Appendix I
Electric and Magnetic Field Calculations

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1.0 INTRODUCTION

Electric and magnetic fields (EMF) were calculated using the Bonneville Power Administration Corona and Field Effects program under worst-case conditions. These conditions result in the calculation of the highest electric and magnetic fields that would be expected adjacent to the Right-of-Way (ROW). The study models the double-circuit 230kV project line between the Solar Two substation and the existing San Diego Gas and Electric (SDG&E) Imperial Valley Substation. Two cases are modeled as follows:

- Double-circuit 230kV line adjacent to the existing 500kV Southwest Powerlink Transmission line with the inner circuit loaded to 300MW and the outer circuit loaded to 450MW.
- Double-circuit 230kV line with one circuit loaded to 300MW and the other loaded to 450MW

The chosen phasing arrangement is a standard arrangement in the industry so that line workers understand the location of the phases for worker safety from shock hazard..

1.1 ASSUMPTIONS FOR MAGNETIC FIELD CALCULATIONS

- Maximum current (793 amps/phase for circuit 1 and 1190 amps/phase for circuit 2) available from the project at the proposed project output of 300MW for circuit 1 and 450MW for circuit 2 on the transmission line and at the minimum plant voltage.
- Maximum current calculated using the SDG&E 2005 Heavy Summer power flow case.
- Expected double-circuit, single bundle for the double-circuit line connecting the project to the SDG&E Imperial Valley Substation.
- Maximum conductor sag resulting in minimum conductor ground clearance of the Solar Two line and all lines in the adjacent corridor.
- All calculations are made for fields one meter from the ground.

1.2 ASSUMPTIONS FOR ELECTRIC FIELD CALCULATIONS

- Maximum expected operating voltage of 242kV.
- Expected double circuit, single bundle for the double-circuit line connecting the project to the SDG&E Imperial Valley Substation.
- Maximum conductor sag resulting in minimum conductor ground clearance of the new Solar Two line and all lines in the adjacent corridor.
- All calculations are made for fields one meter from the ground.

1.3 FIGURES

The following figures are included in this Appendix I:

- Figure I-1 depicts the predicted magnetic field strength for the recommended phasing under worst-case conditions for the double-circuit line between the Solar Two Substation and the SDG&E Imperial Valley Substation along the adjacent SDG&E 500kV Southwest Powerlink Transmission Line.
- Figure I-2 depicts the predicted electric field strength for the recommended phasing under worst-case conditions for the double-circuit line between the Solar Two Substation and the SDG&E Imperial Valley Substation along the adjacent SDG&E 500kV Southwest Powerlink Transmission Line.
- Figure I-3 depicts the predicted magnetic field strength for the recommended phasing under worst-case conditions for the double-circuit line alone.
- Figure I-4 depicts the predicted electric field strength for the recommended phasing under worst-case conditions for the single-circuit line between the point where the double-circuit transmission line alone.
- Figure I-5 depicts the predicted magnetic field strength for the existing SDG&E 500kV Miguel Transmission Line without the proposed new transmission lines for comparison.
- Figure I-6 depicts the predicted electric field strength for the existing SDG&E 500kV Miguel Transmission Line without the proposed new transmission lines for comparison.

2.0 EMF MODELING RESULTS

The chosen phasing arrangement for the new transmission line resulted in higher magnetic fields than existing within the ROW and in magnetic fields slightly higher or about the same as existing fields at the ROW dge.

