PHOTOVOLTAIC SOLAR ARRAY FEASIBILITY STUDY WOODS ROAD LANDFILL FALMOUTH, MAINE



Prepared for:

Town of Falmouth 101 Woods Road Falmouth, ME 04105

Prepared by:



TRC Engineers, Inc. 14 Gabriel Drive Augusta, Maine 04330

February 2, 2016

TRC Environmental Corporation (TRC) is pleased to submit this feasibility study to the Town of Falmouth (Town) of the Town's closed landfill at Woods Road as a possible site of a photovoltaic (PV) solar installation.

TRC's project understanding and tasks were based on discussions with the Town at our October 22, 2015 meeting, your request for proposal (RFP) dated October 22, 2015, and subsequent discussions (November 18, 2015).

This report is organized as follows:

- Project Understanding
- Feasibility Study Task Summary
- Appendices with Task Specific Detailed Memoranda

PROJECT UNDERSTANDING

A passive, fix-tilt PV solar array installation is currently under consideration for construction on the Town's closed landfill. An understanding of the potential generation capacity of the site, impacts of such an installation on the functionality of the landfill cap, and possible constraints imposed by the landfill cap on design and installation of the solar array are required. It is TRC's understanding that the project will require permitting by the Maine Department of Environmental Protection (ME DEP). An assessment of the ME DEP's "areas of interest" for the project and design/construction approaches to mitigate potential concerns from the ME DEP is also required.

TASK SUMMARY

TRC undertook four (4) separate but related studies to provide the specific information to assess general project viability. A summary of the results of the four (4) studies is presented below. Longer, more detailed stand-alone memoranda covering the studies are provided as Appendices at the end of this document.

Maximum Array Area

TRC determined that the relatively flat top of the closed landfill is suitable for a PV array. This area is approximately four (4) acres in size. It appears that the proposed project components would be installed on the existing cap and that all associated infrastructure (e.g. collection lines and inverter) would be located within the existing developed areas on the cap near the transfer station and recycling center. Because the probability of wetlands and/or streams existing in these areas is minimal, TRC believes that there will be no direct wetland or stream impacts.

The maximum area study is discussed in detail in the memorandum in Appendix A.



Landfill Cap Evaluation

A senior TRC landfill engineer observed current landfill conditions during a site visit on December 9, 2015. Landfill closure documentation was also reviewed at that time. The top of the landfill is capped with 24 inches of soil over a geosynthetic barrier layer. The landfill top has slopes between four (4) and seven (7) percent. The steeper side slopes of the landfill are covered by 21 inches of soil over an 18-inch clay barrier. Landfill gas generation was found to be minimal at the project site.

Based on current typical array/ballast block foundation design methods and configurations, there are no significant geotechnical or landfill-related impediments hindering the installation of a PV array on the four (4) acre top of the landfill. The side slopes were found to be unsuitable for PV array construction because of excessive slope and thin soil cover over the clay barrier. The landfill cap evaluation used the criteria from the Massachusetts's Department of Environmental Protection (MA DEP) Guidelines for post-closure use of a landfill for a solar array and EPA general guidelines (note that these are very similar). We understand that the permitting guidelines used by ME DEP are similar to these MA DEP guidelines.

Using array construction methods and quality controls typically utilized on other closed landfill solar projects will be adequate to assure an array can be installed on the Woods Road landfill without negatively impacting the landfill cover system.

An area of wet soil and wetland vegetation was noted in the southwest side of the landfill. This area of the landfill cap will need to be remediated prior to array installation.

The landfill cap evaluation is discussed in detail in the memorandum in Appendix B.

Interconnect Study

Central Maine Power (CMP) was contacted as part of this study. Under Maine Public Utility Commission rules, the small size of the project (under 2,000 kilowatts (kW) (two (2) Megawatts (MW)) would place it in a level 2 interconnection study review category (i.e. no system impact study needed). However, CMP recommends submitting as a more detailed level 4 review category because, as CMP indicated, the utility will need to do a system impact study for this project and time would be saved in the overall review process. Under the Public Utility Commission rules, CMP has the right to push a project into a level 4 review if they need additional information on equipment upgrades. CMP suggest that the Town consider using the "Net Energy Billing" approach for the project.

A new direct connection to the CMP grid will likely be needed. A single line diagram of the PV system has been created and is in Appendix C. The single line diagram shows the required alternating current (AC) and direct current (DC) equipment necessary to connect the PV system to the utility grid. The electrical power derived from the array will feed into the existing 12.47 kilovolt (kV) line on Woods road.



Electricity Generation Potential

The estimate of the maximum DC electrical generation potential based on the suitable area is 1,159 kW (AC power 1 MW). A plan showing the maximum-size array on the landfill is also provided in Appendix C. TRC assumed typical design parameters of ground-based and landfill PV solar arrays in making these estimates and used modules, racking, and inverters that have successfully been designed and commissioned on previous landfills. The first year energy production estimate for the array is 1,522,000 kW-hours.

If "Net Energy Billing" is used, the array size must be less than 660 kW (0.660 MW) AC. The first year energy production estimate for an array of this size is 1,125,000 kW-hours.

The interconnect study and electric generation potential are discussed in detail in the memorandum in Appendix C.

We have included pictures (below) of two other landfills with PV solar arrays as examples. These two landfills are in Greenfield, MA and Patterson, NY.



If you have any questions on this study please call either of us at 620-3882 or 620-3881, respectively. TRC appreciates the opportunity to assist the Town of Falmouth on this project and we look forward to continuing to work with you.

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David W. Andrews, P.E. Senior GeoEnvironmental Engineer

Lawrence J. Fitzgerald, C.G. *Project Manager*



Appendix A Maximum Array Area



TRC 14 Gabriel Drive Augusta, ME 04330

Main 207-620-3800 Fax 207-621-8226

Memorandum

То:	Mr. Jay Reynolds, Public Works Director – Town of Falmouth, Maine	Project No.:	246471				
From:	Rich Jordan, PWS/CPESC						
Subject:	Suggested Natural Resources Studies and Preliminary Analysis of Potential State and Federal Permitting Requirements						
Date:	February 2, 2016						
CC:	Larry Fitzgerald, C.G. (TRC)						

TRC performed a preliminary desktop natural resource and permitting analysis of the existing capped landfill on Woods Road in Falmouth. The purpose of this analysis was to provide initial feedback on suggested follow-up studies and state and federal environmental permitting that may be necessary to develop a solar power generating project on the landfill. The preliminary assessment is provided below and includes a description of suggested outreach and follow-up studies as well as a preliminary analysis of state and federal permit requirements. This assessment is based on information available at the time of the analysis, including the potential outline of a proposed solar array on the top of the cap, as provided to you by TRC (submitted under a separate cover).

Suggested Outreach and Follow-up Studies

Outreach: For initial project outreach, TRC recommends sending requests for information on known or potentially protected resources to the Maine Natural Areas Program (rare plants and unique communities) and the Maine Historic Preservation Commission (cultural and historically significant resources). Additionally, TRC recommends that the Town of Falmouth (Town) or a solar developer consult with the U.S. Fish and Wildlife Service (USFWS) and perform an online review of the USFWS Information, Planning and Conservation System (IPaC) to determine if there are known locations of federally-protected species or habitats in the vicinity of the landfill.

Field Surveys: Because the Maine Department of Environmental Protection (ME DEP) requires permits-by-rule (PBR) for certain types of impacts made within 75 feet of some types of wetlands, TRC also recommends that a formal wetland and stream delineation be completed on Town-owned property located within 75 feet of the proposed project components. The wetland delineation should be performed during the growing season by a qualified wetland scientist and carried out per the guidelines established by the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (1987) and it's Northeast/Northcentral Regional Supplement

Suggested Natural Resources Studies and Preliminary Analysis of Potential State and Federal Permitting Requirements Page 2 of 3 February 2, 2016

(2012). Streams should be identified based on the definitions established in the Maine Natural Resources Protection Act (NRPA).

Additionally, as the ME DEP requires PBRs for certain activities within significant vernal pool habitats, TRC recommends a vernal pool survey be completed on Town-owned property located within 250 feet of the proposed project components. The vernal pool survey should be accomplished by a qualified individual during the appropriate breeding season of vernal pool indicators (e.g. wood frogs and spotted salamanders), which in southern Maine is generally during April and May. The survey should also proceed in accordance with the Maine Association of Wetland Scientists' Vernal Pool Survey Protocol (2014).

<u>Preliminary Analysis of State and Federal Natural Resource Permit</u> <u>Requirements</u>

Based on our initial findings of the Falmouth preliminary solar feasibility study, it appears that the proposed project components would be installed on the existing cap and that all associated infrastructure (e.g. collection lines and inverter) would be located within the existing developed areas on the cap and near the transfer station and recycling center. Thus, because the probability of wetlands and/or streams existing in these areas is minimal, TRC believes that there will be no direct wetland or stream impacts, and therefore no nexus for federal oversight or jurisdiction. Based on review of aerial photography, USFWS National Wetland Inventory Maps (NWI), and the existing site plans provided by the Town, there appear to be wetlands located within 75 feet of the southeast corner of the cap. However, these wetlands do not appear to meet the criteria to require a 75-foot adjacency buffer as described by the NRPA (i.e. they are not great ponds, coastal wetlands, rivers, streams, brooks, or freshwater wetlands containing significant wildlife habitat, peatland, or more than $\frac{1}{2}$ acre of open water). Additionally, it appears that no woody vegetation will need to be cleared for construction of the solar project. This is an important factor because the landfill lies within the historic range of the federally-threatened and stateendangered northern long-eared bat, and tree clearing in this species' range generally requires special permitting and timing considerations. Thus, based on initial information, it is likely that no state or federal natural resource permits (e.g. Maine NRPA, Maine Site Location of Development Act, Clean Water Act, etc.) would be required other than an amendment to the existing post-closure use permit for the landfill.

