



**BROOKSIDE SOLAR, LLC**

**Matter No. 21-00917**

**900-2.23 Exhibit 22**

**Electric and Magnetic Fields**

**Contents**

Acronym List ..... ii

Glossary Terms..... iii

Exhibit 22: Electric and Magnetic Fields ..... 1

    22(a) Right-of-Way Segments with Unique Characteristics ..... 1

    22(b) Cross-Sections ..... 1

    22(c) Aerial Photographs/Drawings ..... 2

    22(d) EMF Calculation Report..... 2

Conclusions ..... 4

**Table**

Table 22-1.    NYPSC EMF Level Interim Guidelines .....4

**Appendix**

Appendix 22-1. Electric Magnetic Field (EMF) Study

## Acronym List

|         |                                       |
|---------|---------------------------------------|
| AES     | The AES Corporation, Inc.             |
| EMF     | electric magnetic field               |
| kV      | kilovolt                              |
| kV/m    | kilovolt per meter                    |
| mG      | milligauss                            |
| NYCRR   | New York Codes, Rules and Regulations |
| NYPSC   | New York Public Service Commission    |
| ORES    | Office of Renewable Energy Siting     |
| ROW     | right-of-way                          |
| STE sum | summer short term emergency           |
| STE win | winter short term emergency           |
| USCs    | Uniform Standards and Conditions      |

## Glossary Terms

**Applicant**

Brookside Solar, LLC, a subsidiary of The AES Corporation, Inc. (AES), the entity seeking a siting permit for the Facility from the Office of Renewable Energy Siting (ORES) under Section 94-c of the New York State Executive Law.

**Facility**

The proposed components to be constructed for the collection and distribution of energy for the Brookside Solar Project, which includes solar arrays, inverters, electric collection lines, and the collection substation.

## **Exhibit 22: Electric and Magnetic Fields**

This Exhibit provides information required in accordance with the requirements of Section 900-2.23 of the 94-c Regulations.

### **22(a) Right-of-Way Segments with Unique Characteristics**

The Applicant has identified the new proposed 115-kilovolt (kV) interconnection line as the only right-of-way (ROW) segment with unique electric and magnetic field (EMF) characteristics. The 115-kV line connects to the Facility's collection substation with the existing New York State Electric and Gas (NYSEG) Line 911 Willis Road to Chateaugay 115-kV transmission line. An EMF Study (Appendix 22-1), with calculation tables and field strength graphs, was performed on the interconnection between the Facility's collection substation and the tap to the existing line. The two interconnection lines will be approximately 210 and 173 feet in length and composed of a flexible connection. The proposed ROW for the interconnection line is 150 feet wide, or 75 feet from the centerline to the edge of the ROW on both sides. Additional information on the EMF evaluation for these components is included in the EMF Study in Appendix 22-1.

The EMF Study did not evaluate the effects from the 34.5-kV collection lines since the proposed line rating is less than the 69-kV rating requirement. The collection lines will also be installed underground; therefore, EMF impacts would be negligible.

### **22(b) Cross-Sections**

The EMF Study (Appendix 22-1) details the "base case" and the "proposed" cross-sections for the overhead electric interconnection and distribution facilities. The base case represents the existing conditions prior to Facility construction. The EMF Study, as well as the Design Drawings (Appendix 5-1), provide structural details and dimensions, cross-sections, phasing and phase spacing, and other characteristics that may affect EMF.

The EMF Study includes an analysis of the potential EMF impacts related to the Facility along the interconnection between the Facility's proposed collection substations and the tap to the existing NYSEG Line 911 Willis Road to Chateaugay 115-kV transmission line. No EMF calculations were performed on the 34.5-kV collection system. Cross-sections provided in Appendix 22-1 and the Facility Design Drawings (Appendix 5-1) include the following, as applicable:

1. All overhead electric transmission, sub-transmission, and distribution facilities including the proposed Facility showing structural details and dimensions and identifying phase spacing, phasing, and any other characteristics affecting EMF emissions;
2. All underground electric transmission, sub-transmission, and distribution facilities;
3. All underground gas transmission facilities;
4. All ROW boundaries; and
5. Structural details and dimensions for all structures (dimensions, phase spacing, phasing, and similar categories) and include a station number identifying the location.

