Appendix E

Preliminary Interconnection Feasibility Reports
Chesapeake Bay Bridge Tunnel
Wind Turbine

Preliminary Interconnection Feasibility Report

Prepared for:

James Madison University
Virginia Department of Mines, Minerals and Energy
Timmons Group
In Cooperation with
The Chesapeake Bay Bridge Tunnel Commission

Prepared By:
Utility Professional Services, Inc

May 18, 2012
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study

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Chesapeake Bay Bridge Tunnel – Wind Turbine Preliminary Interconnect Feasibility Study

Description & Scope of the Study

- Perform a preliminary site assessment of the Chesapeake Bay Bridge Tunnel (CBBT) area and identify any and all existing aerial and underground Dominion Virginia Power facilities that provide service.

- Determine the feasibility paths for cable from the turbine structure and assess multiple delivery points for a 6 MW load/output and where inter-connect switch may be needed.

- Provide a conceptual layout and electrical equipment configuration for each associated cable route.

- Provide an analysis and conceptual budget review summary for all relevant cable requirements and any new costs for cable extensions.

- Coordinate with Chesapeake Bay Bridge personnel about facility, electrical capacity, best delivery points and any other utility impacts.

Alternative A
For all CBBT Facilities

A-1: From Turbine to load bank at 4th Island (Phase 1 potentially)
A-2: From turbine to the point on CBBT facilities (Island 1, Island 2, or sub-station near South Toll Plaza) that will allow back-feeding on existing infrastructure (Phase 2 potentially)
A-3: From Turbine directly to substation at South Toll Plaza
A-4: Appropriate combination(s) of A-1, A-2, or A-3 that is / are most pragmatic / practicable

Alternative B
Fort Story landfall

The attached sketches for Alternative B to Fort Story would avoid laying cable beneath any dredged channels. By following the dotted green path route shown on the attached nautical charts and taking a wide arc passing just east of the G “3” and R “4” buoys that mark the southern entrance of the Cape Henry Channel, but make sure we stay inside the Territorial Sea Limit.
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Executive Summary

Dominion Virginia Power is supplying two (2) separate 34.5 KV three-phase overhead circuits that adequately feed the Chesapeake Bay Bridge Tunnel (CBBT) at the present time. The two (2) circuits currently feed the CBBT owned substation by the South Toll Plaza. This substation is the original substation from 1964 and is scheduled to be completely replaced in the 2021/2022 timeframe by CBBT. The replacement site is next to the existing substation.

The original thought for this project was to install the turbine to the east of Island #4 approximately 12,500 feet away; bring the cable onto Island #4 and connect it to the existing ventilation building; add an inter-connect switch; then back-feed the excess power, if any was available, through the existing CBBT cables attached to the bridge structure and selling that excess to Dominion Virginia Power. Once we visited the CBBT site and talked to them, a few logistical issues arose.

Two (2) items came up to make the original thinking, we believe, to be cost prohibitive. The first is the cable conduit is mis-aligned from Island #4 to Island #1. Back-feeding cable through these conduits can not be done, according to the CBBT personnel. They have tried it in the past and were unsuccessful. The second, and probably the most important, is that the existing equipment: step-down transformer, switches and relays from Island #4 back to the substation would have to be replaced or updated to back-feed power. This could be very costly and time consuming, taking one to two years to have the equipment produced.

We presently have five cable route options on the table: Alternative A1 - Turbine to Island #4; Alternative A2 - Turbine to Island #1; Alternative A3 - Turbine to CBBT substation; Alternative A4 - Turbine to Island #4 & Island #1; Alternative B1 - Turbine to Fort Story. Of the five alternatives, Alternative A3 & B1 are the most logical and least problematic. The trenching costs will only vary due to the proximity to the shipping channel, time of the year restrictions and the safety of shipping traffic.

Without looking at the trenching costs, the most practical solution would be to run the cable from the turbine to the Island #1 Ventilation Building. This bypasses three problem areas:

1. The replacing of equipment in the 4 ventilation rooms, i.e., 1 step-down transformer, switches, relays and cable, that need to be done if Alternative A1 is chosen. You can not bring the cable up onto Island #4, install an inter-connect switch and back-feed power to the substation without changing this equipment configuration. The cost is estimated to be $1 million dollars.
2. Adding #4/0 aluminum cable in a new cable tray from Island #4 to Island #1 would need to be done to make Alternative A1 complete. The estimated cost is $3.4 million dollars.
3. Installing an additional modular building to house the load bank & inter-connect switch on Island #4 and strapping it down to hurricane force wind standards.

Installing the new cable to a Modular Building that houses the Step-down transformer, inter-connect switch and Load Bank, (see page 28 for diagram of installation), at the Island #1 Ventilation Building would be the most practical solution. This will allow the least interruption of the existing CBBT power system. CBBT has said their power system is OK up to Island #1, but they have mis-aligned cable conduit from Island #1 to Island #4. Using Island #1 as a termination point would not change any of CBBT’s existing power equipment passed Island #1. Dominion Virginia Power still has to approve the location of the Inter-connect switch ahead of Dominion Virginia Power’s grid. This location would require a 60-90 day study by Dominion Virginia Power. Since there are two (2) circuits with 34.5 KV power already on the CBBT site, there should be very few, if any, changes or upgrades that Dominion Virginia Power would have to make to their system to accommodate “net-metering”. Since this turbine has an output rating of 6 MW of power, Dominion Virginia Power’s Schedule 19 Tariff will allow up to 20 MW of power to be “net-metered” back to them. After the study is done by Dominion Virginia Power, a PJM Application can be completed to sell back the additional power.
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### Executive Cost Summary Matrix