If in the course of the wetland and stream delineation it is determined that there are streams located within 75 feet of project components, then a PBR notification for adjacency may be required by the ME DEP (PBR 2 for "Activities adjacent to protected natural resources"). If there are Significant Vernal Pools (per Maine NRPA Ch.335) identified within 250 feet of project components or within wetlands within 75 feet of project components, the ME DEP may request a PBR 2 for adjacency work or a PBR 19 for "Activities in, on or over a significant vernal pool habitat". If streams or significant vernal pool habitats and/or their adjacent buffers are likely to be impacted by the project, then TRC would recommend consultation with the ME DEP to assess if PBRs or other permits would be required. Due to the disturbed nature of the

Suggested Natural Resources Studies and Preliminary Analysis of Potential State and Federal Permitting Requirements Page 3 of 3 February 2, 2016

site and the low impact of the potential project components, the ME DEP may waive some permitting requirements.

Cap Wet Areas: Based on a site visit by TRC's Landfill Engineer in December 2015, it appears that there are small areas of subsidence on the landfill cap that have developed some wetland characteristics (i.e. wetland vegetation). The wetland delineation suggested above should include an investigation on the cap to determine if these subsidence areas contain the three (3) determining factors required for an area to be considered a wetland: hydric soils, dominance of wetland vegetation, and evidence of hydrology. If these features are lacking one (1) or more of the required three (3) factors to be considered a wetland, then no additional environmental follow-up is required. However, if one or more of the subsidence areas meets the statutory definition of "wetland", then TRC suggests additional outreach to ME DEP and the USACE to discuss permit requirements for cap maintenance. It is very likely that any work on the cap of the landfill would be considered by these agencies to meet the definition of "normal maintenance and repair" of the existing facility and thus any intrusions or impacts (e.g. draining and grading) on these subsidence wet areas would be exempt from state and federal permitting. Along with additional information gleaned from the wetland scientist, follow-up consultation with the regulatory agencies would confirm this assumption.

Thank you for the opportunity to support the Town of Falmouth on this exciting and important project. We are looking forward to continuing to assist you in project development and to see the project come to fruition. If you need any additional information, please contact us.

Suggested Natural Resources Studies and Preliminary Analysis of Potential State and Federal Permitting Requirements February 2, 2016

Figure

Legend



Data Sources: MEOGIS, ESRI Note: Not all features in the Legend appear in map view.





Appendix B Landfill Cap Evaluation



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Main 207-620-3800 Fax 207-621-8226

Memorandum

То:	Mr. Jay Reynolds, Public Works Director – Town of Falmouth, Maine	Project No. :	246471
From:	David Andrews, PE		DAVID DAVID
Subject:	Geotechnical/Landfill Assessment for a Solar Woods Road Landfill	Installation at the	PP MOREWS
Date:	February 2, 2016		WONAL ENGONAL
CC:	Larry Fitzgerald, C.G. (TRC)		-million

TRC Environmental Corporation (TRC) is pleased to provide this geotechnical/landfill assessment to the Town of Falmouth (Town) of the Town's closed landfill at Woods Road as a possible site of a photovoltaic (PV) solar installation.

PROJECT UNDERSTANDING

The installation of a passive, fix-tilt PV solar array is currently under consideration on the Town's closed landfill. Falmouth contracted with TRC to analyze the potential impacts of such an installation on the functionality of the landfill cap suitability and possible constraints imposed by the landfill cap on design and installation of the proposed project. It is TRC's understanding that the project will eventually require permitting by the Maine Department of Environmental Protection (ME DEP).

TRC performed the following activities as part of the assessment:

- A Site visit
- Evaluation of the various potential project-related impacts and constraints to the landfill

Specific potential impacts and constraints reviewed included:

- o Suitable slopes,
- Set-back requirements from gas vents, monitoring wells, and other landfill structures,
- o Solar ballast block and inverter foundations design parameters,
- Cable burial,
- o Landfill cap modifications,
- o Settlement,

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- o Stability,
- Temporary and permanent access roads,
- o Construction impacts, and
- Stormwater run-off controls.

Site Visit

TRC performed a site visit on December 9, 2015. The weather and ground conditions were favorable for observing the condition of the landfill surface features. A selection of photographs taken during the site visit are included as Attachment 1. Following the site visit, various files and documents relating to the landfill closure were reviewed at the Public Works Office.

Woods Road Landfill

Town documents that were reviewed indicate that the subject landfill served as a municipal solid waste landfill and was closed in accordance with a ME DEP Closure Order approximately 25 years ago (1991 -1992). However, the landfill reportedly stopped accepting waste prior to 1990. The closed areas on the landfill consisted of the main 7.9 acre mound and two (2) smaller areas located north of the main landfill. The main mound of the landfill is the subject site under consideration for the solar array installation. This site consists of a rectangular area with a relatively flat top of approximately four (4) acres and steeper sides. The mound slopes from northeast to southwest with slopes ranging from four to seven percent. The side slope is approximately 33 percent. Figure 1 shows the configuration and topography of the landfill.

The Town-provided as-built documentation for the landfill indicates that the cover systems differ for the top and side slopes of the landfill. The top cover system consists of (from top of ground surface to lowest level):

- Grass cover,
- Three (3) inches of loam,
- Nine (9) inches of common Borrow,
- Geotextile,
- 12 inches of drain sand,
- 30 mil polyvinyl chloride (PVC) geomembrane,
- Six (6) inches of special borrow,
- Daily landfill cover, and
- Solid waste.

The side slope cover system consists of (from top of ground to lowest level):

- Grass cover,
- Three (3) inches of loam,
- Six (6) inches of common borrow,
- Geotextile,

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- 12 inches of drain sand,
- 18 inches of compacted, low permeability clay,
- Daily landfill cover, and
- Solid waste.

Surface water drainage on the landfill is via overland flow to a riprapped lined down comer chute in the center of the southwest side, and two riprapped down comers in the western side of the landfill near the recycling building (see Figure 1). The drainage sand layer is drained by a four (4) inch diameter perforated drain pipe located along the perimeter of the top cap system. The pipe discharges at the top of the three down comers.

The landfill has 11 passive gas vents located on the top of the landfill (photograph 2). The vents are connected via a gravel filled/perforated pipe trench below the cover system. At the time of the site visit, a faint odor of landfill gas was observed only in the six (6) vents with the highest elevation.

There are no permanent roads on the landfill. TRC understands that mowing equipment accesses the landfill on the north side where the side slopes are minimal and can accommodate access (photograph 1).

Except as discussed in this letter report, it is TRCs understanding that there are currently no significant outstanding environmental issues relating to the landfill cover system.

Proposed Solar Array

TRC conducted our evaluation using the criteria from the Massachusetts's Department of Environmental Protection (MA DEP) Guidelines for post-closure use of a landfill for a solar array and the United States Environmental Protection Agency (EPA) general guidelines. TRC also reviewed the ME DEP requirements for post-closure reuse of landfills under Maine's solid waste and beneficial reuse rules (which defer to the MA DEP guidelines.)

The current concept for the solar array is a conventional, fix-tilt PV module array with at-grade ballast block foundations. The inverters and transformers are likely to be placed off of the landfill near the recycling building (shown on the attached landfill concept drawings). It is also possible that string inverters could be used in lieu of off-landfill inverters. Cabling would be buried in accordance with the electrical codes and the interconnection location is located off of the landfill. Details of the final array configuration, including module heights, rack spacing, and ballast block types, have not been developed at this time.

In the following sections, the general requirements are stated and TRC's assessment of the Falmouth landfill conditions, with respect to each topic, follows in italics.

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Suitable Slopes

Current practice for installing PV arrays on closed landfills are to only place the arrays on slopes not steeper than 15 percent. This criteria has been generally adopted by both regulators and PV rack designers.

The entire top of the landfill has slopes below the 15 percent threshold and would be suitable for an array. The side slopes are not suitable because they are too steep.

Setback Requirements

The PV array must be set back from gas vents, monitoring wells, and access roads. In addition, ballast blocks cannot be placed in defined drainage locations and diversions. Setbacks from the edges of steep slopes are also usually established in order to address potential cap stability issues.

The subject landfill has relatively few gas vents and no defined drainage ways in the suitable slope areas. Overall, the landfill has better than average space utilization in regards to efficient use of the landfill.

Foundation Design

The landfill cover and underlying waste must have adequate bearing capacity in order to support the racking system live loads (wind and snow) and dead loads of the ballast block foundations. Inadequate bearing capacity could result in damage to the underlying landfill cover.

A typical second criteria required for foundation design at the landfill is that the ballast block contact stress on top of the drain sand layer not exceed seven (7) pounds per square inch (psi). This criteria assures that the PVC geomembrane is not damaged by the ballast block.

