



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

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TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

December 30, 2011

William Friel
Town of Canton
801 Washington Street (Memorial Hall)
Canton, Massachusetts 02021

and

Frances McMahon, Esq.
Southern Sky Renewable Energy, LLC
40 Court Street, Suite 1110
Boston, MA 02108

RE: Approval with Conditions
Application for: BWP SW 11: Landfill – Major Modification
Solar Photovoltaic Array
Transmittal #: X241291

AT: Canton Landfill
Pine Street
Canton, Massachusetts
Facility ID#: 39139
Regulated Object No. 172393

Dear Mr. Friel and Mr. McMahon:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section (the "MassDEP"), has completed its administrative and technical review of the referenced Landfill – Major Modification permit application (the "Application") for the Canton Landfill (the "Landfill"). The Application was prepared and submitted on behalf of the Town of Canton and Southern Sky Renewable Energy, LLC (SSRE) (collectively the "Applicants") by GZA Geo-Environmental, Incorporated (the "Consultant") of Providence, Rhode Island. The Application proposes design changes to the solar photovoltaic ("PV") array permitted to be constructed at the Landfill through a Post Closure Use-Major permit issued by MassDEP on December 30, 2010.

MassDEP has determined the Application is administratively and technically complete and hereby approves the Landfill-Major Modification application, subject to conditions as specified herein.

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868
MassDEP Website: www.mass.gov/dep

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I. SUBMITTALS:

MassDEP has reviewed the Application pursuant to 310 CMR 19.000: *Solid Waste Regulations*, 310 CMR 19.143: *Post-Closure Use of Landfills* and MassDEP's *Landfill Technical Guidance Manual*, May 1997 (the "Manual"). The Application consists of the following:

- A. The permit transmittal form, application forms for a Landfill – Major Modification (BWP SW 11), a narrative describing the proposed changes to the original design prepared by the Consultant, revised engineering calculations, and three engineering drawings received by MassDEP on December 1, 2011.
- B. Supplemental Application information, prepared by the Consultant, consisting of an e-mailed cover letter and one revised drawing received by MassDEP on December 21, 2011, in response to MassDEP technical comments.
- C. Supplemental information, received by e-mail on December 28, 2011 from the Consultant, consisting of the construction contractor's OSHA Health and Safety Plan in response to condition #6 of the Post Closure Use-Major permit issued by MassDEP on December 30, 2010.
- D. Supplemental Application information, received by e-mail on December 29, 2011 from the Consultant, consisting of *Surface Emission Monitoring Report- November 2011*, in response to condition #14 of the Post Closure Use-Major permit issued by MassDEP on December 30, 2010.

II. POST-CLOSURE USE PROPOSAL MODIFICATION SUMMARY:

On December 30, 2010, MassDEP approved an application submitted on behalf of the Town of Canton (the "Town") and Southern Sky Renewable Energy, LLC (SSRE) (transmittal No. X235567), prepared by the Consultant, proposing to construct and maintain a solar photovoltaic array (the "array") on the capped Landfill, consisting of the following components:

- Approximately 13,800 precast concrete foundations placed within the vegetative support layer;
- Approximately 24,000 PV modules installed on support racks placed on the concrete foundations;
- Approximately 51 inverters placed on concrete foundations (3 feet x 5 feet) located along the eastern end of the arrays rows;
- The panels are to be connected to the inverters using above ground wiring that will run through electrical conduit;
- A 1,200 square-foot concrete pad for electrical equipment;
- A 14-foot wide plywood or Dura-Mat temporary road to avoid damage to the final cover system.

The subject Application notifies MassDEP of a proposed change in the manufacturer/supplier of the solar photovoltaic array system from Talmage to RBI solar and summarized the significant differences between the new and formerly approved array system information.

The identified differences are as follows:

No.	Item	<u>Manufacturer/Supplier</u>	
		Talmage	RBI solar
1	Total No. of Foundations	13,800	19,800
2	Total PV Modules	24,000	19,800
3	PV Module Size (ft)	3.25 x 5.5	3.23 x 6.42
4	PV Module Layout per Assembly	6 x 14	1 x 2
5	PV module per assembly	84	2
6	Footing Area (sq ft)	1.25	3
7	Loads (Array, Ballast, Snow (lbs))	1500	<800
8	Panel Tilt (degrees)	2	5
9	Spacing Between Rows (ft)	5.5 – 7.5	3
10	Foundation placement	within topsoil layer	on top of topsoil layer

The Application included a revised analysis for the design loadings associated with the revised array and supporting structures. The Consultant determined that since the new array system loadings decreased (1500 pounds to less than 800 pounds) and the area of the footing system has increased (1.25 sq ft to 3 sq ft), the array loading would be more spread out than originally designed and the stress and possible settlement of the new array system would be less than previously calculated for the formerly proposed array system.

