State Of California The Resources Agency of California

Memorandum

Date: October 11, 2010
Telephone: (916) 653-8236
File: 09-AFC-7

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DATE OCT 11 2010
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To: Commissioner, Robert Weisenmiller. Presiding Member
Commissioner Karen Douglas, Associate Member
Hearing Officer Raoul Renaud

From: California Energy Commission - **Alan Solomon**
1516 Ninth Street **Siting Project Manager**
Sacramento, CA 95814-5512

Subject: **Palen Solar Power Project (09-AFC-7) Energy Commission Staff Rebuttal Testimony**

In its October 6, 2010 Opening Testimony, the applicant questioned the necessity of Trans-6 to control glint or glare from the project. Staff here provides additional testimony explaining the need for this measure and proffers some changes to the condition designed to address the applicant's previously stated concerns about operational restrictions. Additionally, in the area of Cultural Resources staff has identified a need to update Conditions of Certification 11, 12, 13, and 14 to include reference to those sites that would be encountered under the project configuration of Alternative 2 or 3.

cc: Proof of Service List
Docket 09-AFC-7

PROOF OF SERVICE (REVISED 10/11/10) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 8/27/10
SS

Cultural Resources

These changes incorporate the applicants proposed changes made in their opening testimony as well as staff proposed changes.

Changes in underline strikethrough are the applicant's, which staff agrees to.

Changes in tracked changes are staff's, which will require the applicant's agreement.

S. Jordan, cultural resources opening testimony:

CUL-5, Verification 1 (p. 10)
1. Preferably at least ~~90~~45 days, but in any event no less than 30 days, the project owner shall submit the CRMMP to the CPM for review and approval.

RA3 and RA2 have two resources in common: SMP-H-1012 & JR-104. RA2 has two additional resources: JR-107 & JR-108. Three of the four resources are historic refuse scatters & should be added to CUL-13 (SMP-H-1012; JR-104; JR-107). One resource, a military camp (JR-108) with associated refuse scatter should be added to CUL-14.

CUL-11, Verification 1, (p. 18)
1. Preferably at least ~~90~~45 days, the project owner shall notify the CPM that data recovery for small sites has ensued.

CUL-12, Verification 1, (p. 20)
1. Preferably at least ~~90~~45 days, the project owner shall notify the CPM that data recovery for large complex sites has ensued.

CUL-13, (pp. 20–22)
Prior to the start of ground disturbance, the project owner shall ensure that a recovery plan is included in the CRMMP for upgrading the recordation of historic-period refuse scatter sites located on the proposed plant site. For Reconfigured Alternative # 3, these consist of sites SMP-H-1003, SMP-H-1004, SMP-H-1006, SMP-H-1008, SMPH- 1009, SMP-H-1010, SMP-H-1011, SMP-H-1012, SMP-H-1013, SMP-H-1020, SMP-H- 1021, SMP-H-1022, SMP-H-1023, SMP-H-2002, SMP-H-2003, SMP-H- 2004, SMP-H-2006, SMP-H-2007, SMP-H-2008, SMP-H-2010, SMP-H- 2011/12, SMP-H-2017, SMP-H-2019, SMP-H-2021; ~~DS-465, -DS-466, DS- 467, DS712;~~ JR-101, JR-102, JR-104, JR-109, JR-110; TC-008, TC -009, TC -020, and TC-032. For Reconfigured Alternative # 2, the sites requiring upgraded recordation consist of the same sites as Reconfigured Alternative # 3, plus site JR-107. These site lists may be revised only with the agreement of the CRS and the CPM.

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The focus of the recordation upgrade is to determine if these sites can be attributed to the DTC/C-AMA use of the region and are therefore contributors to the DTCCL. The plan shall specify in detail the location recordation equipment and methods to be used and describe any anticipated post-processing of the data. The project owner shall then ensure that the CRS, the PHA, and/or archaeological team members implement the plan, if allowed by the BLM, which shall include, but is not limited to the following tasks:
1. The project owner shall hire a PHA with the qualifications described in CUL-3 to supervise the field work.

2. The project owner shall ensure that, prior to beginning the field work, the PHA and ~~all field crew members~~ crew chief are trained by the DTCCL Historical Archaeologist, or equivalent qualified person approved by the CPM and hired by the project owner should the DTCCL Historical Archaeologist not be available, to identify the specific landform for each site; in the identification, analysis and interpretation of the artifacts, environmental modifications, and trash disposal patterns associated with the early phases of WWII land-based U.S. army activities, as researched and detailed by the DTCCL PI-Historian and the DTCCL Historical Archaeologist.

3. The project owner shall ensure that, prior to beginning the field work, the field crew members are also trained in the consistent and accurate identification of the full range of late nineteenth and early-to-mid-twentieth-century can, bottle, and ceramic diagnostic traits.

4. The project owner shall ensure that the original site map shall be updated to include at minimum: landform features such as small drainages, any man-made features, the limits of any artifact concentrations and features, using location recordation equipment that has the latest technology with sub-meter accuracy (such as UTM 11 North or California Teale Albers).

5. The project owner shall ensure that a detailed in-field analysis of all artifacts shall be completed, documenting the measurements and the types of seams and closures for each bottle, and the measurements, seams, closure, and opening method for all cans. Photographs shall be taken of maker‘s marks on bottles, any text or designs on bottles and cans, and of decorative patterns and maker‘s marks on ceramics. Artifacts shall not be collected.