<table>
<thead>
<tr>
<th>Cable Alternative A &amp; B</th>
<th>Location</th>
<th>*Distance &amp; Cable Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative A2</td>
<td>Turbine to Island #1</td>
<td>46,250' feet of #1,000kcmil Al plus trenching &amp; boring and equipment costs</td>
<td>$$$4,750,000</td>
</tr>
<tr>
<td>Alternative A3</td>
<td>Turbine to CBBT Substation</td>
<td>72,500' feet of #1,000kcmil Al plus trenching &amp; boring</td>
<td>**$5,520,000</td>
</tr>
<tr>
<td>Alternative B1</td>
<td>Turbine to Fort Story</td>
<td>56,000' feet of #1,000kcmil Al to shoreline, 1,000' of trenching/bore onshore</td>
<td>**$5,638,000</td>
</tr>
</tbody>
</table>

* Assume all wire is Aluminum
** Cost includes: wire & material costs for splicing of 4 conductors, trenching/permit costs for installing cable.
*** Includes upgrading costs of equipment, i.e., Step-down transformer, switches and relays in the 2 Ventilation Rooms at CBBT.

Alternative A1 not used due to high cost of trenching, cable, upgrading of equipment and cable tray to the 4 Ventilation rooms. Estimated cost is $5.4 million dollars.
Alternative A4 not used due to additional cable costs, trenching, upgrading of equipment to the 4 Ventilation rooms. Estimated cost is $5.1 million dollars.
Cost do not include Modular building, interconnect switch, Load bank and other equipment for “Net Metering” back to the power company.

Location of proposed wind turbine is approximately 12,500' feet east of Island #4.
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Recommendations

1. UtilityPros strongly recommends trenching/boring and installing a new 1,000kcmil (1,000 circular mils) aluminum cable from the proposed 6 MW Turbine location east of CBBT’s Island #4 to CBBT’s existing Island #1 Ventilation Building; installing a modular building to house the Step-down transformer, load grid and the Inter-connect switch and back-feeding CBBT’s existing cable system.

2. UtilityPros is not representing or guaranteeing that any utility will accept or consider any relocation request. Utilities may refuse to relocate for operational reasons, including, but not limited to, the inability to secure needed easements or permits, or having a piece of equipment for which they have no underground or offsite relocation solution.

3. All costs are rough estimates in today’s dollars as of the date of the report.
Chesapeake Bay Bridge Tunnel – Wind Turbine
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Challenges & Issues at Risk

The first challenge will be from the Federal, State and possible the local area environmental permits. This will require the Army Corps of Engineers and the Virginia Marine Resource Commission to become involved. The local government, approval from the City of Virginia Beach, may also be necessary. If it is trenched in along the roadway, they will want to oversee this process. If the onshore portion is directional bored, they may not.

The second challenge we’ll have is with Dominion Virginia Power and PJM. Dominion Virginia Power has the exclusive rights to provide any power to Virginia & Maryland through the State Corporation Commission. Under the present tariff, an individual can produce its own power and sell back the excess to Dominion Virginia Power. The State can own the turbine and sell the excess power back to Dominion Virginia Power, but an individual company can not produce the power, supply it to someone, such as CBBT, and then sell the excess back to Dominion Virginia Power. In order to do this they would have to form a Coop Power Company and get certified through the State Corporation Commission.

Before Dominion Virginia Power approves “net-metering”, they would need to do a 60-90 day study to determine where an inter-connect switch would be positioned and if changes or upgrades to their system would need to be done to except the load onto their grid. Once the study is completed, then an application with PJM is started.

The third challenge is the future work that will be done to the CBBT from 2021 through 2040. The present power system was installed in 1964. The conduits from Island #4 to Island #1 have mismatched alignment problems and can not be used to pull new cables back through them. CBBT would like to add another 4/0 feed from Island #4 to Island #1 for better back-feed possibilities. CBBT will be adding a new substation, next to the present substation, in the 2021/2022 timeframe. They will also add additional tunnels in the 2040 timeframe. If the inter-connect switch is installed at the Island #4 ventilation room and power is back fed to the Dominion Virginia Power’s grid, CBBT would have to replace a step-down transformer, cable, switchgear and relays at each ventilation room. For this study, we have estimated the costs based on CBBT costs from 1997-2000 study.

Installing submarine cable from the wind turbine to Fort Story by taking a wide arc passing just east of the G “3” and R “4” buoys that mark the southern entrance of the Cape Henry Channel, while staying inside the Territorial Sea Limit so that it doesn’t wander into federal waters, presents two (2) areas of concern. The first is where would the cable come ashore at Fort Story and the second is where the cable would connect to the Dominion Virginia Power grid. Another additional concern is what type of agreement or permit the Federal Government would require to encroach onto Fort Story.
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Virginia Electric and Power Company

Schedule 19
POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

I. APPLICABILITY & AVAILABILITY

This Schedule is applicable to any Cogenerator or Small Power Producer (Qualifying Facility), as defined in the Public Utility Regulatory Policies Act of 1978 (PURPA), which desires to provide all or part of its electrical output to the Company on an energy and capacity or on an energy only basis, and which has a net capacity of 20,000 kW or less, and enters into an agreement for the sale of electrical output to Virginia Electric and Power Company (Agreement).

No developer, or any affiliate of a developer, shall be permitted to locate a Schedule 19 facility within one-half mile of any other Schedule 19 facility owned or operated by such developer or any affiliate of such developer unless:

a. Such facilities provide thermal energy to different, unaffiliated hosts; or
b. Such facilities provide thermal energy to the same host, and the host has multiple operations with distinctly different or separate thermal needs; or
c. Such facilities utilize a renewable resource that may be subject to geographic siting limitations, such as hydroelectric, solar or wind power facilities.

This Schedule is available to a Qualifying Facility (QF) which enters into an Agreement with the Company during the effective period of this Schedule, and which achieves Commercial Operation in accordance with the provisions of its Agreement (Commercial Operations) on or after January 1, 2006.

