Appendix E:

Glare Analysis

Solar Glare Hazard Analysis Report

EERA staff utilized the Scandia National Laboratories Solar Glare Hazard Analysis Tool (©1997-2014 Scandia Corporation) to assess potential glare from the PV panels. The following is a summary of this analysis. Outcomes from this tool are limited, for example, it does not take into account on-the-ground obstacles, such as trees, hills, or buildings that might reduce or eliminate glare. The full technical reference manual and user's manual are available at: https://share.sandia.gov/phlux/references/.

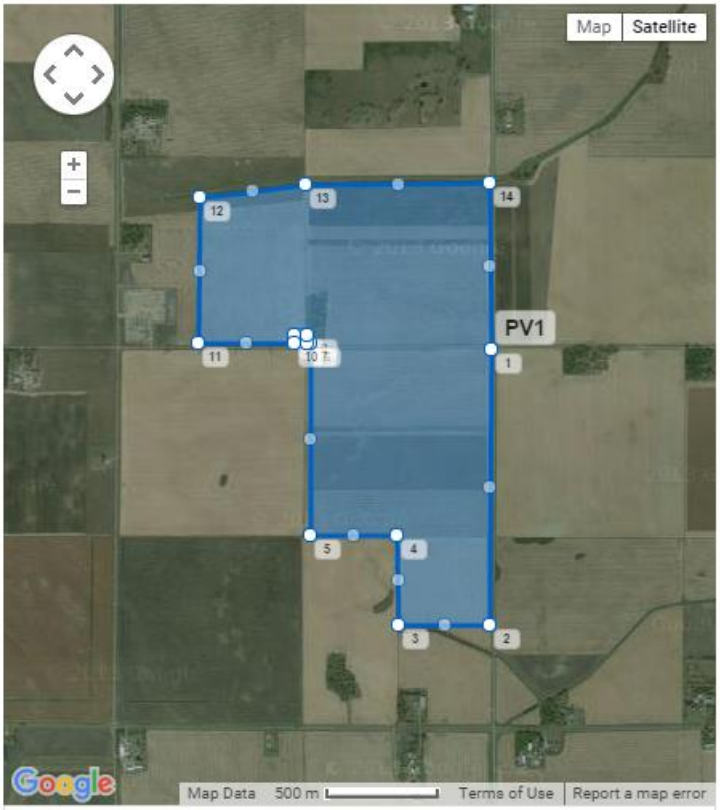
Inputs

Analysis name	Marshall Solar 1
PV array axis tracking	None
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	30.00
Rated power (kW)	50,000 kW
Vary reflectivity	True
PV surface material	Smooth glass with ARC
Timezone offset	-6.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal legth (m)	0.017
Time interval (min)	1.0
Correlate slope error with material	False
Slope error (mrad)	8.43

PV Array Vertices

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of Panels Above Ground (ft)	Total Elevation (ft)
1	44.4721174375	-95.6552546471	1111.27	12.0	1123.27
2	44.4615904373	-95.6552573293	1103.57	12.0	1115.57
3	44.461616281	-95.6602180749	1104.58	12.0	1116.58
4	44.4650131888	-95.6602422148	1109.58	12.0	1121.58
5	44.4650141459	-95.6649401039	1114.72	12.0	1126.72
6	44.4723595582	-95.6648891419	1110.56	12.0	1122.56
7	44.4723614722	-95.6650728732	1110.26	12.0	1122.26
8	44.4726753662	-95.6650634855	1109.39	12.0	1121.39
9	44.4726791942	-95.6657769531	1108.65	12.0	1120.65

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of Panels Above Ground (ft)	Total Elevation (ft)
10	44.4723719991	-95.6657809764	1109.55	12.0	1121.55
11	44.4723605152	-95.6708785146	1103.15	12.0	1115.15
12	44.4779261428	-95.6708436459	1091.70	12.0	1103.70
13	44.4784428694	-95.6651426107	1090.60	12.0	1102.60
14	44.4784734901	-95.6553203613	1090.60	12.0	1102.60



Observation Points

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
A	44.4804169145	-95.6742882729	1100.60	6.0
B	44.4806924909	-95.6543111801	1100.27	6.0
C	44.4760534487	-95.6743848324	1109.47	6.0
D	44.4715824716	-95.6802642345	1110.60	6.0
E	44.4722102665	-95.6645357609	1110.61	6.0