FIGURE I-1 MAGNETIC FIELD: SOLAR TWO DOUBLE-CIRCUIT INTERCONNECT ADJACENT TO SDG&E SOUTHWEST POWERLINK LINE

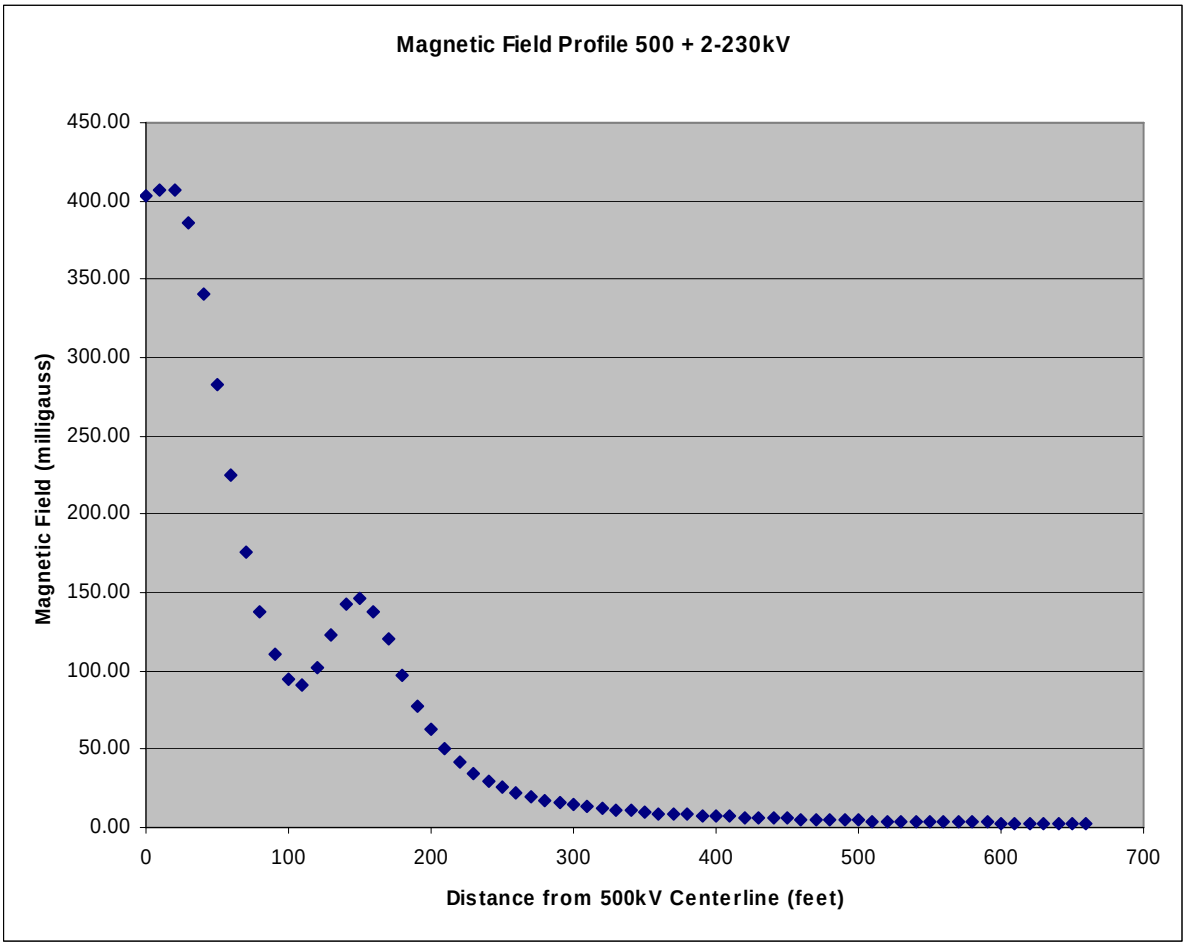