As proposed, at each array ballast foundation, a filter fabric will be placed directly on closely cut grass and overlain by 2 to 3 inches of compacted ¾" crushed stone. The stone bedding for the foundation will be semi-continuous with a 3 foot wide gap placed every 70 feet along the array.

The Application also included a site plan (PV-2) depicting two on-Landfill access roads not proposed in the original Post Closure Use application. One 10-foot wide access road will run north to south and a 12-foot wide access road will run east west. The roads will consist of a 3-inch layer of compacted crushed stone underlain by a layer of Woven Mirafi 500X geotextile fabric. The Consultant stated that materials/equipment used onsite will be low ground pressure track equipment. As a condition of this permit, should the Applicants propose to use the access roads for vehicles or equipment with a ground pressure greater than 7 psi during array construction or during array operation and maintenance, the Applicants must submit the proposed vehicles loading information and design calculations to MassDEP, demonstrating the adequacy of roadway design to protect the integrity of the existing final cover system.

The stormwater drainage for the Landfill was reanalyzed and it was determined that the minimal increase in stormwater flow above existing conditions would be adequately controlled.

A copy of the Applicants' Contractors site-specific health and safety plan for the construction of the PV array was submitted to MassDEP (for its files) and included protocols for monitoring of landfill gas and procedures for modifying construction practices if landfill gas is detected at levels deemed

unsuitable. Submittal of a Solar Photovoltaic Array operation and maintenance phase health and safety plan is required (**refer to condition # 8**).

III. PERMIT DECISION:

MassDEP, having determined the information in the Application is satisfactory and in accordance with its authority granted pursuant to M.G.L. c.111, s. 150A, and 310 CMR 19.000, hereby **APPROVES** the Landfill – Major Modification for modifications to the Post-Closure Use of the Canton Landfill for a solar photovoltaic array subject to the conditions identified herein.

IV. GENERAL PERMIT CONDITIONS:

1. **Permit Limitations:** The issuance of this approval is limited to the proposed solar photovoltaic array at the Canton landfill as detailed in the subject Application and, as applicable, in the application approved on December 30, 2010, and does not relieve the Applicants from the responsibility to comply with all other regulatory or permitting requirements. Post-Closure Use construction shall proceed in complete compliance with the approved plans, MassDEP's regulations and requirements, the Manual or as required by this Approval. This approval does not relieve the Town, as the owner of the Landfill, from its responsibility to comply with all post closure monitoring and maintenance requirements for the entire Landfill. There shall be no deviation from this Approval without prior consent from MassDEP. MassDEP shall be consulted prior to any deviation from the approved design. MassDEP may require a permit modification application for significant design modifications.
2. **Regulatory Compliance:** The Applicants shall fully comply with all applicable local, state and federal laws, regulations and policies, by-laws, ordinances and agreements. This includes but is not limited to, 310 CMR 19.142: *Post-Closure Requirements*, 310 CMR 19.143: *Post-Closure Use of Landfills*, and 310 CMR 19.043: *Standard Conditions*. Applicable federal regulations include, but are not limited to, 29 CFR Part 1910, OSHA standards governing employee health and safety in the workplace and all applicable local, state and federal electrical codes and permits, including National Electrical Code (NEC), 2011 Edition, Article 690-"Solar Photovoltaic (PV) Systems".
3. **Inspection and Repair of Settlement Areas:** Prior to construction of the solar array, any suspect settlement areas on the Landfill project area shall be surveyed to determine the lowest spot. The surrounding area should be then surveyed to find the "relief point" defined as the lowest surrounding area where ponded water would flow out. The elevation difference is defined as the "pond value". Minor settlement shall be defined as less than a 12-inch pond value. Any landfill project area that has undergone minor settlement shall be corrected by the placement of additional vegetative support soil to promote runoff and the area shall be reseeded. Any area repaired should be surveyed and the location marked on a plan with the pond value. Any future settlement should be recorded cumulatively. If/when the total settlement reaches 12-inches, the area will be considered to have suffered major settlement and appropriate repairs to eliminate ponding shall be performed.