Assuming the typical structural loads and ballast blocks used for PV arrays (from TRC's experience), similar landfill caps (compared to the subject landfill) will have an adequate allowable bearing capacity even under the worst case conditions. A factor of safety of at least 3 is typically used in bearing capacity determination to assure failure will not occur. TRC's experience with similar landfills and arrays indicate that the actual bearing pressures are well below the allowable bearing capacity of the landfill cap. TRC expects that this will be the case at the subject landfill. However, a rack specific and load/ballast block bearing capacity analysis will be required to confirm this assumption. It should be noted that the ballast block size can be modified to developed adequate bearing capacity.

Assuming typical loads and ballast blocks are used, the ballast block contact stress criteria (less than seven (7) psi) will be met in the proposed project. If this criteria is not met, the ballast block can be readily modified to meet it.

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Cable Burial

Cable conduits must be buried on the landfill in order to protect and prevent damage during mowing and in order to be thermally stable. The National Electric Code (NEC) minimum direct soil burial depths over cables or conductors (NEC 300.5 (A)) is applicable to buried conductors on the landfill. Without a variance, the burial depth is required to be 24 inches, or 12-inches underlying two (2) inches of concrete.

A 24-inch burial depth is not attainable for the landfill because the PVC geomembrane would be breached. In TRC's experience, a variance for 12-inch deep burial without the 2-inch concrete cover can typically be obtained because the solar array is on a secured site and is not located where either heavy wheel traffic or digging is likely to occur. However, shallower burial depths less than 12 inches are usually unacceptable and variances cannot be obtained.

A burial depth of 12 inches on the subject landfill is feasible. The presence of the geotextile at 12 inches is an advantage as it will act as a marker layer and limit over excavation. Excavation activities near the geotextile will need to be properly managed to avoid damage of the geotextile. Cabling may have to be buried in the clay layer on the side slopes if the inverters are placed off the landfill. TRC understands that the ME DEP has indicated to the Town that excavation into the clay layer may not be permitted. TRC believes that the ME DEP's reluctance can be overcome by presenting proper backfill design. Because the functionality of the clay layer cannot be compromised, the trench would have to be backfilled with soil that meets the initial design criteria for that layer (permeability of less than 1 x 10^{-7} centimeters per second). There are several ways this can be done, including using a sand/bentonite soil blend as backfill. However, the final backfill method would have to be developed during design and would require approval from the ME DEP as part of the permitting process. Minimizing the number of buried conduits would be a positive aspect in obtaining a variance to the burial depth.

Landfill Cap Modifications

Making modifications to the closed landfill, including regrading or changing the gas vent system, in order to construct the solar array could be problematic in regard to overall functioning of the cap and regulatory approval.

It appears that the subject landfill will not need to be modified in a manner that would require regulatory approval for this project.

Settlement

The weight of the solar array will likely cause some settlement of the landfill surface. In theory, if this settlement is excessive, the underlying clay layer could be compressed and, under extreme conditions, possibly rupture.

A second settlement issue of concern would be landfill settlement due to decomposition of the waste. If this settlement is excessive, the solar array could be damaged.

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The underlying clay layer rupturing would only occur if the ballast block load greatly exceeds the bearing capacity of the subject landfill cap. A discussed above, this is not a concern as the ballast blocks are expected to be designed to have an acceptable factor of safety against bearing failure, i.e. rupture of the landfill cap.

Significant compression of the clay layer would occur if that layer were to be subjected to a long-term load greater than that of the construction induced compaction. The ballast block foundations, by design, are expected to impose a stress of no more than seven (7) psi on the clay layer. This stress is less than that created by in-place compaction of the clay layer during construction, therefore compression settlement of the clay layer is expected to be negligible.

The fact that landfill gas has been generated is evidence of decomposition. The top of Woods Road landfill has settled since it was closed. This was obvious from observations made during the site visit. The highest portion of the landfill has settled approximately two (2) feet (comparing as-built to recent topography). Landfill decomposition and the resulting settlement decreases steadily over time as the compostable organic matter in the landfill is consumed. It is generally observed that smaller landfills, like the subject landfill, undergo the majority of their settlement within the first one (1) or two (2) decades after waste placement has ended. Because the landfill has been inactive for approximately 30 years, TRC expects that future surface settlement will be limited and no significant differential settlement is expected to occur. PV racking systems are, by the nature of their design, relatively flexible and can be configured to be adjustable after installation. Landfill settlement is expected not to be a significant issue.

Stability

Wind forces on the array will impose overturning and sliding forces. Using standard structural design methods, the racking designer will determine the size of the ballast blocks so that the racking system has an adequate safe factor against overturning and sliding on the landfill surface. However, sliding of the racking system and landfill cap topsoil layer on the clay layer is still possible.

A conventional landfill cap sliding stability analysis is used to check that the factor of safety for sliding on the landfill surface and PVC geomembrane is adequate. This is a rack specific analysis. A factor of safety of 2 is typically used in array design. Based on TRC's experience, it is likely that the factor of safety for this condition on the landfill will be adequate however if not, the ballast block design can be modified or changed to obtain an acceptable factor of safety.

Access Roads

Permanent and temporary access roads must be constructed so as not to damage the cap or impact stormwater run-off.

Permanent and temporary on-landfill access roads have to be designed specifically for the anticipated traffic load and underlying soil cap properties. Based on TRC's previous experience, suitable roads, if needed to be constructed on the landfill, can be designed for the landfill. Given the relatively small size of the landfill, TRC's experience with similar projects lead to the opinion that temporary roads would not be needed for this site.

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Stormwater Run-off

Placing impervious concrete ballast blocks on the landfill surface will increase the stormwater run-off and decrease the infiltration of the landfill surface. Stormwater conveyance systems, such as ditches, diversions, and down comers, are designed for peak stormwater flow for a specific design storm. The change in peak flow caused by the ballast blocks must not compromise the existing drainage system. It should be noted that the PV modules are not considered "impervious surfaces" in evaluating stormwater run-off in this case.

Using conventional hydraulic modeling software, the stormwater run-off analysis can be performed to compare the existing landfill conditions to conditions that will exist after the array is installed. The impact of the change in rainfall run-off on the stormwater conveyance system can then be evaluated. This is an array-specific analysis, therefore a quantitative assessment cannot be done at this time. However, TRC's experience indicates that given the limited design drainage system on the landfill (primarily the down comers) and the large area of overland flow, the change in peak run-off is expected to be minimal. Therefore, because most drainage conveyances are overdesigned, TRC expects that no change to the landfill's drainage would be needed.

Construction Impacts

The erection of the solar array and conductor installation is an activity that could possibly damage the landfill cap. In fact, it is likely the installation, rather than the actual array itself, that poses the greatest risk to the cover system. Design elements, installation specifications, and quality control/oversight procedures must be developed in order to reduce the risk of cap damage.

The subject landfill, with its thicker (24 inches) soil layers and geotextile over the PVC geomembrane and clay barrier layers, is expected to be less vulnerable to construction damage than a landfill with a thinner soil layer. Design element specifications and on-site oversight procedures during construction will need to be written specifically for the landfill in order to prevent long-term damage to the landfill cap. Examples of these design element specifications and oversight procedures could include:

- Predesign of temporary access roads on the landfill,
- Pre-selection of ballast block/rack system to minimize on-cap traffic,
- Use of string inverters rather than large on-cap inverters,
- Use of lower ground pressure equipment only on the cap,
- Enforce setback distances from gas vents,
- Minimize disturbed areas,
- Conduct test pits before trenching,
- Excavate with hand tools or control depth trencher,
- Use of full time, onsite monitoring of the landfill condition, and
- Frequent communication with stakeholders.

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Landfill Maintenance and Monitoring

Maintenance and monitoring of the landfill, in accordance with the current approved plan, cannot be compromised by the solar array. The layout of the solar array on a landfill will need to be dimensioned so that mowing of the grass can be performed as required. Access to gas vents, monitoring wells, and other landfill features must be maintained.

The above criteria are expected to be easily met at the landfill.

Landfill Maintenance

The landfill cover system should be in a good state of repairs before a solar array is installed, as future work on the landfill cap would be more difficult to undertake with the array in place.

Two repair items were noted during the 2015 site visit. The first of these items was an area of Phragmites, the common reed found in wetlands that should be removed. The second issue is an area of very wet soil at the edge of the top of the landfill on the upper side slope between the two down comers in the western side of the landfill (photograph 4) that should be repaired. TRC suspects that settlement of the landfill has caused the grade of the perimeter perforated pipe to flatten to the point where water is ponding in the pipe and saturating the soil. This area would need to be either repaired or a significant setback from the area to the array put in place so that future repairs could be done. It should be noted that the ME DEP has not cited this problem in its periodic inspection reports of the landfill.

The outlets for the drain sand at the riprapped down comers is the second repair item observed onsite. These outlets are blocked by vegetation and sediment and clearing the outlets would be easier conducted before the array is in place than afterwards.

In addition to the two repair items mentioned above, two areas of unusual grass growth were observed in the middle of the top of the landfill (photograph 5). We are unsure of the cause of the bright green, short grass, roughly circular areas but they are not commonly seen. It would be prudent to investigate these unusual grass growth areas prior to array installation in case remedial cap repair is required.

ME DEP Solar on Closed Landfills Permitting

TRC understands that, as of December 2015, the ME DEP has not approved a permit to install a PV system on a closed landfill and therefore the specific concerns that the ME DEP could have for such a project are not known at this time. However, the ME DEP indicated that they would need plans and assessments similar to those submitted to the MA DEP for solar projects proposed on closed landfills.

TRC is very familiar with the engineering assessment requirements and criteria of the MA DEP Landfill Post Closure Use Permit application process which ME DEP uses to assess projects such as this. Based on the MA DEP permitting process, TRC sees no significant problems meeting the criteria except as discussed above.

