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5800
Ser 400000D/2118
May 5, 2010

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SUBJECT: POTENTIAL MISSION IMPACTS POSED BY SOLAR MILLENNIUM SOLAR POWER PROJECT, DOCKET NUMBER 09-AFC-9, CACA-49016

Thank you for the opportunity to review and provide comment regarding the Solar Millennium Solar Power Project, under current SA/DEIS review under CEC Docket 09-AFC-9, and BLM case file CACA-49016. Please add the Naval Air Warfare Center Weapons Division (NAWCWD) to the list of "Interested Agencies" regarding this project.

Established in 1943 as the Naval Ordnance Test Station, NAWCWD China Lake is the Navy's premier facility for the development and test of weapon systems. Since its inception, nearly every significant airborne weapon system has been either developed or tested at NAWCWD. Today, NAWCWD China Lake is designated the national Center of Excellence for Naval Weapons and Armament Research, Development, Acquisition, Test and Evaluation (RDAT&E). The proposed Solar Millennium Solar Power Project site is located directly south from the China Lake main site and ranges, and underlies the R-2508 airspace. The proposed Solar Millennium site is also approximately 4 miles south-southwest of the China Lake airfield. The NAWCWD staff has reviewed the project documentation uploaded to the California Energy Commission webpage. From this initial review, NAWCWD has the following concerns, detailed in enclosure (1), regarding the Solar Millennium Solar Power Project's potential impacts to NAWCWD's mission.

Again, thank you for the opportunity to review and provide comment regarding the Solar Millennium Solar Power Project. We look forward to future cooperation for land use management with both the BLM and the CEC.

Sincerely,

SCOTT M. O'NEIL
Executive Director
By direction of the Commander

Enclosure: 1. Potential Mission Impacts

POTENTIAL MISSION IMPACTS POSED BY SOLAR MILLENNIUM SOLAR POWER PROJECT, DOCKET NUMBER 09-AFC-9, CACA-49016

1. AIR CLARITY IMPACTS ASSOCIATED WITH COOLING TOWER PLUME.

Based on the Solar Millennium documentation, the cooling plant associated with the proposed site is expected to dissipate in excess of the 250 MW power plant nametag rating of waste heat, depending on the solar flux and the ambient air temperature. The resulting thermal plume associated with the cooling plant is expected to generate non-homogenous thermal mixing as it extends far upward and outward into the atmosphere. This thermal plume is expected to demonstrate plume rise an order in magnitude larger than the visible plume.[i] A key physical effect associated with this plume is a high degree of visible and infrared shimmer and refraction. For instrumentation systems or sensors looking through the plume, shimmer will result in reduced target contrast and resolution. This effect is often called optical haze. The refractive effects will result in changes in line-of-sight and will not be stationary, but rather varying in both time and position within the plume. The thermal plume is expected to rarely act as a purely vertical plume due to prevalent winds; the resulting "bent over" plume and its corresponding optical haze is expected to span a significant portion of the southern Indian Wells Valley. This degradation is a concern for systems at the China Lake Range Complex, especially for instrumentation systems tracking or acquiring systems under test ingressing to the China Lake Range Complex from the south.

2. THERMAL SIGNATURE

Thermal signature is often a key physical attribute that weapon systems and sensors utilize to successfully conduct their mission, hence the prevalence of infrared sensors in use throughout military technologies. The Solar Millennium Solar Power Project presents a large-scale industrial facility with substantial thermal signature generated both by the solar field and the large cooling tower associated with the plant. The thermal signature of the thermal plume as discussed previously is also expected to reduce the available contrast for instrumentation systems operating in the infrared bands. Given the proposed placement of the solar plant under the R2506 airspace, the emergence of a large thermal signature is a concern to the Naval Air Warfare Center Weapons Division (NAWCWD) test and evaluation mission due to its potential effect on sensor acquisition and performance of systems under test.

3. GLINT

Light scattering and glint associated with the power plant's mirror and collector system is a concern as a result of its impact on NAWCWD's mission to test systems utilizing sensors, missile seekers, and airborne systems. These concerns are over and beyond prior studies that solely considered glint from the perspective of evaluating health hazards associated with glint and glare from solar projects.[ii] Glint effects are of particular concern as a result of the close proximity of test aircraft and sensors to the power plant mirrors and other hardware that will

occur. The site is located under airspace used by military aviation in support of the NAWCWD mission. Sun glint from collecting mirrors will be visible to passing aircraft from the Solar Millennium Solar Power Project field as a result of direct reflections from the parabolic trough mirrors at certain aircraft positions during all hours of the day. These reflections will appear as a line of intense reflected sunlight running down the length of the mirrors. There will also be a glint associated with a recollimation of stray (reflected and scattered) light sources from the target tube assembly back to the reflecting mirrors apparent for certain aircraft and mirror positions. There will also be glare produced directly from the collecting tubes that will be visible over a wide range of angles. The net effect of this combined sun glint is expected to include both a noticeable flash, coupled with glint demonstrating an apparent duration as different zones of mirrors come into play. The emergence of a potentially substantial glint source is a concern for pilot distraction, testing of weapon systems, sensors, and airborne platforms, as it has effect across both the visible and infrared wavelengths. Additionally, the scattering effect similar to that experienced in the optical bands is expected to be evident in the radio-frequency bands relative to airborne systems. The scattering in the radio-frequency bands is expected to impact the Center's electronic warfare and mission systems testing programs as they utilize the airspace surrounding the proposed power plant.

