January 31, 2006

Mr. Patrick Doyle
Marble River, LLC
3 Columbia Way
Albany, New York 12207

Re: Hydrogeologic Evaluation
Marble River Wind Farm Project
Clinton County, New York
ESS Project No. A456-005

Dear Mr. Doyle:

On behalf of Marble River, LLC, ESS Group, Inc. (ESS) performed an evaluation of the potential impacts that the proposed Marble River Wind Farm (the Project) might pose to regional groundwater resources, in particular water supply wells situated near the Project. The evaluation focused on identifying the regional geologic and hydrogeologic settings of the Project Area and assessing how the construction and operation of the primary components of the Project (i.e., wind turbines and associated footings, underground electric transmission cables, access roadways, and a substation) might potentially impact groundwater resources.

The following sections present: (i) a Project description; (ii) a description of the geologic and hydrogeologic setting; (iii) a description of water supply sources; (iv) a discussion of potential impacts; (v) recommended activities; and (vi) conclusions.

PROJECT DESCRIPTION

Marble River, LLC is proposing a wind-powered electric generating project in the Towns of Clinton and Ellenburg in Clinton County, New York. The Project will occur on approximately 19,310 acres of leased land within an overall area of approximately 29,765 acres. The land is primarily forest and agricultural uses and also includes significant wetland acreage. Farms and rural residences exist along the public roadways within the Project area. The Project will consist of up to 109 wind turbines, with 89 of the turbines proposed to be located in the Town of Clinton and 20 in the Town of Ellenburg. Other Project components include the construction and use of approximately 41 miles of gravel access roads, 55 miles of underground electric line, and a 267-foot by 690-foot electrical substation with two adjoining 34.5 kV collector stations, each 136-foot by 173-foot, situated off of Patnode Road in the Town of Clinton. It is our current understanding that the proposed wind turbines will be constructed using either spreadfoot style foundations (approximately 50-feet wide and up to 15-feet in depth) or caisson style foundations (approximately 25-feet wide and up to 50-feet in depth). At this point it is has not been determined if blasting will be required to install the foundations for the individual wind turbines and/or the meteorological towers. Based on discussions with representatives of Marble River, LLC, it is currently proposed that the individual wind turbines will be constructed at least 1,200 feet from existing structures.

PROJECT AREA GEOLOGY AND HYDROGEOLOGY

Geologic Setting

Based on the findings of a geology review performed by ESS as part of the Draft Environmental Impact Statement (DEIS), the following provides a brief description of the surficial and bedrock geology in the Project Area. A more detailed description of the geologic setting will be provided in the DEIS for the Project.

Uppermost bedrock within the majority of the Project Area is Cambrian-age Potsdam Sandstone (Isachsen and Fisher, 1970). The sedimentary flat-lying strata regionally dip gently down to the north. To the south, the beds of the Potsdam onlap the older Precambrian-age metasediments and metaigneous rocks of the Adirondack Mountains (Cadwell and Pair, 1991). Although bedrock outcrops are not widespread in the Project Area due to the lack of topographic relief, the Potsdam is intermittently exposed, especially in stream cuts and in the eastern portion of the Project Area.

The surficial sediments overlying bedrock in the Project Area were deposited by different processes during the Pleistocene glaciation. Glacial till is mapped in the western portion of the Project Area; a northwesterly-trending till moraine outcrops sporadically in the east, north of Ellenburg (Cadwell and Pair, 1991). The till thins to the east in the Project Area, and is scattered with bedrock rubble (MacClintock and Stewart, 1964). No significant deposits of stratified drift (i.e., sand and/or gravel) have been mapped within the Project Area.

Hydrogeologic Setting

The Project Area is located along the watershed divide between the St. Lawrence River basin and the Lake Champlain basin. Surface water drainages within the western portion of the Project Area typically flow to the west and northwest (e.g., Marble River) towards the St. Lawrence River. Surface water drainages within the eastern portion of the Project Area typically flow to the east (e.g., English River) towards Lake Champlain.

Groundwater likely occurs within both the shallow glacial till deposits and the underlying Potsdam Sandstone, except possibly in locations of shallow bedrock where groundwater may be absent within the thin veneer of glacial till. Groundwater flow directions are expected to generally mimic the topography and the surface water drainage patterns. The depth to groundwater within the Project Area is likely variable and was not determined as part of this evaluation.

Review of the following three publications is consistent with the geologic setting of the Project Area as previously discussed.

- Kantrowitz, et al., 1982, Availability of Water from Aquifers in Upstate New York;
- Bugliosi, 1987, Groundwater Availability from the Unconsolidated Deposits of the St. Lawrence River Basin, New York; and
- Bugliosi, et. al., 1987, Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York – Adirondack Sheet.

All three of these publications identify the unconsolidated deposits within the Project Area as glacial till consistent with the surficial geologic map of the area (Cadwell and Pair, 1991). These publications list potential well yields within the Project Area as generally less than 10 gallons per minute (gpm) within both the glacial till and underlying bedrock, although higher yields are possible within the bedrock. No higher yielding stratified drift aquifers are mapped within the Project Area.

PROJECT AREA WATER SUPPLY SOURCES

Based on discussions with representatives of the Clinton County Health Department's Environmental Health Unit, there are no public water supply systems serving the Towns of Clinton and Ellenburg. The Health Department representative did state that there may be small non-community water systems present in the two Towns, specifically those that typically serve restaurants, mobile home parks and similar types of uses. The Health Department indicated that they do not maintain records of private water supply wells and was unaware of any other entities within Clinton County that maintain private well records.