FIGURE I-2 ELECTRIC FIELD: SOLAR TWO DOUBLE-CIRCUIT INTERCONNECT ADJACENT TO SDG&E SOUTHWEST POWERLINK LINE

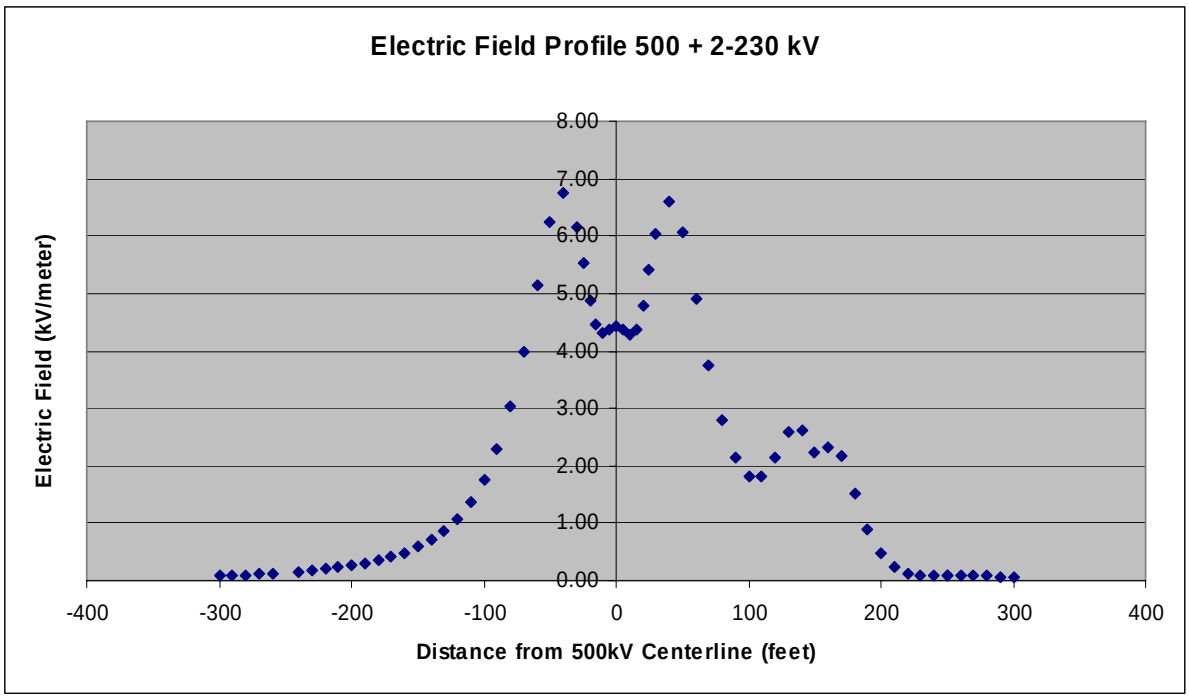

