

**AERONAUTICAL CHARTING FORUM**  
**Charting Group**  
**Meeting 14-01 – April 29- May 1, 2014**

**RECOMMENDATION DOCUMENT**

**FAA Control # ACF-CG RD 14-01-274**

**Subject: Solar Power Plant Ocular Hazard Symbol on Aeronautical Charts**

**Background/Discussion:**

Solar Energy Power Plant construction has rapidly increased over the last several years. While solar energy power plant technology is continuing to mature, data indicates that the bigger the site, the better the site. Many sites now cover hundreds of acres and contain multiple “farms” of mirrors. These sites are rapidly becoming VFR checkpoints for cross country flights as well as visual navigation fixes for IFR visual procedures.

Today, the only charting symbology linked to solar power plants is an associated obstruction (tower) centered in the farm. While appropriate for the obstruction, this symbol does not identify the Solar Power Plant sites as “highly visible visual landmarks”, nor do they indicate that these sites can present ocular hazards for flight crews. The most common hazard is reported as being similar to the sun’s glare reflected off water. However, there are reports of more intense reflections that can cause a temporary after-image for flight crew members.

**Recommendations:**

Define and establish aeronautical charting symbology for placement at large solar power plant sites that will identify;

1. The visual landmark for VFR navigational purpose.
2. This site has potential ocular hazard considerations.

**Comments:**

**Submitted by:** FAA Western Service Center (WSC) Operations Support Group (OSG)

**Organization:** South Airspace/Procedures Team, AJV-W21

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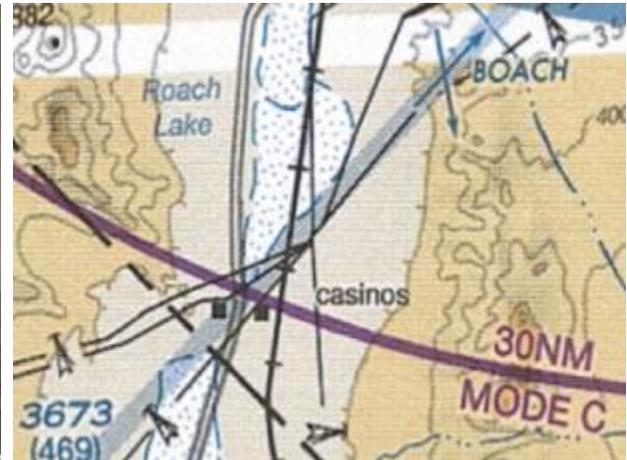
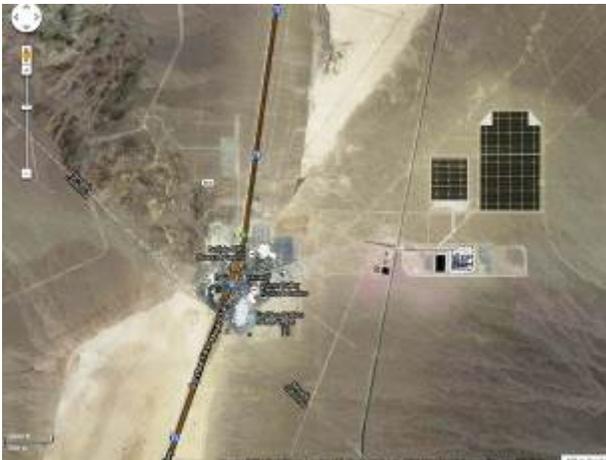
**E-mail:** rex.maclean@faa.gov

**Date:** February 14, 2014



**Ivanpah Solar Electric Generating System**

**Ivanpah Dry Lake, CA**



**First Solar Electric**

**Jean, NV**

**ACF 14-01:**

Valerie Watson, AJV-3, briefed the issue on behalf of the submitter, the FAA Western Service Center Operations Support Group. Valerie stated that the number of Solar Energy Power Plants has rapidly increased over the past several years. Many of these sites cover hundreds of acres and can contain hundreds of thousands of mirrors. [Pictures were displayed](#) to the group of several existing plants. The Service Center is concerned that the only thing charted currently is the associated obstruction tower often located in the center of the solar farm. This does not address the associated glare from the mirrors during day-time operations, which may present an ocular hazard to flight crews passing within the vicinity of such solar farms. The submitter of this request would like to see solar farms indicated on visual charts not only as a visual landmark for VFR navigation, but also identified as a potential hazard to pilots.