F	44.4717815293	-95.6500518322	1124.81	6.0
G	44.4679380657	-95.6760585308	1120.43	6.0
H	44.4593123204	-95.6629224122	1110.60	6.0
I	44.4582593792	-95.6593859196	1117.04	6.0
J	44.4564061565	-95.6594932079	1116.49	6.0
K	44.4568809547	-95.6526267529	1110.6	6.0
L	44.4583665886	-95.6514036655	1110.63	6.0

Observation Points and Preliminary Development Area

Glare Occurrence Plots

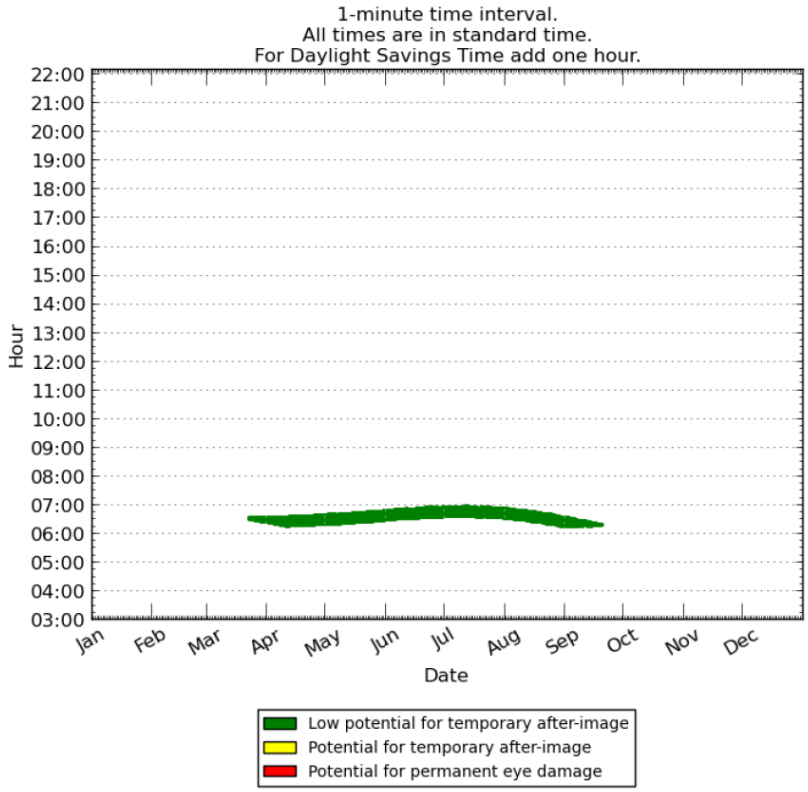
Observation Point A

No glare.

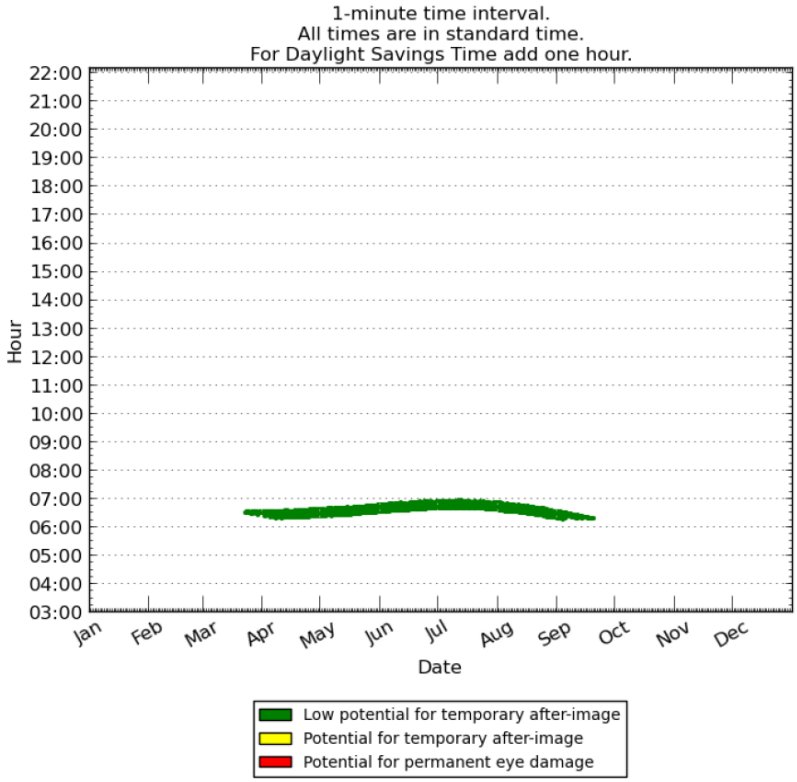
Observation Point B

No glare.