Based on discussions with the Clinton County Health Department and the hydrogeologic setting and the rural nature of the Project Area, it is likely that the majority of residences in the vicinity of the Project Area obtain their water from shallow wells completed in the glacial till or from deeper wells completed in the underlying bedrock. In addition, based on the reported thin deposits of glacial till overlying bedrock in the eastern portion of the Project Area, it is likely that the majority of the wells in this area are completed in the bedrock.

DISCUSSION OF POTENTIAL IMPACTS

This section discusses potential impacts that the construction and operation of the proposed Marble River Wind Farm Project may have on groundwater resources within the Project Area, in particular nearby water supply wells.

Potential Project Impacts

The potential impacts to groundwater resources can be grouped into the following two categories:

1. Physical impacts to groundwater recharge characteristics due to the construction of and presence of Project infrastructure; and
2. Physical impacts to individual water supply wells during the construction of the Project infrastructure.

The majority of recharge to the glacial till and underlying bedrock within the Project Area is likely derived from precipitation (i.e., rainfall) and subsequent infiltration into the subsurface. Based on the size of the Project Area, the spacing between individual components of the proposed wind farm and use of gravel access roads, it is anticipated that the construction or operation of the proposed Marble River Wind Farm will not have a significant impact on groundwater recharge characteristics within the Project Area. Therefore, it is not anticipated that any mitigation measures will be necessary to address potential impacts to groundwater recharge characteristics within the Project Area.

Physical impacts to individual water supply wells are not anticipated from the construction and operation of the Project components since most of the Project infrastructure will be located a significant distance from existing structures. It is currently our understanding that the proposed wind turbines, meteorological towers, and electrical substation will be located at least 1,200 feet from existing structures, in accordance with land leasing agreements.

As previously stated herein, at this point it is has not been determined if blasting will be required to install the foundations for the individual wind turbines and meteorological towers. However, based on the geologic setting it is possible that shallow bedrock may be encountered at one or more of the wind turbine or meteorological tower locations that may require focused blasting, if the bedrock can not be removed by other mechanical means (e.g., excavation or ripping). It is not anticipated that blasting will be required for construction of the access roads, placement of the subsurface transmission cables or construction of the electrical substation.

If blasting is determined to be necessary, it is important to note that the permanent (inelastic) deformation of rock typically occurs within close proximity to the borehole (or area of focused blasting). As described in a technical controlled blasting document developed by the Aggregate Producers Association of Ontario (http://www.apao.com/Downloads/publicationsPFDs/ControlledBlastingAtQuarries.pdf), "physical breaking or cracking of the rock is limited to a localized area around each blast hole. These microcracks only occur usually within several metres of the blast hole. Offsite rock structure, aquifers, or well installations are not affected". While this description of potential blasting impacts is subject to site-specific conditions (i.e., bedrock type, number of blast holes, amount of charges, etc.) it can be relied upon to make general conclusions on lateral impacts. Based on the anticipated minimum distance to existing structures (at least 1,200 feet) and the assumption that water supply wells are located in close proximity to these structures (typically within 100 feet), it is highly unlikely that blasting (if necessary and performed) would physically damage the individual wells or affect the groundwater flow to these wells (and subsequently the well yield). This statement assumes that the blasting activities will be performed in accordance with an appropriately designed blasting program. Therefore, based on our current

understanding of the Project conditions, it is not anticipated that the blasting (if necessary to install foundations for the wind turbines and/or the meteorological towers) will have a significant impact on the physical integrity or yield of nearby water supply wells.

RECOMMENDED ACTIVITIES

Based on findings of this evaluation, which generally concludes that it is highly unlikely that the construction or operation of the Project will adversely impact groundwater resources including nearby water supply wells, no specific mitigation actions are deemed necessary. However, ESS is recommending that the following data collection and planning activities be performed prior to the construction and operation of the Project.

- To avoid potential damage to individual wells or wellheads during construction and operation of the Project, ESS recommends that an inventory of existing water supply wells be performed for the leased parcels and any other parcels that will be disturbed during the construction of the Project. In general, information generated from the well inventory would allow the Project proponent, designers and construction supervisors to plan for and avoid the water supply wells during construction and operation of the Project.

- If blasting is deemed necessary for the construction of structural foundations, such blasting should be conducted in accordance with a Project-specific blasting plan. A qualified explosives contractor should be engaged and utilized to establish effective blasting procedures (based on rock strength). Measures that could be implemented to minimize potential impacts include: (i) location, orientation, depth and number of shotholes into which the explosives are placed; (ii) total amount (weight) of charge in each hole; and (iii) detonation delays (in milliseconds) between smaller packages of explosive charges. Pre- and post-blasting inspections of all sensitive receptors in the Project Area could also be conducted to document any changes that may have occurred from the blasting operations.

CONCLUSIONS

Based on our current understanding of the geologic and hydrogeologic setting of the Project Area and the proposed components of the Project, ESS concludes that it is highly unlikely that either the construction or operation of the Project will have any significant impact on groundwater resources, including individual water supply wells, and therefore no specific mitigation measures are deemed necessary at this time. The information and data obtained from the recommended activities will further assist with ensuring that individual water supply wells are identified and subsequently avoided during construction and operation of the Project. If the findings of the recommended activities (i.e., water well inventory and preparation of a blasting plan, if necessary) suggest that specific mitigation measures may be necessary, such measures will be identified and considered during the future planning stages of the Project (and prior to Project construction activities).

If you should have any questions regarding the contents of this letter, please contact the undersigned at (781) 489-1102.

Sincerely,

ESS GROUP, INC.

Jeffrey G. Hershberger, P.G.
Senior Hydrogeologist

C: Steve Wood, ESS
Project File (A456)