a wind turbine facility. See Appendix 1 for proposed turbine locations.

1.2 Methodology

This evaluation is presented as an update to the Route Evaluation Study, prepared by Hull & Associates, Inc. (Hull) in March 2009 for the Buckeye Wind Project (Ohio Power Siting Board Docket 08-666-EL-BGN). Because the Buckeye II Wind Farm will be adjacent to and overlap with the Buckeye Wind Project, this Route Evaluation Study Update builds upon and references the 2009 study to produce a comprehensive evaluation of the delivery routes required to complete the Buckeye II Wind Farm. The 2009 study is provided in Appendix 2 for reference.

This evaluation is designed to progressively identify and analyze feasible routes for construction traffic. It is divided into two stages; Stage 1 and Stage 2. The evaluation identifies three Road Types:

1. Primary Road – Interstate and 4-lane divided State highways;
2. Secondary Road – 2-lane State highways; and
3. Tertiary Road – 2-lane county and township roads.

The evaluation is based on both Interstate-70 and US Route-33 being used as primary roads to the Project Area. Therefore, the Stage 1 evaluation will originate at interchanges from these roadways. (See Appendix 1 for a route location map.) Based on the Project Area shown on Appendix 1, approximately 20 different locations or "access nodes" from public roads will be necessary to allow access to the proposed turbines for construction. The secondary roads will be Ohio Department of Transportation (ODOT) roadways originating from intersections with the primary roads. The Stage 2 evaluation will investigate the tertiary roads such as local county and township roads to provide routes to each access node where necessary. Potential gravel access roads to each turbine location are also shown on the map in Appendix 1.

This evaluation (Stage 1) includes on-site visual assessment of the probable routes and documentation of roadway limitations for load, pavement width, pavement condition, height, grades, intersection radii, and sharp curve radii. The evaluation identifies locations where improvements to the road are likely needed to accommodate the size of the delivery and construction vehicles, and figures are included that graphically show these conceptual improvements. Research for state permits that are necessary for hauling the materials and equipment is also included in the evaluation. Research of local permits will be completed as part of Stage 2.

1.3 Route Evaluation Study (2009) Routes

The primary, secondary, and tertiary roads identified and assessed during the 2009 study will be used for the construction of the Buckeye II Wind Farm. (Additional secondary and tertiary roads will be needed for the Buckeye II Wind Farm and are discussed in later sections). The roads that were included in the 2009 study are adequate to transport the turbine components (see Appendix 2 for the 2009 study). This evaluation for the Buckeye II Wind Farm focuses on the additional roads that are required for access to the proposed Buckeye II Wind Farm turbines.

The following roads were evaluated as part of the 2009 study. These roads are presented along with the additional roads for the Buckeye II Wind Farm on the map in Appendix 1.

Primary Roads (No additional primary roads are required for the Buckeye II Wind Farm)

1. Interstate-70
2. US Route-33

Secondary Roads

1. US Route 36 from US Route 33 to State Route 814
2. State Route 56 from Interstate 70 to State Route 29
3. State Route 29 from State Route 56 to Ludlow Road

Tertiary Roads

1. Ludlow Road (SR 814) from SR 29 north to Kennard Road
2. Perry Road from SR 36 north to Urbana Woodstock Road

1.4 Vehicle Types

Although other equipment and materials will be needed to construct the Facility, the turbine components define the largest vehicles required for deliveries. The size and types of vehicles needed to deliver the turbine equipment depend on the specific project and the model and manufacturer of the turbine being hauled. Turbine components can be classified as follows:

1.4.1 Wind Turbine Equipment

- Blade Sections – Blades are transported on trailers with one to three blades per vehicle. Blades typically control the length of the design vehicle, and the radii of the curves along the travel route to the site. Specialized transport vehicles are designed with articulating (manual or self-steering) rear axles to allow maneuverability through curves.

- Tower Sections – Towers are typically transported in four to six sections depending on the supplier. Towers generally do not control design vehicle length but may control design vehicle height and/or width.

- Nacelle and Hub – The turbine nacelle, hub, and related elements are typically the heaviest components transported. Generally, the nacelle and hub are transported separately, and the nacelle is the heaviest component.

- Escort Vehicles – Light trucks with signs and banners that travel immediately in front and/or behind oversized loads to alert motorists of the oversized vehicle.

1.4.2 Construction Equipment and Materials

- Construction of Site Access Roads – Conventional trucks carrying stone, gravel and miscellaneous construction equipment.

- Crane – For assembly of the wind turbine towers, cranes are transported in sections over numerous trips to the site.

- Concrete trucks for tower foundations.

- Vehicles transporting construction staff and other incidental truck trips.