II. MONTHLY BILLING TO THE QF

The provision of Electric Service from the Company to the QF will be in accordance with any applicable rate schedule. A QF that elects to sell electrical output from its generation facility will be billed a monthly charge as follows to cover the cost of meter reading and processing:

1. For QFs requiring only one non-time differentiated meter: $5.56.
2. For QFs requiring only one time differentiated meter: $65.09.
3. For QFs requiring two time differentiated meters: $102.62.

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Virginia Electric and Power Company

Schedule 19

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(Continued)

III. CONTRACT OPTIONS

QFs with a net capacity of 10 kW or less shall elect, from the following two options, the manner in which the QF shall operate and provide its electrical output to the Company. This election shall be contracted for and made a part of the QF’s Agreement. QFs with a net capacity greater than 10 kW but less than or equal to 20,000 kW must contract for the supply of both energy and capacity to the Company, in accordance with Paragraph III. A., below. Purchase payments, if any, to the QF for the supply of energy and/or capacity to the Company shall be based on this contractual designation.

A. Supply of Energy and Capacity: A QF shall contract for the supply of both energy and capacity to the Company, except as may be permitted pursuant to Paragraph III. B., below. The level of capacity that the QF contracts for shall not exceed 20,000 kW. The supply of both energy and capacity shall require the installation of one (or two, if necessary) time differentiated meter(s) to measure the hourly output of the QF’s generation facility.

B. Supply of Energy Only: A QF with a net capacity of 10 kW or less may elect to contract for the supply of only energy to the Company. A QF electing this option will not be eligible for capacity payments. Election of this option shall require the installation of a non-time differentiated meter to measure the monthly output of the QF’s generation facility.

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY

A QF that supplies both energy and capacity to the Company, in accordance with Paragraph III. A., above, shall receive purchase payments as follows:

A. Energy Purchase Payments

1. Purchase payments for the supply of energy by the QF to the Company will be based on an hourly energy purchase price (cents per kWh) that is calculated using the hourly $/MWh PJM Interconnection, LLC (PJM) Dom Zone Day Ahead Locational Marginal Price (DA LMP) divided by 10, and multiplied by the hourly net generation as recorded on the Company’s time differentiated meter.

(Continued)
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(Continued)

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY
(Continued)

2. All energy purchase prices per kWh will be increased by 2.8% to account for line losses avoided by the Company. This line loss percentage will be fixed for the term of the contract between the QF and the Company.

3. In lieu of the line loss percentage in Paragraph IV. A.2., a QF may request that the percentage be derived by a line loss study calculated to the location the QF interconnects with the Company. To receive this site specific line loss percentage, the QF must be willing to bear the cost of such a study.

B. Capacity Purchase Payments

Purchase payments for the supply of capacity by the QF to the Company will be made based upon the QF’s daily net on-peak generation multiplied by that corresponding day’s on-peak capacity purchase price, as calculated, below. If applicable, the purchase payment for capacity may be modified by application of the Summer Peak Performance Factor (SPPF), as described, below. The on-peak hours for every day are from 7 AM to 11 PM. Off-peak hours are defined as all other hours.

Beginning June 1, 2007, and for each June 1, thereafter, PJM will establish the Reliability Pricing Model capacity resource clearing price for each PJM zone, shown as a $/MW/day price, that will be applicable through the following May 31. Such prices will be the clearing results from PJM’s Base Residual Auction. Using the price for the Dom Zone (initially identified on the PJM website as “Dom_PZonal”), the Company will calculate an on-peak capacity purchase price (cents per kWh) for each day by dividing the Dom Zone $/MW/day price by 16 hours, and further dividing the result by 10, rounded to the nearest one-thousandth cent. The resulting cents per kWh on-peak capacity purchase price will be applied to the QF’s net on-peak generation for the corresponding day, to provide for the daily capacity purchase amount. The sum of the daily capacity purchase amounts for the billing month will constitute the monthly capacity purchase payment to the QF, unless modified by application of the SPPF, below.

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POWER PURCHASES FROM
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(Continued)

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY
(Continued)

Initially, a QF’s SPPF will be 1. Once a QF has achieved Commercial Operations and such operation encompasses at least a full Summer (defined by PJM as June 1 through September 30, inclusive), the following January billing month, and for each January billing month thereafter, an SPPF will be calculated that is based on the QF’s operation during the five (5) PJM coincident peak hours (“CP Hours”), as posted by PJM, during the Summer of the previous calendar year. The QF’s SPPF is equal to the number of CP Hours in which the QF generated at or greater than 75% of its net capacity, divided by 5. Therefore, the SPPF could be 0, 0.2, 0.4, 0.6, 0.8, or 1. The QF’s SPPF will be applied to the monthly capacity purchase payment for each billing month of the current calendar year.

V. PAYMENT OF COMPANY PURCHASES OF ENERGY ONLY

A QF that supplies only energy to the Company, in accordance with its election in Paragraph III. B., above, shall receive purchase payments as follows:

A. Purchase payments for the supply of only energy by the QF to the Company will be based on an energy purchase price (cents per kWh) that is calculated using the average of the hourly $/MWh Dom Zone DA LMP for the QF’s billing month divided by 10, and multiplied by the net generation as recorded on the Company’s non-time differentiated meter.

B. All energy purchase prices per kWh will be increased by 2.8% to account for line losses avoided by the Company. This line loss percentage will be fixed for the term of the contract between the QF and the Company.

C. In lieu of the line loss percentage in Paragraph V. B., a QF may request that the percentage be derived by a line loss study calculated to the location the QF interconnects with the Company. To receive this site specific line loss percentage, the QF must be willing to bear the cost of such a study.