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Thank you for the opportunity to support the Town of Falmouth on this exciting and important project. We are available to assist the town with the next steps in moving this project forward.

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Figure

Legend



Data Sources: MEOGIS, ESRI Note: Not all features in the Legend appear in map view.





Geotechnical/Landfill Assessment for a Solar Installation February 2, 2016

Attachment 1 – Photo Log

Photo Log Site Visit December 9, 2015 Woods Road Landfill, Falmouth, Maine



1. North side of landfill top access area



3. Top of Landfill looking northeast



2. Typical top of landfill with gas vents



4. Phragmites and wet soil area

Photo Log Site Visit December 9, 2015 Woods Road Landfill, Falmouth, Maine



5. One of two green grass areas



6. Landfill top looking northeast

Appendix C Interconnect Study and Electric Generation Potential



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TRC 14 Gabriel Drive Augusta, ME 04330

Main 207-620-3800 Fax 207-621-8226

Memorandum

То:	Mr. Jay Reynolds, Public Works Director – Town of Falmouth, Maine	Project No.:	246471	
From:	Eric M. Sverdrup, PE			
Subject:	Electrical Generation/Interconnection Assessment for a Solar Installation at the Woods Road Landfill			
Date:	February 2, 2016			
CC:	Larry Fitzgerald, C.G. (TRC)			

TRC Environmental Corporation (TRC) is pleased to submit this landfill assessment of the Town's closed landfill at Woods road as a possible site of a photovoltaic (PV) solar installation.

PROJECT UNDERSTANDING

The installation of a passive, fix-tilt PV solar array is currently under consideration on the City's closed landfill. This study will assist the Town in determining what the maximum buildout and solar potential the Landfill site has at Woods Road. This study includes the estimated potential energy generation capacity of the site as well as the interconnection location. Central Maine Power (CMP) was contacted and provided very informative direction on how to proceed with the connection as detailed below.

PV SITE AVAILABLE CAPACITY

There are four (4) acres suitable for solar PV buildout located, as shown on drawing GA-01. There is room for 3,800 solar modules on this four (4) acres. At 305 watts per module, the total direct current (DC) power is estimated at 1,159 kW (1.159 MW). The maximum alternating current (AC) power available would be 1,000 kW (1 MW) which is defined as a Level 2 customer-generator interconnection facility, as delineated by the Maine Public Utilities Commission (MPUC). CMP refers to the MPUC guidelines for customer solar PV connections. The interconnection level will be discussed in more detail below.

The first year energy production estimate for the 25° fixed tilt 1,159,000 W_{DC} (1,000,000 W_{AC}) PV field is **1,522,000 kWh**. This calculation uses the simulation software PVsyst version 6.39 to account for the complex variables used to model a PV system throughout the year.

As discussed below it may be beneficial to limit the overall system size to 660 kW (0.660 MW) AC or below. The total estimated number of modules would be approximately 2,888. The first year energy production estimate for the 25° fixed tilt 881,000 W_{DC} (630,000 W_{AC}) PV field is **1,125,000 kilowatt**

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hour (**kWh**). See GA-02 for the site layout for the approximate 630 KW (0.630 MW) AC Solar PV System on the landfill. This calculation uses the simulation software PVsyst version 6.39 to account for the complex variables used to model a PV system throughout the year.

The estimated production degradation is 0.5% per year which is typical for solar PV installations.

CENTRAL MAINE POWER (CMP) RECOMMENDATIONS

CMP attended an early meeting with the Town of Falmouth (Town) and TRC and they were able to hold a follow-up call with TRC (once the available area was defined) in order to give recommendations on proceeding forward.

The MPUC has issued rules and procedures for Small Generator Interconnections under Chapter 324. These rules and procedures establish statewide standards for the interconnection of renewable energy facilities to the energy grid. The purpose of these rules and procedures is to increase the efficiency of the interconnection process and to encourage the use of renewable energy and distributed generation. These rules and procedures are detailed on CMP's website (see link below) and important points are discussed below.

Link to CMP's website: http://www.cmpco.com/YourAccount/puc324.html

The review levels are defined by Public Utilities Commission (PUC); even though the size of less than 2,000 kW (2 MW)pushes the project into a level 2 review category, CMP recommends starting this project as a level 4 review as they will need to perform a System Impact Study. Since a System Impact Study will need to be performed (per CMP), it forces CMP to re-define the review level to level 4 as they currently do not know what system upgrades they need to make and the only way they can determine that is with the level 4 review. If the project starts out as a level 2, it will take extra time for CMP to review it as a level 2 and then promote it to a level 4. A System Impact Study takes 45 calendar days for CMP to complete and will determine if there are any adverse effects to the distribution system as well as define system upgrades or additional costs needed for the project to be implemented.

A single line drawing (E-01) and site plan view drawing (GA-01) have been created for the approximate 1,000 kWAC (1 MWAC) output. CMP requires that an Interconnection Application be filled out (blank application attached). After CMP reviews the application, they will decide if a study is required. If this study is required, the applicant will be required to pay the actual study cost (see fees below). In order to fill out the application, the customer will need to select specific equipment proposed to use for the inverters, transformers, circuit breakers, and protection relays. Eventually, the interconnection agreement and System Impact Study will also have to be completed (blank forms of those documents have also been attached). The single line drawing will need to be sealed by a professional engineer. Please note that the first version of the single line drawing is not sealed due to there are multiple options available to the Town for system configuration. Once a configuration is finalized, a sealed drawing can be prepared.

CMP recommends that the Town review net energy billing as a possibility for this project (please see below for definition of net energy billing).

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NET ENERGY BILLING

Net energy billing is defined as:

Under the MPUC Chapter 313 statute, CMP is required to enter into a Customer Net Energy Billing Agreement with any customer seeking to connect a generator operating in parallel with CMP, provided that the generator is an "eligible facility" and is less than 660 kW (0.660 MW) in size (total installed capacity). With "net energy billing," the utility invoices the customer based on net energy produced over the billing period, taking into account any accumulated kWh credits from prior billing periods. "Net energy" is the difference between the energy used by the customer and the energy generated by the customer's facility over a common billing period. If the monthly net metered amount indicates generator output in excess of monthly usage, a customer will still be responsible to pay CMP's minimum delivery charge. The unused kWh (MWh) credits go into a "bank" administered by CMP. The banked kWh (MWh) credits will be netted against usage in future monthly bills with the oldest credits applied first. Each unused kWh (MWh) credit may remain in the bank for up to one (1) year. At the end of each month, CMP will deduct from the bank any unused kWh (MWh) credits that have reached their 12-month expiration.

CMP is set up to allow 10 different accounts to participate under one net metering umbrella. This could allow generation from this proposed project to offset load at other locations important to the Town. TRC encourages further discussion between CMP and the Town should this option be of interest to the Town.

ESTIMATED FEES BASED ON DISCUSSION WITH CMP AND A LEVEL 4 REVIEW

Application fee \$100

Cost per kW is \$2 per kW 1000 kW system is \$2,000 660 kW system is \$1,320

Deposit of \$1,500 is typically required dependent of course on the overall cost of the study.

PV POINT OF INTERCONNECT (POI)

A new direct connection to the utility (CMP) grid will be required. The medium voltage distribution line connection is 12.47 kV for CMP. TRC understands that the proposed project module's DC voltage will be transformed into AC voltage and stepped up to 12.47 kV at an inverter/transformer skid located off of the landfill cap near the recycling building in a location to be determined. From the inverter/transformer skid there will be an underground cable connection to the new medium voltage switchgear that will contain the Town's electrical meter, protection relays, and circuit breaker. From the switchgear there will be an underground cable connection to a new CMP-owned disconnect/meter and a new riser pole. There will be a tap from the riser pole to an existing 12.47 kV overhead line (CMP circuit # 622D2) shown on drawing GA-1&2. A fence surrounding the PV facility (to protect the public from both the solar and utility power source) is usually required by the authority having jurisdiction based on the national electric code and the national electric safety code.

Electrical Generation/Interconnection Assessment for a Solar Installation February 2, 2016

Figures



SYSTEM SUMMARY						
DESCRIPTION	VALUE	UNITS				
DC CAPACITY	1,159,000	WATTS				
AC CAPACITY	1,000,000	WATTS				
DC/AC RATIO	1.16	-				
ESTIMATED 1ST YEAR ENERGY PRODUCTION	1,522,000	kWH				
INVERTER	1,000,000	WATTS				
MODULE POWER RATING	305	WATTS				
TOTAL NUMBER OF MODULES	3,800	EACH				
MODULE STRING LENGTH	19	EACH				
TOTAL AVAILABLE ACRES	4.0	ACRES				
RACK TYPE	FIXED TILT	-				
BALLAST	ABOVE GRC					
RACK ANGLE	25	DEGREES				
RACK PITCH (TOE TO TOE)	13.5	FEET				

1. POINT OF INTERCONNECT (POI) AND INVERTER/TRANSFORMER LOCATION

MAY CHANGE DURING DETAILED DESIGN.

