UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

5/25/2010

Mr. Joe Incardine
BLM Phoenix District Office
Sonoran Solar Energy Project
21605 N 7th Ave.
Phoenix, AZ 85027

Subject: Draft Environmental Impact Statement (DEIS) for the Sonoran Solar Energy Project, Maricopa County, Arizona (CEQ #20100108)

Dear Mr. Incardine:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Sonoran Solar Energy Project (SSEP). Our review and comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act (CAA). We appreciate the Bureau of Land Management's (BLM) willingness to accept this letter one day after the official close of the comment period.

EPA supports increasing the development of renewable energy resources in an expeditious and well planned manner. Using renewable energy resources such as solar power can help the nation meet its energy requirements while minimizing the generation of greenhouse gases. While renewable energy facilities offer many environmental benefits, they are not without the potential for adverse impacts. Appropriate siting and design of such facilities is of paramount importance if the nation is to make optimum use of its renewable energy resources without unnecessarily depleting or degrading its water resources, wildlife habitats, recreational opportunities, and scenic vistas.

The BLM has identified thirty-four proposed renewable energy projects as "fast track" projects that are expected to complete the environmental review process and be ready to break ground by December 2010 in order to be eligible for funding under the American Recovery and Reinvestment Act. Twenty-eight of these projects are located in our Region; the SSEP is the only one located in Arizona. We are aware that many more projects that have not been designated "fast-track" are also being considered by BLM. Many, if not all, of these projects, fast track or otherwise, are proposed for previously undeveloped sites on public lands. In making its decisions regarding whether or not to grant rights-of-way for such projects, we recommend that BLM consider a full range of reasonable alternatives to minimize the adverse environmental impacts. Such alternatives could include alternative technologies or altered project footprints at the proposed location, as well as alternate sites, such as inactive mining or other disturbed sites that may offer advantages in terms of availability of infrastructure and less vulnerable habitats. We understand that BLM has established a process for identifying such sites in Arizona, and we are interested in learning about the interface, if any, between that effort and individual projects such as the SSEP.

On August 28, 2009, EPA provided extensive formal scoping comments for the SSEP which included a variety of detailed recommendations regarding purpose and need, range of alternatives, and resource areas of concern. Based on our review of the SSEP DEIS, we have rated the document as *Environmental Concerns – Insufficient Information* (EC-2). Please see the enclosed "Summary of EPA Rating Definitions."

EPA is particularly concerned that the proposed action includes wet cooling, and the extraction of nearly 1 billion gallons of groundwater annually to support it. EPA strongly supports Alternative A: Reduced Water Use, which would use dry cooling and substantially reduce groundwater extraction. In the enclosed detailed comments, EPA provides additional recommendations regarding analyses and documentation to assist in assessing potential significant impacts from the proposed SSEP Project. Specifically, EPA is concerned with water resources, biological resources, alternatives analysis, greenhouse gas emissions and economic analysis.

EPA appreciates the Bureau's coordination on this project, and the interagency meeting held on April 27, 2010. We are available to further discuss all recommendations provided. When the FEIS is released for public review, please send two hard copies and two CDs to the address above (Mail Code: CED-2). If you have any questions, please contact me at (415) 972-3521 or contact Tom Kelly, the lead reviewer for this project. Tom can be reached at (415) 972-3856 or kelly.thomasp@epa.gov.

Sincerely,

Kathleen M. Goforth, Manager
Environmental Review Office (CED-2)

Enclosures: Summary of EPA Rating Definitions
Detailed Comments

cc: Henry Krautter, Maricopa County Air Quality Department

U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE SONORAN SOLAR ENERGY PROJECT, MARICOPA COUNTY, ARIZONA, MAY 24, 2010

Water Resources

Dry Cooling

A primary goal for the Phoenix Active Management Area[1] is a safe yield of groundwater by the year 2025. Nearby communities extracting groundwater for municipal use are expected to replenish 67% of all water extracted from local aquifers[2]. While current rules may allow the Sonoran Solar Energy Project (SSEP) to withdraw nearly one billion gallons a year, losing nearly all of the water to evaporation in cooling towers, this use appears inconsistent with the goal of the Phoenix Active Management Area.

The proposed action is also inconsistent with the recommendations of the "Best Management Practices and Guidance Manual: Desert Renewable Energy Projects," which was jointly developed by the Bureau of Land Management, the U.S. Fish and Wildlife Service, the California Energy Commission, and others[3]. That manual states, "[t]he following critical actions provide guidance on how to address the major significant issues that usually arise when conducting environmental reviews. . . 2) The project will not use fresh groundwater or surface water for power plant cooling."