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(Continued)

VI. PROVISIONS FOR COMPANY PURCHASE OF THE QF GENERATION

A. The QF shall own and be fully responsible for the costs and performance of the QF's:

1. Generating facility in accordance with all applicable laws and governmental agencies having jurisdiction;

2. Control and protective devices as required by the Company on the QF's side of the meter.

B. The Company shall own and install any interconnection facilities on the Company side of the meter required for the QF to sell energy to the Company. The costs associated with these facilities will be borne by the QF. These costs include, but are not limited to, the costs of connection, switching, metering, transmission, distribution, safety provisions, telephone lines, and administrative costs incurred by the Company which are directly related to the installation and maintenance of the facilities necessary to permit interconnected operations with the QF. The QF shall pay for these interconnection costs by either of the following methods:

1. A one-time lump-sum payment equal to the estimated new installed cost of all interconnection facilities provided by the Company multiplied by the appropriate tax effect recovery factor (if applicable), plus the appropriate monthly charge as described in Section IV.E. of the Company's Terms and Conditions on file with the Virginia State Corporation Commission.

2. A continuous monthly charge as described in Section IV.E. of the Company's Terms and Conditions on file with the Virginia State Corporation Commission which is designed to recover over time the estimated new installed cost of all interconnection facilities and their related operating expenses.

The QF will also be responsible for payment to the Company for the cost of removing the interconnection facilities at the conclusion of the QF's Agreement. Payment for these costs shall be in the same manner as the Company charges its other customers for similar work.

(Continued)
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Virginia Electric and Power Company

Schedule 19

POWER PURCHASES FROM
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(Continued)

VI. PROVISIONS FOR COMPANY PURCHASE OF THE QF GENERATION (Continued)

C. In addition to the costs in Paragraph VI.B., above, the actual costs associated with
   relocating and/or rearranging existing facilities to allow interconnected operation
   will also be borne by the QF. A monthly charge shall not apply to these costs.
   Payment for these costs shall be in the same manner as the Company charges its
   other customers for similar work.

D. The QF shall have equipment specifications and plans for control devices
   interconnection facilities, and protective devices approved by the Company in
   advance of energizing the facility.

E. The relays and protective equipment shall be subject, at all reasonable times, to
   inspection by the Company's authorized representative.

F. Upon request by the Company, the Cogenerator or Small Power Producer must
   demonstrate that the facility is a Qualifying Facility as defined by PURPA.

G. The Company shall have the right to reduce the energy received from a QF during
   periods when a minimum load condition exists on the Company's system. These
   reductions will be within the design limits of each QF's equipment and will be
   limited to 1,000 off-peak hours in any calendar year.

VII. MODIFICATION OF RATES AND OTHER PROVISIONS HEREUNDER

The provisions of this schedule, including the rates for purchase of electricity by the
Company, are subject to modification at any time in the manner prescribed by law, and
when so modified, shall supersede the rates and provisions hereof. However, payments to
QFs with contracts for a specified term at payments established at the time the obligation
is incurred shall remain at the payment levels established in their contract.

VIII. TERM OF CONTRACT

The term of contract shall be mutually agreed upon, but not less than one year.
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Chesapeake Bay Bridge Tunnel 16 Questions
Regarding the Wind Energy Interconnection

1. What size is the cable bringing power from the structure to Island 4?

   Answer: Wire size to transmit the power at 13.2KV from the tower to shore is a #1,000kcmil aluminum wire. The size of the wire was chosen to effectively carry 260amps at 13.2KV for 12,500ft. This number was based off of direct buried three conductor cable with a voltage drop of 3%. The size of wire may change based on the selected manufactures cable specifications.

2. What is the weight of the cable per foot?

   Answer: #1,000kcmil aluminum wire weighs 2.8 lbs/foot.

3. Is it shielded so that personnel can work adjacent to it?

   Answer: The submarine cable is fully insulated and can come shielded with an armor coating on the outside to keep moisture & air out. Personnel can work around the exposed cable safely. The armored cable from the turbine can then be pushed thru the directional bore sleeve up into the building and terminated at the switch.

4. If they cannot work adjacent to it, what is the safe distance?

   Answer: The area that will need to be carefully watched is where the cable leads are terminated in the switch room. This is where normal electrical connection safety applies.

5. How deep can a directional bore go?

   Answer: Figuring the depth of the rip-rap, below and above sea level, plus the retaining wall, a bore of 100 foot deep will not be a problem.

6. How far can a directional bore go?

   Answer: The recommended maximum distance is 6,500 feet.
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7. What type of structure would be needed where the cable comes up on Island 4?
   
   Answer: According to CBBT Staff, there’s no room in the present ventilation building. A new building will need to be built or a modular building be used. The cable can either be attached on the outside of the building & fed through conduit into the building or brought up inside the building in conduit.

8. How would the power be brought into the ventilation building?
   
   Answer: The Transfer Switch would be inside the new building.

9. How would the cable be tied into our system?
   
   Answer: The cable from the turbine will be on the Load side of CBBT system.

10. How would the power be isolated from our system if needed?
    
    Answer: An Interconnect switch will be used.

11. How much current/load would be placed into our system?
    
    Answer: The turbine will produce a max of 6MW of electricity. The turbine will generate this power at 690Volt, AC, 3-phase at 60 hertz frequency; this is standard for wind turbines of this magnitude. The wind turbine is equipped with a transformer stepping up from the generator terminal voltage (690 Volt) to a medium voltage at around 13.2 KV for the ac system connection. The transformer usually is located inside the base of the turbine tower and it will transmit the power back to Island #4 with the 13.2 KV rating. The 13.2KV was chosen for easy integration into CBBT existing power grid and to reduce the wire size need to bring the power to Island #4.

12. How much of our infrastructure could this system power?
    
    Answer: Based on the provided load information, the turbine will provide power to the entire CBBT system. The average baseline load was calculated to be approximately 1MW.

13. What plans are there for maintenance of cable, trays, and equipment?
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Answer: This information will come from the manufacturer and installer. It should be the usual standard maintenance, similar to your present equipment.