2. RACK TILT AND PITCH TO BE OPTIMIZED DURING DETAILED DESIGN.

PRELIMINARY - NOT FOR CONSTRUCTION

ES DESIGNED HGP DRAWN ES CHECKED ES APPROVED		TOWN OF FALMOUTH 1MWAC PV II ARRAY	FALMOUTH H, MAINE NSTALLATION LAYOUT	
REVIEW 1	01/12/16 DATE AS NOTED SCALE	C TRC	GA-01	REV. A



SYSTEM SUMMARY						
DESCRIPTION	VALUE	UNITS				
DC CAPACITY	880,840	WATTS				
AC CAPACITY	630,000	WATTS				
DC/AC RATIO	1.40	-				
ESTIMATED 1ST YEAR ENERGY PRODUCTION	1,125,000	kWH				
INVERTER	630,000	WATTS				
MODULE POWER RATING	305	WATTS				
TOTAL NUMBER OF MODULES	2,888	EACH				
MODULE STRING LENGTH	19	EACH				
TOTAL AVAILABLE ACRES	4.0	ACRES				
RACK TYPE	FIXED TILT	-				
BALLAST	ABOVE GROUND CONCRETE					
RACK ANGLE	25	DEGREES				
RACK PITCH (TOE TO TOE)	13.5	FEET				

NOTES:

- 1. POINT OF INTERCONNECT (POI) AND INVERTER/TRANSFORMER LOCATION MAY CHANGE DURING DETAILED DESIGN.
- RACK TILT AND PITCH TO BE OPTIMIZED DURING DETAILED DESIGN.
 8' CHAIN LINK FENCE IS 7' HIGH WITH ADDITIONAL 1' OF 3 STRANDS OF



PRELIMINARY - NOT FOR CONSTRUCTION

And a state of the					
	ES DESIGNED		TOWN OF	FALMOUTH	
	HGP		FALMOUT	H, MAINE	
	DRAWN		1 MWAC PV I	NSTALLATION	
	CHECKED		ARRAY	LAYOUT	
	ES APPROVED				
		01/12/16			REV.
	REVIEW 1	DATE AS NOTED	CIRC	GA-02	Α
	REVIEW 2	SCALE			





GENERAL NOTES

- 1. TYPICAL SCHEME TO INCLUDE 27-UNDER VOLTAGE, 59-OVERVOLTAGE, 81-OVER/UNDER FREQUENCY, 50/51-INSTANTANEOUS/OVERCURRENT PROTECTION RELAY, BUT PROTECTION SCHEME FOR PV FACILITY TO BE DEVELOPED DURING DETAILED DESIGN WITH RESULTS OF IMPACT AND SYSTEM STUDIES.
- 2. AC VOLTAGE DROP LESS THAN 1% AVERAGE FROM INVERTER TO SWITCHGEAR LOCATION.
- 3. TRANSFORMER FUSE SIZE PER MANUFACTURER'S RECOMMENDATION DETERMINED DURING DETAILED DESIGN.
- 4. 1MW SKID CONSISTS OF ONE (1) 1000kVA TRANSFORMER AND TWO (2) 500KW (@50°C) 1000V UL1741 COMPLIANT INVERTER.
- 6. INVERTER POWER FACTOR IS VARIABLE TO MEET CENTRAL MAINE POWER (CMP) REQUIREMENTS.
- 7. TOWN OF FALMOUTH (TOF).

REFERENCE NOTES

- 1 THREE (3) SINGLE 15 KV MV105 4/0 KCMIL ALUMINUM CONDUCTORS WITH 1/3 CONCENTRIC NEUTRAL AND GROUND, EPR-CONC-ENCAP HDPE, DIRECT BURIED.
- 2 VISIBLE THREE (3) PHASE GANG-OPERATED DISCONNECT SWITCH ACCESSIBLE AND LOCKABLE BY THE TRANSMISSION PROVIDER, WITH SWITCH STATUS DETERMINABLE BY SIGHT.
- 3 POINT OF INTERCONNECTION AT 12.47kV DISTRIBUTION LINE COORDINATES ?N, ?W, APPROXIMATELY ? FEET FROM THE COORDINATES ?N, ?W, APPROXIMATELY ? FEET FROM THE PROJECT SUBSTATION.

IE _	AT			4221 BALLOON PARK RD. NE ALBUQUERQUE, NM 87109	PROJECT 1
		REFERENCE ITEMS	REV	DESCRIPTION	DATE
F					
E			-		
E					
			A	FOR CLIENT REVIEW	01/08/15

PRELIMINARY - NOT FOR CONSTRUCTION

TAP

3 2/0 AAC

(3) CT BY

CMP

TRANSITION FROM UNDERGROUND (UG) TO OVERHEAD (OH) IS VIA RISER POLE AT S&C INTEL SWITCH

POINT OF INTERCONNECTION

NO: 24	46471		EMS DESIGNED HGP DRAWN		TOWN OF FALMOUT	FALMOUTH H MAINE	
DES	СНК	APP	EMS CHECKED EMS APPROVED		SINGLE LIN	e diagram	
EMS	JW	EMS	REVIEW 1 REVIEW 2	01/08/15 Date AS NOTED SCALE	© TRC	E-01	REV. A



DEVICE FUNCTION NUMBERS LEGEND:



Forms and Agreements 4: Level 2, Level 3 and Level 4 Interconnection Application

A Customer-Generator applicant ("Applicant") hereby makes application to _______(Utility or T & D Utility) to install and operate a generating facility interconnected with the ______ utility system. This application will be considered as an application for interconnection of generators under Expedited interconnection review provided the generator is not greater than 2 MW but shall serve as an Application for Standard interconnection review if greater than 2 MW or if Expedited review does not qualify the generator for interconnection.

Written applications should be submitted by mail, e-mail or fax to [[*insert utility name*]], as follows:

[<i>Utility</i>]:	
[Utility's address]:	
Fax Number:	
E-Mail Address:	
[Utility] Contact Name:	
[Utility] Contact Title:	

An application is a Complete Application when it provides all applicable information required below. (Additional information to evaluate a request for interconnection may be required and will be so requested from the Interconnection Applicant by Utility after the application is deemed complete).

Section 1. Applicant Information

Mailing Address:	
City:	

State: _____ Zip Code: _____

Facility Location (if different from above):

Telephone (Daytime):	
Telephone (Evening):	
Fax Number:	
E-Mail Address:	

(Utility)

(Existing Account Number, if generator to be interconnected on the Customer side of a utility revenue meter)

Type of Interconnect Service Applied for	_ Network Resource,
Energy Only, Load Response (no export)	Net metering
Section 2. Generator Qualifications	
Data apply only to the Small Generating Facility, r Energy Source: Solar Wind Hydro River):	not the Interconnection Facilities. Hydro Type (e.g. Run-of-
Diesel Natural Gas Fuel Oil Other (s	tate type)
Prime Mover: Fuel Cell Recip. Engine G Microturbine PV Other	as Turb Steam Turb
Type of Generator: SynchronousInduction _	Inverter
Generator Nameplate Rating:kW (Typic Generator Nameplate kVA:	cal)
Interconnection Customer or Customer-Site Load state)	kW (if none, so
Typical Reactive Load (if known): Maximum Physical Export Capability Requested:	kW
List components of the Small Generating Facility I certified	Equipment Package that are currently
Equipment Type	Certifying Entity
2.	
3.	
4	
5	

Is the prime mover compatible with the certified protective relay package? Yes ____No ____

Generator (or solar collector):

Manufacturer, Model Name & Number:

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Version Number:
Individual Generator Power Factor: Rated Power Factor: Leading: Lagging:
Total Number of Generators in wind farm to be interconnected pursuant to this Interconnection Request: Elevation:Single-phase Three- phase
Inverter Manufacturer, Model Name & Number (if used):
List of adjustable set points for the protective equipment or software:
Note: A completed Power Systems Load Flow data sheet must be supplied with the Interconnection Request.
Small Generating Facility Characteristic Data (for inverter-based machines)
Max design fault contribution current: Instantaneous or RMS?
Start-up requirements:

Small Generating Facility Characteristic Data (for rotating machines)

RPM Frequency: ______ (*) Neutral Grounding Resistor (If Applicable): ______

Synchronous Generators:

Direct Axis Synchronous Reactance, Xd:	P.U.
Direct Axis Transient Reactance, X' d:	P.U.
Direct Axis Subtransient Reactance, X" d:	P.U.
Negative Sequence Reactance, X2	P.U.
Zero Sequence Reactance, X0:	P.U.

KVA Base:

Field Volts:	
Field Amperes:	

Induction Generators:

Motoring Power (kW):		
I ² t or K (Heating Time Constant):		
Rotor Resistance, Rr:		
Stator Resistance, Rs:		
Stator Reactance, Xs:		
Rotor Reactance, Xr:		
Magnetizing Reactance, Xm:		
Short Circuit Reactance, Xd":		
Exciting Current:		
Temperature Rise:		
Frame Size:		
Design Letter:		
Reactive Power Required In Vars	(No Load):	
Reactive Power Required In Vars	(Full Load):	
Total Rotating Inertia, H:	Per Unit on kV	A Base

Note: Please contact the T & D Utility prior to submitting the Interconnection Request to determine if the specified information above is required.

Excitation and Governor System Data for Synchronous Generators Only

Provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be determined to be required by applicable studies. A copy of the manufacturer's block diagram may not be substituted.

