URS

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April 28, 2010

Mr. Christopher Meyer
Project Manager
Attn: Docket No. 08-AFC-5
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Imperial Valley Solar (formerly Solar Two) (08-AFC-5)
Applicant's Submittal of the Glint and Glare Study

Dear Mr. Meyer:

On behalf of Imperial Valley Solar (formerly Solar Two), LLC, URS Corporation Americas (URS) hereby submits the Applicant's Glint and Glare Study.

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge. I also certify that I am authorized to submit on behalf of Imperial Valley Solar, LLC.

Sincerely,

Angela Leiba
Project Manager

AL: ml

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April 26, 2010

TESSERA SOLAR

Tessera Solar

Imperial Valley Solar Project
Glint and Glare Study

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POWER ENGINEERS

Imperial Valley Solar Project
Glint and Glare Study

PREPARED FOR: *TESSERA SOLAR*
PREPARED BY: *POWER ENGINEERS*

REVISION HISTORY		
DATE	**REVISED BY**	**REVISION**
4/26/10	J. Pfaff	Rev. 0

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GLINT & GLARE STUDY FOR THE IMPERIAL VALLEY SOLAR PROJECT

1.0 INTRODUCTION

POWER Engineers, Inc. (POWER) has prepared a Glint and Glare Study as per the California Energy Commission (CEC) request supporting environmental impact disclosures contained in the CEC Staff Assessment (SA) and Draft Environmental Impact Statement (DEIS), dated February 12, 2010. Specifically, this analysis developed by POWER seeks to answer the following questions as posed by the CEC:

1. **Question #1:** *Will a 20-foot screen fence or earth berm reduce glint/glare to off-site viewers?*

   The CEC is concerned that glint and glare may be both a safety issue and a distraction to motorists. Therefore, the CEC has asked Tessera Solar to consider construction of a 20-foot high, slatted chain link fence or construction of an earthen berm along the perimeter of the Imperial Valley Solar Project Site. The intended purpose of the fence or berm is to reduce potential glint and glare to off-site viewers. POWER performed a glint and glare study to determine if glint and glare will be visible to off-site viewpoints, and if it is visible, would a 20-foot visual buffer be effective in reducing these effects.

2. **Question #2:** *Will highway travelers experience a flashing effect while driving next to rows of SunCatchers^{TM}? If so, would a 20-foot fence or berm reduce flashing effects?*

   The CEC expressed a concern that travelers may be distracted by potential flashing effects as a result of quickly (70 mph) passing the Imperial Valley Solar Project site along Interstate 8 (I-8). POWER performed a study to determine if travelers will experience a flashing effect, and if so, would a 20-foot fence or berm be effective in reducing these effects.

3. **Question #3:** *What are the luminance readings from the SunCatchers^{TM} (in cd/m2)?*

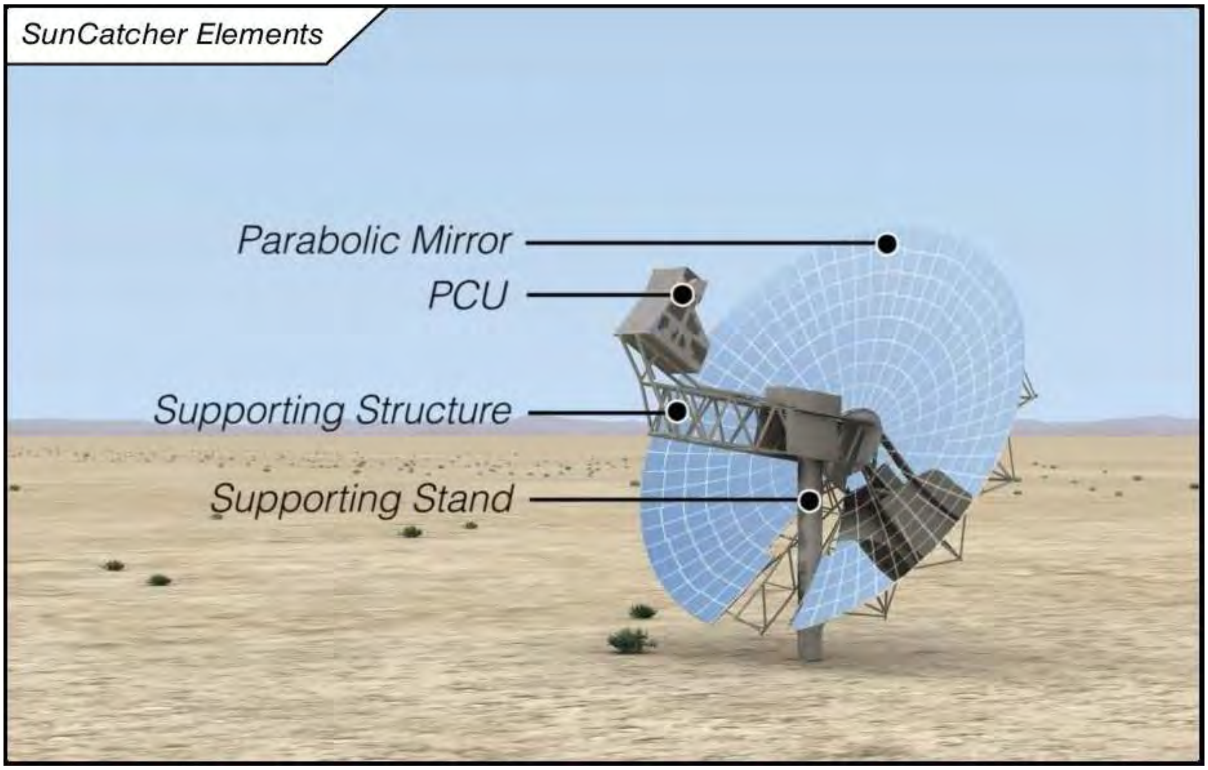
   A separate luminance study, completed by John O'Farrell of Lighting Sciences, Inc. was performed at the Maricopa Solar site, located in Peoria, Arizona. His methods, findings and conclusions regarding luminance values are included in Appendix A.

1.1 DEFINITIONS and DESCRIPTIONS OF THE SUNCATCHER^{TM}

The following definitions and descriptions are key to understanding the methodology and results of the study.

> SunCatcher™ (Inset 1) - The SunCatcher™ is a 25-kilowatt-electric (kWe) solar dish system designed to automatically track the sun so as to collect and focus solar energy on to a power conversion unit (PCU), which generates electricity. The system consists of a solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy into electricity. The conversion process in the PCU involves a closed-loop, high-efficiency, four-cylinder reciprocating Solar Stirling

Engine, using an internal working fluid that is recycled through the engine. The PCU solar receiver is an external heat exchanger that absorbs the incoming solar thermal energy. This heats and pressurizes the internal working fluid in the heat exchanger tubing and this pressurized gas in turn powers the Solar Stirling Engine.



INSET 1 - SUNCATCHER™ DESIGN

- **Glint** – A flash of light, also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™ (see Figure 1).

- **Glare** – A continuous source of excessive brightness, relative to ambient lighting, also known as diffused reflections. Glare occurs where light is focused into the PCU (see Figure 1).

- **Power Conversion Unit (PCU)** – The PCU converts thermal energy into electricity. The collection of light is also the source of glare, experienced by viewers (see Inset 1 for SunCatcher™ design).

Example of Glint

Example of Glare

- **Key Observation Point (KOP)** – KOPs are viewpoints selected by the Bureau of Land Management (BLM) and CEC, used in the glint and glare analysis, and served as the viewpoint locations for photo simulations and animations. KOPs provided analysts a sampling of different distances and view angles, necessary to determine the visibility of glint and glare, flashing effects, and the potential screening benefits of a 20-foot fence or berm (see Figure 2).

1.2 METHODOLOGY

In order to answer the questions posed by the CEC, POWER used computer simulations to study potential glint and glare effects from the Imperial Valley Solar Project. The following is a description of the process.

1. *Identify Potential Glint and Glare Issues*– POWER identified KOPs where glint and glare may be an issue. Photography was taken from different KOPs around the Imperial Valley Solar Project site, and GPS locations and camera information were recorded.

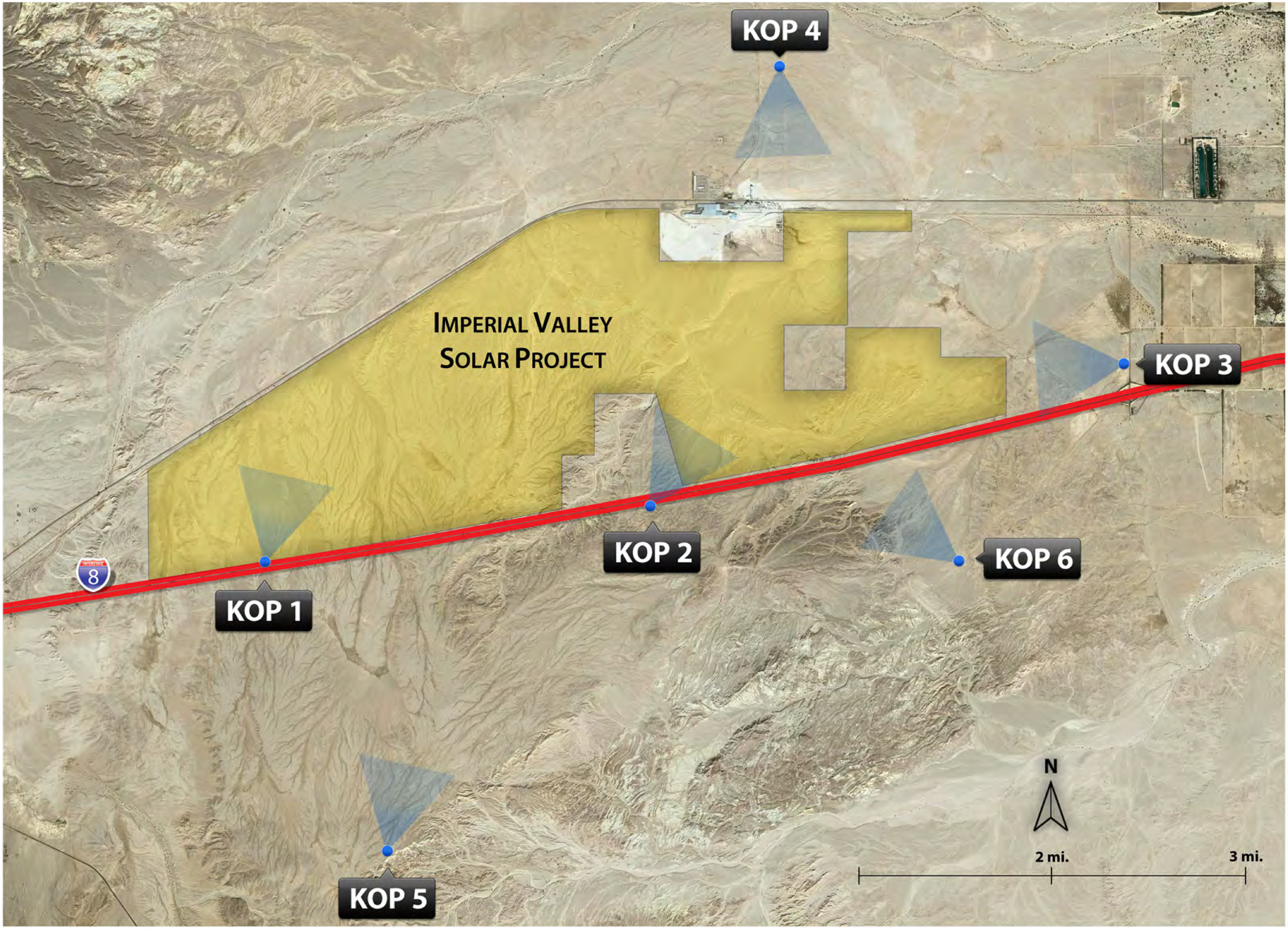
2. *Characterize* – POWER worked closely with Tessera Solar and Stirling Energy Systems (SES) to develop accurate computer simulations of SunCatcher ™ operations. Analysts traveled to the Maricopa Solar Project site to observe and characterize the conditions in which glint and glare may be produced and validate the computer simulation process. Appendix B contains the methodology for the 3D products developed (refer to Photo_TimeLapse.wmv on the DVD for Maricopa Solar site visit example).

3. *Evaluate* – Visual analysts studied the simulated project under different operation modes and lighting conditions, and at different times of the year. These simulations were used to evaluate and document when glint and glare may be visible to KOPs, and to determine if a 20-foot fence or berm will reduce the occurrence of these effects. For purposes of this study, only the 20-foot fence option was used, as it would provide the same screening benefits as an earthen berm. POWER reviewed simulations to evaluate the potential visibility of glint and glare to the KOPs. Simulation results were then validated with observations at the Maricopa Solar site. Results of this evaluation can be found in Section 1.3.

4. *Mitigate* – POWER developed recommendations to mitigate the visibility of glint and glare to KOPs (see Section 1.5).