Information regarding the underground collection system for the Facility is shown in the Design Drawings provided as Appendix 5-1.

### **22(c) Aerial Photographs/Drawings**

The proposed interconnection line is depicted on aerial photography in the Design Drawings provided in Appendix 5-1 (Sheet HV-C.09.01), as well as on Figure 1 in the EMF Study (Appendix 22-1). The drawings and figure detail the ROW segment, cross-sections, and the location of the Facility components in relation to the nearest residence or occupied non-residential building (approximately 950 feet away to the east). The EMF Study provides an evaluation of the distance from the interconnection to the nearest residence.

### **22(d) EMF Calculation Report**

The EMF Study (Appendix 22-1) evaluates the EMFs for each identified segment cross-section for the proposed Facility. The EMF Study includes the following:

1. A signature and stamp by a licensed professional engineer registered and in good standing with the State of New York.
2. EMF modeling and calculations performed using the Bonneville Power Corona & Field Effects Ver. 3.1 Software.
3. Modeled electric field circuits at rated voltage and calculation tables and field strength graphs calculated at 1 meter (3.28 feet) above ground level with 5-foot measurement intervals, depicting the width of the entire ROW out to 575 feet from the edge of the ROW

on both sides. The EMF Study includes digital copies of all input assumptions and outputs for the calculations.

4. A model of the magnetic field of the circuit phase currents equal to the summer normal, summer short-term emergency (STE sum), winter normal, and winter short-term emergency (STE win) loading conditions. The EMF Study also provided the magnetic field calculation tables and field strength graphs calculated at 1 meter (3.28 feet) above ground level with 5-foot measurement intervals, depicting the width of the entire ROW out to 575 feet from the edge of the ROW on both sides. The EMF Study includes digital copies of all input assumptions and outputs for the calculations.
5. Modeling of the magnetic field circuit phase currents equal to the maximum average annual load estimated to occur on the power lines within 10 years of Facility operation. Magnetic field calculation tables and field strength graphs calculated at 1 meter (3.28 feet) above ground level with 5-foot measurement intervals, depicting the width of the entire ROW out to 500 feet from the edge of the ROW on both sides have been provided in the EMF Study, along with digital copies of all input assumptions and outputs for the calculations.
6. A “Base Case” analysis for the magnetic field with the circuit phase currents equal to the maximum average annual load estimated to occur on the power lines within 10 years of Facility operation. Magnetic field calculation tables and field strength graphs calculated at 1 meter (3.28 feet) above ground level with 5-foot measurement intervals, depicting the width of the entire ROW out to 575 feet from the edge of the ROW on both sides have been provided in the EMF Study, along with digital copies of all input assumptions and outputs for the calculations.
7. A demonstration that the proposed Facility and associated components, including the interconnection lines, conform to the New York Public Service Commission’s (NYPSC’s) Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities at the proposed ROW edges. Table 22-1 below details the maximum EMF levels calculated in the analysis.

**Table 22-1. NYPSC EMF Level Interim Guidelines**

| Field Type     | Guidelines Limit | Maximum Value at Proposed ROW Edge |
|----------------|------------------|------------------------------------|
| Electric Field | 1.6 kV/m         | 0.03 kV/m (transmission line)      |
| Magnetic Field | 200 mG           | 15.94 mG (transmission line)       |

The levels of EMF were determined to be less than the 1.6 kilovolt per meter (kV/m) maximum and 200 milligauss (mG) field level permitted at the edge of the proposed ROW. The EMF Study demonstrates that the EMF levels are well within the guidelines. Refer to Appendix 22-1 for additional information.

### Conclusions

An EMF Study was performed on the interconnection between the Facility's collection substation and the tap to the existing line. It details the "base case" and the "proposed" cross-sections for the overhead electric interconnection and distribution facilities, and provides structural details and dimensions, cross-sections, phasing and phase spacing, and other characteristics that may affect EMF. The levels of EMF were determined to be less than the 1.6-kV/m maximum and 200-mG field level permitted at the edge of the proposed ROW, which is well within the guidelines. The Facility has been designed to comply with 19 New York Codes, Rules and Regulations (NYCRR) Section 900-2.23 and the Uniform Standards and Conditions (USCs) and impacts related to EMFs have been avoided and minimized to the maximum extent practicable.