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Subj: Comments on Docket Number 09-AFC-9, "Solar Millennium, Ridgecrest Solar Power Project"

Sir:

I would like to thank the California Energy Commission (CEC) for an opportunity to comment during the Scoping Phase of this project. I realize that there is a strong desire as defined by the California legislature, Governor and members of the public to improve California's energy production posture by promoting green or sustainable energy projects. As with any major new construction project, a balanced analysis of the perceived benefits and costs must be made for the suite of proposed solar PV and thermal plants currently being considered by the CEC. This is a challenging task that the CEC has heretofore taken on with professionalism and through an open and fair process. It is my view that to achieve a balanced and objective analysis of a 'green' power project, one must separate our emotional attachment to "free" solar and carefully examine the reality of the capital cost and the actual benefits of a solar thermal project like that proposed by Solar Millennium (SM) in the Indian Wells Valley (IWV). It is very clear after just a short time with a pencil and paper that the SM project could never be built without State and Federal tax benefits. It is simply impossible to recover capital costs of $1B with gross revenues of about $75 M per year in a timeframe that is attractive to any investment entity. In fact, full recovery (let alone investment positive return) inside of the theoretical lifetime of the plant is questionable. For all of its claims, the SM technology has not progressed much beyond that employed at the Kramer Junction solar plant which was built 30 years ago. Such a facility can best be described as inefficient- in land use, in capital cost, in maintenance and operating expense. For every inefficient facility such as this one that is built, the rate/tax payers of California lose money. Even in a state controlled economy (e.g. China), a legitimate business can only be conducted where the capital can be recovered completely by the sale of the product. Where in the evaluation of projects like this one is an economic analysis performed to evaluate its viability and value to the citizens? What role does evaluation of alternate projects such as Photovoltaic (PV) by the CEC have in determining the fate of projects such as this one? The project alternatives brought forth by SM are weak and clearly do not represent any intention by SM to proceed on a different tack. I suggest a careful analysis of the operation of the Kramer Junction plant would be revealing. The original capital cost was erased in at least one bankruptcy

(Luz). Even so, given the present dilapidated state of mirrors and fencing at the Four Corners plant, there is a suggestion of deferred maintenance that would not be tolerated in a thriving operation.

General comments and suggestions

SM clearly does not even meet several of its own stated objectives as given in Application for Certification (AFC) section 2.2.1. Two failed objectives are listed as follows: "to operate an environmentally sound and economical … facility". On the next line SM states it desire "to locate the project in an area of high solar insolation". SM correctly identified the IWV as an area of high solar insolation. That high solar insolation is a direct consequence of a high number of cloudless, or nearly cloudless days. Unfortunately, this also means a very low number of days with significant cloud cover, and a consequent overall very dry climate with no quantifiable valley floor recharge of the alluvial aquifer from precipitation. Thus, it is unfortunately obvious that SM did not complete its due diligence homework by selecting a site with issues of critical groundwater overdraft. As a consequence, SM was forced away from more efficient wet cooling and in doing so erased the very advantage of the higher insolation this valley offers. In a careful reading of the SM AFC, the mitigations proposed in most areas of significant impact are weak or even nonexistent. Given the project's questionable economic viability and the strong environmental impacts that are clearly present how did the SM proposal get this far in its application?

I think the CEC staff has done a good job in most areas of identifying potential troublesome aspects of the AFC in their Issues Identification Report (IIR). However, I don't think the severity of the water supply issue was fully realized, and I don't think the magnitude of the earthmoving aspect of this project and the dust control issue was fully appreciated either. The quantity of rock and soil being moved is of epic proportions, 7.5 million cubic yards – the largest earthmoving project ever attempted in the IWV. This huge amount is a direct result of picking a site that although is reasonably flat is far from level. It averages about 2 % on its N-S axis. I fully concur with the CEC IIR that the biological impact mitigation is one of the most important and at the same time the mitigation offerings by SM are the weakest. As far as the public is aware SM has not brought forth any acceptable workable and verifiable mitigation for water use, for biological impacts, for dust control or for cultural impact issues. One of the most glaring weaknesses in the SM AFC is in the near absence of real alternatives that have been explored and documented. The alternative site that is now the preferred site is not really different from the original in its impacts. The cultural and biological impacts have not materially changed. Nor has the water use changed. The rest of the alternatives offered are really just a discussion of engineering details. In the following I will key my further comments to the appropriate sections in the SM AFC.