14. How long would it take for this project to be completed?

Answer: This Project is scheduled to be completed in 2014.

15. How would this system be totally isolated from our grid?

Answer: The system would only be isolated from the grid if we are to power only the loads being served from Island 4. If we are to maintain isolation and serve all of CBBT’s load, we will have to pull new feeders from Island 4 to the other islands.

16. What means would there be to mitigate a lightning strike?

Answer: The installer of the turbine will ground the structure according to Manufacturer specs at the turbine structure site.
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Crofton Diving
Proposal

Pricing
And
Cost Criteria
Proposal Pricing

April 16, 2012

Mr. Rick Thomas, PE
Project manager
Timmons Group
208 Golden Oaks Court, Suite 230
Virginia Beach, Va. 23452

Subj: Virginia Offshore Wind Advanced Technology Demonstration Project
Chesapeake Bay
#1-CBBT/Chicks Beach
#2-CBBT/Ft. Story

Topic: Fee Proposal Estimate

Dear Sir:

We are pleased to provide the following as fee proposal estimate information as you continue with your decision making processes. As you have been able to view within the document provided herein, our decades of experience on projects as shown within, this experience equates to realistic project procedures, protocol, proper selection and utilization of hardware and successful project results.

Project Pricing

Consistent with the Scope of Operations provided, the construction efforts are inclusive of all labor, supervision and equipment, mobilization and demobilization operations, acceptance of the appropriate number of reels of conductor, towing operations and load out of all equipment, assist in operational support of the splicing operations. At the conclusion of the project, provide as built data.

As earlier stated, all cable will be provided by others to Crofton’s facility and returnable reels will be managed by others with Crofton involved in the offload and load out at the project’s conclusion. All splice kits, splicing personnel and other associated materials will be furnished by others.

Please call me should you have questions. We are pleased to provide contributive efforts to your team on a project of such significance and importance for the future of Renewable Power in the State of Virginia.

Sincerely yours,

Juan S. Crofton
Crofton Diving Corporation
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study

Subcontractor
And
Diversity Statement
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study

Small Business & Diversity Statement

Crofton’s Small Business, Women, and Minority (SWaM) certification number is 8861.

Diversity Statement

Diversity is a value that is demonstrated through mutual respect and appreciation of the similarities and differences that make people unique. Such as: age, culture, education, ethnicity, experience, gender, race, religion, sexual orientation, etc.

An environment where diversity is respected is one where, as individuals and united members of teams or partnerships, we can effectively apply all of our talents, skills and experiences in pursuit of achieving business objectives.

Crofton is committed to all diverse workforce issues relating to our internal employees, our customers, our suppliers, and sub-contractors whom we seek to place in diverse project situations.

We are dedicated to creating and sustaining a respectful and inclusive environment and culture, to support a diverse workforce.

Equal Employment Opportunity Statement

Crofton’s policy is to insure the promotion of equal opportunity for all persons employed or seeking employment with Crofton or with clients, vendors, or sub-contractors of Crofton who utilize our services or work in conjunction with Crofton’s projects.

It shall be the policy of Crofton to provide equal opportunity to all applicants for employment and to administer all personnel practices such as recruitment, selection, training, promotions, terminations, transfers, layoffs, compensation, benefits and other terms, conditions and privileges of employment in a manner which does not discriminate on the basis of race, color, creed, age, sex, national origin or handicap.

We ask our hiring sub-contractors, clients, and vendors to share the same commitment to providing equal opportunity in all practices, which affect employees and applicants for employment. The client, sub-contractor, and vendors shall ensure that decisions affecting employees are made without regard to their race, color, religion, sex, national origin, age, disability, or any other protected category. This policy is administered in accordance with federal laws (including but not limited to Title VII of the Civil Rights Act of 1964, as amended, Age Discrimination in the Employment Act of 1967, as amended, Equal Pay Act of 1963, as amended, Americans with Disabilities Act of 1990, as amended) and all other applicable state or local law prohibiting discriminatory acts.

We ask that all Clients, Vendors, and Sub-Contractors of Crofton independently make a commitment to follow the same standards that Crofton maintains in its own employment environment.

Crofton Diving Corporation will endeavor, whenever practicable, to employ local labor and utilize local, North Carolina based subcontractors throughout the course of this project.
Chesapeake Bay Bridge Tunnel – Wind Turbine Preliminary Interconnect Feasibility Study
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study

Engineering and Permit Acquisition

Phase I - Engineering and Permit Acquisition

The work entailed in this phase of the operation will include site visits by our survey teams developing GPS location and positioning information for this crossing. Our site visit will also include alignment and routing on the shoreline termination of the project as well as diving operations to develop discovery information for bottom composition and detailed channel depths, which play a large part in the installation process. Once the site survey is complete with real time positioning for PI and HDD locations, our research team will compile adjacent property owner and lease holder information with regards to the existing property rights which requires detailed investigation and further demonstration to the governing agencies.

With completion of all research and field studies, detailed permit drawings will be provided along with a complete photo log, adjacent property owner information, project construction methodology illustrations and other prerequisites as required within the state and federal government requirements for permit application and permit acquisition. The services included with the permit acquisition process will enable Crofton, as your Agent, to attend all state, federal, local and public meetings pertaining to the normal permit process. This thorough hands on process along with our availability to provide a construction perspective for the permit application reviewers at their discretion, has proven over many decades to provide an expeditious permit process with minimal outside engagement by other agencies, thus lessening cost and fees.
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study

Solutions and Innovations

Note: Should Crofton’s involvement with permit acquisition be required, during the course of our operations to acquire the project permits, should additional studies be required by the agencies beyond that of the normal field investigation operations and permit acquisition events that have been described herein, these additional services that may be mandated by these other agencies will be reviewed by our staff, discussed with the agency, and any additional costs for these additional surveys and/or reports would be developed and reported to the owner prior to continuance of the permit application process.