Major settlement is defined as a pond value of 12-inches or more. When this occurs, the final cover system must be repaired to prevent water from ponding above the low permeability layer. The Applicants may either:

- 1) Strip off the final cover soils above the low permeability layer, inspect and repair the low permeability layer if/as necessary, place low permeability soil as necessary to promote runoff, replace final cover soils; or
- 2) Expose the low permeability soil or geomembrane in a trench around the perimeter of the settled area. Fill the area with soil to form slopes promoting runoff. Cap the area with a new low permeability membrane, GCL, or low permeability soil layer that ties into the existing low permeability layer at the identified perimeter. Place new drainage sand and vegetative support material over the new cap area.

Any proposal to repair minor settlement may be done as routine maintenance, provided that the Town reports the settlement to MassDEP and states the intent to perform repairs and provides MassDEP with final survey results and a summary write-up.

Any proposal to do a major settlement repair must be submitted within a Corrective Action Design (BWP SW 25) application since disruption of the final cover system will take place and repair details must be submitted and approved.

4. Notification of Construction: The Applicants shall notify MassDEP in writing (e-mail is acceptable) when the post-closure use construction commences and is completed.
5. Oversight Certification Report: All construction work shall be completed under the supervision of a Massachusetts Registered Professional Engineer who shall have sufficient staff on-site to provide quality assurance/quality control (QA/QC) oversight for all construction work at the Landfill. **Within ninety (90) days** of completing the installation of solar photovoltaic array, MassDEP shall be provided with a certification report. The report shall be signed and stamped by a Massachusetts-registered professional engineer and include, at a minimum, written certification from the supervising engineer that the project was performed in accordance with MassDEP regulations, requirements and the approved Post-Closure Use permit application and the approved Landfill major Modification application. At a minimum, the report shall include as-built drawings depicting all pertinent site features, equipment used etc.
6. Preconstruction Work: Prior to commencement of construction activities all Landfill gas passive vents, Landfill soil-gas monitoring wells, groundwater monitoring wells and other existing above ground structures on the Landfill cap and appurtenances shall be flagged for visibility, and protective barriers shall be placed around such structures as needed to prevent damage by vehicles accessing the area.
7. Health and Safety: The Applicants, Engineers and Applicants' Contractors are responsible to ensure all necessary precautions are taken to protect the health and safety of workers and the general public during both the construction phase and during the operation and maintenance phase of the post-closure use.

A copy of the site specific health and safety plan for the post-closure use **OPERATION AND MAINTENANCE** phase of the post-closure use, shall be submitted to MassDEP (for its files) prior to the commencement of operation of the PV array. The health and safety plan shall include, at a minimum;

- protocols for monitoring for landfill gas (i.e. methane, hydrogen sulfide, etc.), as needed,
- protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable.

8. Methane Monitoring: The Applicants' contractor Health and Safety Plan includes provisions for conducting methane monitoring during construction of the PV array. The Applicants shall notify MassDEP, if the methane concentrations in ambient air, excavations or trenches exceed 10% or more of the Lower Explosive Limit (LEL) (0.5% or 5000 ppm methane) in ambient air and/or excavations within two (2) hours of the measurement.

If the concentration of explosive gases exceeds 10% of the LEL in any building, structure, or underground utility conduits the Applicants shall comply with **condition #9 Landfill Gas Notification Requirements** listed herein.

The Applicants, Engineers and Applicants' Contractors are responsible to ensure all necessary precautions are taken to protect the health and safety of workers and the general public during both the construction phase and during the operation and maintenance phase of the post-closure use.

9. Landfill Gas Notification Requirements:

- a. As specified in solid waste management regulations at 310 CMR 19.132 (4) (g),

"When, at any time, the concentration of explosive gases exceeds 10% of the lower explosive limit (LEL) in any building, structure, or underground utility conduits, excluding gas control, gas recovery and leachate collection system components, the owner/operator shall:

- 1. Take immediate action to protect human health and safety;*
- 2. Notify the Department within two hours of the findings; and*
- 3. undertake the actions specified under 310 CMR 19.150, Landfill Assessment and 310 CMR 19.151: Corrective Action, as required by the Department."*

- b. If at any time monitoring detects the presence of any combustible gases at or in excess of 10% of the lower explosive limit at any location within a building or within any utility conduits on site or off-site, the Applicants or Applicant's contractors shall notify MassDEP's Bureau of Waste Site Cleanup-Emergency Response Section (508) 946-2714 within two (2) hours of the exceedance as per 310 CMR 40.0321(1) (a) of the regulations.