1.5 Design Vehicle Characteristics

Transportation of turbine components and associated construction material involves numerous conventional and specialized transportation vehicles. Wind turbine components (such as the tower sections, blade, and nacelle) are transported separately. The actual dimensions and specifications of the design vehicles may vary, depending on the specific wind turbine supplier and components. At the direction of Champaign Wind LLC, a 180-foot blade (which represents a worst-case scenario) is to be used for the purpose of this route evaluation. Therefore, a worst-case design vehicle was developed for the evaluation which has a 180-foot trailer component and total length of 210 feet.

Approximate vehicle dimensions for other construction components are also listed in Table 1. An experienced transportation provider will be used for the delivery of materials and turbine elements. For the purpose of this investigation, low-profile flatbed or open-bottom (Schnabel) truck trailers will be used to offset overhead clearance limitations. Also, multi-axle trailers will be used to distribute oversized loads to acceptable levels, as stipulated by state special hauling permits.

TABLE 1
DESIGN VEHICLE CHARACTERISTICS

	Approximate Dimension of Component to be Transported, Inclusive of Vehicle		
Vehicle Characteristic	**Blade**	**Nacelle**	**Tower Sections**
Width of vehicle, inclusive of load	9.0'	11.5'	14.1'
Height of vehicle, inclusive of load	13.5'	15.2'	15.2'
Length, inclusive of load and bumpers	210'	115'	135'
Total Weight of vehicle with 3 or more axels	78,000 lbs	380,000 lbs	255,000 lbs

2.0 PROBABLE ROUTE EVALUATION

2.1 Probable Routes

An evaluation and visual assessment of the probable secondary transportation roads were conducted by traveling the roadways listed below (see Appendix 1 for location of roads). Table 2 summarizes the existing conditions of the roadways.

TABLE 2
ROAD CHARACTERISTICS

Road	From	To	2-Lane Width	Pavement Condition	Surface Type	Speed Limit
State Route 29	State Route 56	Proposed Access Road Leading to Turbine 78	30'	Good	Asphalt	55
State Route 4	US Route 36	State Route 161	24'	Good	Asphalt	55
State Route 161	State Route 4	Proposed Access Road Leading to Turbine 90	24'	Good	Asphalt	35-55

2.2 Constraints and Conceptual Improvements

Each of the secondary roads in Table 2 has constraining features, particularly intersection and sharp curve radii. Possible constraining points were investigated in the field, and existing conditions were photo-documented. The path of the worst-case design vehicle was evaluated along each of the potential travel routes to identify conceptual intersection (and sharp curve) improvements that may be required. Appendix 1 shows the locations of the constraining intersections and sharp curves. Individual diagrams were developed to show potential improvement areas for each of the constraints along the potential travel routes. See Figures 10 through 17 for these diagrams. Note that Figures 1 through 9 were used in the 2009 study, so this evaluation starts at Figure 10. Note that Photos 1 through 18 were used in the 2009 study, so this evaluation starts at Photo 19.

The approximate right-of-way shown on the figures was obtained from County Geographic Information System (GIS) and tax map files. The final limit of improvements for each point of constraint is expected to be within the limits shown on the figures. These limits will be confirmed when final information is obtained from the final wind turbine supplier and transportation provider. Table 3 shows a summary of the conceptual widening improvements and roadway limitations.

The secondary roads were also investigated for height limitations. Permanent structures that cross over the road and restrict the clearance for oversized loads (such as bridges and overpasses) were not found along the secondary roads. For overhead cables, the national standard for minimum clearance over roads is 15.5 feet, and cables cross over the studied roadways in numerous locations. In the areas of likely intersection improvements (see Figures 10 through 17); cables and poles running parallel to the road will be in conflict with the travel routes. However, electric providers can (for a fee) temporarily or permanently raise the cables and/or move the poles. Therefore, cables should not be a limiting feature for use of the roads.

TABLE 3
LIMITATIONS OF ROADS AND CONCEPTUAL IMPROVEMENTS

Road	From	To	Figures Showing Road Widening Improvements	Weight Limit if Super Load Permit is Obtained	Minimum Clearance of Overhead Obstructions	Approx. Maximum Grade of Road
State Route 29	State Route 56	Proposed Access Road Leading to Turbine 78	Figure 10	None	15.5' Min	2%
State Route 4	US Route 36	State Route 161	N/A	None	15.5' Min	2%
State Route 161	State Route 4	Proposed Access Road Leading to Turbine 90	Figure 11	None	15.5' Min	2%

2.3 Loads and Permits

Special hauling permits are required when loads exceed legal dimensions or weights. Table 4 summarizes these maximum legal dimensions for State of Ohio highways. Transportation of the blades, nacelles, tower sections, and cranes will require Special Hauling Permits for a variety of criteria. Each vehicle must receive an individual Special Hauling Permit from the ODOT Central Office. Permits are issued by ODOT for various vehicle criteria, but all permits have the name "Special Hauling Permit," unlike some other state departments of transportation.