Additionally, dry cooling provides environmental benefits beyond water conservation. Dry cooling reduces emissions of particulate matter, both 10 micron (PM10) and 2.5 micon (PM2.5), due to the elimination of cooling towers. Alternative A: Reduced Water use reduces annual PM10 emissions by 51% (20.7 tons) and PM2.5 emissions by 57% (12.7 tons), as noted on page 4-29. Dry cooling requires only 6 acres of cooling ponds rather than 30 acres required for wet cooling. The ponds are a danger to the birds attracted by the water, as noted on page 4-179-180, due to the toxic concentration of salt, selenium and possibly other constituents within the groundwater.

We also point out the limited use of wet cooling in similar large scale solar energy projects. Of the 21 solar energy projects within Region 9 that have appeared in the Federal Register recently (as a notice of intent to prepare an Environmental Impact Statement), only four projects continue to propose wet cooling. Of those projects, three

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[1] Third Management Plan, 2000 – 2010, for the Phoenix Active Management Area, Arizona Department of Water Resources, (http://www.adwr.state.az.us/azdwr/WaterManagement/AMAs/ThirdManagementPlan3.htm#Phoenix).

[2] Personal Communication between Tom Kelly, U.S. EPA, and Ron Whitler, City of Buckeye.

[3] Renewable Energy Action Team (California Energy Commission, California Department of Fish and Game, U.S. Department of Interior Bureau of Land Management and Fish and Wildlife Service). CEC-700-2009-016SD-REV

are sponsored by a subsidiary of the same corporate entity, FPL Energy, including the Sonoran Solar Energy Project.

> *Recommendation:*
> EPA strongly recommends that BLM not approve the use of wet cooling. Alternative A, which would employ dry cooling, would reduce water use from a maximum of 3,000 acre-feet per year to less than 152 acre-feet per year, and reduce the projects impacts on air quality and birds.

Groundwater

The aquifer recovery times listed in Table 4-80 are easily misunderstood. The table and accompanying discussion appear to apply the 2,550 acre-feet per year recharge rate for the entire Rainbow Valley groundwater sub-basin to this one project. A table with recharge rates would be more informative in Section 4.20.17, in the cumulative effects on water resources. Including the Sonoran Solar Project, current (and reasonably expected) users will withdraw 860,000 acre-feet of groundwater per year. Based on the natural recharge rate, the groundwater basin will take 337 years to recover from one year of pumping.

The DEIS does not describe the impact of the long-term trend of increasing population in Arizona and communities near the project area. While this trend has slowed with the current economic downturn, growth is expected to continue, placing a greater premium on resources such as groundwater.

To compound the problem described about aquifer recovery, Table 4.80 appears to calculate the aquifer recovery time incorrectly. The proposed action with gas co-firing would use 3,003 acre-feet of water per year and a total of 90,090 acre-feet over the life of the project. At a recharge rate of 2,550 acre-feet per year, given on page 4-172, the correct recovery time would seem to be 90,090 acre-feet divided by 2550 acre-feet per year or 35 years, not 25 years as listed in the table. The values for other alternatives also appear incorrect.

> *Recommendation:*
> The DEIS should calculate an aquifer restoration rate based on pumping throughout the aquifer, both inclusive and exclusive of the groundwater extraction from the SSEP.
>
> The DEIS should consider the impact of population trends in Arizona on water supply.

Floodplains and Drainages

Natural washes perform a diversity of hydrologic, biochemical and geochemical functions that directly affect the integrity and functional condition of higher-order waters

downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging, and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique conditions. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems: adequate capacity for flood control, energy dissipation, and sediment movement, as well as impacts to valuable habitat for desert species.

At the southern edge of the project area, surface water will be routed around the facility by a berm, designed to withstand a 100-year storm event (157-8), however, it is also called a diversion channel (page 4-159). This will reroute the runoff from 215 acres of floodplain within the project area and more than 20 drainages (page 4-159 and Map 19). The DEIS does not clarify where the rerouted surface water will be discharged. Will all the drainages at the project area's southern boundary, within the Waterman Wash watershed, discharge to a single point or multiple locations within the unnamed tributary to Waterman Wash? Similar concerns are more complicated at the south western portion of the project area, within the Rainbow Wash watershed. Will the redirected surface water carve a new drainage to the Rainbow Wash at the extreme angle at the southwest corner, discharge to the first drainage leading away from the project area on its western border, or be distributed to all the drainages leading away from the western and southern boundary of the project area? In addition to the lack of clarity of the exterior flow path, the DEIS does not describe the impacts of these rerouted surface waters on downstream drainages and washes. A comprehensive method to evaluate impacts is through modeling. While the DEIS discusses hydraulic monitoring "to understand the pre-construction conditions and functions of the floodplains. (page 4-155)," it does not state that the impacts of post-construction layout will be modeled.

Recommendations:

The FEIS should describe the downstream impacts of rerouting surface water, including habitat impacts and physical changes.