FIGURE I-3 MAGNETIC FIELD: SOLAR TWO DOUBLE-CIRCUIT INTERCONNECT

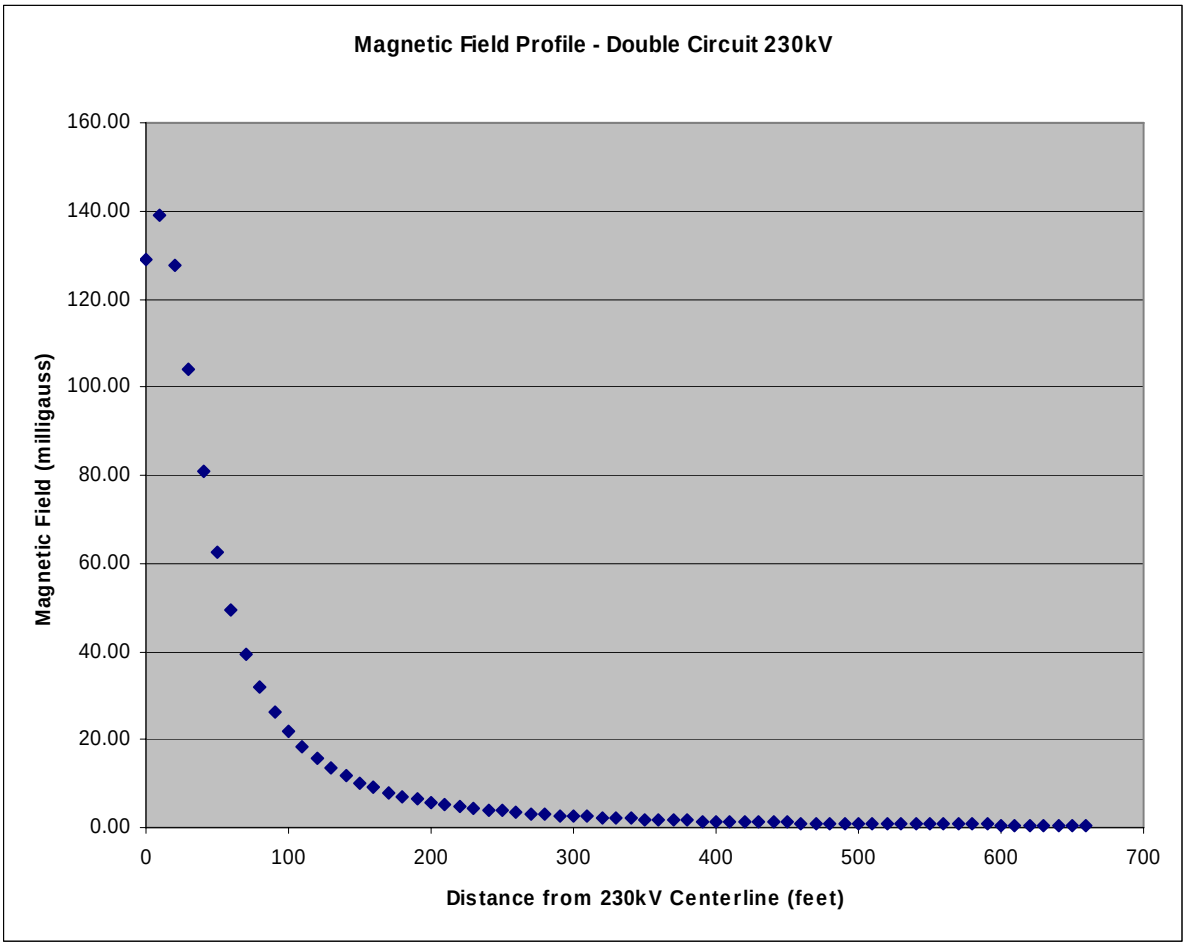

FIGURE I-4 ELECTRIC FIELD: SOLAR TWO DOUBLE-CIRCUIT INTERCONNECT