~~6. The project owner shall ensure a systematic metal detector survey be completed at each site, and that each “hit” is investigated. All artifacts and features thus found must be mapped, measured, photographed, and fully described in writing.~~

6. The project owner shall ensure that the details of what is found at each site shall be presented in a letter report from the CRS or PHA ,which shall serve as a preliminary report, that details what was found at each site, as follows:

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Deleted: 7. The project owner shall ensure that all structures are mapped, measured, photographed, and fully described in writing, and that all associated features having subsurface elements are excavated by a qualified historical archaeologist. All features and contents must be mapped, measured, photographed, and fully described in writing. ¶
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a. Letter reports may address one site, or multiple sites depending on the needs of the CRS;

b. The letter report shall be a concise document that provides a description of the schedule and methods used in the field effort, a preliminary tally of the numbers and types of features and deposits that were found, a discussion of the potential range of error for that tally, and a map showing the location of collection and/or excavation units, including topographic contours and the site landforms; and

c. The letter report shall make a recommendation on whether each site is a contributor to the DTTCL.

7. The project owner shall ensure that the data collected from the field work shall be provided to the DTCCL Historical Archaeologist to assist in the determination of which, if any, of the historic-period sites are contributing elements to the DTCCL.

8.The project owner shall ensure that the PHA analyzes all recovered data and writes or supervisors the writing of a comprehensive final report. This report shall be included in the CRR (CUL-6). Relevant portions of the information gathered shall be included in the possible NRHP nomination for the DTCCL (funded by CUL-2).

CUL-13, Verification 1, (p. 22)
1. At least ~~90~~45 days, the project owner shall notify the CPM that mapping and upgraded in-field artifact analysis has ensued on the historic-period refuse scatter sites.

CUL-14, (pp. 22–23)
Prior to the start of ground disturbance, the project owner shall ensure that a data recovery plan is included in the CRMMP for evaluation and data recovery from historic-period archaeological sites with features. For Reconfigured Alternative # 3, these consist of sites SMP-H-1005, SMP-H-1007, and SMP-H-2016~~; DS-327~~. For Reconfigured Alternative # 2, these consist of the same sites as Reconfigured Alternative # 3, plus site JR-108. These site lists may be revised only with the agreement of the CRS and the CPM. The plan shall specify in detail the location recordation equipment and methods to be used and describe any anticipated post-processing of the data. The project owner shall then ensure that the CRS, the PHA, and/or archaeological team members implement the plan, if allowed by the BLM, which shall include, but is not limited to the following tasks:

1. The project owner shall hire a PHA with the qualifications described in CUL-3 to supervise the field work.

2. The project owner shall ensure that, prior to beginning the field work, the PHA and ~~all field crew members are~~crew chief are trained by the DTCCL Historical Archaeologist, or equivalent qualified person approved by the CPM and hired by the project owner should the DTCCL Historical Archaeologist not be available, in the identification, analysis and interpretation of the artifacts, environmental modifications, and trash disposal patterns

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associated with the early phases of WWII land-based U.S. army activities, as researched and detailed by the DTCCL PI-Historian and the DTCCL Historical Archaeologist.

3. The project owner shall ensure that, prior to beginning the field work, the field crew members are also trained in the consistent and accurate identification of the full range of late nineteenth and early-to-mid-twentieth-century can, bottle, and ceramic diagnostic traits.

4. The project owner shall ensure that the original site map shall be updated to include at minimum: landform features such as small drainages, any man-made features, the limits of any artifact concentrations and features (previously known and newly found in the metal detector survey), using location recordation equipment that has the latest technology with sub-meter accuracy (such as UTM 11 North or California Teale Albers).

5. The project owner shall ensure that a detailed in-field analysis of all artifacts shall be completed, if not done previously. Types of seams and closures for each bottle and all cans shall be documented. Photographs shall be taken of any text or designs. Unusual or unidentifiable artifacts may be collected for further analysis, but otherwise artifacts shall not be collected.

6. The project owner shall ensure a systematic metal detector survey be completed at each site, and that each “hit” is investigated. All artifacts and features thus found must be mapped, measured, photographed, and fully described in writing.

7. The project owner shall ensure that all features are recorded, and that any features having subsurface elements are excavated by a qualified historical archaeologist. All features and contents must be mapped, measured, photographed, and fully described in writing.

8. The project owner shall ensure that the details of what is found at each site shall be presented in a letter report from the CRS or PHA ,which shall serve as a preliminary report, that details what was found at each site, as follows:

a. Letter reports may address one site, or multiple sites depending on the needs of the CRS;

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b. The letter report shall be a concise document that provides a description of the schedule and methods used in the field effort, a preliminary tally of the numbers and types of features and deposits that were found, a discussion of the potential range of error for that tally, and a map showing the location of collection and/or excavation units, including topographic contours and the site landforms; and

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c. The letter report shall make a recommendation on whether each site is a contributor to the DTTCL.

9. The project owner shall ensure that the data collected from the field work shall be provided to the DTCCL Historical Archaeologist to assist in the determination of which, if any, of the historic-period sites are contributing elements to the DTCCL.

10.The project owner shall ensure that the PHA analyzes all recovered data and writes or supervisors the writing of a comprehensive final report. This report shall be included in the CRR (CUL-6). Relevant portions of the information gathered shall be included in the possible NRHP nomination for the DTCCL (funded by CUL-2).

CUL-14, Verification 1, (p. 23)
1. At least ~~90~~45 days prior to ground disturbance, the project owner shall notify the CPM that mapping and in-field artifact analysis has ensued on historic-period sites with features.

TRAFFIC AND TRANSPORTATION – REBUTTAL TESTIMONY GLARE IMPACT ANALYSIS & CONCLUSIONS

For purposes of this analysis, glare or intrusive light is defined as the sensation produced by a point luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss of visual performance and visibility.

Onsite Effects – Worker Safety

Staff finds that the level of beam intensity at 60 feet (20 meters) from the individual reflector arrays may be 4 kW/ m2. As a result, observers (workers) within that zone may be exposed to a beam intensity in excess of the level of 4.5 kW/m2 which may cause ocular damage. Since this occurs within the plant boundaries, proper worker protection will be required.