The FEIS should consider redirection of surface water outside the project area in wide and shallow channels intended to mimic a xeroriparian wash that avoids sharp angles. Plant communities could be re-located from existing washes and floodplains within the project area.

The FEIS should describe the potential impacts of surface water flow at the sharply angled southwestern and southeastern corners, should it remain a feature of the project area's flood protection.

The FEIS should clarify the flow path of exterior storm water flow, and summarize modeled impacts (hydraulics of flow, velocity, sediment transport,

sediment delivery and potential stream channel changes) of diverting drainages and floodplains.

Within the project area, page 4-158 states, "The post-development sediment/retention basin at the discharge points would provide stormwater pollution prevention BMP controls, along with retention time to reduce the peak offsite discharge to pre-development conditions." However, the DEIS does not define peak discharges (1, 10 or 100 year storm), explain the BMPs for peak discharges, nor describe the discharge procedures for less than peak flow. Additionally, the FEIS does not clarify discharge locations for the sediment/detention basins.

Recommendation:
The FEIS should describe the BMPs to be used to ensure that discharges from the stormwater retention basin "match pre-development conditions." The FEIS should also define the term "peak discharges," explain procedures for non-peak discharges, describe the downstream impacts of flow changes, and identify discharge points and flow controls for the sediment/retention basins' water.

The FEIS should describe the impacts of excess water provided to some drainages and reduced or no discharges to other drainages.

Fencing

The DEIS discusses security fencing in many locations, but does not address the effects of fencing on drainage systems. In this region, storms can be sudden and severe, resulting in flash flooding. Fence design must address hydrologic criteria, as well as security performance criteria. The National Park Service recently published an article[4] on the effects of the international boundary pedestrian fence on drainage systems and infrastructure. We recommend that BLM review this article to ensure that such issues are adequately addressed.

Recommendation:
The FEIS should provide more detailed information about fencing and potential effects of fencing on drainage systems within the FEIS, and ensure that the fencing proposed for this project will meet appropriate hydrologic performance standards.

Biological Resources

The DEIS includes a discussion of "Reduced Water Use Option: Brine Concentrator," that does not fully describe the associated benefits. As EPA understands the proposal, the

[4] National Park Service, August 2008, Effects of the International Boundary Pedestrian Fence in the Vicinity of Lukeville, Arizona, on Drainage Systems and Infrastructure, Organ Pipe Cactus National Monument, Arizona,

Brine Concentrator would greatly reduce the amount of water to be evaporated, in the proposed action and Alternative B. This would reduce the size of the SSEP's evaporation ponds, but no quantification is provided for the reduction in pond size. Because the ponds contain contaminants toxic to birds and bats, the DEIS proposes to mitigate these impacts with steep side slopes, to discourage wading birds, and netting (page 4-177). The brine concentrator offers an opportunity to minimize the hazard to birds and bats, before mitigating the impacts.

EPA is also concerned about the potential of the ponds to attract ravens, natural predator of the Sonoran Desert Tortoise. Although evaporation pond design and water quality would be regulated and monitored, we remain concerned with the potential attractiveness of the ponds to birds and wildlife given the arid region

> *Recommendation:*
> The FEIS should discuss the benefits of the Brine Concentrator, including the reduced size of evaporation ponds and the reduced impact to birds and bats.
>
> The FEIS should describe any potential benefits from using the Brine Concentrator as an option combined with Alternative A.
>
> The FEIS should discuss the potential of the evaporation ponds to attract ravens, and the impact of that on desert tortoises.
>
> The FEIS should discuss additional mitigation measures to reduce the attractiveness of the evaporation ponds to migratory birds and water fowl. For example, the FEIS could describe potential bird hazing techniques and their effectiveness.

Alternatives Analysis

Reclaimed Water

The DEIS considered the use of reclaimed water (treated wastewater), but eliminated the option from detailed evaluation. EPA seeks further clarification and discussion of this, particularly in light of the viability of reclaimed water use at other projects proposed by FPL Energy or its subsidiaries (one of which is the sponsor for the SSEP). A subsidiary of FPL Energy has sponsored the Beacon Solar Energy Project on BLM land in California. The California Energy Comission's Final Staff Assessment[5] evaluates dry cooling and two water sources for wet cooling considered feasible. The water sources are treated wastewater from 15 and 40 miles away. Both treated wastewater sources have similar costs. In one alternative the solar energy facility will pay the cost of a 40 mile

[5] Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2) Kern County, California Energy Commission (http://www.energy.ca.gov/2009publications/CEC-700-2009-005/CEC-700-2009-005-FSA.PDF)

pipleline, in the other, the facility will pay the cost of a 15 mile pipeline and the cost to connect residents to the treatment plant (to generate a sufficient quantity of wastewater).