Section 3. Interconnection Facilities Information

Will a transformer be used between the generator and the Point of Common Coupling? ____Yes ____No

Will the transformer be provided by the Interconnection Customer? _____Yes _____No

Transformer Data (If Applicable, for Interconnection Customer-Owned Transformer):

Is the transformer: Single-phase _____Three phase ____? Size: ______ kVA Transformer Impedance: ______percent on ______kVA Base

If Three Phase:				
Transformer Primary:	Volts _	Delta	Wye	Wye Grounded
Transformer Secondary:	Volts _	Delta	Wye	Wye Grounded
Transformer Tertiary:	Volts _	Delta	Wye	Wye Grounded

Transformer Fuse Data (If Applicable, for Interconnection Customer-Owned Fuse):

(Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer:	Туре:	Size:	
Speed:			

Interconnecting Circuit Breaker (if applicable):

Manufacturer: _____ Type: _____ Load Rating (Amps): _____ Interrupting Rating (Amps): _____ Trip Speed (Cycles): _____

Interconnection Protective Relays (If Applicable):

If Microprocessor-Controlled:

List of Functions and Adjustable Setpoints for the protective equipment or software:

Setpoint Function	Minim	num Maximum	
1			
3			
4			
o6			
If Discrete Components: (Enclose Copy of any Prop	osed Time-Overcurr	ent Coordination Curves)	
Manufacturer: Proposed Setting:	Туре:	Style/Catalog No.:	
Manufacturer: Proposed Setting:	Type:	Style/Catalog No.:	
Manufacturer:	Туре:	Style/Catalog No.:	

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Proposed Setting:		
Manufacturer: Proposed Setting:	_Туре:	Style/Catalog No.:
Manufacturer: Proposed Setting:	_Туре:	Style/Catalog No.:
Current Transformer Data (If A (Enclose Copy of Manufacturer's	pplicable): Excitation and Ratio	Correction Curves)
Manufacturer: Proposed Ratio Connection:	_Туре:	Accuracy Class:
Manufacturer: Proposed Ratio Connection:	_Туре:	Accuracy Class:
Potential Transformer Data (If	Applicable):	
Manufacturer: Proposed Ratio Connection:	_Туре:	Accuracy Class:
Manufacturer: Proposed Ratio Connection:	_Туре:	Accuracy Class:

Section 4. General Information

Enclose copy of site electrical one-line diagram showing the configuration of all Small Generating Facility equipment, current and potential circuits, and protection and control schemes. This one-line diagram must be signed and stamped by a licensed Professional Engineer if the Small Generating Facility is larger than 50 kW. Is One-Line Diagram enclosed? Yes _____No _____

Enclose copy of any site documentation that indicates the precise physical location of the proposed Small Generating Facility (e.g., USGS topographic map or other diagram or documentation).

Proposed location of protective interface equipment on property (include address if different from the

Interconnection Customer's address):

Enclose copy of any site documentation that describes and details the operation of the protection and control schemes.

Is Available Documentation Enclosed? Yes _____No _____

Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable). Are Schematic Drawings Enclosed? Yes _____No ____

Section 5. Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in the Interconnection Application is true and correct. I also agree to install a Warning Label provided by (utility) on or near my service meter location. Generating systems must be compliant with IEEE, NEC, ANSI, and UL standards, where applicable. By signing below, the Applicant also certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.

Signed:_____

__Date:____

Section 6. Information Required Prior to Physical Interconnection (Not required as part of the application, unless available at time of application.)

Installing Electrician: License No.:	Firm:		
Mailing Address:			
City:	State:	Zip Code:	
Telephone:			
Installation Date:	Interconnection Date:		
Signed:		Date:	
(Inspector - if required)			

(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

Forms and Agreements 5: Level 2, Level 3 and Level 4 Interconnection Agreement

This Agreement is made and entered into this ____ day of _____ by and between ______, a _____ organized and existing under the laws of the State of ______, a _____, ("Interconnection Customer,") and ______, a ______, existing under the laws of the State of Maine, (" T & D Utility "). Interconnection Customer and T & D Utility each may be referred to as a "Party," or collectively as the "Parties."

Recitals:

Whereas, Interconnection Customer is proposing to develop a Small Generator Facility, or generating capacity addition to an existing Small Generator Facility, consistent with the Interconnection Request completed by Interconnection Customer on _____; and

Whereas, Interconnection Customer desires to interconnect the Small Generator Facility with T & D Utility 's Electric Distribution System.

Now, therefore, in consideration of and subject to the mutual covenants contained herein, the Parties agree as follows:

Article 1. Scope and Limitations of Agreement

- 1.1 This Agreement shall be used for all approved Level 2, Level 3, and Level 4 Interconnection Requests according to the procedures set forth in the Standard Small Generator Interconnection Rule.
- 1.2 This Agreement governs the terms and conditions under which the Small Generator Facility will interconnect to, and operate in Parallel with, T & D Utility 's Electric Distribution System.
- 1.3 This Agreement does not constitute an agreement to purchase or deliver the Interconnection Customer's power.
- 1.4 Nothing in this Agreement is intended to affect any other agreement between T & D Utility and the Interconnection Customer. However, in the event that the provisions of this agreement are in conflict with the provisions of the T & D Utility tariff, the T & D Utility tariff shall control.
- 1.5 Responsibilities of the Parties
 - 1.5.1 The Parties shall perform all obligations of this Agreement in accordance with all Applicable Laws and Regulations, and Operating Requirements.
 - 1.5.2 The Interconnection Customer shall construct, interconnect, operate and maintain its Small Generator Facility, and construct, operate, and maintain its Interconnection Equipment in accordance with the applicable manufacturer's recommended maintenance schedule, in accordance with this Agreement.
 - 1.5.3 T & D Utility shall construct, own, operate, and maintain its Electric Distribution System and Interconnection Facilities in accordance with this Agreement.

- 1.5.4 The Interconnection Customer agrees to construct its facilities or systems in accordance with applicable specifications that meet or exceed the National Electrical Code, the American National Standards Institute, IEEE, Underwriters Laboratories, and any other Operating Requirements.
- 1.5.5 Each Party shall operate, maintain, repair, and inspect, and shall be fully responsible for the facilities that it now or subsequently may own unless otherwise specified in the Exhibits to this Agreement and shall do so in a manner as to reasonably minimize the likelihood of a disturbance adversely affecting or impairing the other party
- 1.5.6 Each Party shall be responsible for the safe installation, maintenance, repair and condition of their respective lines and appurtenances on their respective sides of the Point of Common Coupling.
- 1.6 Parallel Operation Obligations Once the Small Generator Facility has been authorized to commence parallel operation, the Interconnection Customer shall abide by all written rules and procedures developed by the T & D Utility which pertain to the parallel operation of the Small Generator Facility, copies of which are provided as an Exhibit [] to this Agreement.
- 1.7 Reactive Power

The Interconnection Customer shall design its Small Generator Facility to maintain a composite power delivery at continuous rated power output at the Point of Common Coupling at a power factor within the range of 0.95 leading to 0.95 lagging.

Article 2. Inspection, Testing, Authorization, and Right of Access

- 2.1 Equipment Testing and Inspection The Interconnection Customer shall test and inspect its Small Generator Facility and Interconnection Facilities prior to interconnection, and in accordance with IEEE 1547 Standards.
- 2.2 Certificate of Completion

Prior to commencing parallel operation, the Interconnection Customer shall provide T & D Utility with a Certificate of Completion in the form of Attachment 6 of the Interconnection Forms and Agreements. The Certificate of Completion must either be signed by an electrical inspector with the authority to approve the interconnection or be accompanied by the electrical inspector's own form authorizing interconnection of the Small Generation Facility.

2.3 Parallel Operation Obligations

The Interconnection Customer shall abide by all permissible written rules and procedures developed by the T & D Utility which pertain to the parallel operation of the Small Generation Facility. In the event of conflicting provisions the Interconnection Procedures shall take precedence over the T & D Utility's rule or procedure. Copies of the Utilities rules and procedures for parallel operation are either provided as an Exhibit to this Agreement or an Exhibit that provides a reference to a website where copies of the rule or procedure is maintained.

2.2 Right of Access

At reasonable hours, and upon reasonable notice, or at any time without notice in the event of an emergency or hazardous condition, Company shall have access to Customer's premises for any reasonable purpose in connection with the performance of the obligations imposed on it by this Agreement or if necessary to meet its legal obligation to provide service to its Customers.

Article 3. Effective Date, Term, Termination, and Disconnection

3.1 Effective Date

This Agreement shall become effective upon execution by the Parties.

3.2 Term of Agreement

This Agreement shall become effective on the Effective Date and shall remain in effect perpetually, unless terminated earlier in accordance with Article 3.3 of this Agreement.

3.3 Termination

No termination shall become effective until the Parties have complied with all Applicable Laws and Regulations applicable to such termination.

- 3.3.1 The Interconnection Customer may terminate this Agreement at any time by giving T & D Utility 20 Business Days written notice.
- 3.32 Either Party may terminate this Agreement after Default pursuant to Article 6.6.
- 3.33 Upon termination of this Agreement, the Small Generator Facility will be disconnected from T & D Utility's Electric Distribution System. The termination of this Agreement shall not relieve either Party of its liabilities and obligations, owed or continuing at the time of the termination.
- 3.3.4 The provisions of this Article shall survive termination or expiration of this Agreement.
- 3.4 Temporary Disconnection

The T & D Utility may temporarily disconnect the Small Generator Facility from its Electric Distribution System for so long as reasonably necessary in the event one or more of the following conditions or events occurs:

3.4.1 Emergency Conditions

"Emergency Condition" shall mean a condition or situation: (1) that in the judgment of the Party making the claim is imminently likely to endanger life or property; or (2) that, in the case of T & D Utility, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to the Electric Distribution System, T & D Utility 's Interconnection Facilities or (3) that, in the case of the Interconnection Customer, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to the Electric Distribution System, T & D Utility 's Interconnection Facilities or (3) that, in the case of the Interconnection Customer, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to, the Small Generator Facility or the Interconnection Equipment . Under Emergency Conditions, T & D Utility or the Interconnection Customer may immediately suspend interconnection service and temporarily disconnect the Small Generator Facility. T & D Utility shall notify the Interconnection Customer promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect the

Interconnection Customer's operation of the Small Generator Facility. The

Interconnection Customer shall notify T & D Utility promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect T & D Utility's Electric Distribution System. To the extent information is known, the notification shall describe the Emergency Condition, the extent of the damage or deficiency, the expected effect on the operation of both Parties' facilities and operations, its anticipated duration, and the necessary corrective action.