It is clear that the AFC was written by many individuals and without top-level coordination. A lack of coherent connection across disciplines and sections is very evident. There are dozens of examples of conflicting or missing estimates or data in their application. As an example, to transport the 561,000 gallons of construction water a day (AFC 2.5.7.4) to the site by water truck will require 140 roundtrip loads using standard 4,000 gal trucks. No mention of this heavy traffic is mentioned in the traffic section 5.13. This heavy truck traffic will cross Hwy

395, 280 crossings per day, in the early phases of construction. The daily water volume of 561,000 gallons is based on a grading period of 28 months. However, this period is in conflict with stated periods of 24 months and 18 months in other AFC sections. (See the Dust Control and Water Use section below for AFC sections that document this conflict.) If we use an 18 month grading period the daily consumption jumps to 905,000 gallons per day. This would require 226 truck round trips to deliver this volume. The 395 crossings now total 452 which is clearly completely unreasonable (one crossing every 3.19 minutes, 24 hours a day). This is a striking overlooked safety issue considering that 395 is a major highway that is key to N-S commerce along the eastern Sierra. No mention is made of coordinating with CalTrans with regard to crossing engineering, construction and safety personnel– a rather obvious and perhaps amateur omission. There is also no mention at all of the construction water use in AFC section 5.17 on water resources. *Omissions and errors like these examples can lead the public to believe that SM has no experience with large infrastructure construction, which raises reasonable doubt as to the efficacy of the project and the veracity of the entire contents AFC and the SM IWV Solar Thermal project.*

It is clear that any construction water needs to be added to the water consumed during operation to give a total water impact. This is not done anywhere in the AFC. Even if we use the improbably low number of 1500 acre-feet for construction use, this is equal to that used in ten years of operation or 1/3 of the project life. It is this sort of omission that makes it difficult to accept that SM has followed a straightforward due diligence path to create the project proposal. The burning of propane to keep the thermal transfer oil fluid on cold nights is another item that has virtually no mention in the AFC except in passing (AFC Table 5.6-3). The annual consumption is apparently somewhat over a million gallons (AFC 5.6-16). This hydrocarbon consumption is in essence an overhead item and has nothing to do directly with electricity production. It isn't very "green" and in fact will be subject to the new mandates to reduce green house gases set by the California Legislature and signed into law as AB32 in 2006. *The total carbon footprint of this powerplant is staggering when one considers that it is supposed to be an 'alternative energy' producer that the public believes is a zero carbon emitter.* There is not a propane pipeline to the IWV and no railroad. All of this propane must be trucked, one tanker load at a time, most likely from Bakersfield. The carbon cost of this transportation will be counted along with the propane under AB32. The combustion of 1 million gallons of propane will result in the release of 6,500 tons of carbon dioxide per year, not counting that released from the approximately 100 semi-truck loads required to deliver this fuel. The AFC also does not mention the increased public risk from the transport of these loads.

Is the construction and operation of this power plant worth the increased carbon dioxide release to the planet's atmosphere? Isn't this plant supposed to help reduce, perhaps dramatically, our nation's total annual carbon emission? It is astonishing how much carbon a supposed alternative energy plant actually will consume – and the above calculation does not account for plant component manufacture, construction, etc.!!

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Construction dust control and water use

The dust mitigation during construction that is proposed by SM in AFC 2.5.7 and 5.17.3 is only described in superficial terms and as such is totally inadequate. SM does not appear to realize the magnitude of the dust control problem. *If the project were to proceed as described, the project will result in uncontrolled dust production of a very serious magnitude.* The impacts will include human health issues and visibility issues for road and maybe even air traffic. Highway 395 traffic will be impacted and since much of Ridgecrest is directly downwind from the project for prevailing winds, the citizens of that area will feel the full impact. Many valley residents remember all too well the unbelievable dust problems brought about by inadequate dust control on the CalTrans Hwy 58 bypass project at Mojave. This happened even with "state-of-the-art" dust control use. Major roads were closed for days at a time.

