

## **WIND ENVIRONMENTAL PROTOCOLS**

### **PHASE I ENVIRONMENTAL SITE ASSESSMENT AND SUBSURFACE SOIL AND GROUNDWATER ASSESSMENT**

#### **1.0 INTRODUCTION AND SCOPE OF WORK**

Prior to construction and commencement of operations of the Commercial Wind Energy Facilities (CWEF), the Applicant shall conduct a Phase I Environmental Site Assessment (Phase I ESA) and a Subsurface Soil and Groundwater Assessment (SSA) to establish an environmental baseline for soil and groundwater quality at the subject property. The Phase I ESA shall be applicable to the entire property. The SSA shall apply to each individual CWEF constructed on that property.

At twenty-four (24) monthly intervals following commencement of operations, soil and groundwater sampling events will be conducted at each CWEF until termination of operations. Subsequent to decommissioning of each CWEF, the Applicant shall conduct an SSA with additional soil sampling to evaluate potential changes in soil and groundwater quality as a result of ongoing operation of the CWEF. Details of sampling procedures are included in Section 5.1.

#### **2.0 DEFINITIONS**

##### **2.1 Phase I ESA**

The Phase I ESA shall be conducted utilizing industry standards and guidelines for conducting Environmental Site Assessments established by the American Society for Testing and Materials (ASTM), in general accordance with ASTM's Standard Practice for Environmental Site Assessments E 1527-13 (ASTM November 2013) and the All Appropriate Inquiry requirements specified in 40 CFR Part 312.20 and is intended to identify the presence of Recognized Environmental Conditions (RECs) at the Subject Property.

Recognized Environmental Conditions are defined as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release or a material threat of a release of hazardous substances or petroleum products in structures on the property or into the ground, groundwater, or surface water of the property."

##### **2.2 Subsurface Soil and Groundwater Assessment (SSA)**

The SSA with subsurface sampling of soils and groundwater shall be conducted in accordance with regulations as stated in Massachusetts General Laws (MGL) c. 21E and specifically regulations of the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000 and all associated guidance and best management practices.

### **3.0 ENVIRONMENTAL PROFESSIONALS**

The Phase I ESA shall be conducted under the direction and supervision of an Environmental Professional as defined in ASTM # 1527-13. The Environmental Professional shall possess sufficient specific education, training, and relevant experience necessary to exercise professional judgement to develop opinions and conclusions regarding conditions indicative of releases or threatened releases on, at, in, or to a property.

The Subsurface Soil and Groundwater Assessment or SSA, shall be conducted under the direction and supervision of a Massachusetts Licensed Site Professional (LSP), or hazardous waste site cleanup professional, as defined in MGL c. 21A§19A, who will render professional judgement, opinions and conclusions regarding releases or threats of releases of oil and/or hazardous materials to site soils and groundwater as compared to applicable standards for oil and hazardous materials as listed in the MCP at 310 CMR 40.0000.

### **4.0 TIMING OF THE WORK**

The Initial Phase I ESA and SSA shall be completed and report submitted to the Town of Warren Planning Board prior to construction and commencement of operations of the CWF. Subsequently, soil and groundwater sampling events will be completed at the anniversary date of each 24-monthly period of operation of the CWF. At termination of operations and following decommissioning of all the equipment of the CWF, a Final SSA will be completed including additional soil sampling as described in Section 5.1.

### **5.0 SUBSURFACE SOIL AND GROUNDWATER SAMPLING**

In performance of the SSA, the Applicant will conduct subsurface soil and groundwater sampling to evaluate the potential presence of an oil and/or hazardous materials release as a result of Applicant's operation of the property as a CWF.

For the purposes of this Section 5.0, a CWF is considered to be an area of land containing all CWF structure(s), supporting equipment, access roads, retention basins, and drainage control systems.

Prior to conducting soil and groundwater sampling, Applicant shall submit a scaled Site Plan to the Planning Board indicating all proposed soil and groundwater sampling locations. The Site Plan and sampling locations must be approved by the Town prior to conducting the SSA.

#### **5.1 SSA Soil and Groundwater Sampling Procedures**

In performance of the pre-construction SSA, the Applicant shall install four (4), 2-inch groundwater monitoring wells in the area of the CWF. Four (4) soil borings will be advanced to beneath the groundwater table and four (4), 2-inch diameter PVC slotted casings and risers will be constructed within the borings using standard industry materials and practices for installation and completion of groundwater monitoring wells. All groundwater

monitoring wells will be completed with standard 4-inch steel uprights with secured steel caps. The locations of the monitoring wells shall be incorporated into a scaled site plan and included in the SSA report.