If for some unknown reason the permit process is terminated due to complexity of the project or a change in direction with regards to the agencies and their approvals, Crofton will be forwarded fees applicable to the work accomplished within the permit section of this proposal.

Sincerely Yours,

Juan S. (Jay) Crofton
Crofton Diving Corporation

Commonwealth of Virginia
Marine Resources Commission
Authorization

A Permit has been issued to:

Daniel Power
703 East 12th Street
Huntsville, VA 22316

This Permit is hereby authorized to:

remove a barge 95' long with west end of the Route 233 Bridge, under 600 lower feet of water
south of the Azalea Bridge, adjacent to the City of Stafford, Virginia utilizing the following equipment:

fully enclosed diving platform, 100% tied to shore

This Permit is effective from March 27, 2011 until March 27, 2014 and may be suspended or revoked if the permittee does not comply with the conditions of this Permit.

This Permit is hereby issued in accordance with the provisions of the Marine Resources Commission Act of 1974, Virginia Code, Chapter 810, Section 3.2-6500.

SAMPLE APPROVED CAMA PERMIT

6.A.2
Chesapeake Bay Bridge Tunnel – Wind Turbine
Preliminary Interconnect Feasibility Study
HRSD Wind Turbine

Preliminary Interconnection Feasibility Report

Prepared for:

James Madison University
Virginia Department of Mines, Minerals and Energy
Timmons Group
In Cooperation with
Hampton Roads Sanitation Commission

Prepared By:

Utility Professional Services, Inc

May 15, 2012
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

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   C. Alternative 3

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VI. Appendix
   A. Dominion Virginia Power Tariff Schedule 19
   B. Diagram of Interconnect switch & equipment
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Description & Scope of the Study

- Perform a preliminary site assessment of the Hampton Roads Sanitation area and identify any and all existing aerial and underground Dominion Virginia Power facilities that provide service.

- Determine the feasibility paths for cable from the turbine structure and assess multiple delivery points for a 3 MW load/output and where inter-connect switch may be needed.

- Provide a conceptual layout and electrical equipment configuration for each associated cable route.

- Provide an analysis and conceptual budget review summary for all relevant cable requirements and any new costs for cable extensions.

- Coordinate with Hampton Roads Sanitation personnel about facility, electrical capacity, best delivery points and any other utility impacts.

Alternative 1
Alternative 1 – Land Based, no impacts to wetlands or Resource Protection Area (RPA) – From Turbine to interconnection location at HRSD – 2,600 lf

Alternative 2
Alternative 2 – Land Based at shoreline, requires wetland and RPA impact – From Turbine to interconnection location at HRSD – 3,500 lf

Alternative 3
Alternative 3 – Water Based with temporary construction pier from land to turbine – temporary impacts to wetlands and RPA – 3,800 lf
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study
Executive Summary

There are presently three cable route options on the table: Alternative 1 – Install a land based turbine that has no impact to wetlands or Resource Protection Area (RPA); Alternative 2 – Install a land based turbine at the shoreline, may require wetland and RPA impact study and mitigation; Alternative 3 – Install a water based turbine with a temporary construction pier from the land to the turbine which will have temporary impacts to the wetlands and RPA area and will require an impact study and mitigation. All three alternatives would require an underground primary cable being installed from the turbine to the HRSD power building. A modular building could be installed outside the HRSD power building, next to the existing Virginia Power transformer, where the existing power conduits run inside the building. The interconnect switch, Load Bank and other necessary equipment would be housed in this building.

Alternative 1 is the best solution for this project. It will require the least amount of impact to any wetlands or RPA area. Installing the new underground primary cable and interconnect switch in a modular building at the HRSD’s power building next to the Virginia Power’s transformer would be the most practical solution. The modular building will house the load grid; inter-connect switch and other equipment for “Net Metering (see page 11 for diagram of installation). This will allow a short run for installing the inter-connect switch, which Dominion Virginia Power has to approve, ahead of Dominion Virginia Power’s grid. Since this turbine has an output rating of 3 MW of power, Dominion Virginia Power’s Schedule 19 Tariff will allow up to 20 MW of power to be “net-metered” back to them. After the study is done by Dominion Virginia Power, a PJM Application can be completed to sell back the additional power.
## Executive Cost Summary Matrix

<table>
<thead>
<tr>
<th>Cable Alternatives</th>
<th>Location</th>
<th>*Distance &amp; Cable Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>Onshore turbine to HRSD bldg-No RPA or wetlands impact</td>
<td>2,600’ feet of #1,000kcmil Al plus trenching &amp; boring @ $35/foot</td>
<td>**$175,000</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>At shoreline turbine to HRSD bldg-RPA &amp; wetlands impact</td>
<td>3,500’ feet of #1,000kcmil Al plus trenching &amp; boring @ $40/foot</td>
<td>**$270,000</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>Water based turbine to HRSD bldg-temp RPA &amp; wetlands impact</td>
<td>3,800’ feet of #1,000kcmil Al onshore trenching/bore @ $50/foot/pier from turbine to land</td>
<td>**$370,000</td>
</tr>
</tbody>
</table>

* Assume all wire is 1,000kcmil Aluminum @ $10.25/foot

**Cost includes: wire & material costs for 3 conductors, trenching & boring/permit costs for installing cable.  
Cost do not include Modular building, interconnect switch, Load bank and other equipment for “Net Metering” back to Virginia Power.
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Recommendations

1. UtilityPros strongly recommends trenching and installing new 1,000 kcmil (1,000 circular mils) aluminum cables (3 conductors) from the proposed 3 MW Turbine located onshore out of any RPA or wetlands areas, to a modular building situated next to the Virginia Power transformer that presently serves the HRSD facility.