1.2.1 KOP Identification

SunCatcher™ operations were studied from six KOPs. KOPs were identified by the BLM and CEC. Photography was taken from each KOP and used as the foundation of the computer simulations developed. The KOPs provided analysts a sampling of different distances and view angles of the Imperial Valley Solar Project. 3D simulations were developed at each KOP under different lighting and operation conditions (see Figure 3). Each KOP is described below (refer to Figure 2 for KOP locations):



Imperial Valley Solar Project
Key Observation Points, Photo locations
Figure 2

KOP Location - **Representative Viewshed -**

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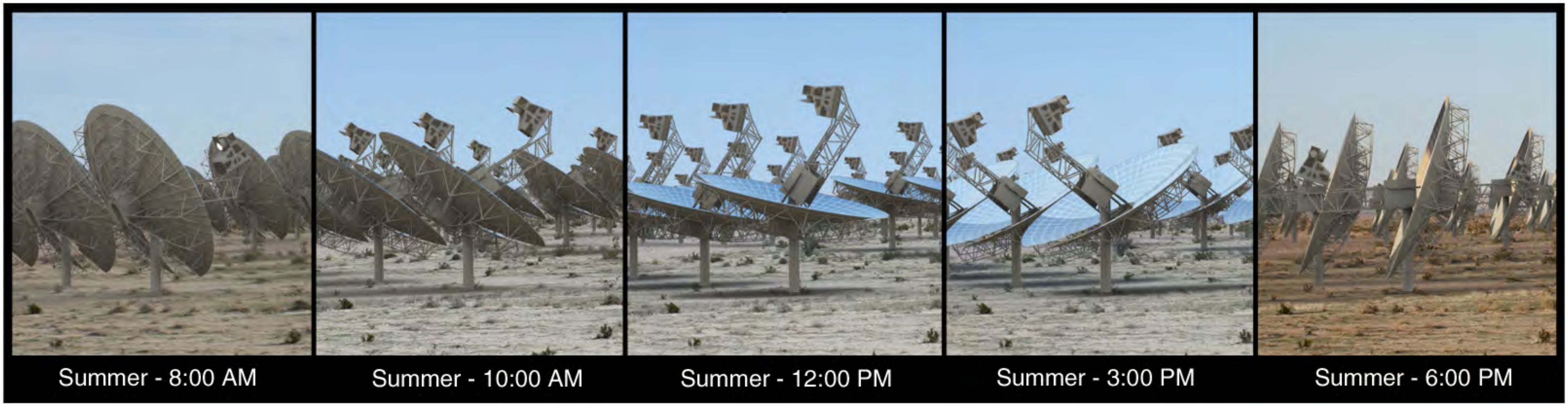
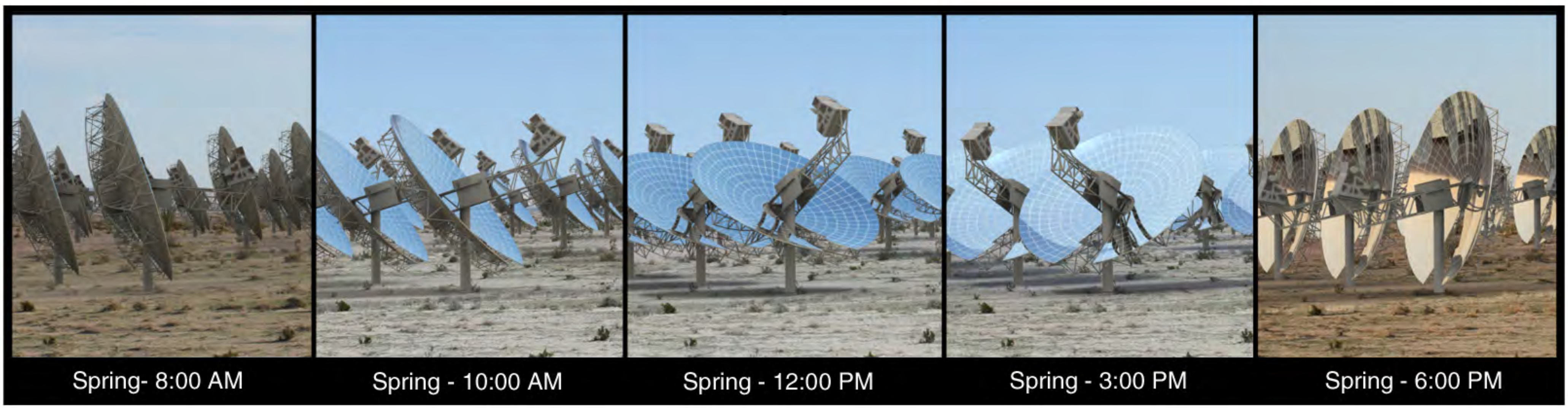




Imperial Valley Solar Project
KOP 1 Animation Stills
Figure 3

- **KOP 1 -** Located along I-8, approximately 480 feet from the Imperial Valley Solar Project site. Open and unobstructed views are primarily associated with interstate travelers heading southwest or northeast.

- **KOP 2** - Located along I-8, approximately 1,650 feet from the Imperial Valley Solar Project site. Open and unobstructed views are primarily associated with interstate travelers heading southwest or northeast.

- **KOP 3 -** Located along Dunaway Rd., approximately 5,133 feet from the Imperial Valley Solar Project site. Open and unobstructed views are primarily associated with Dunaway Rd. travelers heading north and south.

- **KOP 4 -** Located at Campsite 48, about one mile north of Plaster City, and approximately 6,170 feet from the Imperial Valley Solar Project site. There are open and unobstructed views to the southwest and southeast of the Imperial Valley Solar Project site. Views to the south are obstructed by Plaster City.

- **KOP 5** - Located at the Anza Monument Overlook, approximately 13,075 feet from the Imperial Valley Solar Project site. There are unobstructed views from KOP 5 to the north and northwest of the Imperial Valley Solar Project site. Foreground terrain and vegetation obstruct some views to the northeast of the project site.

- **KOP 6** - Located at Campsite 47, approximately 5,680 feet from the Imperial Valley Solar Project site. There are open and unobstructed views of the Imperial Valley Solar Project site to the north, northwest, and west.

- **Interstate 8 -** I-8, located south of the Imperial Valley Solar Project Site, is considered a moving KOP. It was used in the study to analyze potential flashing effects as a result of experiencing glint from passing SunCatchers™ at highway speeds (70 mph). The interstate ranges in viewing distance from 480 – 1,650 feet.

1.2.2 SunCatcher™ Operations

It was important to understand how a SunCatcher™ operates, and the different conditions that may produce glint, glare or flashing effects. There are basically two conditions: tracking and off-axis. The following is a description of each position analyzed in the study. Refer to the DVD for animated examples of these conditions.

- Tracking Position – This is the normal operating position of a SunCatcher™ which occurs approximately 30 minutes after sunrise, and continues throughout the day until sunset. In this position, the center of the parabolic mirror is directly in line with the PCU and the sun. The parabolic shape of the mirror collects light and concentrates it back to the PCU to create energy (refer to KOP1_spring.wmv for example).

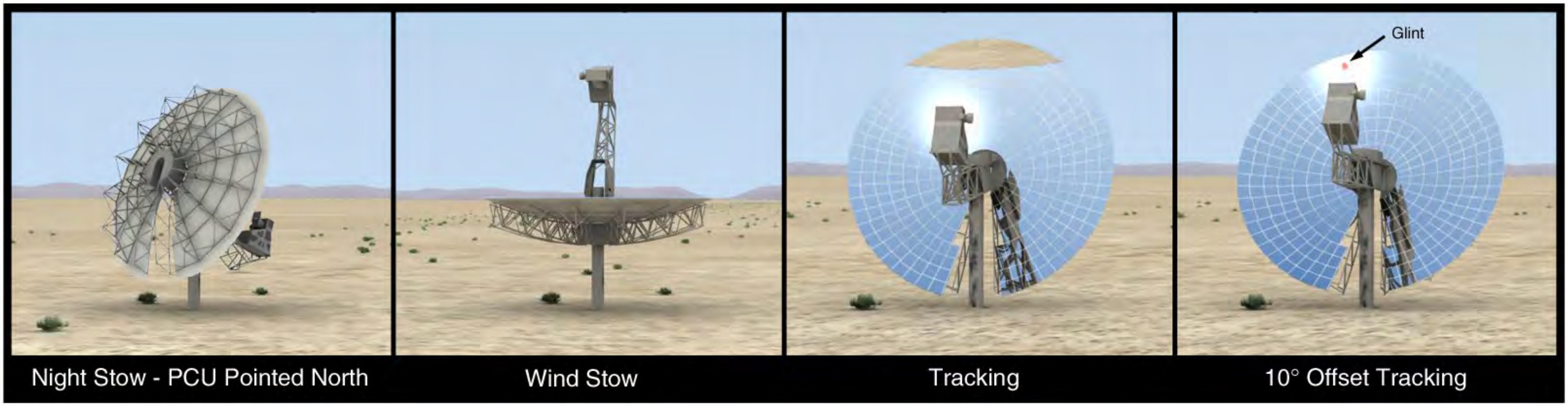
- <u>Off-axis Positions</u> – Off-axis includes all positions where the back of the mirror is not aligned with the PCU and the sun (see Figure 4). In off-axis positions, the focal point of energy is shifted away from the PCU. The following is a description of these conditions.

  - Night-Stow to Operation Transition – A SunCatcher™ moves from night-stow position to a tracking position at sun-up and back into night-stow position after sundown. In the morning, the SunCatcher™ rotates approximately 270 degrees counter-clockwise from a north-facing azimuth to a 10 degree offset track position. The rotation may take up to 5 minutes. It stays in this offset tracking position until the light level is sufficient to generate power (up to 30 minutes). From offset tracking position to tracking position takes approximately 10 seconds (refer to Stow to Track animation on the DVD).

  - Wind Stow – During high winds a SunCatcher™ will cease operations and move into a position with the PCU pointed skyward. It takes up to five minutes for SunCatchers™ to transition into the wind stow position, depending on initial position.

  - Offset Tracking (Cloud Cover) – When the sun is blocked by a cloud, a SunCatcher™ will move into a 10 degree offset tracking position (PCU pointed above the sun). The 10 degree offset track is required to protect equipment and bring the PCU back on-line gradually after the cloud has passed. The SunCatcher™ may stay in an offset track position for up to 30 minutes waiting for the PCU to come on-line. Once the PCU is on-line, it takes approximately 10 seconds to transition from offset tracking to tracking position (refer to Drive60_offaxis_with fence.wmv).

  - Malfunction – A malfunction or fault is a rare occurrence. In most cases, the SunCatcher™ detects the fault, immediately moves into a wind stow position, and remains offline until maintenance is performed. In very rare cases, a SunCatcher™ may malfunction and hold a static position. A SunCatcher™ unable to move into wind stow position is either manually moved or repaired within one hour.



Imperial Valley Solar Project
Examples of Off-Axis Positions
Figure 4

1.2.3 3D Products

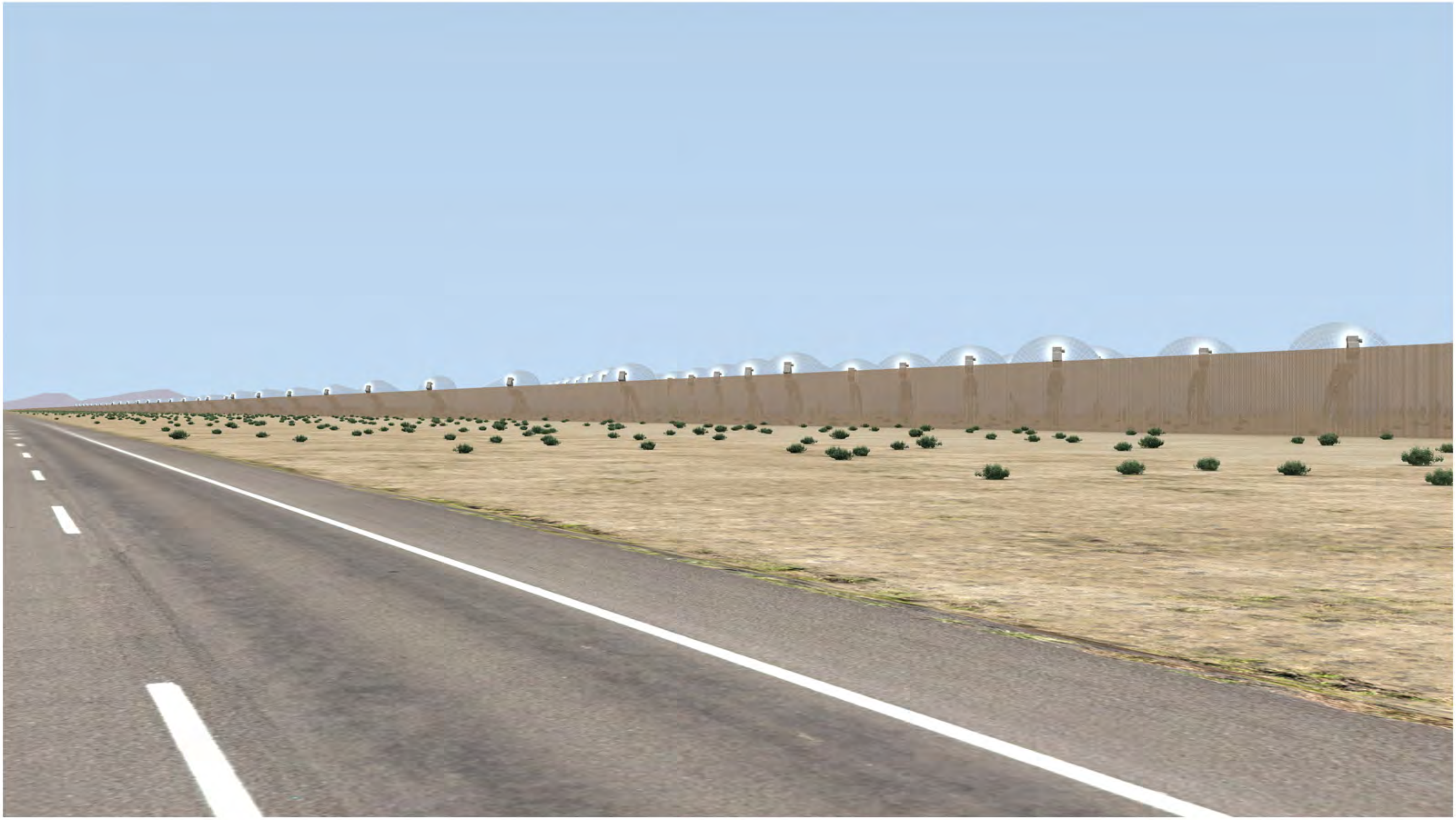
At each KOP, several products were developed to accurately create and study the effects of glint, glare and flashing effects under different operation and lighting conditions. The following is a description of the products used in the glint, glare and flashing effect study:

- 3D Animated KOP simulations: 3D animated photo-simulations (KOP simulations) were developed using photography from each KOP (see Figure 5). Photography provided contextual reference to compare existing conditions and the proposed project. 3D SunCatcher™ models, 3D site information and a 3D 20-foot fence were superimposed into the photographs for study. Each KOP simulation accurately depicted a full-day sun cycle during the summer and winter solstices, and the spring and fall equinoxes. Visual analysts reviewed the simulations and documented where and when glint or glare may occur throughout the day and year. Once completed, new simulations were conducted with the addition of a 20-foot screen fence to determine potential screening effects. Results were documented and are located in Appendix C of this report. All animations can be viewed from the accompanying DVD included with this report.