As previously mentioned, municipalities that extract groundwater are required to return 67% of extracted groundwater back to the aquifer, leaving less incentive to provide reclaimed water to SSEP. While this task may be complex, the Palo Verde Nuclear Generating Station, located 55 miles west of Phoenix, obtains 20 billion gallons of reclaimed water per year from several treatment plants, including the City of Phoenix.

> *Recommendation:*
> The FEIS should evaluate potential sources of reclaimed water from all wastewater treatment plants in at least a 40-mile radius.

Industrial Wastewater

The DEIS eliminated Industrial Wastewater from consideration by stating, "[n]o industrial wastewater sources are present or available. [2-56]"

> *Recommendation:*
> The FEIS should evaluate industrial wastewater sources within at least a 40 miles.

Alternative Technologies

On the subject of alternative technologies, the DEIS states, "[l]arge scale PV [photovoltaic] facilities on the scale of the Proposed Action have simply not yet been constructed anywhere in the world, although several have been proposed (the largest installation in the United States is 25 MW). Consequently, the advantages and challenges of such a facility have not been quantifiably studied, analyzed, or understood. For these reasons, the use of PV technology for this project was eliminated from further analysis."

Like photovoltaic technology, there are few, if any, parabolic trough solar thermal facilities operating in the U.S. at the scale proposed by the SSEP. In addition to photovoltaic technology, many concentrating solar energy facilities are currently being planned. An example of a large scale PV facility is the First Solar Project on BLM land (http://www.blm.gov/ca/st/en/info/newsroom/2010/january/CDD1027_firstsolar_desertsunlight_noi.html). The concentrating dish/sterling engine technology is also being frequently proposed. A recent example is the Sterling Energy Systems Solar Two Project (http://www.blm.gov/ca/st/en/fo/elcentro/nepa/stirling.html), which was recently renamed the Imperial Valley Solar Project.

> *Recommendation:*
> The FEIS should consider alternative solar energy generating technologies that may reduce the resource impacts of the project.

Alternative Locations

EPA is pleased that the DEIS provided discussion of other locations on BLM land that were eliminated from further discussion; however, we question whether the discussion of the availability of groundwater at those locations is appropriate, given the reduced water needs from dry cooling. The criteria for evaluating private sites also raises many concerns. Once a screening criterion, such as 15 miles to the Jojoba Switchyard, is set, which locations on BLM land such as Aguila do not meet, the private options become quickly limited. We recommend that BLM re-consider the screening criteria to determine their appropriateness.

> *Recommendation:*
> The basis for each screening criterion should be explained in the FEIS.

Air Emissions

Emission Controls

The DEIS describes two options for natural gas co-firing: co-fired boilers and heat transfer fluid heaters (page 2-15). The project will also include auxiliary boilers and heat transfer fluid freeze protection boilers (page 4-18). The DEIS does not provide alternatives for this equipment that could increase its efficiency or reduce air emissions, such as ultra low NOx burners for the boilers.

> *Recommendation:*
> The FEIS should briefly discuss emission controls contained in the air permit application.
>
> The FEIS should discuss additional or alternative equipment capable of increasing the facility's efficiency or reducing emissions of NOx and PM10.

General Conformity

The DEIS notes that a Conformity Analysis is currently in development but has not been included in the DEIS (page ES-9). If applicable, a Conformity Determination will be necessary to support a record of decision. EPA encourages BLM to coordinate with EPA and the Maricopa County Air Quality Department in advance of issuing the FEIS.

Greenhouse Gas Emissions

EPA is pleased that the project sponsor is seeking alternatives to sulfur hexafluoride (or SF_6). As the DEIS notes, it's a GHG 23,000 times more potent than CO_2. Additionally, SF_6 has a long atmospheric life. EPA estimates that one pound of SF_6 has the same global warming potential as 11 tons of CO_2. As page 2-18 notes that SF_6 could still be used on

the project, EPA offers several recommendations to reduce SF_6 emissions, should the compound be used at the SSEP.

> *Recommendation:*
> The project sponsor should consider joining EPA's SF6 Emission Reduction Partnership for Electric Power Systems (http://www.epa.gov/highgwp/electricpower-sf6/basic.html), and, at a minimum, consider:
>
> - Annual inspection and estimation of SF_6 emissions using an emissions inventory protocol;
> - For equipment that will contain SF_6, purchase only new equipment that meets International Council on Large Electric Systems (CIGRE) standards for leak rates;
> - Implement SF_6 recovery and recycling; and
> - Ensure that only knowledgeable personnel handle SF_6.

Economic Analysis

The DEIS has not summarized information on the relative costs of the project, such as equipment costs, labor, loan rates, or an expected rate of return. Without an understanding of this type of information, BLM should not agree that effective and reasonable mitigation measures or combined alternatives are ruled out on the basis of cost.