10. On-Landfill Access Roads: Two on-landfill access roads have been proposed for the project. Should the Applicants propose to use the proposed access roads for vehicles or equipment with a ground pressure greater than 7 psi during array construction or during array operation and maintenance, the Applicants must submit the proposed vehicles loading information and design calculations to MassDEP, demonstrating the adequacy of roadway design to protect the integrity of the existing final cover system.
11. Vehicles Operating on the Landfill Final Cover System: Low-pressure construction equipment (with ground pressures of 7 psi or less) operating off the access road shall limit turning on the vegetative support layer as much as possible. If MassDEP determines the use of equipment is creating the potential for damage to the low permeability soil layer, the usage of such equipment shall immediately cease upon notification by MassDEP. All operators of the vehicles entering the final cover system area shall be clearly instructed by the on-site engineer and/or the contractor of the requirements of this permit prior to arrival, to avoid damage to the landfill final cover system components. A list of low ground pressure equipment used and the pressure rating of each vehicle shall be indicated in the certification report required in condition #5.
12. Access Roads and Low Ground Pressure Equipment: Low ground pressure equipment shall not access the final cover system from access roads where the transition will result in excessive pressure and wear on the landfill topsoil layer. The on-site engineer may construct ramps as necessary.
13. Construction Precautions: All necessary precautions shall be taken to protect the Landfill storm water control system, environmental monitoring network and the Landfill gas vents. All operators of vehicles entering the area should be clearly instructed by the on-site engineer and/or the Applicants' Contractor of the permit requirements to avoid damage to the Landfill components. The on-site engineer shall observe the extent of each excavation performed on the Landfill capping system. If any damage occurs to the any Landfill components, the Applicants' Engineer shall notify MassDEP within 24 hours and provide a written plan with a schedule for repairs.
14. Integrity of the Final Cover System: All disturbances of the Landfill shall be limited to the proposed excavations and installations as depicted and described within the Application and approved plans. Excavations shall be limited to the topsoil layer. No excavations shall penetrate the sand drainage layer during construction, including staking for concrete forms, or during operation and maintenance of the PV array without written approval by MassDEP. The Engineer and Applicants' Contractors shall ensure that vehicles operating on the Landfill surface do not compromise the integrity of the Landfill final cover system.
15. Personnel Training: The Applicants, Engineers and Applicants' Contractors shall instruct all personnel regarding the potential hazards associated with landfill gas and shall give on-the-job training involving in any activity authorized by this permit. Such instruction and on-the-job training shall teach personnel how to comply with the conditions of the permit to carry out the authorized activity in a manner that is not hazardous to public health, safety, welfare or the environment.

16. Proposed Inverter/Transformer Pad (PowerStation) and Interconnection Equipment: If the Applicants propose to change the electrical equipment a copy of the final design for the inverter/transformer concrete pad and any other electrical pads and protective switchgear (interconnection equipment) proposed on-site shall be submitted to MassDEP for review and approval. The Applicant, Engineers and Applicants' Contractors are responsible to ensure that utilities/structures will not accumulate landfill gas during construction and operation. There shall be no penetrations (utility, conduits or other) at the base of any concrete pads or foundations. There shall be no penetration of any kind of the impermeable layer of the final cover system without written approval from MassDEP.

17. Landfill Gas Notification Requirements:

c. As specified in solid waste management regulations at 310 CMR 19.132 (4) (g),

"When, at any time, the concentration of explosive gases exceeds 10% of the lower explosive limit (LEL) in any building, structure, or underground utility conduits, excluding gas control, gas recovery and leachate collection system components, the owner/operator shall:

- 1. take immediate action to protect human health and safety;*
- 2. notify the Department within two hours of the findings; and*
- 3. undertake the actions specified under 310 CMR 19.150, Landfill Assessment and 310 CMR 19.151: Corrective Action, as required by the Department."*

d. If at any time monitoring detects the presence of any combustible gases at or in excess of 10% of the lower explosive limit at any location within a building or within any utility conduits on site or off-site, the Town shall notify MassDEP's Bureau of Waste Site Cleanup-Emergency Response Section (508) 946-2714 within two (2) hours of the exceedance as per 310 CMR 40.0321(1)(a) of the regulations.