- 3D Transportation Flash Effect Animations: Visual analysts developed 3D transportation animations to determine if a series of SunCatchers™ would produce a flashing effect to motorists traveling 60 miles per hour parallel to the Imperial Valley Solar Project site along I-8 (see Figure 5). Transportation simulations were developed for tracking and off-axis SunCatchers™. A 20-foot fence was incorporated into the animation to document screening potential. All animations can be viewed from the accompanying DVD, included with this report.

The 3D Products incorporated an accurate, computer generated, solar algorithm based on the latitude and longitude of the actual project near El Centro, California. 3D models of the project were accurately placed in the exact geographic location as the project and the sun system. Sun calculations and results were based on hours of operational daylight and solar clocks for the following times of year:

- Summer Solstice (June 21st) - 14 hours 21 minutes of sunlight
  - Sunrise: 5:21 a.m.
  - Sunset: 7:42 p.m.
- Winter Solstice (December 21st) - 9 hours 57 minutes of sunlight
  - Sunrise: 7:31 a.m.
  - Sunset: 5:28 p.m.
- Fall Equinox (September 23rd) - 12 hours 05 minutes of sunlight
  - Sunrise: 6:17 a.m.
  - Sunset: 6:23 p.m.
- Spring Equinox (March 21st) - 12 hours 11 minutes of sunlight
  - Sunrise: 6:30 a.m.
  - Sunset: 6:41 p.m.



Imperial Valley Solar Project
Transportation Animation (Tracking Position)
Figure 5

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1.3 RESULTS

This study focused on determining whether offsite viewers could experience glint, glare or flashing effects, and if a 20-foot fence or berm could screen these effects. Results were determined through visual review of the 3D products developed, and field verified through visits to the Maricopa Solar project. All results were documented in a spreadsheet for each KOP (Appendix C). The spreadsheet documents any conditions under which glint or glare would be visible to KOPs. The following is a description of each type of situation studied and the general results. Please refer to Appendix C for detailed reporting.

- Glint Analysis (SunCatcher™ in tracking position) – By design, the SunCatcher's™ parabolic mirror focuses solar energy back to the PCU, blocking the reflection of the sun, effects of glint or flashing effects to viewers. This was observed during field visits to the Maricopa Solar Project site and repeated during in-house KOP simulation development (see Figure 6). Examples of animated SunCatchers™ can be found in the accompanying DVD (please refer to KOP 1-6 SunCatcher™ tracking animations for example). Regardless of viewer location or time of day and year, a tracking SunCatcher™ will produce no visible glint (reflection of ther sun) or flashing effects to KOPs. In these conditions, a 20-foot screen fence or berm is not required.

- Glint Analysis (SunCatcherTM in off-axis position) – Off-axis tracking SunCatchers™ have the potential for viewers to experience glint. In this condition, the mirror focal point shifts from the PCU and the reflection of the sun may be visible to viewers in the parabolic mirror. This is dependent on SunCatcher™ position, time of day, year and viewer location. These occurrences are rare and typically last less than 30 minutes in duration. There are four times when a SunCatcher™ may be in an off-axis position:

  - Offset Tracking (Night-Stow to Operation Transition) – A SunCatcher™ moves from night-stow to a tracking position at sun-up and back into stow position after sundown. Morning transitions may create situations of glint to off-site viewers facing west. Specifically KOPs 1, 2, 3, 6 and I-8 travelers. This may occur for up to 30 minutes after sunrise. KOP simulation review determined glint will be visible in the upper portion of the parabolic mirror above the proposed fence line, and the construction of a 20-foot fence or berm in its proposed location will have minimal screening benefits.

  - Wind Stow – During high winds a SunCatcher™ will cease operations and move into a position with the PCU pointed skyward. While in this position, simulation review and on-site visits to the Maricopa Solar Project site determined no glint or glare will be visible to KOPs. Depending on time of day, year and location of viewpoint, a brief glint (typically 1-5 seconds) may occur while the SunCatcher™ is moving into wind stow position. Once in wind stow position, all reflected light will be directed skyward and no glint visible to KOPs studied. However, in some conditions where a viewer has an elevated view of the Imperial Valley Solar Project, glint may be visible. A 20-foot fence or berm is not required for wind stow conditions.

Imperial Valley Solar Project
Examples of Glint Hidden by PCU
Figure 6

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- Offset Tracking (Cloud Cover) – When the sun is blocked by a cloud, a SunCatcher™ will move into an offset tracking position (see Figure 7). The 10 degree offset track is required to protect equipment and bring the PCU back on-line gradually after the cloud has passed. This process may take up to 30 minutes.

  Glint may be visible to KOPs 1-6 and motorists, depending on time of day. KOPs facing northwest or west may experience glint during morning hours and KOPs facing east or northeast may experience glint during evening hours. Simulation review determined a 20-foot fence to be of minimal benefit. This is due to the glint location high in the parabolic mirror during morning and evening conditions. In-house studies determined if the PCU could be moved from a 10 degree to a 25 degree offset track position, the effects of glint may be eliminated or substantially reduced when viewed from KOPs.

- Malfunction (Fault) - In the event of equipment failure (fault) a SunCatcher™ may malfunction. In most cases, the SunCatcher™ detects the fault and immediately moves into a wind stow position and remains offline until maintenance is performed (see Figure 7). In rare cases, a SunCatcher™ may malfunction and hold a static position. Maintenance is performed quickly to protect equipment and the SunCatcher™ is either repaired or stowed for maintenance within 60 minutes. Simulations were developed for equipment failure at 8:00 a.m., 12:00 p.m. and 5:00 p.m. to determine if glint may be visible to KOPs.

  Simulation review determined glint may be visible to KOPs 1-6 and motorists for a fixed position malfunction, depending on time of day and location. Simulation review determined a 20-foot fence will provide up to 35% screening and reduce duration of glint if a SunCatcher™ malfunctioned in the morning or late afternoon (refer to Appendix C for exact times of day glint may be visible from established KOPs). Refer to malfunction animations for examples of the study performed for each KOP.

- <u>Glare Tracking Position</u> – Typically, glare is experienced when viewing a SunCatcher™ from the side or back with direct line of site to the PCU. 3D photo-simulation review determined a 20-foot screen fence will provide minimal screening (1-5%) for KOPs 1, 2, 3 - 6 (see Figure 8).

- <u>Glare Offset Tracking</u> – Field tests and in-house study determined offset tracking SunCatchers™ produce no glare. This condition is a result of having no focused light on the PCU.

Example of a Offset Tracking Position

Example of a Malfunction Position

Imperial Valley Solar Project
Example of Glare in Tracking Position
Figure 8

- Transportation Glint Flash Effects – Flash effects will not occur in tracking SunCatchers™. Flashing effects are created when consecutive rows of SunCatchers™ are in an offset tracking position and glint is visible in the mirror. When experienced at highway speeds and in multiple SunCatchers™, this condition can appear as flashes. This effect may occur during morning night-stow to tracking transitions, and offset tracking (cloud-cover) situations. The flash occurs as a motorist's movement changes the relative angle between the viewer, the sun and the SunCatcher™ (see transportation flash animations on the accompanying DVD for example). Flash speed may increase with travel speed and view angle acuity. This condition is very rare, but would primarily occur during morning or late afternoon when the SunCatcher™ is low in the horizon. Refer to Appendix C for exact times of day and situations for which this may occur.

  A 20-foot fence or berm will provide minimal screening benefit due to the position of the glint, high in the parabolic mirror during morning and evening hours. Mid day conditions did not produce flashing effects, due to the position of the SunCatcher™.

  It is important to note, that a motorist's vision is much different than that of a static KOP. In a study completed by the Washington State Department of Transportation (DOT) (Schauman, et. al 1992), it was determined that our visual system can be divided into two types; focal and ambient.

  "The visual system can also be divided in to focal and ambient vision. Focal vision provides high resolution, detailed vision for identifying and evaluating important information, such as hazards. Ambient vision is peripheral and provides information on motion, locations and locomotion – it serves as a kind of early warning system. If something catches our attention from the ambient system, we turn our eyes to focus on its details. What the visual system of someone moving at 55 miles per hour through the environment detects is different than that detected by a person who is strolling or sitting. Furthermore, the driver's vision is much more limited, because of the car, than the vision of a person walking through the environment. A walker can see something of the surroundings over a visual angle of about 180 degrees. A driver sees only about 20 percent of the scene."

In the rare occurrence of a flash distraction, review of the transportation flash animations determined the flash would most likely occur in our peripheral vision, outside the 20 percent of a motorist's focused vision. Review of the transportation flash animations determined that quick flashes would most likely occur in the ambient vision of a driver. This is due to the angle acuity of the driver to the parabolic mirrors. However, as determined in the Washington DOT study, highway drivers focus on 20 percent of the scene and do not rely on ambient vision for driving.

1.4 CONCLUSIONS

Question #1: *Will a 20-foot screen fence or earth berm reduce glint/glare to off-site viewers?*

Answer: No, the screening benefits of a 20-foot screen fence or berm are minimal for all situations studied.

- Glint - During normal operations and when a SunCatcher™ is tracking the sun, glint will not be visible to offsite viewers. By design, the parabolic mirror focuses light to the PCU, which blocks all direct reflections of the sun, regardless of viewer position, season or time of day. Glint and flashing effects may occur when a SunCatcher™ is in an off-axis position. During morning and evening hours when the sun is low on the horizon, viewers looking east (evening views) or west (morning views) may experience glint from these conditions (up to 30 minutes). In all KOPs reviewed, a 20-foot fence or berm would have little or no benefit to block the effects of glint during off-axis situations. The location of the glint, high in the parabolic mirror could be visible to KOPs over the top of the 20-foot fence or berm (fence provided an approximate 1-5% reduction in the occurrence of glint, see Appendix B). In-house studies determined there are three ways to reduce the occurrence of glint to KOPs.

  - Relocation of Proposed 20-foot Fence or Berm – A 20-foot fence or berm provides minimal screening for glint and glare in the current proposed location. In-house simulations determined additional screening benefits could be created if the 20-foot feature was moved closer to KOPs, specifically those near the Imperial Valley Solar Project Site (I-8, KOP 1 and KOP 2). It is important to note however, that the fence or berm will have to be moved within 75 feet of I-8, inside the Cal-Trans Right-of-Way in order to fully screen these glint/glare effects. This action may have substantial visual impacts to both landscape aesthetics and landscape visibility. The long linear barrier would block views and create a new linear contrast in the landscape. A berm would carry with it, a new set of issues. A berm 20 feet high, over 6 miles in length, and approximately 60 feet wide (to meet slope stability requirements) would require a significant amount of fill material and create a significant linear disturbance. Neither the fence, nor the berm was carried forward as a recommendation. Other recommendations like the mirror repositioning plan would create the similar with less impact to natural resources.

  - Offset Track Repositioning – Studies concluded that the best method to reduce the occurrence on glint is through mirror repositioning. Over 90% of the occurrence of glint was experienced in the offset tracking position. By shifting the current offset track position from 10 degrees above sun azimuth to 25 degrees above azimuth, glint would be nearly eliminated during offset tracking situations (see Figure 9 and Track10_off_25off.wmv, located on the DVD). Discussions with SES determined this option could be accomplished through computer programming.

- Malfunctions which result in a fixed position SunCatcherTM in an off-axis position are very rare, and if it does occur, it is limited to one SunCatcherTM. A 20-foot perimeter fence reduced 35% of glint from this rare situation, and was not seen as beneficial due to aesthetic and landscape visibility impacts. Instead, a strict "Glint Mitigation Response Plan" is recommended to quickly deal with these situations if they occur.

- Glare – Glare will be visible during normal operations. This effect is experienced from the back and side of a SunCatcher^{TM} when looking into the PCU. Simulation review determined a 20-foot fence would provide minimal blocking benefits and was not recommended as mitigation.

Question #2: *Will highway travelers experience a flashing effect while driving next to rows of SunCatchers^{TM}? If so, would a 20-foot fence or berm reduce flashing effects?*

Answer: In certain, very rare conditions, a flashing effect may be experienced by motorists in their peripheral vision, outside their focused vision. Due to the location of the glint, high on the parabolic mirror, a 20-foot screen fence or berm in its proposed location would provide minimal glint screening.

- Flashing effects to motorists were determined to occur only where consecutive rows of SunCatchers^{TM} are in an offset tracking position, with glint moving from one dish to the next. Offset tracking conditions in the morning or evenings may produce this result. In all KOPs reviewed, a 20-foot fence or berm would have little or no benefit to block the effects of glint during offset tracking situations (approximate 1-5% reduction in the duration of glint). However, study of transportation animations determined if the offset track position was moved from 10 degrees to 20-25 degrees, glint would be eliminated in most of these situations (see Figure 9 and Track10_off_25off.wmv, located on the DVD).

- In the rare event of an equipment malfunction, and if the SunCatcher^{TM} cannot move into a wind stow position for repairs, glint may be visible to off-site viewers. This situation receives priority from maintenance employees, as damage to equipment may occur and is resolved in less than one hour. In some cases, a 20-foot fence or berm did help block the effects of some glint during a malfunction (approximately 35%).

Question #3: *What are the luminance readings from the SunCatchers^{TM} (in cd/m2)?*

Answer: A separate luminance study, completed by John O'Farrell of Lighting Sciences, Inc. was performed at the Maricopa Solar site, located in Peoria, Arizona. His methods, findings and conclusions regarding luminance values are included in Appendix A.

1.5 RECOMMENDED MITIGATION

The following mitigation measures are recommended to reduce or eliminate the effects of glint and glare to off-site viewers:

- Offset Track Repositioning – During in-house testing of 3D models, it was determined that if the offset tracking position could be moved from the current 10 degree position to a 25 degree position, glint could be eliminated or substantially reduced for offset tracking situations (see Figure 9 and Track10_off_25off.wmv, located on the DVD). Tessera Solar should consider moving the standard offset tracking position from 10 degrees to 25 degrees. Additionally, Tessera should monitor and adjust offset track positions throughout the period of one year to document the changes in sun angle. The offset 10 degree offset tracking results presented in Appendix C of this report should be used as reference with new 25 degree offset tracking results documented for CEC review.