2. UtilityPros is not representing or guaranteeing that any utility will accept or consider any relocation request. Utilities may refuse to relocate for operational reasons, including, but not limited to, the inability to secure needed easements or permits, or having a piece of equipment for which they have no underground or offsite relocation solution.

3. All costs are in today’s dollars as of the date of the report.
HRSD Wind Turbine  
Preliminary Interconnect Feasibility Study

Challenges & Issues at Risk

The first challenge will be from the Federal, State and possible the local area environmental permits. This will require the Army Corps of Engineers and the Virginia Marine Resource Commission to become involved. The local government, approval from the City of Suffolk, may also be necessary. If it is trenched in along the roadway, VDOT will want to oversee this process.

The second challenge we’ll have is with Dominion Virginia Power and PJM. Dominion Virginia Power has the exclusive rights to provide any power to Virginia & Maryland through the State Corporation Commission. Under the present tariff, an individual can produce its own power and sell back the excess to Dominion Virginia Power. The State can own the turbine and sell the excess power back to Dominion Virginia Power, but an individual company can not produce the power, supply it to someone, such as HRSD, and then sell the excess back to Dominion Virginia Power. In order to do this they would have to form a Coop Power Company and get certified through the State Corporation Commission.

Before Dominion Virginia Power approves “net-metering”, they would need to do a 60-90 day study to determine where an inter-connect switch would be positioned and if changes or upgrades to their system would need to be done to except the load onto their grid. Once the study is completed, then an application with PJM is started.
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Appendix
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Virginia Electric and Power Company

Schedule 19
POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

I. APPLICABILITY & AVAILABILITY

This Schedule is applicable to any Cogenerator or Small Power Producer (Qualifying Facility), as defined in the Public Utility Regulatory Policies Act of 1978 (PURPA), which desires to provide all or part of its electrical output to the Company on an energy and capacity or on an energy only basis, and which has a net capacity of 20,000 kW or less, and enters into an agreement for the sale of electrical output to Virginia Electric and Power Company (Agreement).

No developer, or any affiliate of a developer, shall be permitted to locate a Schedule 19 facility within one-half mile of any other Schedule 19 facility owned or operated by such developer or any affiliate of such developer unless:

a. Such facilities provide thermal energy to different, unaffiliated hosts; or
b. Such facilities provide thermal energy to the same host, and the host has multiple operations with distinctly different or separate thermal needs; or
c. Such facilities utilize a renewable resource that may be subject to geographic siting limitations, such as hydroelectric, solar or wind power facilities.

This Schedule is available to a Qualifying Facility (QF) which enters into an Agreement with the Company during the effective period of this Schedule, and which achieves Commercial Operation in accordance with the provisions of its Agreement (Commercial Operations) on or after January 1, 2006.

II. MONTHLY BILLING TO THE QF

The provision of Electric Service from the Company to the QF will be in accordance with any applicable filed rate schedule. A QF that elects to sell electrical output from its generation facility will be billed a monthly charge as follows to cover the cost of meter reading and processing:

1. For QFs requiring only one non-time differentiated meter: $5.56.
2. For QFs requiring only one time differentiated meter: $65.09.
3. For QFs requiring two time differentiated meters: $102.62.

(Continued)
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Virginia Electric and Power Company

Schedule 19

POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

(Continued)

III. CONTRACT OPTIONS

QFs with a net capacity of 10 kW or less shall elect, from the following two options, the manner in which the QF shall operate and provide its electrical output to the Company. This election shall be contracted for and made a part of the QF’s Agreement. QFs with a net capacity greater than 10 kW but less than or equal to 20,000 kW must contract for the supply of both energy and capacity to the Company, in accordance with Paragraph III. A., below. Purchase payments, if any, to the QF for the supply of energy and/or capacity to the Company shall be based on this contractual designation.

A. Supply of Energy and Capacity: A QF shall contract for the supply of both energy and capacity to the Company, except as may be permitted pursuant to Paragraph III. B., below. The level of capacity that the QF contracts for shall not exceed 20,000 kW. The supply of both energy and capacity shall require the installation of one (or two, if necessary) time differentiated meter(s) to measure the hourly output of the QF’s generation facility.

B. Supply of Energy Only: A QF with a net capacity of 10 kW or less may elect to contract for the supply of only energy to the Company. A QF electing this option will not be eligible for capacity payments. Election of this option shall require the installation of a non-time differentiated meter to measure the monthly output of the QF’s generation facility.

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY

A. QF that supplies both energy and capacity to the Company, in accordance with Paragraph III. A., above, shall receive purchase payments as follows:

A. Energy Purchase Payments

1. Purchase payments for the supply of energy by the QF to the Company will be based on an hourly energy purchase price (cents per kWh) that is calculated using the hourly $/MWh PJM Interconnection, LLC (PJM) Dom Zone Day Ahead Locational Marginal Price (DA LMP) divided by 10, and multiplied by the hourly net generation as recorded on the Company’s time differentiated meter.

(Continued)
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Virginia Electric and Power Company

Schedule 19

POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

(Continued)

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY
(Continued)

2. All energy purchase prices per kWh will be increased by 2.8% to account for line losses avoided by the Company. This line loss percentage will be fixed for the term of the contract between the QF and the Company.

3. In lieu of the line loss percentage in Paragraph IV. A.2., a QF may request that the percentage be derived by a line loss study calculated to the location the QF interconnects with the Company. To receive this site specific line loss percentage, the QF must be willing to bear the cost of such a study.

B. Capacity Purchase Payments

Purchase payments for the supply of capacity by the QF to the Company will be made based upon the QF’s daily net on-peak generation multiplied by that corresponding day’s on-peak capacity purchase price, as calculated, below. If applicable, the purchase payment for capacity may be modified by application of the Summer Peak Performance Factor (SPPF), as described, below. The on-peak hours for every day are from 7 AM to 11 PM. Off-peak hours are defined as all other hours.