Offsite Effects – Motorist Safety

Intrusive light is produced by either specular or diffuse reflections. Specular reflections occur off mirror-like surfaces, where the angle of reflection is identical to the angle of incidence from the light source. Diffuse reflections occur off rough or uneven surfaces, where the reflection angles are in all directions.[47] The concern posed by the proposed PSPP is specular reflection off the parabolic troughs. (Diffuse reflection is not a concern at the proposed PSPP). Intrusive light from specular reflection off the troughs could occur when the troughs are moving from a stow to a tracking position and from a tracking to a stow position. Intrusive light could also occur during the winter when the sun is low on the southern horizon and aligned with the trough, causing reflected light to spill from the north end of the troughs (referred to as end loss).[48] In the summer, when the sun rises and sets towards the north, spillage could also occur from the south end of the troughs in the early morning and early evening hours. Intrusive light can also occur at any time of day or time of year if the mirrors become misaligned with respect to the sun.

Recently, scientists and engineers at the Solar Technologies Department at Sandia National Laboratories proposed safety metrics for assessing the effects of intrusive light, based on a review of medical research and other research undertaken by the U.S. Air Force.[49] They noted that adverse effects of intrusive light are functions of the level of retinal irradiance and the subtended angle of the light source meeting the retina.[50] That is, as the intensity of light reaching the retina increases, and the subtended angle of the light source increases (becomes larger in the visual field of the observer), adverse effects on the eye increase. The Sandia team has proposed two performance standards for describing the adverse impacts of glint and intrusive light:

• Potential for permanent eye damage (ocular damage)

• Potential for temporary after-image, also known as flash blindness

Both thresholds have been developed empirically and can be measured through equations accounting for the intensity of the light source and the subtended angle of the reflected image. Permanent eye damage is caused by extremely high intensities of light that burn the retina. At substantially lower levels, the intensity of light can be great enough to cause temporary flash blindness, which is caused by oversaturation of the retinal pigments. Flash blindness is characterized by a temporary after-image in the visual field. Flash blindness is defined as a temporary visual image remaining after intrusive light exposure causing retinal saturation. Impacting variables may include, but not be limited to: individual filtering ability of the preretinal ocular media, background luminance adaptation, age, eye disease and corrective corneal surgery (radial keratotomy or RK). Flash blindness can last for varying durations. An example of flash blindness is the effect after viewing a camera flash in a dim room.[51]

Figure **Glare 1** was developed for this study to provide criteria for assessing the potential impacts of intrusive light from the proposed PSPP facility. The figure presents maximum distances between the parabolic mirror and an observer at which flash blindness can occur as a function of mirror length available to reflect the sun. (Permanent eye damage is not a concern at the distances from the parabolic troughs for off-site observers.) The calculated distances assume specular reflection from a mirror with a reflectivity of 0.94, a subtended sun angle of 9.4 milliradians (mrad), and an RMS slope error of 5 mrad.[52] The focal length for the collector is assumed to be infinite, which would be true of a flat mirror. This validly represents the nature of the reflection off the long (linear) axis of the trough collector. The reflected sun image along this long axis, rather than the short parabolic axis, is the critical feature in assessing the potential for flash blindness. The reflected image of the sun along the long axis would maintain a constant subtended angle in the observer's visual field as the observer moves further from the mirror. This effect would continue until the observer is so far from the mirror that the entire image of the sun overfills the available mirror area, at which point the subtended angle of the reflected sunlight would decrease with increasing distance.

Figure **Glare 1** indicates that the maximum distance that can cause flash blindness depends on the length of the mirror available to reflect the sun (which dictates the subtended angle of the reflected sun image as a function of distance). The longer the mirror, the greater the distance capable of causing flash blindness. A flat mirror 5 meters in length would reflect sunlight intense enough to cause temporary flash blindness approximately 2,000 meters away. A flat mirror 20 meters in length would reflect sunlight that could cause temporary flash blindness a distance of 7,800 meters (approximately 4.8 miles).

Figure **Glare 2** illustrates the situations during which specular reflections from the mirror arrays would extend off the PSPP plant property. The top panel is a

schematic representation of end loss or spillage of the reflected solar image off the end of the parabolic mirror. This would occur when the sun is low on the horizon – during the middle of the winter, early on summer mornings, and late on summer evenings. At the proposed PSPP site, the sun is approximately 33 degrees above the horizon on noon of the winter solstice.[53] When the sun is 33 degrees above the horizon, and assuming that the heat collection element is 1.5 meters from the vertex of the parabolic mirror, approximately 2.3 meters at the northern edge of the mirrors would spill specular reflections of the sun off the north edge of the mirror array. Referring to Figure **Glare 1**, a flat mirror 2.3 meters in length would reflect sunlight intense enough to cause flash blindness a distance of approximately 900 meters (2,950 feet). The bottom panel on Figure **Glare 2** indicates how sunlight would be reflected if the mirror array was misaligned or moving to or from the stow position. In those situations, the entire length of the mirror would be available to create specular reflections. According to information provided by the applicant, each mirror unit is 63 feet (approximately 19 meters) long.[54] These units are arranged end-to-end in rows 1,200 to 1,300 feet (approximately 400 meters) long. If one of the 19-meter long mirror units was misaligned with the sun, it would reflect intrusive light capable of causing temporary flash blindness at a distance of about 7,600 meters (approximately 4.7 statute miles). If an entire row of mirrors was misaligned, it could reflect blinding intrusive light capable of causing temporary flash blindness considerably farther, potentially dozens of miles.[55]

Ocular Damage. At I-10's distance from the mirrors, there is no potential for ocular damage (retinal burn) from the solar facility to motorists on I-10. Unless an individual is near the focal point of the collector, there is no risk of permanent ocular damage for an exposure of 0.15 seconds, which is the typical blink reflex time.