- Morning Stow to Tracking Transitions – Tessera Solar should consider positioning SunCatchers™ in the 25 degree offset tracking position several minutes before sunup. This will eliminate the chance of glint effects created by a moving SunCatcher™.

- Night Stow – Tessera Solar should consider positioning SunCatchers™ back into the night stow position after sundown. This will eliminate the chance of glint effects created by a moving SunCatcher™.

- Develop an Emergency Glint Response Plan – Tessera Solar should consider developing an emergency response plan for an immobile malfunctioning SunCatcher™. The plan should include procedures to quickly reduce potential glint impacts to offsite viewers.

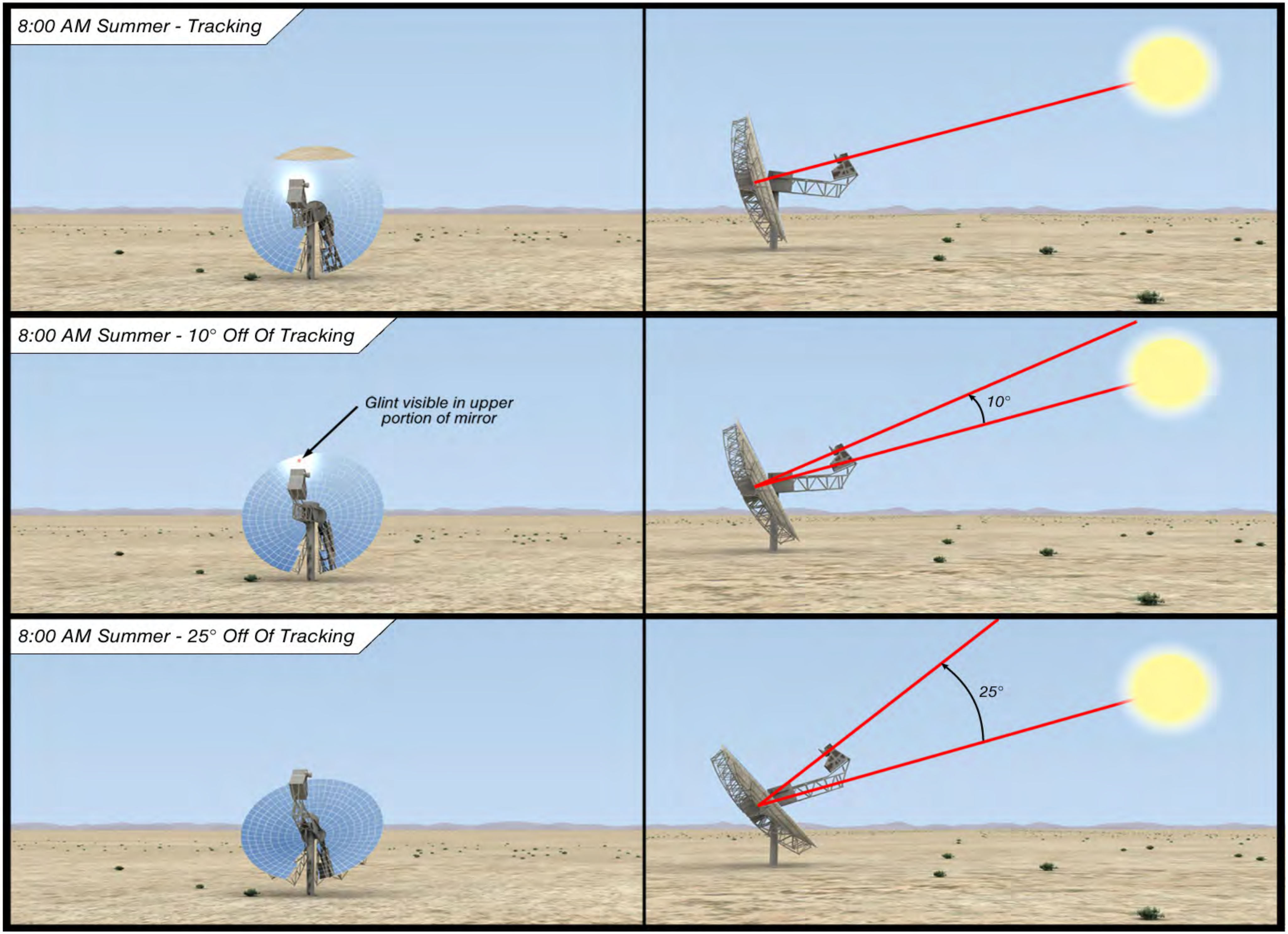
1.6 SOURCES

Ho, Clifford K., Cheryl M. Ghanbari, and Richard B. Diver. 2009. *Hazard Analysis of Glint and Glare from Concentrating Solar Power Plants*, SolarPaces 2009, Berlin Germany. Ph.D., Sandia National Laboratories, Solar Technologies Department, P.O. Box 5800, Albuquerque, NM 87185-1127, USA Phone: 1-505-844-2384, E-mail: ckho@sandia.gov Test Engineer, Sandia National Laboratories, Solar Technologies Department Ph.D., Sandia National Laboratories, Solar Technologies Department. September 15-18, 2009.

O'Farrell, John. 2010. *Report for URS on Suncatcher Luminances*. Lighting Services, Inc. April 20, 2010.

Reynolds, Ryan. 2010. Personal communication, April, 2010.

Schauman, Sally, J. Heerwagen, A. Vernez Moudon, B. Witherspoon, S. James and J. Mundee. 1992. Visual Perception of the Roadway and Roadside Elements by the Observer in Motion, Final Report. Washington State Department of Transportation. WA-RD 283.1. Olympia, Washington. December 1992.



Imperial Valley Solar Project
8:00 AM Summer Study
Figure 9

APPENDIX A – LUMINANCES REPORT

Lighting Sciences Inc.
7826 East Evans Road
Scottsdale, Arizona 85260 U.S.A.
Tel: 480-991-9260 Fax: 480-991-0375
www.lightingsciences.com

Report for URS on Suncatcher Luminances

20 April 2010

I arrived at the site of the Maricopa Solar plant at 75th and Northern Avenues in Peoria, Arizona before sunrise on 14 April 2010. Also present was Seth Hopkins of URS Corporation. We set up near the southeastern corner of the facility.

I had a Photo Research Spotmeter model UBD-1/2° for the measurement of luminance. This instrument has an accuracy of approximately ±5%. The parabolic mirror I measured was approximately 200 feet to the WNW of my position. The complete set of measurements is in a spreadsheet: URSLuminances.xls.

Sunrise occurred at 6:01am MST. The SunCatchers began operation at about 6:30am. The parabolic dishes moved to an "offaxis" mode initially. During this mode of operation a reflection of the sun was visible in many of the parabolic reflector dishes. I attempted to measure the luminance of a solar image. However my instrument is limited to 685,000 cd/m² and it saturated when I tried to measure the solar reflection. The solar reflection did appear to be less difficult to view than the Sun itself. The luminance of the Sun at a high solar altitude can have a luminance of approximately 1.6 billion cd/m².

Since the luminance of the reflectors was not uniform, I made luminance measurements near the bottom of the reflector, the middle of the reflector (approximately a half radius out from the center), the top of the reflector and I attempted to find and measure the most luminous spot on the reflector. The most luminous spot on the reflector was generally a diffuse reflection of the brightly lit focal point on the power conversion unit (PCU). It could be seen as a glow in the area where the line of sight placed the PCU in front of the parabolic reflector. As the dish rotated and the PCU moved off the dish, from the point of view of the observer, this glow disappeared.

In general, the sky was reflected in the parabolic dishes and the luminance of this reflection was less than the luminance of the sky itself. In the early morning, when the parabolic dishes where pointed near the horizon, an image of the ground was visible in the top portion of the reflectors. Later at higher solar altitudes the ground image disappeared. At even higher solar altitudes, an image of the top portion of the parabolic reflector was visible in the bottom portion of the reflector. When this reflection became visible I made two separate measurements of the bottom of the reflector. One measurement was of the reflected sky and the other the image of the top portion of the parabolic dish.

Near the beginning of the measurement session I noticed that the SunCatcher just to the North of the one I had been measuring had a greater luminance in the brightest area of the dish. I made separate measurements of the bright spot on this dish. I can only speculate that the bright spot in this dish had a higher luminance due to the difference in viewing angle or just the amount of dust on the reflector surface.

Measurements were made every 15 minutes until 12:30 pm MST when solar noon occurred.

I did make an estimate of the luminance of the focal point of the reflector on the PCU. This luminance was above the maximum measurable value of my instrument. However I was able to move the light acceptance cone of the Spotmeter so that only half of the focal point was being measured before saturation occurred. Therefore I can estimate that the luminance of the focal point on the PCU was approximately twice my maximum measurable value or roughly 1.4 million cd/m^2.

All measurements are recorded in a spreadsheet: **URSLuminances.xls**.

John O'Farrell
Senior Physicist
Lighting Sciences, Inc.
7826 East Evans Road,
Scottsdale, Arizona 85260

Note: Most Measurments made of dish slightly north of west of spot meter

Time	Location of Measurement	Luminance [ftL]	Luminance [cd/m²]	Notes
NA	Focal Point on Engine	~400000	~1E6	I could only get about half the spot before saturation but I estimate ~1e6 cd/m²
6:38	Bottom of Dish	390	1336	
6:38	Middle of Dish	820	2810	
6:38	Top of Dish	5000	17131	Near Solar Reflection - Solar Reflection not measureable but less intense than the Sun itself
6:40	Bottom of Dish	400	1371	
6:40	Middle of Dish	900	3084	
6:40	Top of Dish	7200	24669	
				All Measurements after 6:40 are in tracking mode
6:45	Bottom of Dish	625	2141	
6:45	Middle of Dish	1700	5825	
6:45	Top of Dish	340	1165	Reflection of ground
7:00	Bottom of Dish	700	2398	
7:00	Middle of Dish	760	2604	
7:00	Top of Dish	3520	12060	
7:00	Brightest Spot	13200	45227	Diffuse reflection of focal point on engine
7:15	Bottom of Dish	800	2741	
7:15	Middle of Dish	1550	5311	
7:15	Top of Dish	850	2912	Ground Reflection
7:15	Brightest Spot	8700	29808	Near engine
7:30	Bottom of Dish	718	2460	
7:30	Middle of Dish	1050	3598	
7:30	Top of Dish	4780	16378	
7:30	Brightest Spot	16500	56533	Near engine
7:45	Bottom of Dish	650	2227	
7:45	Middle of Dish	1010	3461	
7:45	Top of Dish	4500	15418	
7:45	Brightest Spot	15300	52422	
7:45	Brightest Spot	34300	117521	Next Dish to the North
8:00	Bottom of Dish	609	2087	
8:00	Middle of Dish	960	3289	
8:00	Top of Dish	4000	13705	
8:00	Brightest Spot	14800	50709	
8:00	Brightest Spot	33000	113067	Next Dish to the North
8:15	Bottom of Dish	600	2056	
8:15	Middle of Dish	910	3118	
8:15	Top of Dish	3760	12883	
8:15	Brightest Spot	13450	46083	
8:15	Brightest Spot	29400	100732	Next Dish to the North
8:30	Bottom of Dish	595	2039	
8:30	Middle of Dish	880	3015	
8:30	Top of Dish	4030	13808	
8:30	Brightest Spot	11600	39745	
8:30	Brightest Spot	25000	85656	Next Dish to the North
8:45	Bottom of Dish	605	2073	
8:45	Middle of Dish	860	2947	
8:45	Top of Dish	4900	16789	
8:45	Brightest Spot	12400	42486	
8:45	Brightest Spot	18400	63043	Next Dish to the North
9:00	Bottom of Dish	670	2296	

9:00	Middle of Dish	835	2861	
9:00	Top of Dish	7780	26656	
9:00	Brightest Spot	11400	39059	
9:00	Brightest Spot	15500	53107	Next Dish to the North
9:15	Bottom of Dish	695	2381	
9:15	Middle of Dish	870	2981	
9:15	Top of Dish	7800	26725	
9:15	Brightest Spot	7800	26725	
9:15	Brightest Spot	11250	38545	Next Dish to the North
9:30	Bottom of Dish	740	2535	
9:30	Middle of Dish	920	3152	
9:30	Top of Dish	4900	16789	
9:30	Brightest Spot	4900	16789	
9:30	Brightest Spot	7750	26554	Next Dish to the North
9:45	Bottom of Dish	780	2672	
9:45	Middle of Dish	925	3169	
9:45	Top of Dish	3850	13191	
9:45	Brightest Spot	3850	13191	
9:45	Brightest Spot	6400	21928	Next Dish to the North
10:00	Bottom of Dish	815	2792	
10:00	Middle of Dish	880	3015	
10:00	Top of Dish	3100	10621	
10:00	Brightest Spot	3100	10621	
10:00	Brightest Spot	5350	18330	Next Dish to the North
10:15	Bottom of Dish	250	857	Top of dish reflection
10:15	Middle of Dish	925	3169	
10:15	Top of Dish	2320	7949	
10:15	Brightest Spot	2590	8874	
10:15	Brightest Spot	4150	14219	Next Dish to the North
10:30	Bottom of Dish	310	1062	Top of dish reflection
10:30	Bottom of Dish	925	3169	sky reflection
10:30	Middle of Dish	905	3101	
10:30	Top of Dish	2000	6853	
10:30	Brightest Spot	2150	7366	
10:30	Brightest Spot	3600	12335	Next Dish to the North
10:45	Bottom of Dish	330	1131	Top of dish reflection
10:45	Bottom of Dish	1020	3495	sky reflection
10:45	Middle of Dish	935	3204	
10:45	Top of Dish	635	2176	
10:45	Brightest Spot	955	3272	
10:45	Brightest Spot	3050	10450	Next Dish to the North
11:00	Bottom of Dish	1510	5174	Top of dish reflection
11:00	Bottom of Dish	1000	3426	sky reflection
11:00	Middle of Dish	920	3152	
11:00	Top of Dish	455	1559	
11:00	Brightest Spot	1850	6339	
11:00	Brightest Spot	2800	9594	Next Dish to the North
11:15	Bottom of Dish	1550	5311	Top of dish reflection
11:15	Bottom of Dish	1100	3769	sky reflection
11:15	Middle of Dish	1065	3649	
11:15	Top of Dish	1240	4249	
11:15	Brightest Spot	1700	5825	
11:15	Brightest Spot	2470	8463	Next Dish to the North
11:30	Bottom of Dish	1555	5328	Top of dish reflection
11:30	Bottom of Dish	1175	4026	sky reflection
11:30	Middle of Dish	1085	3717	
11:30	Top of Dish	1245	4266	
11:30	Brightest Spot	1675	5739	