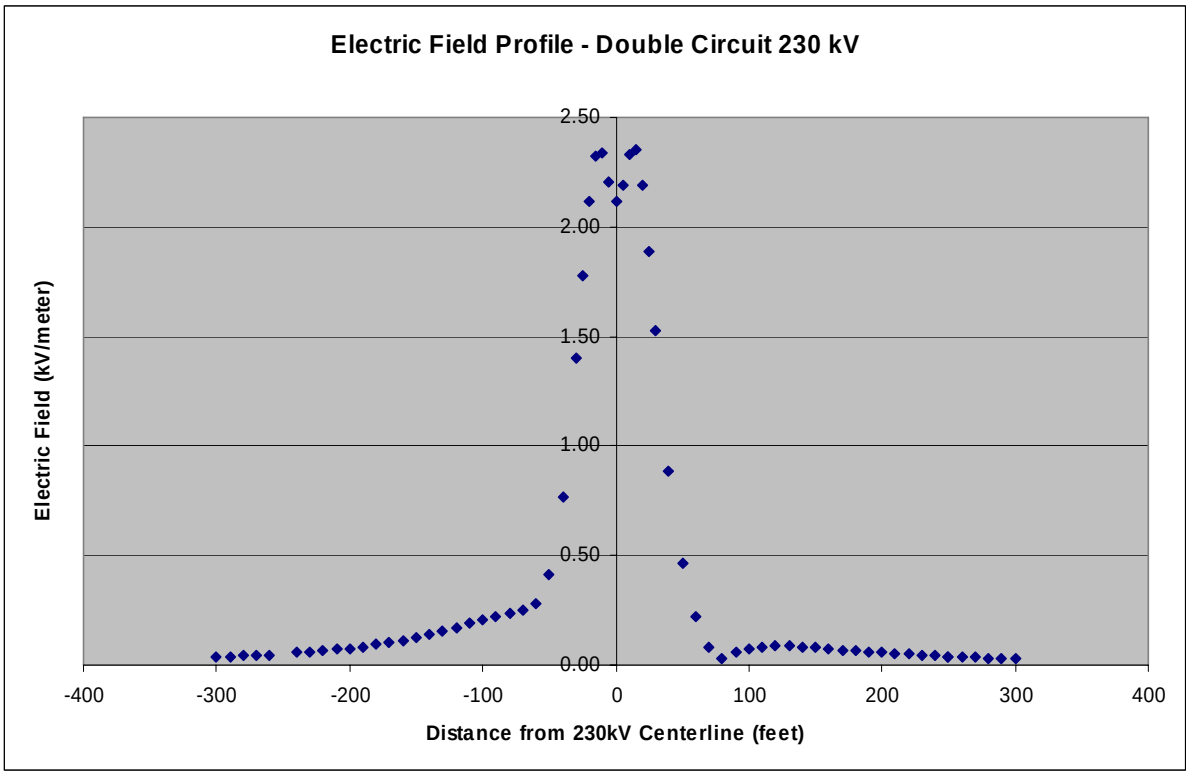

FIGURE I-5 MAGNETIC FIELD: EXISTING SDG&E 500kV SOUTHWEST POWERLINK LINE ALONE