One (1) soil sample will be collected from each soil boring from immediately above the water table, screened using a portable Photoionization Detector (PID) and Massachusetts Department of Environmental Protection (MADEP) methodology and submitted for laboratory analysis as referenced in Section 5.2 below.

At each CWEF, three (3) of the groundwater monitoring wells shall be located in an inferred downgradient direction of groundwater flow from the area of the CWEF equipment. One (1) groundwater monitoring well shall be located in an upgradient location of inferred groundwater flow. Actual locations will be determined based on field observations. Depths to groundwater shall be measured, surveyed, and the direction of groundwater flow determined. Groundwater samples will be collected from all four (4) groundwater monitoring wells and submitted for laboratory analysis as referenced in Section 5.3 below.

Additionally, soil sampling shall be conducted in the vicinity of the CWEF turbine structure. A total of six (6) soil samples will be collected using hand auger equipment to a depth of 6-12 inches. Soils will be screened using a PID and MADEP methodology. Soil samples shall be submitted for laboratory analysis as referenced in Section 5.2 below.

At each 24-month SSA assessment, depth to groundwater monitoring, direction of groundwater flow, groundwater sampling, laboratory analysis, and reporting will be conducted by the Applicant for each groundwater monitoring well installed. Laboratory analyses for groundwater samples collected are provided in Section 5.3. Additionally, soil sampling shall be conducted in the vicinity of the CWEF turbine structure. A total of six (6) soil samples will be collected using hand auger equipment to a depth of 6-12 inches. Soils will be screened using a PID and MADEP methodology. Soil samples shall be submitted for laboratory analysis as referenced in Section 5.2 below.

At the final SSA following decommissioning of all CWEF equipment, groundwater sampling and additional soil sampling will be conducted as described above. A total of ten (10) soil samples will be collected in the vicinity of the CWEF turbine structure to a depth of 6-12 inches, screened, and submitted for laboratory analysis.

## **5.2 Soil Analytical Methods**

All soil samples shall be transported on ice under Chain of Custody documentation to a Massachusetts-certified laboratory for the following analyses:

- 1) US EPA Priority Pollutant Metals 13-Method 6010/7470/7471
- 2) US EPA Method 8260C-D for Volatile Organic Compounds
- 3) MADEP Method EPH/VPH for Extractable and Volatile Petroleum Hydrocarbons
- 4) US EPA Method 537.1 for Per- and Polyfluoroalkyl Substances using isotope dilution techniques

All analytical results shall be tabulated and incorporated as part of the final report. Comparison of analytical results to applicable MCP soil standards shall be included.

### **5.3 Groundwater Analytical Methods**

Groundwater samples shall be transported on ice under Chain of Custody documentation to a Massachusetts-certified laboratory for the following analyses:

- 1) US EPA Priority Pollutant Metals 13-Method 6010/7470/7471
- 2) US EPA Method 8260C-D for Volatile Organic Compounds
- 3) MADEP Method EPH/VPH for Extractable and Volatile Petroleum Hydrocarbons
- 4) US EPA Method 537.1 for Per- and Polyfluoroalkyl Substances using isotope dilution techniques

All analytical results will be tabulated and incorporated as part of the final report. Comparison of analytical results to applicable MCP groundwater standards will be included.

## **6.0 FINAL REPORTING, CONCLUSIONS AND RECOMMENDATIONS**

Fifteen (15) copies of the pre-construction Phase I ESA Report and fifteen (15) copies of the SSA Report shall be submitted to the Town of Warren Planning Board prior to construction of the CWEF. Fifteen (15) copies of the subsequent SSA soil and groundwater sampling reports shall be submitted within 30 days of each 24-monthly anniversary following commencement of operations of the CWEF. Fifteen (15) copies of the SSA Final Report shall be submitted to the Planning Board within 30 days following termination of operations and decommissioning of all CWEF equipment. All SSA Reports shall fully describe the objectives, methodology, field observations, field procedures, soil and groundwater analytical results, tabulated analytical results with comparison to applicable MCP standards, direction of groundwater flow, groundwater contours, and conclusions of all work completed.

The Environmental Professional shall render an opinion as to the presence or likely presence of recognized environmental conditions at the property and recommend additional investigation as appropriate based on the results of the Phase I ESA. The LSP shall render an opinion and recommend additional investigation as appropriate based on all results of the Subsurface Soil and Groundwater Assessments in accordance with regulations of the Massachusetts Contingency Plan at 310 CMR 40.0000.