11:30	Brightest Spot	2390	8189	Next Dish to the North
11:45	Bottom of Dish	1335	4574	Top of dish reflection
11:45	Middle of Dish	1140	3906	
11:45	Top of Dish	1125	3855	
11:45	Brightest Spot	1400	4797	
11:45	Brightest Spot	2050	7024	Next Dish to the North
12:00	Bottom of Dish	1450	4968	Top of dish reflection
12:00	Middle of Dish	1100	3769	
12:00	Top of Dish	1160	3974	
12:00	Brightest Spot	1415	4848	
12:00	Brightest Spot	2010	6887	Next Dish to the North
12:15	Bottom of Dish	1460	5002	Top of dish reflection
12:15	Middle of Dish	1200	4112	
12:15	Top of Dish	1130	3872	
12:15	Brightest Spot	1340	4591	
12:15	Brightest Spot	1930	6613	Next Dish to the North
12:30	Bottom of Dish	1450	4968	Top of dish reflection
12:30	Middle of Dish	1255	4300	
12:30	Top of Dish	1245	4266	
12:30	Brightest Spot	1445	4951	
12:30	Brightest Spot	1940	6647	Next Dish to the North

Figure 6-2. Approximate Luminance of Various Light Sources

Light Source		Approximate Average Luminance (cd/m^2)
Natural light sources		
Sun (at its surface)	—	2.3×10^9
Sun (as observed from earth's surface)	At meridian	1.6×10^9
Sun (as observed from earth's surface)	Near horizon	6×10^6
Moon (as observed from earth's surface)	Bright spot	2.5×10^3
Clear sky	Average brightness	8×10^3
Overcast sky	—	2×10^3
Lightning flash	—	8×10^{10}
Combustion sources		
Candle flame (sperm)	Bright spot	1×10^4
Kerosene flame (flat wick)	Bright spot	1.2×10^4
Illuminating gas flame	Fish-tail burner	4×10^3
Welsbach mantle	Bright spot	6.2×10^4
Acetylene flame	Mees burner	1.1×10^5
Photoflash	—	1.6×10^8 to 4×10^8 peak
Nuclear sources		
Atomic fusion bomb	0.1 msec after firing—30-m dia. ball	2×10^{12}
Self-luminous paints		0.2 to 0.3
Incandescent lamps		
Carbon filament	3.15 lm/W	5.2×10^5
Tantalum filament	6.30 lm/W	7×10^5
Tungsten filament	Vacuum lamp 10 lm/W	2×10^6
Tungsten filament	Gas-filled lamp 20 lm/W	1.2×10^7
Tungsten filament	750-W projection lamp 26 lm/W	2.4×10^7
Tungsten filament	1200-W projection lamp 31.5 lm/W	3.3×10^7
RF (radio frequency)	24-mm diameter disk	6.2×10^7
Blackbody at 6500 K	—	3×10^9
Blackbody at 4000 K	—	2.5×10^8
Blackbody at 2042 K	—	6×10^5
60-W inside frosted	—	1.2×10^5
10-W inside frosted	—	2×10^4
Tungsten-halogen sources		
3000 K CCT	—	1.3×10^7
3200 K CCT	—	2.3×10^7
3400 K CCT	—	3.9×10^7
Fluorescent sources		
CFL	36-W twin tube	3×10^4
T-5	14–35 W	2×10^4
T-8	58 W	1.4×10^4
T-8	36 W	1.1×10^4
T-12 bulb	Cool white 430 mA	8.2×10^3
T-12 bulb	Cool white 800 mA	1.1×10^4
T-12 bulb	Cool white 1500 mA	1.7×10^4
T-17 grooved	Cool white 1500 mA	1.5×10^4
Electroluminescent sources		
Green color at 120 V 60 Hz	—	27
Green color at 600 V 400 Hz	—	68
Carbon arc sources		
Plain carbon arc	Positive crater	1.5×10^8
High intensity carbon arc	13.6 Rotating positive carbon	1.0×10^9
Enclosed electric arc sources		
High pressure mercury	Type H33 2.5 atm	1.5×10^6
High pressure mercury	Type H38 10 atm	1.8×10^6
High intensity short arc mercury	30 atm	2.4×10^8 (4.3×10^9 peak)
Xenon short arc	900 W dc	1.8×10^8
Electronic flash tubes	900 W dc	1×10^9 to 3×10^9

APPENDIX B - 3D PRODUCT CREATION PROCESS

APPENDIX B

3D Product Creation Process

Photography:
POWER traveled to the project site west of El Centro, CA and collected photography on March 12-13, 2010. POWER collected photography at each of the pre-determined KOPs several times throughout the day, providing a range in lighting conditions. POWER recorded the longitude and latitude of the photo location at each KOP using a global positioning system.

Camera Match:
POWER used a Canon XSI, crop sensor camera to capture the photography for the simulations. The lens lengths used were 18mm, 35mm and 55mm. Before setting up the virtual camera in 3D Studio Max, POWER had to convert the crop sensor data using a focal length conversion (lens length x 1.6). Using the converted camera lens length data and the GPS location, target angle and supplemental control points were used to align the photography with the virtual camera. This step will result in a 3D scene properly aligned with the photography.

Lighting:
A sun system was developed to match the date, time of day and atmospheric conditions for each KOP photograph. The sun system included a full day of sunlight at the summer and winter solstices, and the spring and fall equinoxes.

3D Model:

- Step 1 - Creating 3D Terrain - POWER received 2-foot contours of the project site from RMT. These contours were used to develop a digital terrain model to help determine the height of the fence, as well as structure placement for the proposed transmission line.

  Austin Streetman (POWER) obtained 10 meter contours of the surrounding mountains, which were used to help line up the photosimulations.

- Step 2 - 3D Model of SunCatcher™ - POWER received two very detailed models of a SunCatcher™ from Ronan Reynolds with SES. POWER used those files to accurately represent a SunCatcher™ in POWER's 3D Program. Although POWER simplified some of the structure on the back of the dish, an emphasis was made to ensure that the modeling of the dish itself, the PCU, and the alignment of the two were absolutely correct. POWER received direction on an acceptable format to model the dish itself through conversations with Mr. Reynolds.

  Materials for the SunCatchers™ were determined through conversations with Mr. Reynolds, as well as with a visit to the Maricopa Solar Project site, where photography of working SunCatchers™ was taken throughout the course of a day.

- Step 3 - SunCatcher™ - POWER received the SunCatcher™ layout from Robert Byall (Tessera Solar). The AutoCAD file provided POWER with the X, Y, and Z value of each SunCatcher™ on the site. POWER used that information to hand place each SunCatcher™.

- Step 4 - Screening Fence - POWER received an AutoCAD file of the fence design from Nate Viste with RMT. POWER took the fence layout and used it to create a 20-foot high screening fence. POWER was informed by Richard Knox (Tessera Solar) that it would be a slated chain link fence.

- Step 5 - Proposed Transmission Line - POWER was given structure spotting, structure type and structure heights of the proposed transmission line from Brian Sedgwick with RMT. POWER used that information along with the 2-foot contours to determine correct placement on the site. Materials were provided by Mr. Sedgwick as well.

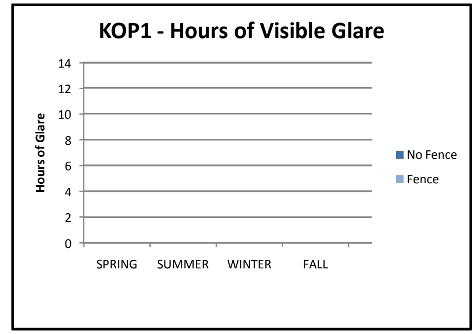
Animation:
Using the 3D max sun system for each KOP, POWER animated the sun from sunrise to sunset creating a time lapse animation for the 3D model. The photography was blended from sunrise to sunset for each KOP. POWER compiled several layers of animation using Adobe Premiere into a final video for each KOP. Each video consisted of: an animated background photography layer; an animated 3D content layer; a mask layer; and a title bar that included KOP name location, date and solar clock that represented the time lapse throughout the day.

APPENDIX C – GLINT/GLARE RESULTS

KOP 1 - GLINT ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (with Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



KOP 2 - GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
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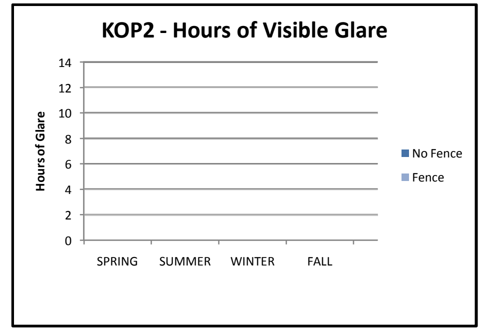
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

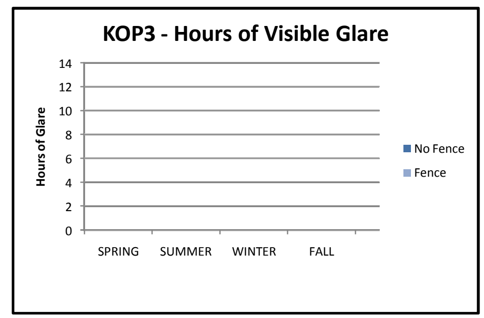
NO GLINT OBSERVED



KOP 3- GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



Note 1: GLARE: A continuous source of excessive brightness, relative to ambient lighting (also known as Diffused reflections). Glare occurs where light is focused into the Power Conversion Unit (PCU).

Note 2 : Glare analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)

Note 3 : Refer to Glint/Glare Study for methodology

*** No visible glint effects were detected. By design, all energy is focused to the PCU, blocking the reflection of the sun to viewers.**

LEGEND	
(dark blue)	Glare Visible without fence - (N,S,E,W) indicates direction KOP will view Glare
(light blue)	Glare Visible with fence - (N,S,E,W) indicates direction KOP will view Glare
(black)	No Sunlight

TABLE 1a - GLINT ANALYSIS (SunCatcher™ in Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

KOP 4 - GLINT ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
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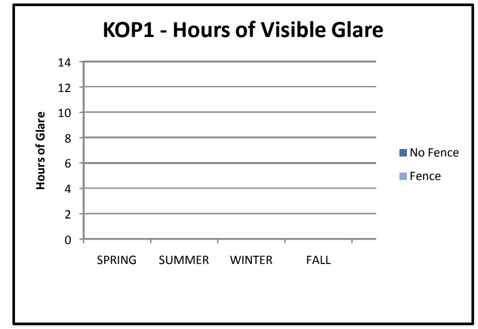
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

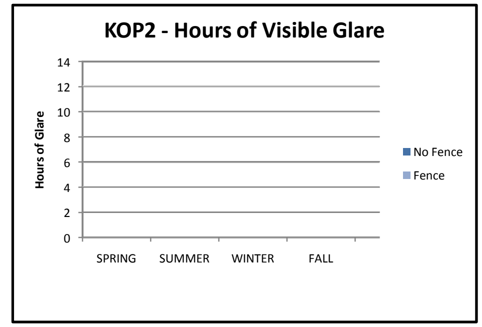
NO GLINT OBSERVED



KOP 5 - GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

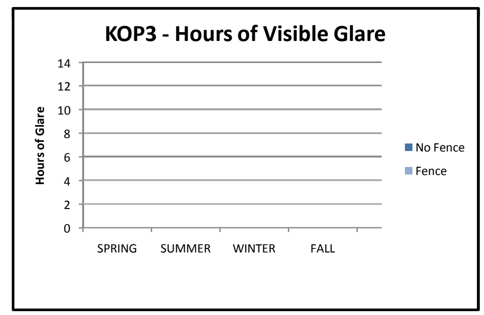
NO GLINT OBSERVED



KOP 6 - GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



Note 1: GLARE: A continuous source of excessive brightness, relative to ambient lighting (also known as Diffused reflections). Glare occurs where light is focused into the Power Conversion Unit (PCU).
Note 2 : Glare analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glare Visible without fence - (N,S,E,W) indicates direction KOP will view Glare
(light blue)	Glare Visible with fence - (N,S,E,W) indicates direction KOP will view Glare
(black)	No Sunlight

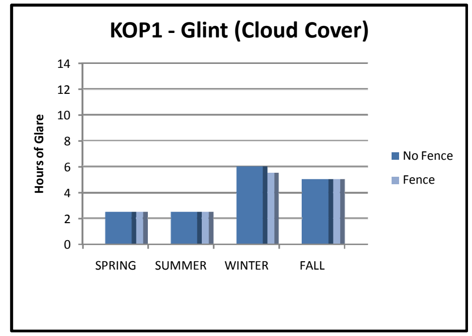
*** No visible glint effects were detected. By design, all energy is focused to the PCU, blocking the reflection of the sun to viewers.**

TABLE 1b- GLINT ANALYSIS (SunCatcher™ in Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

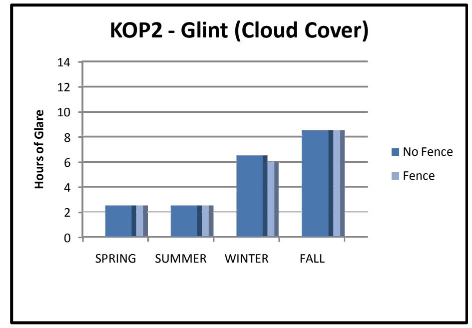
KOP 1 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																							
SPRING (With Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																							
SUMMER (No Fence)	W	W	W	W	W																									
SUMMER (With Fence)	W	W	W	W	W																									
WINTER (No Fence)					NW\W	NW\W	NW\W	NW\W	NW	NW										NE	NE	NE	NE	NE	NE					
WINTER (With Fence)						NW\W	NW\W	NW\W	NW	NW										NE	NE	NE	NE	NE	NE					
Fall (No Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																NE	NE	NE	NE	NE			
FALL (With Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																NE	NE	NE	NE	NE			