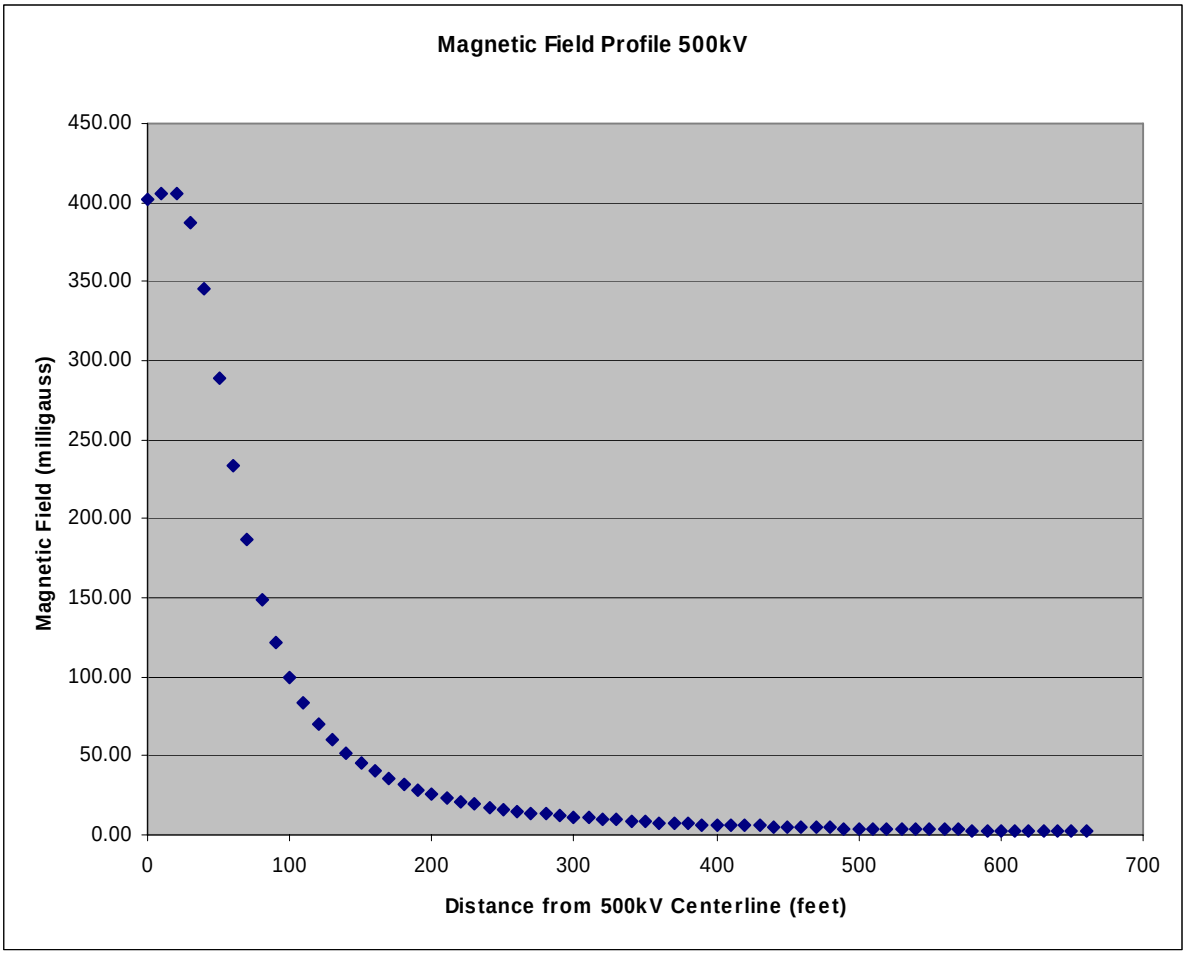
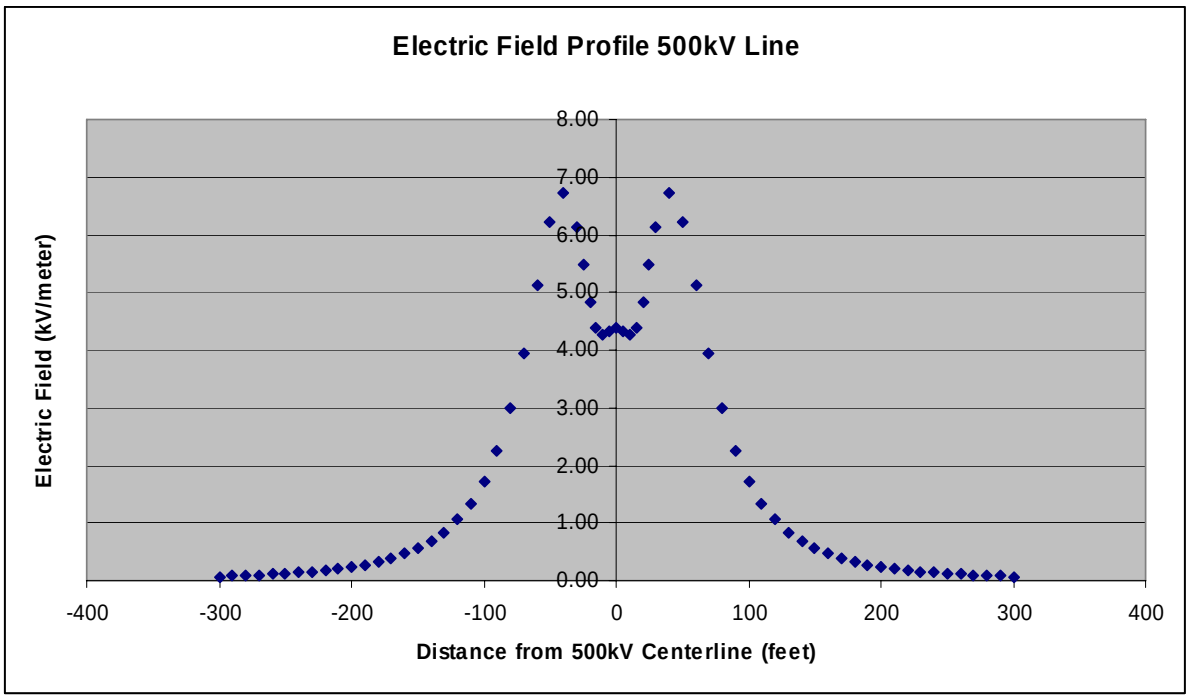
FIGURE I-6 ELECTRIC FIELD: EXISTING SDG&E 500kV SOUTHWEST POWERLINK LINE ALONE