3.4.2 Routine Maintenance, Construction, and Repair

T & D Utility may interrupt interconnection service or curtail the output of the Small Generator Facility and temporarily disconnect the Small Generator Facility from T & D Utility's Electric Distribution System when necessary for routine maintenance, construction, and repairs on T & D Utility's Electric Distribution System. T & D Utility shall provide the Interconnection Customer with five Business Days notice prior to such interruption. T & D Utility shall use reasonable efforts to coordinate such reduction or temporary disconnection with the Interconnection Customer.

3.4.3 Forced Outages

During any forced outage, T & D Utility may suspend interconnection service to effect immediate repairs on T & D Utility's Electric Distribution System. T & D Utility shall use reasonable efforts to provide the Interconnection Customer with prior notice. If prior notice is not given, T & D Utility shall, upon request, provide the Interconnection Customer written documentation after the fact explaining the circumstances of the disconnection.

3.4.4 Adverse Operating Effects

T & D Utility shall provide the Interconnection Customer with a written notice of its intention to disconnect the Small Generator Facility if, based on Good Utility Practice, the T & D Utility determines that operation of the Small Generator Facility will likely cause disruption or deterioration of service to other Customers served from the same electric system, or if operating the Small Generator Facility could cause damage to T & D Utility's Electric Distribution System. Supporting documentation used to reach the decision to disconnect shall be provided to the Interconnection Customer upon request. T & D Utility may disconnect the Small Generator Facility if, after receipt of the notice, the Interconnection Customer fails to remedy the adverse operating effect within a reasonable time which shall be at least five Business Days from the date the Interconnection Customer receives the T & D Utility's written notice supporting the decision to disconnect, unless Emergency Conditions exist in which case the provisions of Article 3.4.1 apply.

3.4.5 Modification of the Small Generator Facility

The Interconnection Customer must receive written authorization from T & D Utility before making any change to the Small Generator Facility that may have a material impact on the safety or reliability of the Electric Distribution System. Such authorization shall not be unreasonably withheld. Modifications shall be done in accordance with Good Utility Practice. If the Interconnection Customer makes such modification without T & D Utility's prior written authorization, the latter shall have the right to temporarily disconnect the Small Generator Facility.

3.4.6 Reconnection

The Parties shall cooperate with each other to restore the Small Generator

Facility, Interconnection Facilities, and T & D Utility 's Electric Distribution System to their normal operating state as soon as reasonably practicable following a temporary disconnection.

Article 4. Cost Responsibility for Interconnection Facilities and Distribution Upgrades

- 4.1 Interconnection Facilities
 - 4.1.1 The Interconnection Customer shall pay for the cost of the Interconnection Facilities itemized in the Exhibits to this Agreement. If a Facilities Study was performed, T & D Utility shall identify its Interconnection Facilities necessary to safely interconnect the Small Generator Facility with T & D Utility's Electric Distribution System, the cost of those facilities, and the time required to build and install those facilities.
 - 4.1.2 The Interconnection Customer shall be responsible for its share of all reasonable expenses, including overheads, associated with (1) owning, operating, maintaining, repairing, and replacing its Interconnection Equipment, and (2) operating, maintaining, repairing, and replacing T & D Utility's Interconnection Facilities as set forth in the Exhibits to this Agreement.
- 4.2 Distribution Upgrades

T & D Utility shall design, procure, construct, install, and own any Distribution Upgrades. The actual cost of the Distribution Upgrades, including overheads, shall be directly assigned to the Interconnection Customer.

Article 5. Billing, Payment, Milestones, and Financial Security

- 5.1 Billing and Payment Procedures and Final Accounting
 - 5.1.1 T & D Utility shall bill the Interconnection Customer for the design, engineering, construction, and procurement costs of T & D Utility provided Interconnection Facilities and Distribution Upgrades contemplated by this Agreement as set forth in the Exhibits to this Agreement, on a monthly basis, or as otherwise agreed by the Parties. The Interconnection Customer shall pay each bill within thirty (30) calendar days of receipt, or as otherwise agreed to by the Parties.
 - 5.1.2 Within ninety (90) calendar days of completing the construction and installation of T & D Utility 's Interconnection Facilities and Distribution Upgrades described in the Exhibits to this Agreement, T & D Utility shall provide the Interconnection Customer with a final accounting report of any difference between (1) the actual cost incurred to complete the construction and installation and the budget estimate provided to the Interconnection Customer and a written explanation for any significant variation. (2) the Interconnection Customer's previous deposit and aggregate payments to T & D Utility for such Interconnection Facilities and Distribution Upgrades. If the Interconnection Customer's cost responsibility exceeds its previous deposit and aggregate payments, T & D Utility shall invoice the Interconnection Customer for the amount due and the Interconnection Customer shall make payment to T & D Utility within thirty (30) calendar days. If the Interconnection Customer's previous deposit and aggregate payments exceed its cost responsibility under this Agreement, T & D Utility shall refund to the Interconnection Customer an amount equal to the

difference within thirty (30) calendar days of the final accounting report.

5.2 Interconnection Customer Deposit

At least twenty (20) Business Days prior to the commencement of the design, procurement, installation, or construction of a discrete portion of T & D Utility 's Interconnection Facilities and Distribution Upgrades, the Interconnection Customer shall provide T & D Utility with a deposit equal to 50 percent of the cost estimated for its Interconnection Facilities prior to its beginning design of such facilities.

Article 6. Assignment, Liability, Indemnity, Force Majeure, Consequential Damages, and Default

6.1 Assignment

This Agreement may be assigned by either Party upon fifteen (15) Business Days prior written notice, and with the opportunity to object by the other Party. When required, consent to assignment shall not be unreasonably withheld; provided that:

- 6.1.1 Either Party may assign this Agreement without the consent of the other Party to any affiliate of the assigning Party with an equal or greater credit rating and with the legal authority and operational ability to satisfy the obligations of the assigning Party under this Agreement;
- 6.1.2 The Interconnection Customer shall have the right to assign this Agreement, without the consent of T & D Utility, for collateral security purposes to aid in providing financing for the Small Generator Facility;
- 6.1.3 Any attempted assignment that violates this Article is void and ineffective. Assignment shall not relieve a Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof. An assignee is responsible for meeting the same obligations as the Interconnection Customer.
- 6.2 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, consequential, or punitive damages, except as authorized by this Agreement.

- 6.3 Indemnity
 - 6.3.1 This provision protects each Party from liability incurred to third Parties as a result of carrying out the provisions of this Agreement. Liability under this provision is exempt from the general limitations on liability found in Article 6.2.
 - 6.3.2 The Parties shall at all times indemnify, defend, and hold the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third Parties, arising out of or resulting from the indemnified Party's action or failure to meet its obligations under this Agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

- 6.3.3 If an indemnified person is entitled to indemnification under this Article as a result of a claim by a third party, and the indemnifying Party fails, after notice and reasonable opportunity to proceed under this Article, to assume the defense of such claim, such indemnified person may at the expense of the indemnifying Party contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.
- 6.3.4 If an indemnifying party is obligated to indemnify and hold any indemnified person harmless under this Article, the amount owing to the indemnified person shall be the amount of such indemnified person's actual loss, net of any insurance or other recovery.
- 6.3.5 Promptly after receipt by an indemnified person of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in this Article may apply, the indemnified person shall notify the indemnifying party of such fact. Any failure of or delay in such notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the indemnifying party.
- 6.4 Consequential Damages

Neither Party shall be liable under any provision of this Agreement for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability; provided, however, that damages for which a Party may be liable to the other Party under another agreement will not be considered to be special, indirect, incidental, or consequential damages hereunder.

- 6.5 Force Majeure
 - 6.5.1 As used in this Article, a Force Majeure Event shall mean "any act of God, labor disturbance, act of the public enemy, war, acts of terrorism, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure Event does not include an act of negligence or intentional wrongdoing."
 - 6.5.2 If a Force Majeure Event prevents a Party from fulfilling any obligations under this Agreement, the Party affected by the Force Majeure Event (Affected Party) shall promptly notify the other Party of the existence of the Force Majeure Event. The notification must specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the Affected Party is taking to mitigate the effects of the event on its performance, and if the initial notification was verbal, it should be promptly followed up with a written notification. The Affected Party shall keep the other Party informed on a continuing basis of developments relating to the Force Majeure Event until the event ends. The Affected Party will be entitled to suspend or modify its performance of obligations under this Agreement (other than the obligation to make payments) only to the extent that the effect of the Force Majeure Event cannot be reasonably mitigated. The Affected Party will use reasonable efforts to resume its performance as soon as possible.