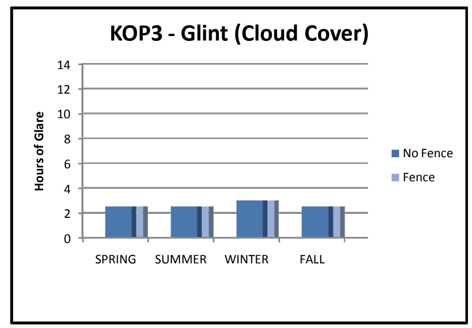
KOP 2 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																							
SPRING (With Fence)			NW\W	NW\W	NW\W	NW\W	NW\W																							
SUMMER (No Fence)	NW	NW	NW	NW	NW																									
SUMMER (With Fence)	NW	NW	NW	NW	NW																									
WINTER (No Fence)					NW\W	NW\W	NW\W	NW\W	NW	NW									N	NE\N	NE\N	NE\N	NE\N	NE\N	NE					
WINTER (With Fence)					NW\W	NW\W	NW\W	NW\W	NW	NW									N	N	N	N	N	N						
Fall (No Fence)			NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	NW	NW	NW									N	N	N	NE\N	NE\N	NE	NE	NE			
FALL (With Fence)			NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	NW	NW	NW									N	N	N	NE\N	NE\N	NE	NE	NE			



KOP 3 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W																							
SPRING (With Fence)			NW\W	NW\W\SW	NW\W\SW	NW\W\SW	NW\W																							
SUMMER (No Fence)	W\SW	W\SW	W\SW	W\SW	W\SW																									
SUMMER (With Fence)	W\SW	W\SW	W\SW	W\SW	W\SW																									
WINTER (No Fence)					NW\W\SW	NW\W	NW\W	NW	NW	NW																				
WINTER (With Fence)					NW\W\SW	NW\W	NW\W	NW	NW	NW																				
Fall (No Fence)			NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W																							
FALL (With Fence)			NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W																							



Note 1: GLINT- A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)

Note 3 : Refer to Glint/Glare Study for methodology

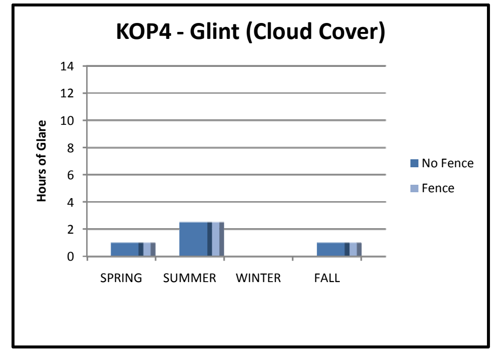
LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

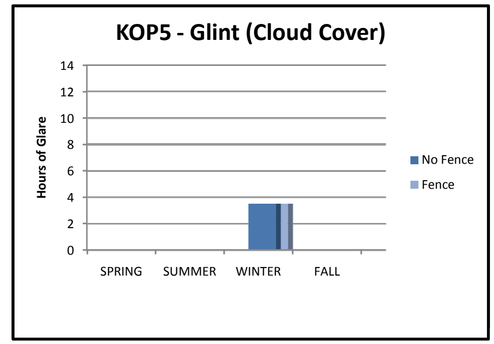
TABLE 2a- GLINT ANALYSIS - CLOUD COVER (Offset Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

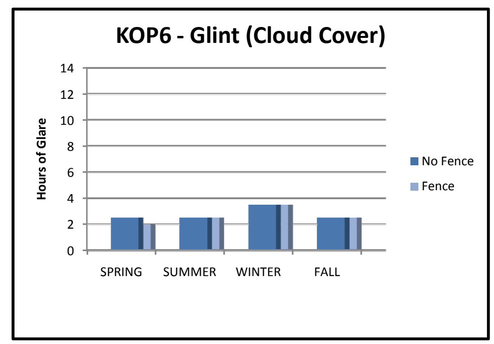
KOP 4 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			SW	SW																										
SPRING (With Fence)			SW	SW																										
SUMMER (No Fence)	SW	SW	SW	SW	SW																									
SUMMER (With Fence)	SW	SW	SW	SW	SW																									
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)			SW	SW																										
FALL (With Fence)			SW	SW																										



KOP 5 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)					NW	NW	NW	NW	NW	NW	NW																			
WINTER (With Fence)					NW	NW	NW	NW	NW	NW	NW																			
Fall (No Fence)																														
FALL (With Fence)																														



KOP 6 - GLINT ANALYSIS - CLOUD COVER (OFFSET TRACKING 10 degrees)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			W	W	W	W	W																							
SPRING (With Fence)				W	W	W	W																							
SUMMER (No Fence)	W	W	W	W	W																									
SUMMER (With Fence)	W	W	W	W	W																									
WINTER (No Fence)					NW\W	NW\W	NW\W	NW\W	NW	NW	NW																			
WINTER (With Fence)					NW\W	NW\W	NW\W	NW\W	NW	NW	NW																			
Fall (No Fence)			W	W	W	W	W																							
FALL (With Fence)			W	W	W	W	W																							



Note 1: GLINT- A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.
Note 2 : Glint analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

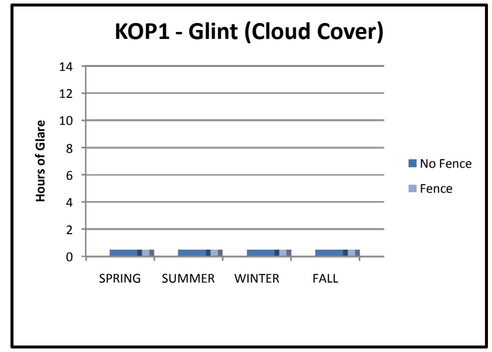
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 2b- GLINT ANALYSIS - CLOUD COVER (Offset Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

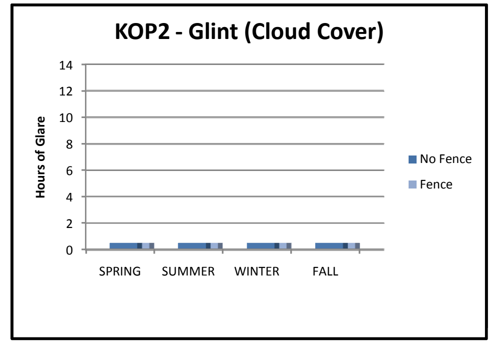
KOP 1 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			W\NW\N																											
SPRING (With Fence)			W\NW																											
SUMMER (No Fence)	W\NW																													
SUMMER (With Fence)	W																													
WINTER (No Fence)					W\NW\N																									
WINTER (With Fence)					W\NW\N																									
Fall (No Fence)			W\NW																											
FALL (With Fence)			W\NW																											



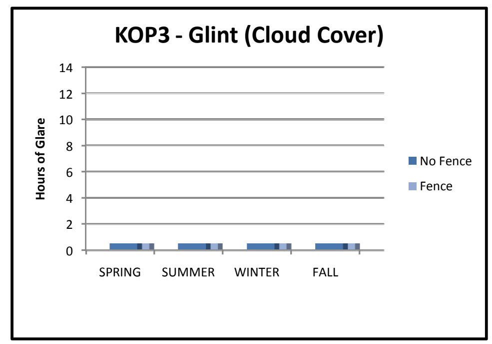
KOP 2 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			W\NW\N																											
SPRING (With Fence)			W\NW\N																											
SUMMER (No Fence)	W\NW																													
SUMMER (With Fence)	W\NW																													
WINTER (No Fence)					W\NW\N																									
WINTER (With Fence)					W\NW\N																									
Fall (No Fence)			W\NW																											
FALL (With Fence)			W\NW																											



KOP 3 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			W\NW																											
SPRING (With Fence)			W\NW																											
SUMMER (No Fence)	W\NW																													
SUMMER (With Fence)	W\NW																													
WINTER (No Fence)					W\NW																									
WINTER (With Fence)					W\NW																									
Fall (No Fence)			W\NW																											
FALL (With Fence)			W\NW																											



Note 1: GLINT- A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.
Note 2 : Glint analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

*** The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.**

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

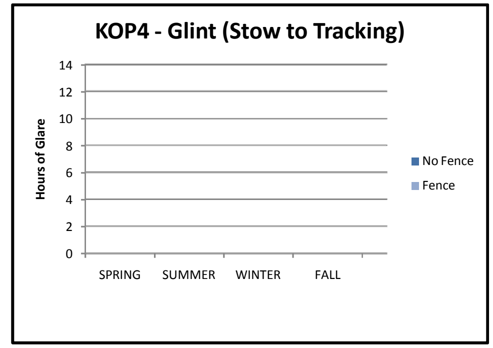
TABLE 3a- GLINT ANALYSIS - STOW to TRACKING (Offset Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

KOP 4 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

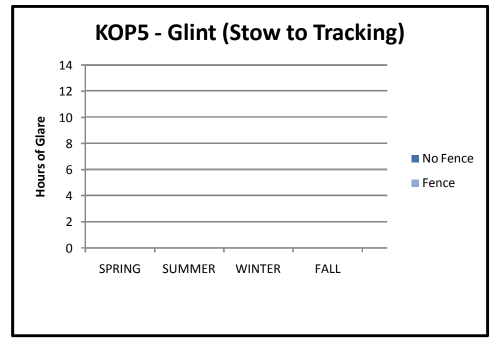
NO GLINT OBSERVED



KOP 5 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

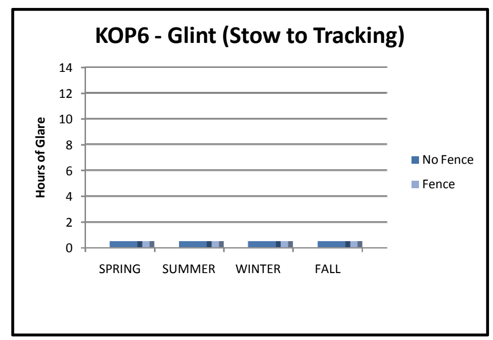
	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



KOP 6 - GLINT ANALYSIS - STOW TO TRACKING (OFFSET TRACKING 10 degrees)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			W\NW																											
SPRING (With Fence)			W\NW																											
SUMMER (No Fence)	W\NW																													
SUMMER (With Fence)	W\NW																													
WINTER (No Fence)					W\NW																									
WINTER (With Fence)					W\NW																									
Fall (No Fence)			W\NW																											
FALL (With Fence)			W\NW																											



Note 1: GLINT- A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.
Note 2 : Glint analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

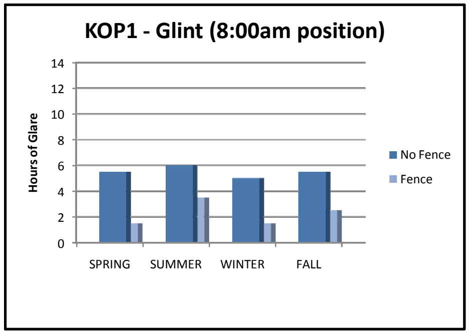
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 3b- GLINT ANALYSIS - STOW to TRACKING (Offset Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

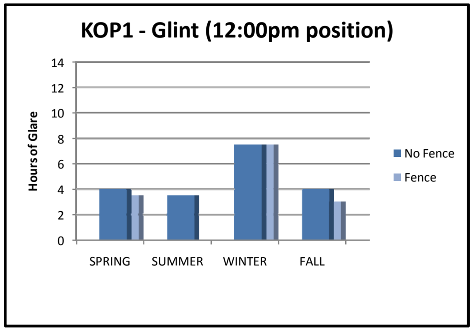
KOP 1 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W	NW\W		NW	NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W																
SPRING (With Fence)			NW\W	NW\W	NW\W																									
SUMMER (No Fence)			W	W	NW\W		W	W	W	W	W	W	W	W	W															
SUMMER (With Fence)			W	W	NW\W		W	W	W	W																				
WINTER (No Fence)					NW\W		NW\W	NW\W	NW\W	NW\W	NW\W	NW		W	W	W														
WINTER (With Fence)					W		W	W																						
Fall (No Fence)			NW\W	NW\W	NW\W		NW\W	NW\W	NW	NW	NW		W	W	W															
FALL (With Fence)			NW\W	NW\W	NW\W		W	W																						



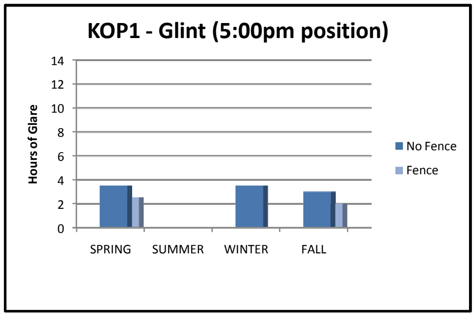
KOP 1 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00 pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W						
SPRING (With Fence)																		NW\W	NW\W	NW\W	NW\W	NW\W	W	W						
SUMMER (No Fence)																				NW	NW	NW	NW	NW	NW	NW				
SUMMER (With Fence)																														
WINTER (No Fence)								NE	NE	NE\N	N	N	N		N	N\NW	N\NW	NW	NW	NW	NW	NW	NW							
WINTER (With Fence)								NE	NE	NE\N	N	N	N		N	N	N\NW	NW	NW	NW	NW	NW	NW							
Fall (No Fence)																	NW	NW	NW\W	NW\W	NW\W	NW\W	W	W						
FALL (With Fence)																			W	W	W	W	W	W						



KOP 1 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00 pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																				NE	NE	NE	NE		NE	NE	NE			
SPRING (With Fence)																						NE	NE		NE	NE	NE			
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																		NE	NE	NE	NE	NE	NE		NE					
WINTER (With Fence)																														
Fall (No Fence)																				NE	NE	NE	NE		NE	NE				
FALL (With Fence)																						NE	NE		NE	NE				