4. FUGITIVE DUST

The mission impacts to NAWCWD associated with fugitive dust emissions are well documented in the literature, particularly in relationship with fugitive dust associated with the exposed playa of Owens Lake.[iii] Health impacts associated with fugitive dust emissions are well recognized, particularly relative to the China Lake site and the Owens Valley. An element of this mission impact is the degradation of air clarity and its resulting direct degradation of instrumentation and sensor system performance. This degradation can directly result in failed and cancelled test events. The NAWCWD is concerned that the proposed Solar Millennium Solar Power Project may yield a large fugitive dust storm immediately up-prevailing-wind from the China Lake main site, potentially resulting in conditions similar to those associated with Owens Lake dust-storms. These particular concerns are amplified as a result of CEC staff discoveries that the Solar Millennium documentation indicates construction water consumption during construction approximately 3.3-5.5 times lower than other projects. From this observation, NAWCWD is particularly concerned that the project as defined will potentially result in large scale fugitive dust emissions, with the corresponding direct impact to the NAWCWD mission. The Solar Millennium Solar Power Project must directly address measures to identified shortfalls in their dust mitigation schemes, and ultimately prevent the negative effects associated with a growth in fugitive dust emissions.

5. LIGHT POLLUTION.

The NAWCWD is concerned about scattered and emitted light in both the visible and infrared bands from this project, as this light scattering has the potential to reduce the effectiveness of instrumentation and sensor systems in night-time tests. Solar Millennium's documentation indicates the adoption of "Dark Skies" compliant lighting, which is

commendable. The project documentation does not, however, indicate which "Dark Skies" standard the project will be adopting for its light pollution approach. An additional concern is the mitigation of light pollution in the infrared bands, which "Dark Skies" standards do not address at all.

6. RADIO-FREQUENCY ENCROACHMENT.

The growth in use of radio-frequency devices in the areas surrounding NAWCWD are an encroachment source of concern, due to its negative impact to NAWCWD's test and evaluation mission. Solar Millennium's documentation indicates the willingness to coordinate their use of radio-frequency emitting devices with NAWCWD to minimize impact, which is appreciated. Nonetheless, NAWCWD requests that Solar Millennium minimize the use of radio-frequency devices for the control and telemetry of the site as much as possible (favoring alternative technologies such as fiber optic communications, for example).

7. IMPACT TO NAVY WATER RESOURCES.

A major concern relative to the proposed Solar Millennium Solar Power Project is its projected water consumption. The aquifer associated with the Indian Wells Valley is generally recognized to be in a long standing overdraft condition. The continuing growth in consumption of the Valley's scarce groundwater resources is a clear concern to the viability of the Navy's interests in its own water well network. As a relative measure, it is noted that the water consumption projected by CEC staff required to prevent fugitive dust emissions during construction (6-8,000 acre-feet) is approximately equivalent to the annual consumption of the Indian Wells Valley Water District (IWVWD), the largest provider of domestic potable water for the Indian Wells Valley. This quantity is also very nearly equal to the estimated annual groundwater recharge for the entire valley.

The Navy has previously taken issue[iv] with the IWVWD's previous plans to expand its water production as part of its "2007/2008 Water Supply Project" due to concerns of the effect the project's increase in water harvesting would have to Navy wells. The increase in water consumption associated with the Solar Millennium Solar Power Project, sourced from the IWVWD, appears to exacerbate the Navy's previous concerns relative to protecting its water interests. The water that Solar Millennium will use will come directly from potable groundwater sources that are already in serious decline.

In concurrence with the previous Navy response to the Indian Wells Valley Water District, it is our recommendation that any increase in water production required to meet the Solar Millennium Solar Power Project must first be further clarified to what extent the Navy wells will be affected. It is particularly noted that a similar solar power plant project, the "Calico" project in San Bernardino County, was required to substantially retire water rights in the affected aquifer prior to project approval. This approach, for a similar project in a nearby Mojave Desert location, seems to be a reasonable means to mitigate water concerns for the Indian Wells Valley aquifer.

8. ENCROACHMENT INTO MILITARY INFLUENCE AREAS.

The Solar Millennium documentation discusses the supply water pipeline to the project site from IWVWD facilities that will pass through and be available to supply potable water to privately owned properties in the area of South China Lake Blvd. and US Highway 395. This area underlies a defined Military Influence Area.[v] Development within this area has been a previous encroachment concern to the Navy. The Navy has taken issue with recent proposals for development of residential properties under this Military Influence Area within the City of Ridgecrest. The Navy's position in favor of limiting development or growth within Military Influence Areas has not changed.

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[i] Uthe, Edward E. "Cooling Tower Plume Rise Analyses by Airborne LIDAR." *Atmospheric Environment*, Volume 18, Issue 1, 1984, Pages 107-119.

[ii] Ho, Clifford K., Ghanbari, Cheryl M., Diver, Richard B. "Hazard Analyses of Glint and Glare from Concentrating Solar Power Plants," SolarPACES Sept 15-19 2009, Berlin, Germany.

[iii] Saint Amand, P., L. Mathews, C. Gaines, and R. Reinking. "Dust storms from Owens and Mono Lakes," TP-6731. Naval Weapons Center, China Lake, CA. 1986.

[iv] NAWS Memo to Indian Wells Valley Water District, 13 August 2007. N45NCW/374.

[v] Final Air Installation Compatible Use Zone Study, Naval Air Weapons Station, China Lake. 2007.

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