6.6 Default

- 6.6.1 No Default shall exist where such failure to discharge an obligation (other than the payment of money) is the result of a Force Majeure Event as defined in this Agreement, or the result of an act or omission of the other Party. Upon a Default, the non-defaulting Party shall give written notice of such Default to the defaulting Party. Except as provided in Article 6.6.2, the defaulting Party shall have 60 calendar days from receipt of the Default notice within which to cure such Default; provided however, if such Default is not capable of cure within 60 calendar days, the defaulting Party shall commence such cure within 20 calendar days after notice and continuously and diligently complete such cure within six months from receipt of the Default notice; and, if cured within such time, the Default specified in such notice shall cease to exist.
- 6.6.2 If a Default is not cured as provided for in this Article, or if a Default is not capable of being cured within the period provided for herein, the non-defaulting Party shall have the right to terminate this Agreement by written notice at any time until cure occurs, and be relieved of any further obligation hereunder and, whether or not that Party terminates this Agreement, to recover from the defaulting Party all amounts due hereunder, plus all other damages and remedies to which it is entitled at law or in equity. The provisions of this Article will survive termination of this Agreement.

Article 7. Insurance

The Interconnection Customer may be required by the T & D Utility to carry liability insurance for its interconnection subject to the restrictions and limitations found in Maine Public Utility Commission Rule Ch. 324 §12(F). To the extent T & D Utility requires liability insurance, its requirements for the Interconnecting Customer and any required documentation of coverage shall be included herewith under Exhibit ().

Article 8. Dispute Resolution (see provisions in the Maine Public Utility Commission's Standard Small Generator Interconnection Rules)

Article 9. Miscellaneous

- 9.1 Governing Law, Regulatory Authority, and Rules The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of Maine, without regard to its conflicts of law principles. This Agreement is subject to all Applicable Laws and Regulations. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.
- 9.2 Amendment The Parties may amend this Agreement by a written instrument duly executed by both Parties.
- 9.3 No Third-Party Beneficiaries

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and where permitted, their assigns.

9.4 Waiver

- 9.4.1 The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.
- 9.4.2 Any waiver at any time by either Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from T & D Utility. Any waiver of this Agreement shall, if requested, be provided in writing.

9.5 Entire Agreement

This Agreement, including all Exhibits, constitutes the entire Agreement between the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, between the Parties with respect to the subject matter of this Agreement. There are no other agreements, representations, warranties, or covenants which constitute any part of the consideration for, or any condition to, either Party's compliance with its obligations under this Agreement.

9.6 Multiple Counterparts

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

9.7 No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or partnership liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

9.8 Severability

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the Parties shall negotiate in good faith to restore insofar as practicable the benefits to each Party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

9.9 Environmental Releases

Each Party shall notify the other Party, first orally and then in writing, of the release any hazardous substances, any asbestos or lead abatement activities, or any type of remediation activities related to the Small Generator Facility or the Interconnection Facilities, each of which may reasonably be expected to affect the other Party. The notifying Party shall (1) provide the notice as soon as practicable, provided such Party makes a good faith effort to provide the notice no later than 24 hours after such Party becomes aware of the occurrence, and (2) promptly furnish to the other Party copies of any publicly available reports filed with any governmental authorities addressing such events.

9.10 Subcontractors

Nothing in this Agreement shall prevent a Party from utilizing the services of any

subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain primarily liable to the other Party for the performance of such subcontractor.

- 9.10.1 The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall T & D Utility be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.
- 9.10.2 The obligations under this Article will not be limited in any way by any limitation of subcontractor's insurance.

Article 10. Notices

10.1 General

Unless otherwise provided in this Agreement, any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given if delivered in person, delivered by recognized national currier service, or sent by first class mail, postage prepaid, to the person specified below:

If to Interconnection Customer:
Interconnection Customer:

Attention:				
Address: City: Phone:	Fax:	State: E-mail	Zip:	
If to T & D Utility : T & D Utility: Attention:				
Address: City: Phone:	Fax:	State: E-mail	Zip:	

10.2.1 Billing and Payment

Billings and payments shall be sent to the addresses set out below:

If to Interconn Interconnection Attention:	ection Customer: Customer:			
Address: City:		State:	Zip:	

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	Phone:	Fax:	E-ı	nail:	
	If to T & D Utility: T & D Utility: Attention:				
	Address:				
	City: Phone:	Fax:	State: E-ı	Zıp: mail:	
10.3	Designated Operating Representative The Parties may also designate operating representatives to conduct the communications which may be necessary or convenient for the administration of this Agreement. This person will also serve as the point of contact with respect to operations and maintenance of the Party's facilities.				
	Interconnection Custome Attention:	er:			
	Address: City: Phone:	Fax:	State: E-	Zip: mail:	
	If to T & D Utility: T & D Utility: Attention:				
	Address:		State:	Zin	

City:	State:	Zip:
Phone:	Fax:	_ E-mail:

Article 11. Signatures

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective duly authorized representatives.

For the Transmission Provider:		
Title:	Date:	
For the Transmission Provider:		
Title:	Date:	
For the Interconnection Customer:		
Title:	Date:	
Exhibits (if any):		

Forms and Agreements 8: Interconnection System Impact Study Agreement

This agreement is made and entered into th	is	day of	by and
between	, a		organized
and existing under the laws of the State of _		, ("Interconnectio	on Customer,")
and	, a		
existing un	der the l	laws of the State of	

(" T & D Utility "). Interconnection Customer and T & D Utility each may be referred to as a "Party," or collectively as the "Parties."

Recitals:

Whereas, Interconnection Customer is proposing to develop a Small Generating Facility or generating capacity addition to an existing Small Generating Facility consistent with the Interconnection Request completed by Interconnection Customer on and:

Whereas, Interconnection Customer desires to interconnect the Generating Facility with T & D Utility 's Electric Distribution System;

Whereas, T & D Utility has completed an Interconnection Feasibility Study and provided the results of said study to Interconnection Customer (This recital to be omitted if the Parties have agreed to forego the Interconnection Feasibility Study.);

Whereas, Interconnection Customer has requested T & D Utility to perform an Interconnection System Impact Study to assess the impact of interconnecting the Generating Facility to T & D Utility 's Electric Distribution System;

Now, therefore, in consideration of and subject to the mutual covenants contained herein the Parties agree as follows:

- 1. When used in this agreement, with initial capitalization, the terms specified shall have the meanings indicated. Terms used in this agreement with initial capitalization but not defined in this agreement shall have the meanings specified in Attachment 1 of the Standard Small Generator Interconnection Forms.
- Interconnection Customer elects and T & D Utility shall cause to be performed an Interconnection System Impact Study consistent with §11 of the Standard Small Generator Interconnection Rule.
- 3. The scope of the Interconnection System Impact Study shall be subject to the assumptions set forth in Attachment A to this agreement.
- 4. The Interconnection System Impact Study will be based upon the results of the Interconnection Feasibility Study and the technical information provided by Interconnection Customer in the Interconnection Request. T & D Utility reserves the right to request additional technical information from Interconnection Customer as may reasonably become necessary consistent with Good Utility Practice during the course of the Interconnection System Impact Study. If Interconnection Customer modifies its designated Point of Interconnection, Interconnection Request, or the technical information provided therein is modified, the time to

complete the Interconnection System Impact Study may be extended.

- 5. The Interconnection System Impact Study report shall provide the following information:
 - 5.1. Identification of any circuit breaker short circuit capability limits exceeded as a result of the interconnection,
 - 5.2 Identification of any thermal overload or voltage limit violations resulting from the interconnection,
 - 5.3 Identification of any instability or inadequately damped response to system disturbances resulting from the interconnection and
 - 5.4 Description and non-binding, good faith estimated cost of facilities required to interconnect the Generating Facility to T & D Utility 's Electric Distribution System and to address the identified short circuit, instability, and power flow issues.
- 6. T & D Utility may require a study deposit of the lesser of 50 percent of estimated non-binding good faith study costs or \$3,000.
- 7. The distribution Interconnection System Impact Study, if required, shall be completed and the results transmitted to Interconnection Customer within thirty Calendar Days after this agreement is signed by the Parties. The distribution Interconnection System Impact Study, if required, shall be completed and the results transmitted to Interconnection Customer within forty-five Calendar Days after this agreement is signed by the Parties, or in accordance with T & D Utility 's queuing procedures.
- 8. Study fees shall be based on actual costs and will be invoiced to Interconnection Customer after the study is transmitted to Interconnection Customer. The invoice shall include an itemized listing of employee time and costs expended on the study.
- Interconnection Customer shall pay any actual study costs that exceed the deposit without interest within 30 Calendar Days on receipt of the invoice. T & D Utility shall refund any excess amount without interest within thirty Calendar Days of the invoice.

In witness thereof, the Parties have caused this agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

[[Insert name of T & D Utility]]	
Signed:	
Name:	
(Printed)	
[[Insert name of Interconnection Customer]]	
Signed:	
Name:	
(Printed)	

Attachment to Interconnection System Impact Study Agreement:

Assumptions Used in Conducting the Interconnection System Impact Study

The Interconnection System Impact Study shall be based upon the results of the Interconnection Feasibility Study, subject to any modifications in accordance with Section 6.5 of the Standard Small Generator Interconnection Rule, and the following assumptions:

- 1. Designation of Point of Interconnection and configuration to be studied.
- 2. Designation of alternative Points of Interconnection and configuration.

Note: 1 and 2 are to be completed by the Interconnection Customer. Other assumptions (listed below) are to be provided by Interconnection Customer and T & D Utility.