Once grading has started, simply stopping work will not stop dust from swirling up from worked areas. One cannot apply an effective palliative on ground that is being worked at the same time. When an area of desert soil is disturbed the stabilizing protection given by surface crust and native vegetation is lost –a process that is described in the scientific literature. During a low to moderate wind event, and especially on large areas, dust is stripped off in a cascade of aeolian erosion or saltation. The initial smaller particles loosen ever larger particles until a blasting action occurs. This is a major contributor to the process of desertification. Having long expanses of open disturbed soil will maximize this effect (like the large pads being created by cut and fill proposed by SM). After reviewing AFC 5.17.3, I strongly suggest that the applicant's calculated water use to control dust is too low by at least a factor of four and arguably far more. *There will be windy days when dust control cannot be achieved with any amount of water.* A simple calculation can be made concerning SM water application claims. In AFC 2.5.7.1 it is stated that grading will take place over an 18 month period (or if you read section 2.5.7 it is 24 months, or section 5.17.3 it is 28 months!). In AFC 2.5.7.4 it is stated that the construction water use will be evenly spread over the construction period. Assuming that only one of the ten pad areas will be worked at a time (200 acres), one can easily calculate a water application rate of 2800 gal/day/acre for a 28 month grading period. This amounts to 0.10 in per day.

I am going to provide a real world example of the futility of using water to control desert dust using similar water application rates. I will describe a situation that took place on an 80 acre agricultural field in the southwest area of the IWV this fall. This field has soil of the same composition as at the proposed SM site and was freshly tilled at the time of the observation reported here. This field had in place rows of undisturbed vegetation and drip tubing running at about 45 degrees from the prevailing wind direction. In early December 2009, a light rain fell on the IWV and in the vicinity of the example field, 0.11 inches was recorded. This amounts to an application of 2990 gal/ac. Thirty five hours later, moderate winds came up as the storm passed on. The wind was about 25 mph with gusts to 35 mph. Averaging the water delivered since the rain, the application rate is 2050 gal/ac/day. At the upwind (start of tilled area) side, the dust load was light but before it passed one quarter of the length of the tilled field (about 500 ft), the dust intensity dramatically increased to near zero visibility. Photo 1 shows the severity of the dust cloud at the end of the field and somewhat beyond. The view is looking southwest with Black Mountain barely visible in the right center of the photo. There were periods of dust density that

obscured all background reference detail. The dust picked up from this one 80 acre recently tilled and watered field was one of the most significant dust sources in the *entire* IWV that day. The dust plume reached an altitude of over 7,000 ft 1 ½ miles downrange as it crossed Inyokern Road at Jacks Ranch Road. The dust at road level on Inyokern Rd seriously reduced visibility at times. The companion photo, Figure 2 was taken from the same location on a clear day with about the same sun angle and zoom setting. What can we learn here? *An application rate of 2050 gal/ac/day (*.075 in/day) *is totally inadequate to control dust on disturbed soil with the composition of the SM site.* The implication of the high clay and silt fines content is apparently not realized by SM nor the effects of desert winds. It is clear that even a dramatic increase in application rate would still have not completely eliminated dust evolution in this example as a result of the nonlinear saltation effects. One must also keep in mind that winds in the IWV on the valley floor are often far higher and gustier than in this example case and that the field was protected to a significant degree by the undisturbed rows.

I also believe SM has completely overlooked two other aspects of the issue of water usage for dust control. 1) For about 7 months of the year the evapotranspiration rate can exceed 0.3 in/day, which is 3 times the application rate described by SM. Peak summer rates exceed 0.5 inches. *There is no possibility of dust control by the use of water under these conditions.* I have also not added the additional water required for dust control on roads and other areas not being actively graded nor has SM given us any estimates either. 2) In order to obtain effective compaction the soil must be brought to a soil moisture content of about 10 %. With the high fines content of the SM site soil, the required water content for optimum compaction will be higher still. This moisture is buried (and thus consumed) with successive layers of soil as the filled portions of the pads are built up. Using the volume of soil and rock in the fill that SM has estimated, 7.5 million cubic yards, we can calculate the compaction water usage as follows: Using a soil density of 110 lbs/cu ft we have a total soil weight to be moved and compacted of 22,000 million lbs. Since a desert soil has significant moisture content only in a thin surface layer we can assume that all of the compaction water will have to be added. Using a compaction soil moisture content of 10%, the weight and hence the volume of compaction water can be easily computed to be about 850 acre-feet. This water requirement must be subtracted from the SM 1,500 acre-feet of construction water, reducing the dust mitigation water to only 650 acre-feet. This low value would result in an application rate of about .045 in per day. *If this reduced quantity is all that SM has to use,* the *SM dust application rate is then only 60% of a rate that was directly observed to be totally inadequate*. Clearly by using the direct observations described in this letter, the SM estimated construction water usage is far too low. I suspect even the higher application of 6,000 to 8,000 ac ft described in the Beacon Project construction phase as mentioned in the CEC IIR would be inadequate as well. The IWV Water District (IWVWD) has stated in its Memorandum of Understanding (MOU) with SM that the maximum construction water amount was to be 1,500 acre-feet and no more. This was further emphasized at the January 5, 2010 CEC workshop by IWVWD Manager Mulvihill. Without a mitigation that involves acquiring outside water (e.g. from Los Angeles Department of Water and Power (LADWP)), there can be no SM project.