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation

Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

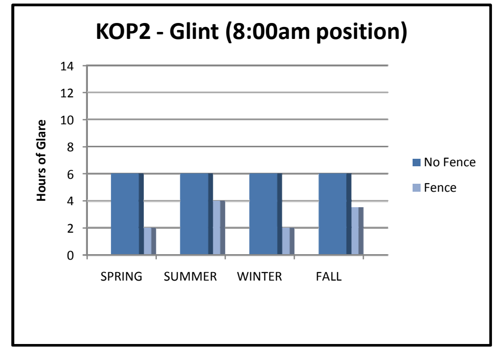
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 4a- MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

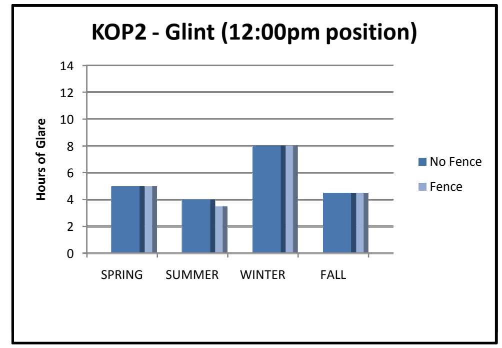
KOP 2 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W	NW\W		NW\W	NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W															
SPRING (With Fence)			NW\W	NW\W	NW\W		NW\W																							
SUMMER (No Fence)			W	W	W		W	W	W	W	W	W	W	W	W															
SUMMER (With Fence)			W	W	W		W	W	W	W	W																			
WINTER (No Fence)					NW\W		NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	W	W	W	W	W													
WINTER (With Fence)					NW\W		NW\W	NW\W	NW\W																					
Fall (No Fence)			NW\W	NW\W	NW\W		NW\W	NW\W	NW\W	NW\W	W	W	W	W	W															
FALL (With Fence)			NW\W	NW\W	NW\W		NW\W	NW\W	NW\W	NW\W																				



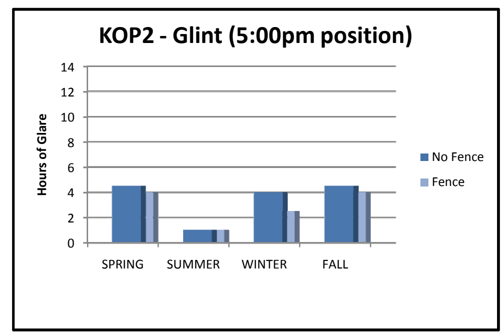
KOP 2 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																NW	NW	NW\W	NW\W	NW\W	W	W	W	W	W					
SPRING (With Fence)																NW	NW	NW\W	NW\W	NW\W	W	W	W	W	W					
SUMMER (No Fence)																		W	W	W	W	W	W	W	W					
SUMMER (With Fence)																		W	W	W	W	W	W	W						
WINTER (No Fence)								NE\N	NE\N	NE\N	N	N	N		NW\N	NW\N	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W						
WINTER (With Fence)								NE\N	NE\N	NE\N	N	N	N		NW\N	NW\N	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W						
Fall (No Fence)																	NW	NW\W	NW\W	NW\W	NW\W	W	W	W	W					
FALL (With Fence)																	NW	NW\W	NW\W	NW\W	NW\W	W	W	W	W					



KOP 2 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																		NE	NE	NE	NE	NE	NE		NE	NE	NE			
SPRING (With Fence)																			NE	NE	NE	NE	NE		NE	NE	NE			
SUMMER (No Fence)																									NE	NE				
SUMMER (With Fence)																									NE	NE				
WINTER (No Fence)																	NE	NE	NE	NE	NE	NE	NE		NE\N					
WINTER (With Fence)																				NE	NE	NE	NE		N					
Fall (No Fence)																		NE	NE	NE	NE	NE	NE		NE	NE	NE			
FALL (With Fence)																			NE	NE	NE	NE	NE		NE	NE	NE			



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation

Note 3 : Refer to Glint/Glare Study for methodology

* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

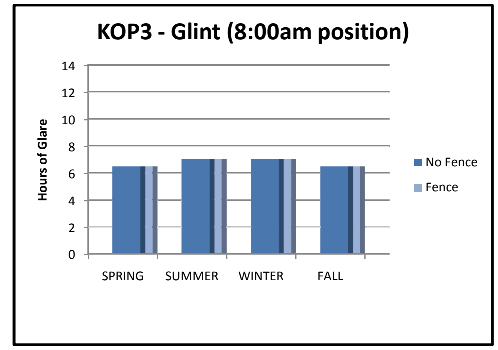
LEGEND

(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

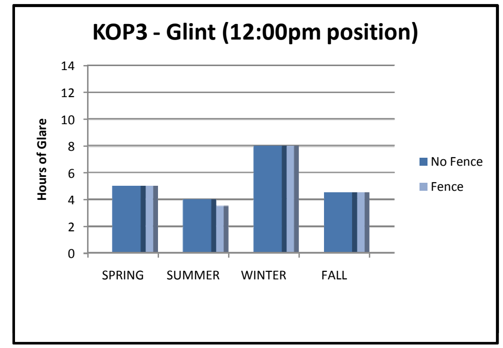
TABLE 4b- MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

KOP 3 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	W	W	W														
SPRING (With Fence)			NW\W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	NW\W	W	W	W	W	W	W	W														
SUMMER (No Fence)			W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	W\SW	W\SW	W	W	W	W	W	W	W													
SUMMER (With Fence)			W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	W\SW	W	W	W	W	W	W	W	W													
WINTER (No Fence)					NW\W		NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	W	W													
WINTER (With Fence)					NW\W		NW\W	NW\W	W	W	W	W	W	W	W	W	W													
Fall (No Fence)			NW\W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	NW\W\SW	W\SW	W\SW	W														
FALL (With Fence)			NW\W	NW\W\SW	NW\W\SW		NW\W\SW	NW\W\SW	NW\W\SW	W	W	W	W	W	W	W														

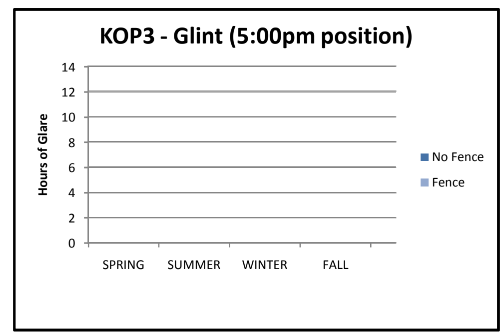


KOP 3 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00pm)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																NW	NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W	W						
SPRING (With Fence)																NW	NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W	W						
SUMMER (No Fence)																				NW\W	NW\W	NW\W	NW\W	NW	NW	NW	NW			
SUMMER (With Fence)																				NW\W	NW\W	W	W							
WINTER (No Fence)																NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	W						
WINTER (With Fence)																NW	NW	NW\W	NW\W	NW\W	NW\W	NW\W	NW\W	W						
Fall (No Fence)																	NW	NW	NW	NW\W	NW\W	NW\W	NW\W							
FALL (With Fence)																	NW	NW	NW	NW\W	NW\W	NW\W	NW\W							



KOP 3 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00pm)*	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation

Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

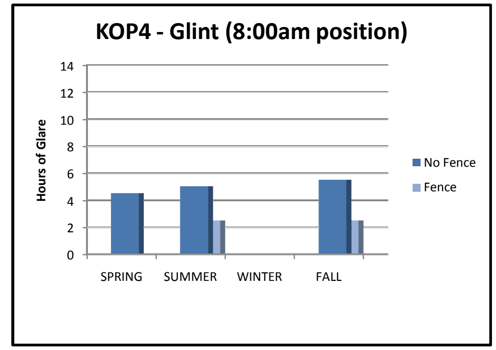
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 4c- MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

KOP 4 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*

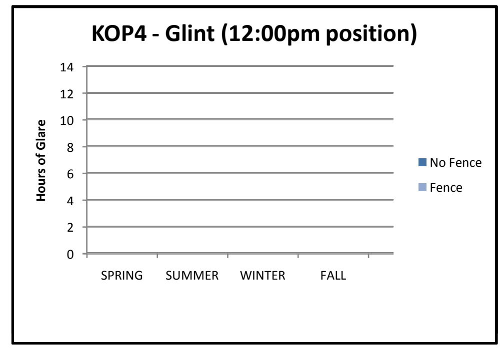
	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)	■	■								SW	SW	SW	SW	SW														■	■	■
SPRING (With Fence)	■	■																										■	■	■
SUMMER (No Fence)							SW	SW	SW	SW	SW	SW	SW	SW	SW	SW														
SUMMER (With Fence)							SW	SW	SW	SW	SW																			
WINTER (No Fence)	■	■	■	■																						■	■	■	■	■
WINTER (With Fence)	■	■	■	■																						■	■	■	■	■
Fall (No Fence)	■	■						SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW										■	■	■
FALL (With Fence)	■	■						SW	SW	SW	SW	SW																■	■	■



KOP 4 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00pm)*

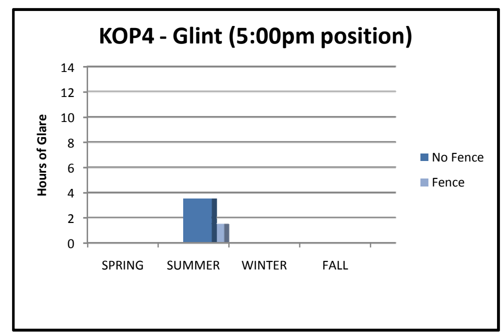
NO GLINT OBSERVED

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)	■	■																										■	■	■
SPRING (With Fence)	■	■																										■	■	■
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)	■	■	■	■																						■	■	■	■	■
WINTER (With Fence)	■	■	■	■																						■	■	■	■	■
Fall (No Fence)	■	■																										■	■	■
FALL (With Fence)	■	■																										■	■	■



KOP 4 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)	■	■																										■	■	■
SPRING (With Fence)	■	■																										■	■	■
SUMMER (No Fence)																	SE	SE	SE	SE	SE	SE	SE							
SUMMER (With Fence)																					SE	SE	SE							
WINTER (No Fence)	■	■	■	■																						■	■	■	■	■
WINTER (With Fence)	■	■	■	■																						■	■	■	■	■
Fall (No Fence)	■	■																										■	■	■
FALL (With Fence)	■	■																										■	■	■



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation

Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
■	No Sunlight

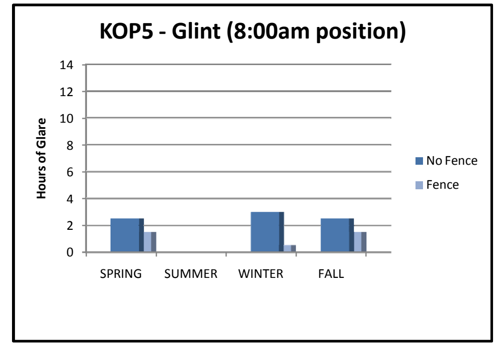
*** The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.**

TABLE 4d- MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

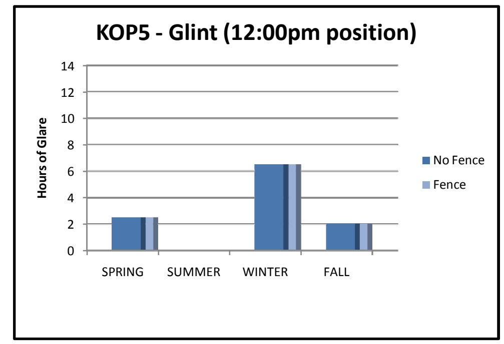
KOP 5 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW	NW	NW		NW	NW																						
SPRING (With Fence)			NW	NW	NW																									
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)					NW		NW	NW	NW	NW	NW																			
WINTER (With Fence)					NW																									
Fall (No Fence)			NW	NW	NW		NW	NW																						
FALL (With Fence)			NW	NW	NW																									



KOP 5 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00pm)*

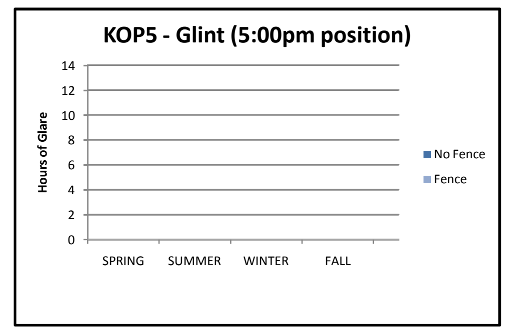
	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)															NW	NW	NW	NW	NW											
SPRING (With Fence)															NW	NW	NW	NW	NW											
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)									N	N	N	N	N		N\NW	N\NW	N\NW	N\NW	N\NW	N\NW	N\NW	N\NW								
WINTER (With Fence)									N	N	N	N	N		N\NW	N\NW	N\NW	N\NW	N\NW	N\NW	N\NW	N\NW								
Fall (No Fence)																NW	NW	NW	NW											
FALL (With Fence)																NW	NW	NW	NW											



KOP 5 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.
Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
	No Sunlight

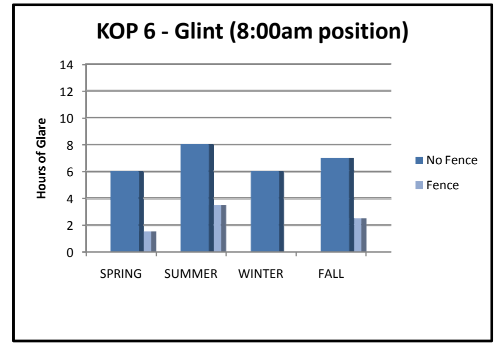
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 4e- MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

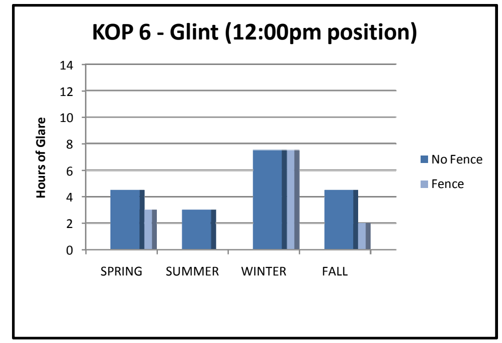
KOP 6 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 8:00am)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)			NW\W	NW\W	NW\W		W	W	W	W	W	W	W	W	W															
SPRING (With Fence)			NW\W	NW\W	NW\W																									
SUMMER (No Fence)		W	W	W	W		W	W	W	W	W	W	W	W	W	W	W													
SUMMER (With Fence)		W	W	W	W		W	W	W																					
WINTER (No Fence)					NW\W		NW\W	NW\W	NW\W	NW\W	NW\W	W	W	W	W	W	W													
WINTER (With Fence)																														
Fall (No Fence)			NW\W	NW\W	NW\W		W	W	W	W	W	W	W	W	W	W	W													
FALL (With Fence)			NW\W	NW\W	NW\W		W	W																						