18. Post-closure Use Operation and Maintenance Plan: During the first year after completion of construction of the PV array, inspections of the Landfill final cover system shall be performed on a monthly basis. Monthly inspection reports shall be submitted to MassDEP **within fourteen (14) days** of completion. Following the first year of operation of the PV array, and if no problems have been documented, inspections of the Landfill shall be performed on a quarterly basis and shall be submitted to MassDEP **within fourteen (14) days** of completion. Pursuant to 310 CMR 19.142(6) inspections shall be conducted by a third-party consulting Massachusetts Registered Professional Engineer, or other qualified solid waste professional. The Applicants, Engineers and Applicants' Contractors shall monitor the effectiveness of the storm water management system which should include; swales, structures and any and all conveyance systems. MassDEP shall be consulted prior to any deviation from the approved storm water design. MassDEP may require a permit modification application for significant design modifications. Any erosion, settlement, security or other issues observed at the Landfill shall be reported to MassDEP and repaired immediately.

19. Entries and Inspections: In accordance with *310 CMR 19.043: Standard Conditions*, MassDEP and its agents and employees shall have the right to inspect the Landfill and any equipment, structure or land located thereon, take samples, recover materials or discharges, have access to and photocopy records, to perform tests and to otherwise monitor compliance with this permit and all environmental laws and regulations.
20. Decommissioning Plan: If the proposed project is abandoned, during or after completion of construction, the Applicants shall submit a decommissioning plan. The decommissioning and site restoration plan should include dismantling and removal of all panels and supporting equipment, transformers, overhead cables, foundations and buildings and restoration of the roads to restore the site to substantially the same physical condition that existed prior to post-closure use construction. Disturbed earth shall be graded and seeded.
21. Reservation of Rights: MassDEP reserves the right to require additional assessment or action, as deemed necessary to protect and maintain an environment free from objectionable nuisance conditions, dangers or threats to public health, safety and the environment. MassDEP reserves all rights to suspend, modify or rescind this permit if it determines the solar array compromises the integrity of the final cover system and/or results in a threat to public health, safety or the environment.

This approval pertains only to the Solid Waste Management aspects of the proposal does not negate the responsibility of the owners or operators to comply with any other local, state or federal laws, statutes and regulations or enforcement actions, including orders issued by another agency now or in the future. Nor does this approval limit the liability of the owners or otherwise legally responsible parties from any other applicable laws, statutes or regulations now or in the future.

RIGHT OF APPEAL

Right to Appeal – This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.037: Review Procedures for Permit Modifications, Permit Renewals and other Approvals, of the “Solid Waste Management Regulations”. Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance of this determination may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. c. 111, § 150A and M.G.L. c. 30A not later than thirty (30) days following receipt of the final permit. The standing of a person to file an appeal and the procedures for filing such an appeal shall be governed by the provisions of M.G.L. c. 30A. Unless the person requesting an appeal requests and is granted a stay of the terms and conditions of the permit by a court of competent jurisdiction, the permit decision shall remain effective or become effective at the conclusion of the thirty (30) day period.

Notice of Appeal - Any aggrieved person intending to appeal a grant of a permit to the Superior Court shall first provide notice of intention to commence such action. Said notice of intention shall include the Department transmittal number X241291 and shall identify with particularity the issues and reason why it is believed the permit decision was not proper. Such notice shall be

provided to the Office of General Counsel of the Department and the Regional Director for the regional office which processed the permit application at least five days prior to the filing of an appeal.

Office of General Counsel
Department of Environmental Protection
One Winter Street
Boston, MA 02108

David Johnston, Regional Director
Department of Environmental Protection
20 Riverside Drive
Lakeville, MA 02347

No allegation shall be made in any judicial appeal of a permit decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in 310 CMR 19.000, provided that a matter may be raised upon a showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures or that matter sought to be raised is of critical importance to the environmental impact of the permitted activity.

Please direct any questions regarding this matter to me at (508) 946-2833 or to Mark Dakers at (508) 946-2847, or Dan Connick (508) 946-2884 or write to the letterhead address.

Very truly yours,

This final document copy is being provided to you electronically by the
Department of Environmental Protection. A signed copy of this document
is on file at the DEP office listed on the letterhead.

David B. Ellis, Chief
Solid Waste Management Section

E/ DC/MD

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