Beginning June 1, 2007, and for each June 1, thereafter, PJM will establish the Reliability Pricing Model capacity resource clearing price for each PJM zone, shown as a $/MW/day price, that will be applicable through the following May 31. Such prices will be the clearing results from PJM’s Base Residual Auction. Using the price for the Dom Zone (initially identified on the PJM website as “Dom_PZonal”), the Company will calculate an on-peak capacity purchase price (cents per kWh) for each day by dividing the Dom Zone $/MW/day price by 16 hours, and further dividing the result by 10, rounded to the nearest one-thousandth cent. The resulting cents per kWh on-peak capacity purchase price will be applied to the QF’s net on-peak generation for the corresponding day, to provide for the daily capacity purchase amount. The sum of the daily capacity purchase amounts for the billing month will constitute the monthly capacity purchase payment to the QF, unless modified by application of the SPPF, below.

(Continued)
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Virginia Electric and Power Company

Schedule 19

POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

(Continued)

IV. PAYMENT FOR COMPANY PURCHASES OF ENERGY AND CAPACITY
(Continued)

Initially, a QF’s SPPF will be 1. Once a QF has achieved Commercial Operations and such operation encompasses at least a full Summer (defined by PJM as June 1 through September 30, inclusive), the following January billing month, and for each January billing month thereafter, an SPPF will be calculated that is based on the QF’s operation during the five (5) PJM coincident peak hours (“CP Hours”), as posted by PJM, during the Summer of the previous calendar year. The QF’s SPPF is equal to the number of CP Hours in which the QF generated at or greater than 75% of its net capacity, divided by 5. Therefore, the SPPF could be 0, .2, .4, .6, .8, or 1. The QF’s SPPF will be applied to the monthly capacity purchase payment for each billing month of the current calendar year.

V. PAYMENT OF COMPANY PURCHASES OF ENERGY ONLY

A QF that supplies only energy to the Company, in accordance with its election in Paragraph III. B., above, shall receive purchase payments as follows:

A. Purchase payments for the supply of only energy by the QF to the Company will be based on an energy purchase price (cents per kWh) that is calculated using the average of the hourly S/MWh Dom Zone DA LMP for the QF’s billing month divided by 10, and multiplied by the net generation as recorded on the Company’s non-time differentiated meter.

B. All energy purchase prices per kWh will be increased by 2.8% to account for line losses avoided by the Company. This line loss percentage will be fixed for the term of the contract between the QF and the Company.

C. In lieu of the line loss percentage in Paragraph V. B., a QF may request that the percentage be derived by a line loss study calculated to the location the QF interconnects with the Company. To receive this site specific line loss percentage, the QF must be willing to bear the cost of such a study.

(Continued)
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study

Virginia Electric and Power Company

Schedule 19

POWER PURCHASES FROM
COGENERATION AND SMALL POWER PRODUCTION
QUALIFYING FACILITIES

(Continued)

VI. PROVISIONS FOR COMPANY PURCHASE OF THE QF GENERATION

A. The QF shall own and be fully responsible for the costs and performance of the QFs:

1. Generating facility in accordance with all applicable laws and governmental agencies having jurisdiction;

2. Control and protective devices as required by the Company on the QF's side of the meter.

B. The Company shall own and install any interconnection facilities on the Company side of the meter required for the QF to sell energy to the Company. The costs associated with these facilities will be borne by the QF. These costs include, but are not limited to, the costs of connection, switching, metering, transmission, distribution, safety provisions, telephone lines, and administrative costs incurred by the Company which are directly related to the installation and maintenance of the facilities necessary to permit interconnected operations with the QF. The QF shall pay for these interconnection costs by either of the following methods:

1. A one-time lump-sum payment equal to the estimated new installed cost of all interconnection facilities provided by the Company multiplied by the appropriate tax effect recovery factor (if applicable), plus the appropriate monthly charge as described in Section IV.E. of the Company's Terms and Conditions on file with the Virginia State Corporation Commission.

2. A continuous monthly charge as described in Section IV.E. of the Company's Terms and Conditions on file with the Virginia State Corporation Commission which is designed to recover over time the estimated new installed cost of all interconnection facilities and their related operating expenses.

The QF will also be responsible for payment to the Company for the cost of removing the interconnection facilities at the conclusion of the QF's Agreement. Payment for these costs shall be in the same manner as the Company charges its other customers for similar work.

(Continued)
VI. PROVISIONS FOR COMPANY PURCHASE OF THE QF GENERATION (Continued)

C. In addition to the costs in Paragraph VI.B., above, the actual costs associated with relocating and/or rearranging existing facilities to allow interconnected operation will also be borne by the QF. A monthly charge shall not apply to these costs. Payment for these costs shall be in the same manner as the Company charges its other customers for similar work.

D. The QF shall have equipment specifications and plans for control devices interconnection facilities, and protective devices approved by the Company in advance of energizing the facility.

E. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.

F. Upon request by the Company, the Cogenerator or Small Power Producer must demonstrate that the facility is a Qualifying Facility as defined by PURPA.

G. The Company shall have the right to reduce the energy received from a QF during periods when a minimum load condition exists on the Company's system. These reductions will be within the design limits of each QF's equipment and will be limited to 1,000 off-peak hours in any calendar year.

VII. MODIFICATION OF RATES AND OTHER PROVISIONS HEREUNDER

The provisions of this schedule, including the rates for purchase of electricity by the Company, are subject to modification at any time in the manner prescribed by law, and when so modified, shall supersede the rates and provisions hereof. However, payments to QFs with contracts for a specified term at payments established at the time the obligation is incurred shall remain at the payment levels established in their contract.

VIII. TERM OF CONTRACT

The term of contract shall be mutually agreed upon, but not less than one year.
HRSD Wind Turbine
Preliminary Interconnect Feasibility Study
Interconnect Switch & Meter Configuration