Ron Haag, AJV-321, stated that there is already a precedent for similar hazards being shown on the visual charts as a landmark symbol with a boxed note.

Ted Thompson, Jeppesen, asked how the information will be sourced and maintained. Chris Criswell, AJV-22, questioned why it would have to be databased and stated that there are currently similar items on visual charts that are not contained in any database. Ron stated that his office could go through the Operations Support Group (OSG) to get a listing of the areas that should be charted.

John Moore, Jeppesen, stated that the group still needs to try to define the problem. He questioned whether these areas should be considered as landmarks or if these sites should be considered a hazard and charted as such. He stated that the source would have to meet certain criteria in order to be considered a hazard.

Melissa McCaffrey, AOPA, stated that she is part of the Southern California Airspace Users Working Group and pilots there have stated that this is a hazard. She offered to go back to that group and try to get more information from pilots in that area.

Jolda Reed, AJV-W21, stated that these areas are potential hazards and recommends that they be charted as such. Jolda cited the Airport Cooperative Research Program report regarding solar energy and its potential impacts on aviation in her comments.

Valerie stated that we do not have enough information yet to know whether or not this should be defined as a hazard or if it should be charted as such. Visual charting team can, under current specifications, show these farms as landmark objects or areas with accompanying text to identify them as solar farms, but it is beyond the scope of the charting offices to designate them as "hazards".

**STATUS: OPEN**

**ACTION:** Ron Haag, AJV-321, will work with the Western Service Area, Operations Support Group, to pursue the charting of these areas a landmark object or area symbol with identifying text.

**ACTION:** Melissa McCaffrey, AOPA, will gather more information from pilots in Southern California and will report back on the scope of the problem.

**MEETING 14-02**

Valerie Watson, AJV-344, reviewed the topic. Rick Fecht, AJV-3213, showed the audience the [current VFR Sectional chart depictions](#) of the two solar plants that were identified by the Western Service Center as presenting an ocular hazards to pilots. He asked attendees for feedback on the depictions.

Lev Prichard, ASA, commented that the current charting depictions look understated. Lev inquired if there was anything charted on any FAA Instrument charting products. Valerie replied back that current FAA policy prohibits the practice of posting cautionary comments on IFR Charting products.

Melissa Rudinger, AOPA, Bill Wade, Delta Air Lines, John Collins, GA Pilot, and others echoed the sentiment that the solar plants are not prominently enough displayed on the current Sectional charts. Valerie suggested that the visual charting team try to work on a more prominent visual depiction and also utilize text to alert users that there is an ocular hazard associated with the plants. Rick agreed.

Lynette Jamison, AJR-B1, stated that there are currently two NOTAMs on the circuit which were issued by the ATC Traffic Advisory Committee to alert users of the plants. Lynette added that there have been several filings by pilots through NASA ASRS comments and ATSB reports. She also stated that these are the first two such solar power stations and that there are 5 more large farms in planning. Lynette then asked if there was anything in the AIM regarding ocular hazards.

Valerie stated that in searching the AIM prior to the ACF, she found nothing addressing flash blindness or cockpit illumination associated with solar mirror farms. She stated pilots desiring to report problems with an ocular hazard should report to their local Flight Standards District Office (FSDO) to voice their concerns.

**STATUS: OPEN**

**ACTION:** Valerie Watson, AJV-344 and Rick Fecht, AJV-3213, to work on generating new charting concepts that would provide a more prominent depiction and alert users of the ocular aspect.

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**MEETING 15-01:**

Valerie Watson, AJV-553, reviewed the topic. Rick Fecht, AJV-5223, [showed the new](#), more prominent charting depiction of Ocular Hazards on FAA VFR charts. The revised depiction was well received by the audience.

Valerie asked about the source of the ocular hazard data. Rick stated that the requests to date have come in via special request from the Western Service Center and the areas are not currently databased in NASR.

Ted Thompson, Jeppesen, stated that if these hazards are not sourced through NASR, they will not appear on any commercial charts.

Mike Wallin, AJV-5331, stated that he would look into how Ocular Hazards could be databased in NASR. In the short term, they can be published as a NFDD add-on page.