Flash Blindness from Intrusive Light. Staff believes motorists on I-10 may be affected by temporary flash blindness from exposure to bright intrusive light. Based on the intrusive light direction and distances discussed above and presented in Figures **Glare 1** and **Glare 2**, staff finds that mirrors tracking to and from stow each morning and evening and mirrors that may be misdirected by a system malfunction would result in reflected solar energy from these activities on nearby roads, particularly I-10, and on public access areas. PSPP's Unit 2 is closest to the I-10 freeway at approximately 343 meters (1,125 feet) from the highway. Due to the volume of traffic along this segment of I-10, staff considers the potential safety impact from intrusive light to motorists on I-10 as potentially significant.

To ensure special consideration is given to motorists on nearby roads, particularly I-10, and all public access areas adjacent to the project where the mirrors may present exposure to intrusive brightnesses, Condition of Certification **TRANS-6** is recommended to reduce the potential for flash blindness and distraction to motorists on I-10 thus reducing potential safety impacts to a less than significant level.

MITIGATION

TRANS-6 To reduce glint and glare from the Project, the Project Owner shall implement the following measures during operation of any unit:

1. Ensure the mirrors are brought out of stowage before sunrise and are aligned to catch the first rays of the morning sun;
2. Ensure the mirrors are returned to stow position after sunset;
3. As soon as is feasible, redirect malfunctioning mirrors to the east in a manner so that there is no reflection from the sun as the sun continues west; and
4. Establish a toll-free number for the public to report complaints related to glint and glare and post such number in a location visible from I-10. This number may be the same as that required in Compliance-9. If the project owner receives a complaint regarding glint or glare it shall investigate to determine whether the project is the source of such glint or glare and, if so, shall take all feasible measures to reduce the glint or glare at its source. The project owner shall notify the CPM within 3 days of receiving a glint or glare complaint. As soon as the complaint has been resolved to the complainant's satisfaction, the project owner shall submit to the CPM a report in which the complaint as well as the actions taken to resolve the complaint are documented. The report shall include (a) a complaint summary, including the name and address of the complainant; (b) a discussion of the steps taken to address the complaint and the final results of these efforts; and (c) a signed statement by the complainant, if obtainable, stating that the glint or glare problem is resolved to his or her satisfaction.

Verification: 90 days prior to the start of operation of any unit, the project owner shall prepare and submit to the CPM for review and approval a plan describing how the above measures will be implemented to reduce glint and glare If a complaint is received concerning glint or glare, the project owner shall notify the CPM within 3 days of receipt of the complaint and shall provide the report detailing how the complaint has been addressed within 7 days.

REFERENCES

[47] Ho, C.K., C.M. Ghanbari, and R.B. Diver. Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation. In Proceedings of the 4th International Conference on Energy Sustainability, ES2010, Phoenix, AZ, May 17-22, 2010, p. 3.

[48] Ho, C.K., C.M. Ghanbari, and R.B. Diver. Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation. In Proceedings of the 4th International Conference on Energy Sustainability, ES2010, Phoenix, AZ,

May 17-22, 2010, p. 3.

[49] Ho, C.K., C.M. Ghanbari, and R.B. Diver. Hazard analyses of glint and glare from concentrating solar power plants, SAND2009-4131C. In Proceedings of SolarPACES 2009, Berlin, Germany, September 15-18, 2009.

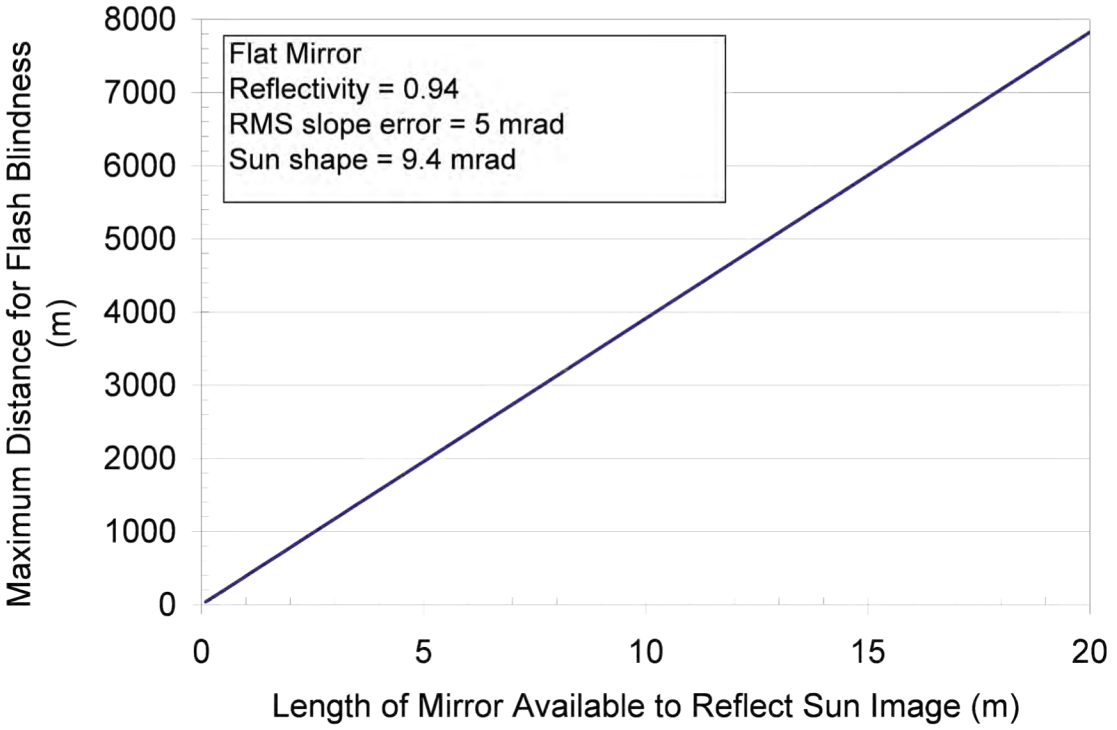
[50] The subtended angle of the light source (or the reflected image) is a measure of the amount of the visual field that is occupied by the light source.