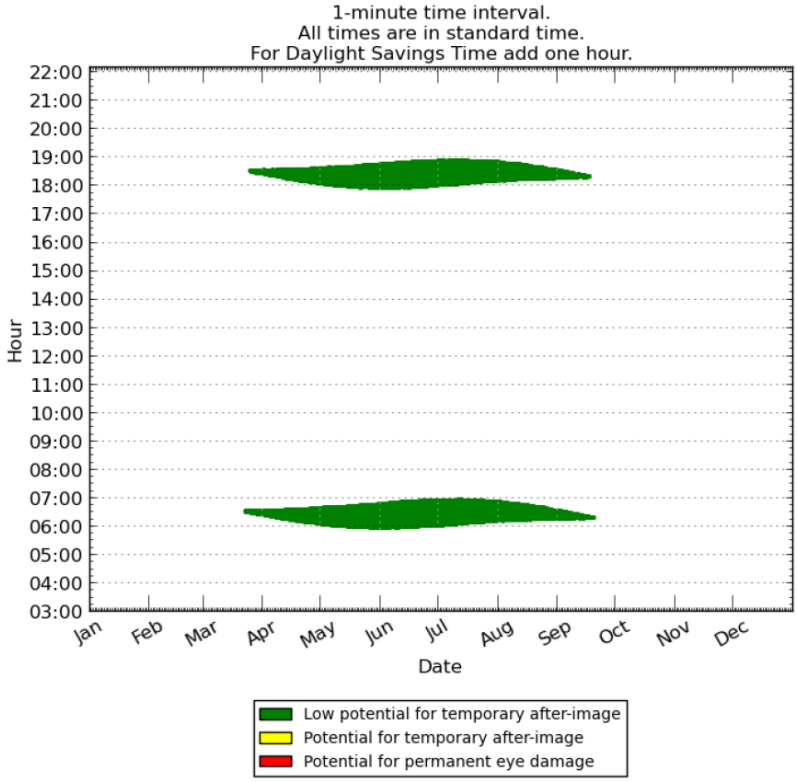
Observation Point C



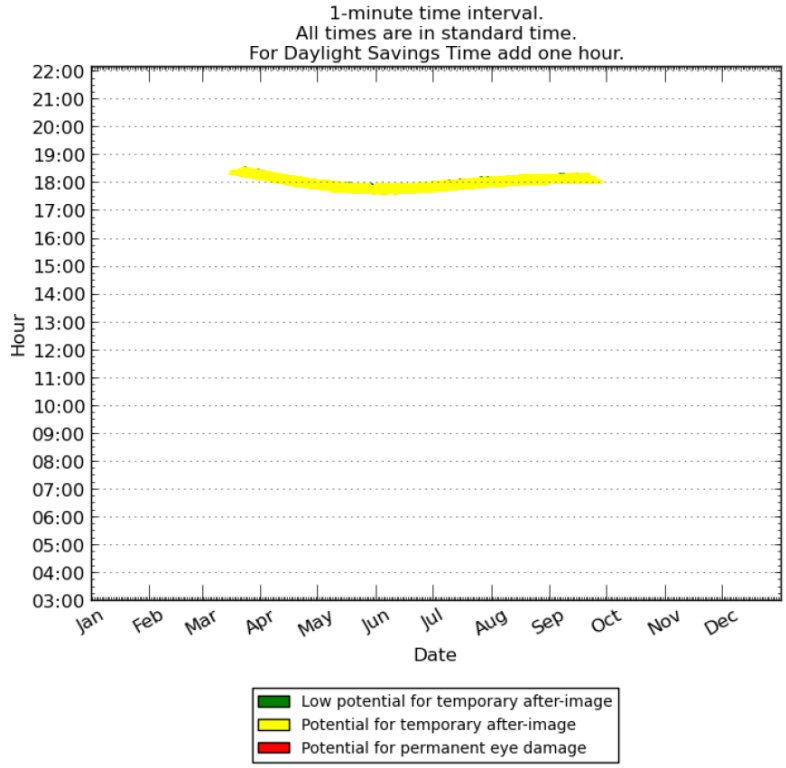
Observation Point D



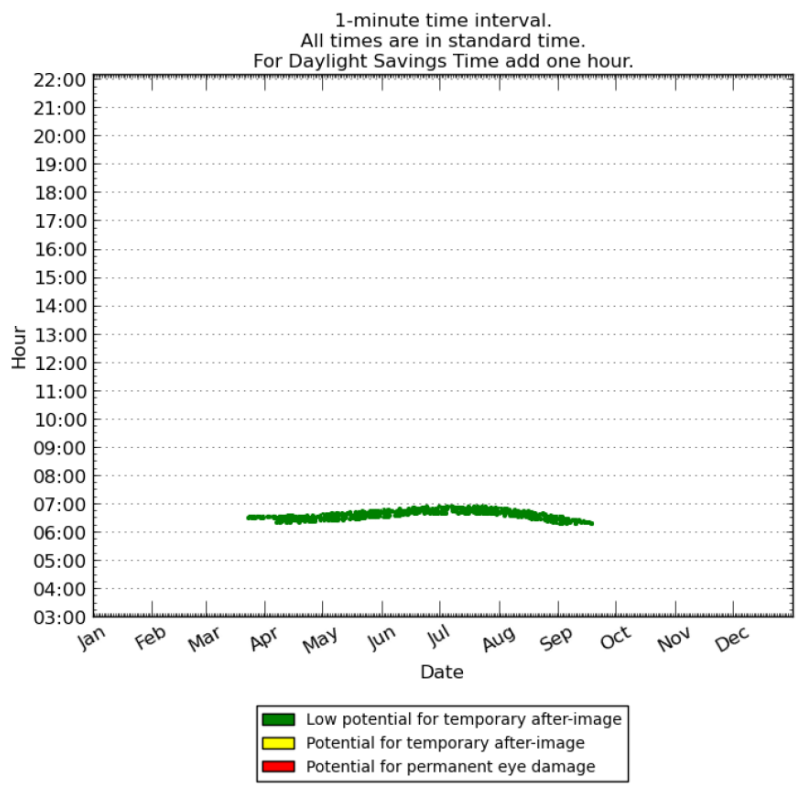
Observation Point E



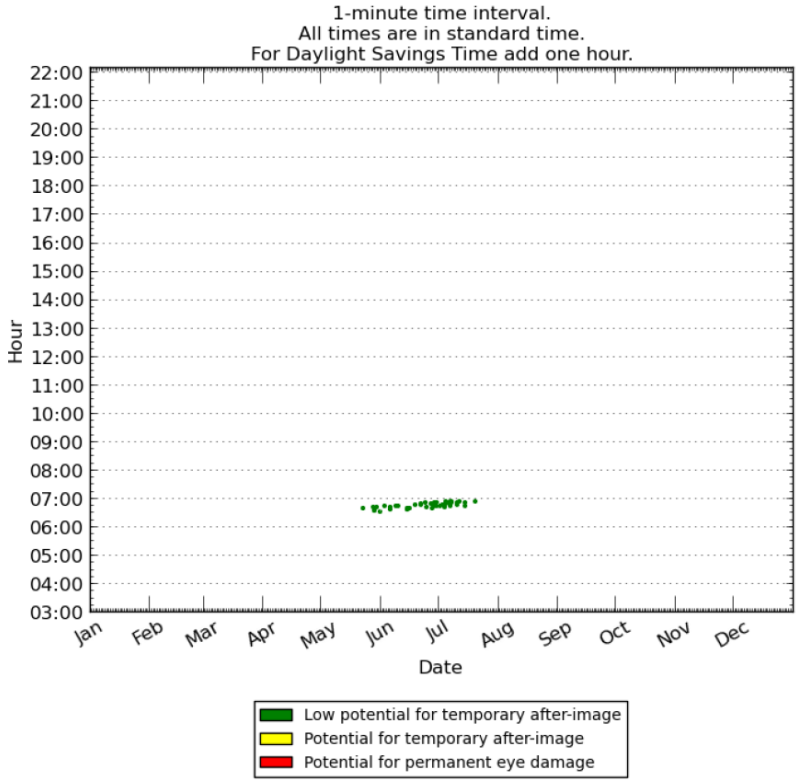
Observation Point F



Observation Point G



Observation Point H



Observation Point I

No glare.

Observation Point J

No glare.

Observation Point K

No glare.

Observation Point L

No glare.