**STATUS: OPEN**

**ACTION:** Mike Wallin, AJV-5331, will investigate the databasing of Ocular Hazards in NASR.

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**MEETING 15-02:**

Valerie Watson, AJV-553, reviewed the topic. Valerie commented that at present, there are two solar power plants that have been depicted on the FAA VFR Sectional charts with the existing “ocular hazard” symbology. The issue that remains is the sourcing and databasing of solar fields deemed to be Ocular Hazards for pilots.

Mike Wallin, AJV-5331, stated that NFDC is currently looking in to how to database the areas in NASR. (The two current areas were published via NFDD “add-on” pages.) Mike said that for the data to be published, Solar Power plants would have to be submitted to NFDC by the Service Areas via the portal. Also, any future modifications would have to come in through the same means from the service centers.

Valerie asked about the source of the currently charted ocular hazard areas. Rick Fecht, AJV-5223, stated that the requests to date have come in via special request from the Western Service Center. The areas are not currently databased in NASR. Rick Mayhew, AJV-533, commented that it may be possible to expand FAA Order 7900.3 for special activity areas to include the housing of these areas. Rick also stated that NFDC can reach out to the service centers to see if they have additional areas where ocular hazard should be charted.

Discussion shifted to what altitudes solar plants that operate utilizing focused mirrors impact pilots. Jolda Reed, AJV-W21, stated that pilots can suffer glare at any altitude. She said that at Ivanpah Solar Power Facility, pilots have reported ocular hazard up to 380FL and 180 miles away from the facility.

Rune Duke, AOPA, suggested that the FAA look into using the ocular glare tool; Significant Glare Analysis Tool (<https://share.sandia.gov/phlux>), currently used for Solar Panel installations at and around airports.

Discussion then shifted as to what the FAA's reporting requirements are for companies looking to construct solar sites. It was stated that the only real requirement is when there is an obstacle constructed at or above 200 feet AGL. There was a question regarding what information is included on the construction notice when an obstacle is submitted. Rick Mayhew will look into whether the information submitted on construction notices provides an indication that a solar farm is being constructed. The final consensus was that the Service Areas will need to submit to NFDC the areas that they deem to be ocular hazards to pilots and are thus “chart-worthy”. NFDC cannot take the responsibility for making this decision, nor can the charting teams. Rick will pursue with the three Service Areas to set up a source submission process.

**STATUS: OPEN**

**ACTION:** Rick Mayhew, AJV-533, will reach out to the Service Areas regarding submission of solar farms required for charting.

**ACTION:** Rick Mayhew, AJV-533, will review FAA Order 7900.3 to see if it can be expanded to include ocular hazards for databasing in NASR under the newly developed Special Activity Area resource.

**ACTION:** Rick Mayhew, AJV-533, to research what information is submitted on a construction notice with regard to solar plant construction.

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### **MEETING 16-01:**

Valerie Watson, FAA/AJV-553, reviewed the topic and stated that there are currently two solar power plants depicted on the FAA VFR Sectional charts. Rick Mayhew, FAA/AJV-533, reported that he has investigated the publications strategy, but, due to the fact that there are currently only two such areas being requested for charting, it is not financially feasible to modify NASR to add the new resource to the database. He stated that such locations will continue to be handled via NFDD “add-on” pages for the foreseeable future.

Jill Olson, FAA/AJV-553, reported that since last ACF she sent an inquiry to ATO Safety regarding the identification of solar plants that are classified as an ocular hazard for pilots. The intent is that the ATO Safety Office provide guidance on the criteria that could be used to determine if an ocular hazard warrants depiction on the charts and/or as a text notice in the Chart Supplement. Jill reported that she has not yet gotten a response back from ATO Safety and will continue to follow up.

### **STATUS: OPEN**

**ACTION:** Jill Olson, FAA/AJV-553, will continue to reach out to the ATO Safety Office regarding charting/publication criteria for ocular hazards.

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### **MEETING 16-02:**

Jill Olson, FAA/AJV-553, provided an update stating that she had not had success getting an answer from ATO Safety regarding publication criteria for ocular hazards. Jill stated that at this time, there is no charting criteria that exists for these types of hazards. She added that to date, there have only been two requests for the charting of ocular hazards and that these two sites appear on the VFR charts.

Valerie Watson, FAA/AJV-553, suggested that this item be closed. If in the future, large numbers of these requests for charting are submitted, the issue can return to the ACF for further discussion. The ACF audience agreed to close this item.

### **STATUS: CLOSED**