[51] Ho, C.K., C.M. Ghanbari, and R.B. Diver. Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation. In Proceedings of the 4th International Conference on Energy Sustainability, ES2010, Phoenix, AZ, May 17-22, 2010, p. 2.

[52] Reflectivity is a measure of the degree to which a reflection accurately represents the light from the source. A value of 1.0 would represent perfect reflectivity. The subtended angle describes the size of the reflected image in the field of view. Mrad (milliradians) is a description of an angle subtended, or circumscribed, by a circular arc. RMS denotes root-mean-squared or the standard deviation associated with a range of distortions for slope errors along the mirror surface. www.srrb.noaa.gov/highlights/sunrise/azel.html

[54] Solar Millennium2009a. Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, Section 2.0, Project Description, dated 8/24/2009.

[55] The distance across which reflections would travel from a 400-meter long mirror would be so great that atmospheric attenuation typically would have to be accounted for in calculating the distance at which reflections would remain intense enough to cause flash blindness.



NOTES:

mrad (milliradians)
One-thousandth of a radian. The radian is a description of an angle subtended by a circular arc. It is computed as the ratio of the length of the arc to the radius of the arc.

RMS (root mean square)
The standard deviation of multiple measurements, in milliradians, of the slope error of the mirror surface.

Slope Error
The relative angular deviation in milliradians of the mirror surface from a perfect parabolic shape.

Subtended Angle
An angle subtended by (or lying within) a circular arc. In this analysis, the subtended angle describes the relative size of a reflected image, with the circular arc representing the field of view of a person with normal vision.

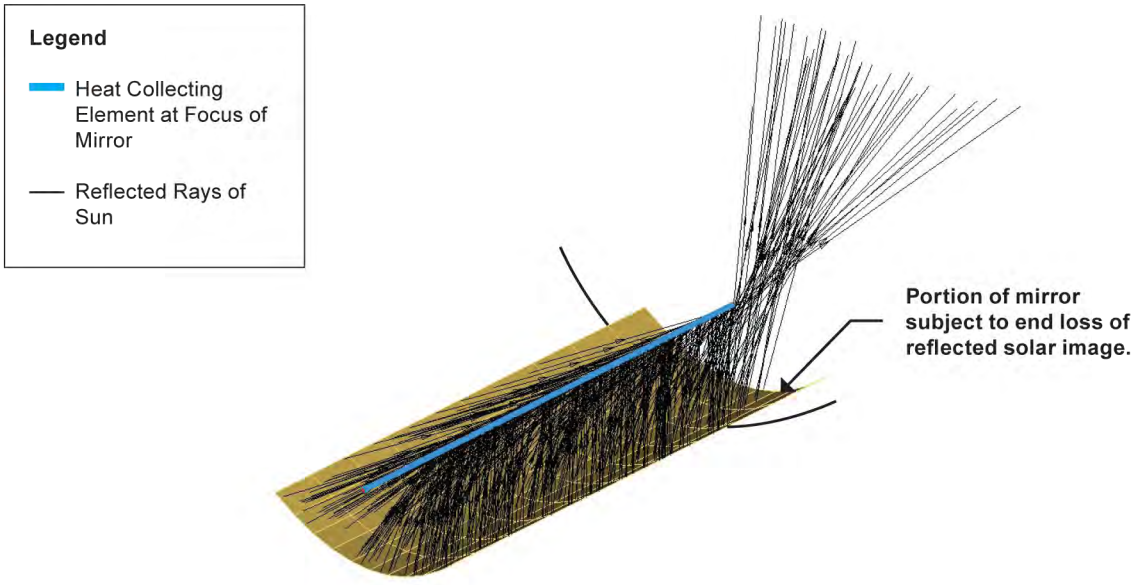
Sun Shape
The relative size of the sun in the visual field of a person with normal vision. (The total size of the visual field is 1 radian.)

1/ The calculation of maximum distances for flash blindness assumes that the collector is flat and focal length is infinite, which is true along the long-axis of the linear collector. The calculation is derived from Ho et al., Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation. In Proceedings of the 4th International Conference on Energy Sustainability, ES2010, Phoenix, AZ, May 17-22, 2010, p. 2.
2/ Typical RMS slope errors of current parabolic trough collectors are approximately 5 to 6 mrad (personal communication, Tim Moss, Sandia National Laboratories, 6/16/2010).

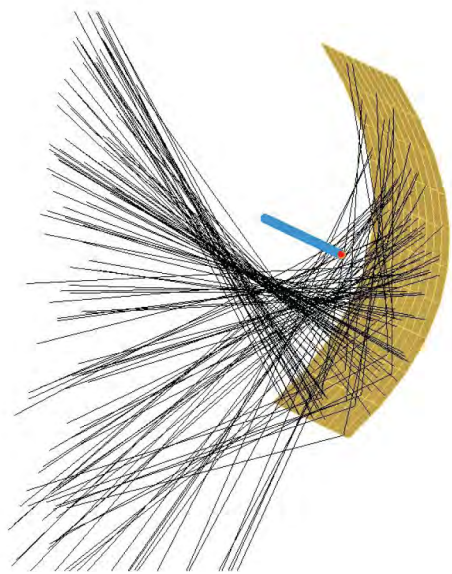
Source: Clifford K. Ho, June 2010.
Prepared by: Lindsley Architectural Lighting, Oct 2010

Glare 1

Maximum Distances at Which Flash Blindness May Occur from Specular Reflections at **PSPP**



Potential for end loss when sun is low on the horizon to the northeast, south, or northwest of the mirror array.