KOP 6 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 12:00pm)*

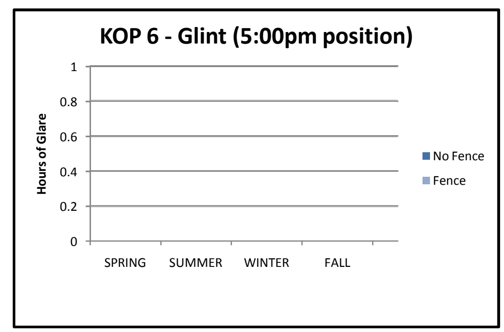
	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																NW	NW	NW\W	NW\W	W	W	W	W	W						
SPRING (With Fence)																NW	NW	NW\W	NW\W	W	W									
SUMMER (No Fence)																			W	W	W	W	W	W						
SUMMER (With Fence)																														
WINTER (No Fence)									N	N	N	N	N		N\NW	N\NW	N\NW	N\NW\W	NW\W	NW\W	NW\W	NW\W	W	W						
WINTER (With Fence)									N	N	N	N	N		N\NW	N\NW	N\NW	N\NW\W	NW\W	NW\W	NW\W	NW\W	W	W						
Fall (No Fence)																NW	NW	NW\W	NW\W	W	W	W	W	W						
FALL (With Fence)																NW	NW	NW	NW											



KOP 6 - MALFUNCTION GLINT ANALYSIS (SunCatcher™ fixed position at 5:00pm)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																														
SPRING (With Fence)																														
SUMMER (No Fence)																														
SUMMER (With Fence)																														
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																														
FALL (With Fence)																														

NO GLINT OBSERVED



Note 1: GLINT - A flash of light also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface of the SunCatcher™.

Note 2 : Glint analysis for fixed SunCatchers™, represents a malfunction and non-tracking situation

Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glint Visible without fence - (N,S,E,W) indicates direction KOP will view Glint
(light blue)	Glint Visible with fence - (N,S,E,W) indicates direction KOP will view Glint
(black)	No Sunlight

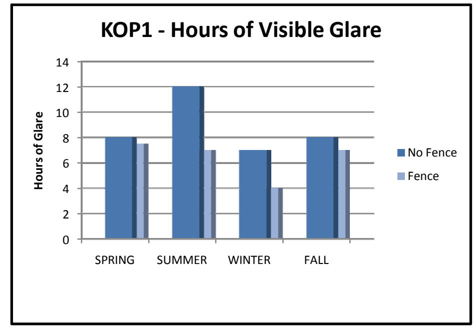
* The glint analysis documents all possible times when established KOPs may experience glint. Typically the duration of these occurrences are less than 30 minutes.

TABLE 4f - MALFUNCTION GLINT ANALYSIS - (Fixed Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

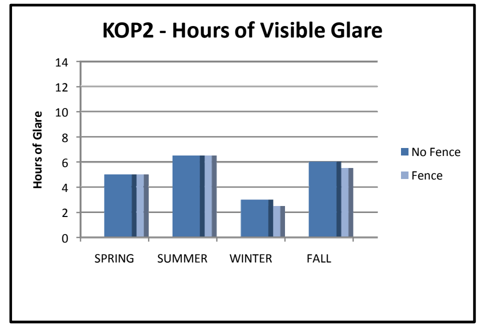
KOP 1 - GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)				NE	NE	NE	NE	NE	NE\E	NE\E	NE\E	NE	NE					NW\W	NW\W	NW\W	NW\W	NW	NW	NW						
SPRING (With Fence)					NE	NE	NE	NE	NE\E	NE\E	NE\E	NE\E	NE\E					NW\W	NW\W	NW\W	NW\W	NW	NW	NW						
SUMMER (No Fence)	N	N	N	N	N	N	N\NE	N\NE	N\NE	NE	NE	NE	NE						NW	NW	NW	NW	NW	N	N	N	N	N	N	N
SUMMER (With Fence)					N	N	N\NE	N\NE	N\NE	NE	NE	NE	NE						NW	NW	NW	NW	NW							
WINTER (No Fence)					NE	NE	NE\E	NE\E	NE\E	NE\E								W	W	NW\W	NW\W	NW	NW	NW	NW					
WINTER (With Fence)							NE	NE	NE	NE								W	W	W	W									
Fall (No Fence)				NE	NE	NE	NE	NE\E	NE\E	NE\E	NE\E						W	NW\W	NW\W	NW\W	NW\W	NW	NW	NW						
FALL (With Fence)					NE	NE	NE	N\NE	N\NE	N\NE	N\NE						W	NW\W	NW\W	NW\W	NW\W	NW	NW							



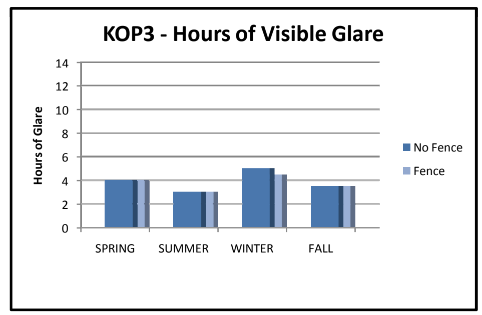
KOP 2 - GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)							NE	NE	NE	NE	NE									W	W	NW\W	NW	NW	NW	NW				
SPRING (With Fence)							NE	NE	NE	NE	NE									W	W	NW\W	NW	NW	NW	NW				
SUMMER (No Fence)		N	N	N	N	N		NE	NE	NE	NE									NW\W	NW\W	NW	NW							
SUMMER (With Fence)		N	N	N	N	N		NE	NE	NE	NE									NW\W	NW\W	NW	NW							
WINTER (No Fence)					NE	NE	NE	NE	NE												W									
WINTER (With Fence)					NE	NE	NE	NE	NE												W									
Fall (No Fence)						NE	NE	NE	NE	NE	NE								W	W	W		NW	NW	NW					
FALL (With Fence)						NE	NE	NE	NE	NE	NE								W	W	W		NW	NW	NW					



KOP 3- GLARE ANALYSIS (SunCatcher™ in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																SW	W\SW	W\SW	W\SW	W\SW	NW\W	NW	NW							
SPRING (With Fence)																SW	W\SW	W\SW	W\SW	W\SW	NW\W	NW	NW							
SUMMER (No Fence)																	W\SW	W\SW	W\SW\NW	W\SW\NW	NW\W\SW	NW\SW								
SUMMER (With Fence)																	W\SW	W\SW	W\SW\NW	W\SW\NW	NW\W\SW	NW\SW								
WINTER (No Fence)																SW	W\SW	W\SW	W\SW	W	W	NW	NW	NW	NW					
WINTER (With Fence)																SW	W\SW	W\SW	W\SW	W	W	NW	NW	NW						
Fall (No Fence)																SW	W\SW	W\SW	W\SW	W	NW	NW								
FALL (With Fence)																SW	W\SW	W\SW	W\SW	W	NW	NW								



Note 1: GLARE: A continuous source of excessive brightness, relative to ambient lighting (also known as Diffused reflections). Glare occurs where light is focused into the Power Conversion Unit (PCU).
Note 2 : Glare analysis represents the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glare Visible without fence - (N,S,E,W) indicates direction KOP will view Glare
(light blue)	Glare Visible with fence - (N,S,E,W) indicates direction KOP will view Glare
(black)	No Sunlight

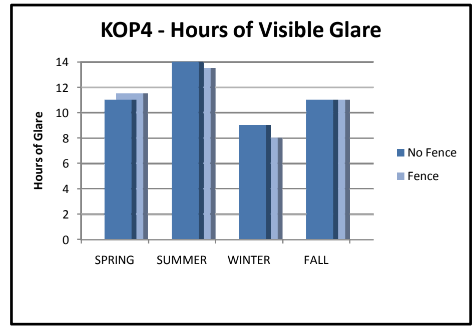
* This study documents all possible times when established KOPs may experience glare from the PCU. A SunCatcher™ does not produce glare in a non-tracking position

TABLE 5a- GLINT ANALYSIS (SunCatcher™ in Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS™

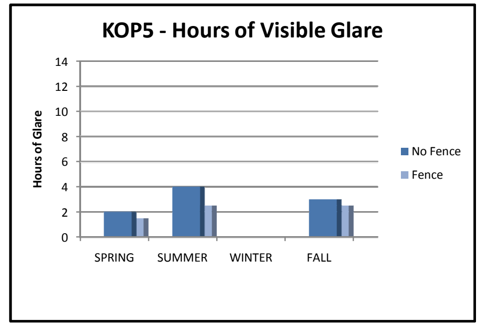
KOP 4- GLARE ANALYSIS (Suncatcher in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence) Date: 3-21			SE	SE\S	SE\S	S	S	S	S	S	SE\S	SW\S	SW\S	SW\S\SW	SW\S\SW	SW\S\SW	SW\S\SW	SW\S\SW	S\SW	S	S	S	S	S						
SPRING (With Fence)				S	S	S	S	S	S	S	SE\S	SW\S	SW\S	SW\S\SW	SW\S\SW	SW\S\SW	SW\S\SW	SW\S\SW	S\SW	S	S	S	S	S						
SUMMER (No Fence) Date: 6-21			SE	SE	SE	SE	SE	SE	SE	SE	S\SE	S\SE	S\SE	S\SE	S	SW\S	SW\S	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
SUMMER (With Fence)			SE	SE	SE	SE	SE	SE	SE	SE	S\SE	S\SE	S\SE	S\SE	S	SW\S	SW\S	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	
WINTER (No Fence) Date: 12-21					S	S	S				SW	SW	SW	SW	SW\SE	SW\SE	SE	SE	SE	S\SE	S	S	S	S	S					
WINTER (With Fence)						S	S				SW	SW	SW	SW	SW\SE	SW\SE	SE	SE	SE	S\SE	S	S	S	S						
Fall (No Fence) Date: 9-23			SE	S\SE	S	S	S	S	S	S	S\SE	S\SE	S\SE	S\SW\SE	S\SW\SE	S\SW\SE	S\SW\SE	S\SW	S\SW	S	S	S	S	S						
FALL (With Fence)			SE	S\SE	S	S	S	S	S	S	S\SE	S\SE	S\SE	S\SW\SE	S\SW\SE	S\SW\SE	S\SW\SE	S\SW	S\SW	S	S	S	S	S						



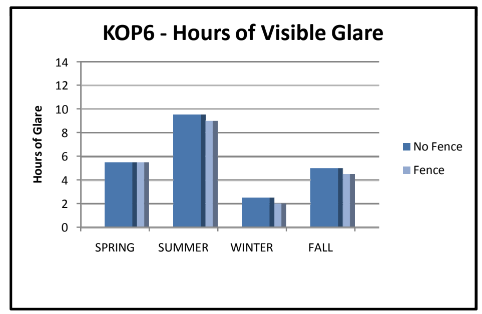
KOP 5 - GLARE ANALYSIS (Suncatcher in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																								NW	NW	NW	NW			
SPRING (With Fence)																								NW	NW	NW				
SUMMER (No Fence)																						NW	NW	NW		N	N	N	N	N
SUMMER (With Fence)																						NW	NW	NW		N	N			
WINTER (No Fence)																														
WINTER (With Fence)																														
Fall (No Fence)																						NW	NW	NW	NW	NW	NW			
FALL (With Fence)																						NW	NW	NW	NW	NW				



KOP 6 - GLARE ANALYSIS (Suncatcher in Tracking Position)*

	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00
SPRING (No Fence)																	W	W	W	W	W	NW	NW	NW	NW	NW	NW			
SPRING (With Fence)																	W	W	W	W	W	NW	NW	NW	NW	NW	NW			
SUMMER (No Fence)	N	N	N	N	N	N												W	NW\W	NW\W	NW\W	NW	NW	NW	N	N	N	N	N	N
SUMMER (With Fence)		N	N	N	N	N												W	NW\W	NW\W	NW\W	NW	NW	NW	N	N	N	N	N	N
WINTER (No Fence)																		W	W	W	W				NW					
WINTER (With Fence)																		W	W	W	W									
Fall (No Fence)																		W	W	W	NW	NW	NW	NW	NW	NW	NW			
FALL (With Fence)																		W	W	W	NW	NW	NW	NW	NW	NW				



Note 1: GLARE: A continuous source of excessive brightness, relative to ambient lighting (also known as Diffused reflections). Glare occurs where light is focused into the Power Conversion Unit (PCU).
Note 2 : Glare analysis representes the total number of hours glare may be visible to established Key Observation Points (KOP)
Note 3 : Refer to Glint/Glare Study for methodology

LEGEND	
(dark blue)	Glare Visible without fence - (N,S,E,W) indicates direction KOP will view Glare
(light blue)	Glare Visible with fence - (N,S,E,W) indicates direction KOP will view Glare
(black)	No Sunlight

* This study documents all possible times when established KOPs may experience glare from the PCU. A suncatcher does not produce glare in a nontracking position

TABLE 5b- GLINT ANALYSIS (Suncatcher in Tracking Position)

IMPERIAL VALLEY GLINT/GLARE ANALYSIS for SUNCATCHERS

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
IMPERIAL VALLEY SOLAR PROJECT
(formerly known as SES Solar Two Project)
IMPERIAL VALLEY SOLAR, LLC

Docket No. 08-AFC-5

PROOF OF SERVICE
(Revised 4/12/10)

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*indicates change

DECLARATION OF SERVICE

I, _Corinne Lytle, declare that on_April 28, 2010_, I served and filed copies of the attached, Applicant's Glint and Glare Study. The original documents, filed with the Docket Unit, are accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/solartwo/index.html]

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

__X__ sent electronically to all email addresses on the Proof of Service list;

______ by personal delivery;

__X__ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

__X__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-5
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original signed by

____

Corinne Lytle

*indicates change