The dust mitigation using palliatives that SM briefly describes has been extensively tried in this Valley by Kern County in an attempt to control road dust in rural areas with unpaved roads. Road traffic very quickly damages the coatings and even when freshly applied only give a

partial solution. The Air Quality descriptions and Mitigations in AFC Section 5 related to dust control are completely bogus and not based on any direct experience with the soils and winds in the project area.

Given the county's experience, and CARB fugitive dust control legislation, dust control will be an issue for the SM project long after construction is complete. The long-term health impacts of dust produced from a site that is upwind from nearly the entire Ridgecrest population located in the city's core from fine grain soils that produce particulate matter that naturally contain trace metals such as arsenic, mercury, lead, etc. is not addressed in the SM AFC. After a decades long series of court battles, the LADWP is now engaged in a multi-million dollar dust mitigation program on Owens Lake that arguably has been of limited success. Is SM, and potentially the CEC as an approving body, prepared to serve as principle responsible parties in the event of the occurrence of widespread and persistent deleterious health effects from dust generated from SM's facility? While no threat is either implied or meant, it remains nonetheless a very real possibility of long-term human health risk from dust produced on SM's facility, with the resultant prosecution of civil action under NEPA and potentially RCRA (superfund).

Is the construction and operation of this power plant worth the increased health risk of the residents of IWV from dust exposure? The court system didn't think so, and has directed LADWP to do something about Owens Lake.

Is the construction and operation of this power plant worth the permanent loss of drinking water to taxpayers in exchange for ineffective dust control and washing of taxation-free SM's mirrors?

Cultural

Although the archeological investigation did discover and document significant cultural resources in the project area and vicinity, this evaluation did not attempt to relate the findings to the broader questions of the relationship of the sites to the known importance of the Black Mountain Sacred Area or to the sites along the prehistoric China Lake to the North. Nothing in Appendix G indicates an awareness of the subtle and ancient trails that pass through the project areas. These trails are only mostly visible at low sun angles and from certain vantage points. However, once located they can be traced for long distances. The wildflower blooms in the spring often also reveal old footpaths marked by unusual flower concentration as the slight depression in the path serves to concentrate seed and water. Discussion was made by the undersigned in the early 70's with very old native Americans from the Lone Pine area who were camping in the vicinity of the SM proposed site. These discussions revealed that the individuals mentioned had visited the area in the early 1900's with their families in the spring to gather seeds and hunt rabbits. Their camps were along the major washes which at that time ran with water most or even all of the year. Their food gathering activity was concentrated on an arc around the north side of the base of Black Mountain. The relationship of prehistoric artifacts with the "ephemeral" washes is noted for example in appendix G at site R-S-19c in agreement with these stories.

It is not a coincidence that this early human activity was located on the fan around the north side of the El Pasos as the soil here is derived from the relatively rapid weathering of the basalt rock from Black Mountain and its vicinity. The primary mineral in basalt is plagioclase feldspar that is fairly rapidly hydrolyzed to kaolin clay with the release of potassium. Hydrolysis

of other minerals especially apatite releases phosphorus. The elements phosphorus and potassium are very soluble in the soil water and can be readily leached out and thus are bioavailable to plants and soil microbes. Plant vitality depends on continual replacement of soil nutrients, including potassium and phosphorus. Plant vitality depends on continual replacement. The relatively high rates of erosion on the fan to the north of the El Paso Mountains greatly contributes to the accelerated release of nutrients by the energetic action of the washes and minor streams when they do flow. With plant growth so enhanced comes an enhanced animal presence – all of which leads to the attraction of early humans to the area. All of these aspects are tied together by the basic chemistry of the weathering of a volcanic rock. It has long been appreciated by local residents how nice the spring wildflower shows can be in this area.