Potential for reflection along length of mirror array when misaligned with sun or when moving to or from stow position.

Source: Clifford K. Ho, June 2010.
Prepared by: Lindsley Architectural Lighting, Oct 2010

Glare 2

Examples of Specular Reflection from Parabolic Trough Solar Collectors

DECLARATION OF
Alan Lindsley, AIA, IESNA, LEED GA

I, Alan Lindsley, declare as follows:

1. I am presently Owner of Lindsley Architectural Lighting.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the Intrusive Light analysis in the Traffic and Transportation section of the Palen Solar Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Digitally signed by Alan Lindsley
DN: cn=Alan Lindsley, o=Lindsley Architectural Lilghting, ou, email=alindsley@lindsleylighting.com, c=US
Date: 2010.10.08 13:35:47 -07'00'

Alan Lindsley, AIA, IESNA, LEED GA

LINDSLEY
Architectural Lighting

Alan Lawrence Lindsley, AIA, IESNA, LEED GA

Alan Lindsley, Principal and Founder of Lindsley Architectural Lighting, is noted for his creativity, depth of knowledge, strategic capabilities and commitment to green design. He has over thirty years of extensive project management experience in lighting design, interior architecture and historic preservation. As a result, he has the unique ability to fully understand and integrate lighting design with architecture. His design solutions integrate the creative use of lighting design products as well as custom fixtures that he creates for the client. The quality of his projects are frequently recognized by clients and peers within the industry. Numerous IESNA Section awards and AIA awards have been awarded for his project work.

As a hands on designer, he is completely involved in the design, technical evaluation, project coordination and implementation of each project. He has strong capabilities in delivering creatively designed, energy efficient and sustainable projects for corporate, institutional and governmental clients. Working with building departments throughout the United States, he has developed a strong base of knowledge in resolving complicated energy and building code issues. He is well-experienced in effectively directing the efforts of large multi-disciplinary teams to provide effective budget and scheduling controls.

Alan's commitment to energy efficiency and sustainable design spans several decades. His approach incorporates daylighting, use of high efficacy light sources, lighting control systems, and the intelligent application of light and darkness to highlight architectural features and address the needs of the people who inhabit or use the space. He has been actively involved in the dark sky movement to reduce light pollution as well as the American Institute of Architect's 2030 Initiative to produce a carbon neutral building. Alan is a LEED (Leadership in Energy and Environmental Design) Green Associate and member of the US Green Building Council.

Prior to starting his firm, Alan was Vice President at Brereton Architects and an Associate at Gensler and Associates. Alan received his Bachelors of Environmental Design / Architecture from University of Colorado at Boulder. He is a licensed architect (AIA) in California as well as several other states and holds a National Council of Architectural Registration Board certificate.

Current Projects

Wylie Civic Center
300,000 square feet
Wylie, TX

Green's Restaurant
6,000 square feet
San Francisco, CA

Antique Automobile Museum
10,000 square feet
Martinez, CA

California Energy Commission
Solar Generation Facilities
Glare Studies

- Ivanpah Solar Project
- SES Solar 1 & 2
- San Joaquin Solar
- Mojave Solar One
- FPL Genesis
- Solar Millennium Palen
- Solar Millennium Ridgecrest
- Solar Millennium Blythe

Relevant Projects

Yountville Municipal Golf Course
Light Trespass & Installation Mitigation
Yountville, CA

Pan v. City & County of San Francisco
Trip and Fall Litigation
San Francisco, CA

Carondelet High School
Light Trespass Analysis
Concord, CA

Verizon Cell Phone Tower
Light Trespass Analysis
Concord, CA

City of Concord
Lighting Ordinance Draft Review
Concord, CA

Alpine Hills Tennis & Swimming Club
Light Trespass Analysis
Portola Valley, CA

Alan is currently launching a manufacturing business producing sustainable solid state (LED) light fixtures for light commercial and residential use. For more information visit www.lindsleylighting.com

Additional information and projects are available on our web site at www.lindsleyarchitecturallighting.com.

261 La Espiral, Suite B Orinda, California 94563-1832 925.254.1860 Fax 888.695.3699

LINDSLEY
Architectural Lighting

CORPORATE HEADQUARTERS

The Gap 100,000 square feet
San Francisco, CA

The Shorenstein Company 17,000 square feet
San Francisco, CA

Amerada Hess Corporation 40,000 square feet
Denver, CO

National Reinsurance 80,000 square feet
Stamford, CN

Hamilton Brothers Oil 100,000 square feet
Denver, CO

Levi Strauss & Company 700,000 square feet
San Francisco, CA

Informix Campus 1 million square feet
Palo Alto, CA

Champlin Petroleum 200,000 square feet
Denver, CO

Amoco Production Company 650,000 square feet
Denver ,CO

Dantz Development Corporation 30,000 square feet
Walnut Creek, CA

CORPORATE OFFICES

Scient 180,000 square feet
San Francisco, CA

Sony Product Design Center 12,000 square feet
San Francisco, CA

Prager, McCarthy & Sealy 10,000 square feet
San Francisco, CA

Health Plan of San Mateo 22,000 square feet
San Mateo, CA

Westpac Banking Corporation 14,000 square feet
San Francisco, CA

Relational Technology, Inc.. 82,000 square feet
Alameda, CA

West Coast Life Insurance 45,000 square feet
San Francisco, CA

Merrill, Pickard, Anderson & Eyre 8,000 square feet
Palo Alto, CA

Clarion Resources 12,000 square feet
Denver, CO

First Deposit National Corp. Various Projects
Greater San Francisco Bay Area

American Savings and Loan 200,000 square feet
Stockton, CA

Dome Petroleum Corporation 155,000 square feet
Denver, CO

Bank of the West 125,000 square feet
Pleasant Hill, CA

33 New Montgomery Street 330,000 square feet
San Francisco, CA

One DTC 225,000 square feet
Denver, CO

Boettcher DTC 180,000 square feet
Denver, CO

Hudson's Bay Centre 180,000 square feet
Denver, CO

City Square 150,000 square feet
Oakland, CA

222 Kearny Street 115,000 square feet
San Francisco, CA

455 Market Street 349,000 square feet
San Francisco, CA

Prudential Plaza 130,000 square feet
Denver, CO

The Cascades 308,000 square feet
Denver, CO

Speer Center 149,000 square feet
Denver, CO

Empire Park 350,000 square feet
Denver, CO

One Denver Place 250,000 square feet
Denver, CO

Great West Plaza I & II 250,000 square feet
Denver, CO

Charles Schwab, Phase I & II
360,000 square feet
Pleasanton, CA

LAW OFFICES

Jackson, Tufts, Cole & Black 14,500 square feet
San Francisco, CA

Kutak, Rock & Huie 45,000 square feet
Denver, CO

Anderson & Pearl 8,000 square feet
Reno, NV

Heller, Ehrman, White & McAuliffe 40,000 square feet
Palo Alto, CA

Brobeck, Phleger & Harrison 15,000 square feet
San Francisco, CA

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LINDSLEY
Architectural Lighting

RESTAURANTS

Elroy's Restaurant 17,000 square feet
San Francisco, CA

301 Restaurant 6,000 square feet
San Francisco, CA

Boudin Bakery & Cafe 12 Selected Stores
United States

Grill Squared 8,100 square feet
Mesa, AZ

RETAIL

The North Face Corporate Showrooms
5,000 square feet
San Leandro, CA

The North Face 20,000 square feet
New York City, NY

Pier One Imports ***4*** Selected Stores

The GAP Stores ***14*** Selected Stores

Jessica McClintock 4,500 square feet
San Francisco, CA

American Savings and Loan 5,000 square feet
Branch Banking
Pleasanton, CA

First Interstate Bank 10,000 square feet
Oakland, CA

Writer Square 110,000 square feet
Denver, CO

Fantasies 1,200 square feet
Denver, CO

Clint Faubion's Mens Store 4,000 square feet
Denver, CO

Flower Kiosk 45 square feet
San Francisco, CA

Geiger-Brickel Showroom 4,500 square feet
San Francisco, CA

Bank of America 8,500 square feet
San Mateo, CA

A.G. Ferrari Grocers ***4*** Selected Stores
San Francisco Bay Area

Good Guys Electronics 14,000 square feet
Glendale, CA

ATHLETIC FACILITIES

Villa Sports SPLASH 14,000 square feet
Colorado Springs, CO

San Francisco Athletic Club 30,000 square feet
San Francisco, CA

24 hr Nautilus 15,000 square feet
Denver, CO

SPECIALTY

B of A Video Production Facility 16,000 square feet
Televideo Production Suite
San Francisco, CA

Vallejo Street Renovation
Historic District Street Lighting
San Francisco, CA

Oakland A's Press Box 3,000 square feet
Oakland, CA

World Bank Child Care Center 6,000 square feet
Washington, D.C.

SINGLE/ MULTI-FAMILY

Matthews Residence 3400 square feet
Orinda, CA

Alderson House 5400 square feet
Tiburon, CA

Banks/ Baron Residence 3200 square feet
Oakland, CA

Slater Residence (Esherick Original)
Los Altos Hills, CA

McNealy Residence
Portola Valley, CA

Shenkman Residence 6,000 square feet
Tiburon, CA

DeSilva Island Townhouses 3200 square feet
Marin, CA

Siebel Apartment 8,000 square feet
Paris, FR

Park Townsend Housing 70,000 square feet
San Jose, CA

Knights Valley Residence 25,000 square feet
Knights Valley, CA

Paigebrook Farms Renovation 10,000 square feet
Westlake, TX

Azure Residence Tower 400,000 square feet
Dallas, TX

CONTINUING CARE RETIREMENT COMMUNITIES

Classic by Hyatt 1,000,000 square feet
Palo Alto, CA

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LINDSLEY
Architectural Lighting

The Sequoias San Francisco, CA	200,000 square feet
Querencia at Barton Creek Austin, TX	400,000 square feet

SACRED SPACES

St. Peter's Church San Francisco, CA	20,000 square feet
Old St. Mary's Church San Francisco, CA	50,000 square feet
St. Agnes Cathedral San Francisco, CA	75,000 square feet
Mission Dolores San Francisco, CA	12,000 square feet
St. Peter's Church San Francisco, CA	20,000 square feet
St. Agnes Cathedral San Francisco, CA	75,000 square feet
Mission Dolores San Francisco, CA	12,000 square feet
Congregation Beth Am Ark of the Covenant Lighting Los Altos, CA	
Sanctuario de Guadalupe Dallas, TX	20,000 square feet
Sanctuario de Guadalupe Tower Dallas, TX	6,000 square feet
Hunter's Glen Baptist Church Dallas, TX	Facade Lighting Study
St. Ignatius Church Exterior San Francisco, CA	24,000 square feet
St. Ignatius Church Master Plan San Francisco, CA	40,000 square feet
St. Ignatius Stations of the Cross San Francisco, CA	10,000 square feet
St. Ignatius Upper Nave (PII) San Francisco, CA	10,000 square feet
St. Ignatius Parish Offices San Francisco, CA	3,700 square feet
St. Joan of Arc Catholic Church San Ramon CA	10,500 square feet
Sanctuario de Guadalupe Dallas, TX	20,000 square feet
Sanctuario de Guadalupe Tower Dallas, TX	6,000 square feet