While it would be possible to document the important prehistoric sites and curate the materials found, any planned destruction of these sites by construction would totally destroy the context of the finds and any possibility of ever putting the pieces of the regional puzzle together. *As is stated in CEQA Guidelines, CCR Title 14, Section 15124.7, the preferred mitigation for archeological sites is preservation in place.* Preservation in place will be completely impossible when moving 7.5 million cubic yards of soil on the proposed construction site. Is the construction of this power plant worth the permanent loss of an important part of Native American history?

Biological

AFC 5.3 is in substantial variance with the discoveries made and documented in Appendix F. The project area is in fact prime habitat for a wide range of desert plants and animals. The desert tortoise population is higher than in areas already determined to be critical habitat by the Bureau of Land Management (BLM). The biota survey described in the appendix did identify a rich diversity of plants and animals. The survey however did not identify many of the rare animals known to be in the area including the desert gecko due to the limited time available for the survey. There are undoubtedly far more discoveries to be made and studied in the biology of the area.

It would be possible to capture and transport tortoise and mojave ground squirrel and to translocate them to another site. Such a mitigation plan would require the identification of habitat at least as high quality as that left behind. I will offer the view that no such habitat can be found in private hands. As was described in the Cultural section above there is an intimate connection between the soil type, its weathering to release scarce nutrients and the plant and animal communities here. The proposed project site is a location of high biological quality. It was pointed out to the BLM in the mid 1990's when the West Mojave (WEMO) plans were being laid out that this area needed to be included in the critical habitat areas being defined; this, unfortunately, did not happen. So here we are with SM proposing a huge footprint of total destruction on this very area. The area should have been withdrawn for large scale development a long time ago. There is no possible mitigation to cover its destruction. The SM project simply does not belong here. SM has not identified any mitigation scheme that is public knowledge that even comes close to meeting the CEC standards of verifiable results. In fact this author contends there is no reasonable mitigation to offer.

Is the permanent loss of biodiversity and ecological habitat worth the actual ‘gains’ offered by this power plant?

Alternate Sites and Processes

The alternate site, resource and process descriptions in AFC 4.0 are not comprehensive nor are they fully developed. In fact, the descriptions serve to indicate that SM has so strongly locked onto its chosen project as to preclude other more efficient and more economical approaches. No serious effort is apparent to locate the project on a disturbed site with far less environmental impact. This section belies a good faith approach that SM has repeatedly claimed to be the basis of its proposal.

Summary

It appears to this writer looking in from the outside that SM has simply not put together a project that meets the standards of a real business proposition. This viewpoint is reinforced by having participated in every public forum on solar power projects for the Mojave from the earliest BLM Steering Committee meetings years ago. Its lack of economic viability starts the list of deficiencies. In a real sense it cannot produce enough electricity to pay for its construction. How green can that be? Unless we can consider the dollar as renewable, there is no renewable energy here either. The myriad of serious environmental impacts and the SM failures to identify real and verifiable mitigation in critical areas like water use and biota impacts is stunning. Warnings were given to SM perhaps two years ago that the IWV was in critical overdraft and that the basin was teetering on the brink of adjudication. It is very hard to see how a smart company like SM could in fact be so far off of the mark in defining such a huge project. Wrong location, wrong valley and outdated inefficient technology all are strongly indicative of a failure – a failure that SM or its successors will simply writeoff as a failed business ‘enterprise’ while the residents of IWV must suffer the long-term consequences of permanent drinking water resource loss, increased health risks, and the permanent loss of a site rich with Native American history, and ecological diversity. The only viable project choice is the alternate project- “NO Project”.

Signed, Don Decker

Photo 1: Early December, southwest IWV dust storm caused by disturbed soil. Rain fell on the affected area 35 hours before. View to the southwest. Note highest peak – this is Black Mountain. See text for details.

Photo 2: Taken a few days later from the same location as Photo 1. Note the cholla cactus and Black Mountain peak for reference. A slightly shorter zoom setting is the only camera difference. See text for details.