CIVIC

Courthouse Square Riverside, CA	55,000 square feet
Wylie Civic Center Wylie, TX	160,000 square feet
The Beach Chalet San Francisco, CA	6,000 square feet
City of Hayward City Hall Hayward, CA	155,000 square feet
911 Emergency Building San Francisco, CA	65,000 square feet
Hearst Castle San Simeon, CA	50,000 square feet
Tower Building Dallas, TX	56,000 square feet
The Columbarium San Francisco, CA	10,000 square feet
Food & Fiber Building Dallas, TX	50,000 square feet
Centennial/ Automobile Building Dallas, TX	100,000 square feet
Fair Park Bandshell Dallas, TX	
Hopkins County Courthouse Sulphur Springs, TX	16,000 square feet
Old Red Courthouse Dallas, TX	40,000 square feet
Wylie Civic Center Wylie, TX	300,000 square feet

HOSPITALITY

Bohemian Club San Francisco, CA	50,000 square feet
The Donatello Hotel San Francisco, CA	15,000 square feet
Joule Boutique Hotel Dallas, TX	250,000 square fee
Delta Gamma House Berkeley, CA	2,000 square feet

MASTER PLANNING

Fair Park Esplanade Master Plan Dallas, TX	1 million square feet
Wadsworth Publishing Master Plan San Mateo, CA	60,000 square feet

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LINDSLEY
Architectural Lighting

One Market Plaza 1,445,000 square feet
Disabled Access Study
San Francisco, CA

AT&T Gateway Tower 1,000,000 square feet
Architectural Design Guide
Seattle, WA

St. Ignatius Church Master Plan 40,000 square feet
San Francisco, CA

SITE/FACADE LIGHTING

Lake Fork Pump Station 75,000 square feet
Lake Fork, TX

Sanctuario de Guadalupe South Facade
Dallas, TX

St. Ignatius Church Exterior Lighting
San Francisco, CA

Larkspur Landing Lobby 5,000 square feet
Larkspur, CA

Grace Cathedral
East Facade Lighting
San Francisco, CA

Daniels & Fisher Tower 19,000 square feet
Denver, CO

Masonic Building 54,000 square feet
Denver, CO

Loyola-Marymount Campanile
Los Angeles, CA

90 New Montgomery Street 110,000 square feet
San Francisco, CA

Emerystation Office Building 250,000 square feet
Emeryville, CA

St. Peter's & Paul
San Francisco, CA

Yountville Golf Course
Driving Range
Yountville, CA

International House Facade/ Entry Lighting
Berkeley, CA

595 Market Street Lobby 5,000 square feet
San Francisco, CA

Hunter's Glen Baptist Church Facade Lighting Study
Dallas, TX

123 Townsend Street Lobby Remodel
San Francisco, CA

Azure Residence Tower 400,000 square feet
Dallas, TX

1530/1526 Main Street ***Exterior Lighting***
Dallas, TX

Campion Hall, USF ***Exterior Lighting***
San Francisco, CA

RESEARCH LABS

Berkeley Wireless Research Center
8,000 square feet
Berkeley, CA

Electronic Design Automation Center
18,000 square feet
Berkeley, CA

EXPERT WITNESS/ LIGHT TRESPASS/ LIGHTING ORDINANCES

Yountville Municipal Golf Course
Light Trespass & Installation Mitigation
Yountville, CA

Pan v. City & County of San Francisco
Trip and Fall Litigation
San Francisco, CA

Carondelet High School
Light Trespass Analysis
Concord, CA

Verizon Cell Phone Tower
Light Trespass Analysis
Concord, CA

City of Concord
Lighting Ordinance Draft Review
Concord, CA

Alpine Hills Tennis & Swimming Club
Light Trespass Analysis
Portola Valley, CA

THEATRICAL

Palace/ Heritage Theaters
15,000 square feet
Grapevine, TX

Jinks Theater
12,000 square feet
San Francisco, CA

MEDICAL

DTC Eye Associates 8,400 square feet
Outpatient Surgery
Denver, CO

EDUCATIONAL

Academy of Art College Light Lab
Lighting Demonstration Facility

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San Francisco, CA

San Francisco Art Institute Tower
125th Anniversary Celebration
San Francisco, CA

Kalmanovitz Hall 10,000 square feet
University of San Francisco
San Francisco, CA

Thacher Gallery 1,000 square feet
University of San Francisco
San Francisco, CA

Tenderloin Elementary School 30,000 square feet
San Francisco, CA

MUSEUM DISPLAY

Petro-Lewis Mineral Collection
Denver, CO

Leland Stanford Museum 16,000 square feet
Sacramento, CA

Bohemian Club 50,000 square feet
San Francisco, CA

Thacher Gallery 10,000 square feet
San Francisco, CA

SIGNAGE

3COM 3D Site Signage
Santa Clara, CA

EPRI Site Signage
San Mateo, CA

MULTI-USE PROJECTS

116 University Avenue 16,000 square feet
Palo Alto, CA

102 University Avenue 10,400 square feet
San Mateo, CA

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 *PALEN SOLAR POWER PLANT PROJECT*

Docket No. 09-AFC-7

PROOF OF SERVICE
(Revised 8/27/10)

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*indicates change

DECLARATION OF SERVICE

I, Sabrina Savala, declare that on October 11 , 2010, I served and filed copies of the attached CEC Staff's Rebuttal Testimony dated October 11, 2010. The original document, filed with the Docket Unit, is 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/solar_millennium_palen]

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. 09-AFC-7
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 Signature in Dockets
Sabrina Savala