

DOCKETED

Docket Number:	07-AFC-05C
Project Title:	Ivanpah Solar Electric Generating System (Compliance)
TN #:	207094
Document Title:	Ivanpah Solar Electric Generating System Avian and Bat Technical Advisory Meeting Notes
Description:	N/A
Filer:	Joe Douglas
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	12/21/2015 10:40:51 AM
Docketed Date:	12/21/2015

**Ivanpah Solar Electric Generating System (Ivanpah)
Avian & Bat Technical Advisory Committee (TAC) Meeting**
September 30, 2015 – Meeting Notes

TAC Meeting on September 30, 2015 at California Energy Commission, Sacramento, CA

TAC Members Present: Roger Johnson – TAC Co-Chair – CEC
Mike Ahrens – TAC Co-Chair – BLM, Needles Field Office
Mitch Samuelian – TAC Member – NRG Renew O&M / Solar Partners
George Piantka – TAC Member – NRG Energy, Inc. / Solar Partners
Amedee Brickey – TAC Member – USFWS

Via Teleconference: Magdalena Rodriguez, TAC Member – CDFW

Invited Guests: Doug Davis – NRG Operations
Geoff Lesh – CEC Staff
Karl Kosciuch – WEST, Inc.
Marc Sydnor – Sydnor and Associates, Inc.

Via Teleconference: Wally Erikson – WEST, Inc.
Daniel Riser-Espinoza – WEST, Inc.
Rob Diehl - USGS

Introductions

- Attendee introductions (TAC members and invited guests)

Review of Agenda

- NRG requested to add an item for presentation of the upcoming Sandia National Laboratory Study.

Review of July 2, 2015 meeting notes and follow up actions

- Item #1 – West to revise winter report – completed.
- Item #2 – NRG to provide proposal for roadrunner best management practices – NRG submitted in this TAC meeting and will provide an electronic version.
- Item #3 – NRG to facilitate discussion between Dr. Ho and CEC staff regarding Sandia presentation on the lack of potential for avian vaporization – NRG contacted Dr. Ho, who did reach out to CEC staff.
- Item #4 – NRG to provide the documentation of approved changes to the Avian Plan – NRG provided list of TAC-approved changes to the Avian Plan in this TAC meeting and will provide an electronic version for posting to follow-up.

TAC Discussion:

- Discussion of the specifics of the roadrunner best management practices proposal – vast majority of roadrunner detections are feather spots at the fence; pilot BMP program will be one installation in a location that avoids drainages.

Follow-up Items:

- NRG to submit an electronic version of the roadrunner plan.

Review 2015 Spring Report

- WEST Presentation on 2015 Spring Season Monitoring Report:
 - Avian Use surveys observed 750 individual birds, consisting of 41 species, with statistically significant higher density in the desert than in the heliostats.
 - Patterns of avian use were consistent with previous reporting periods.
 - 8 Raptor and other 2 large bird species were observed.
 - Three bats were discovered in Unit 2 prior to installation of bat deterrence.
 - Unknown cause detections decreased to 29%.
 - The patterns of avian mortality (detections) by location and by cause remain consistent with previous reports.
 - Sampling efforts for the searcher efficiency and scavenger bias trials was increased in spring relative to previous year.
 - Searcher efficiencies were on target with plan goals and carcass persistence decreased for small birds and remained approximately the same for large birds.
 - Deterrence was tested in Unit 1 during the spring monitoring period; WEST discussed the evidence of a statistically significant difference between Unit 1 mortality estimate and the other Units, potentially indicating a positive effect of deterrence at Unit 1.
 - Mortality was classified as low as per the Avian Plan with no potential to negatively affect local, regional or national populations within a particular species or group of species.

TAC Discussion:

- Discussed the tower versus heliostat area for estimation purposes; clarified that the tower area includes the inner high-density heliostat area.
- Discussed the detections by date and noted that one day had detections that were all of unknown cause.
- Discussed that searcher efficiencies were approximately the same for spring as other seasons; however, the scavenger rates decreased for small birds, but remained the same for large birds. WEST stated that the number of bias trials did not affect the estimated values, but instead improves the precision of the estimate.
- Discussed how the searcher and scavenger bias trial value are derived. WEST described the use of models that determine the appropriate covariates for these values – large bird/small bird and vegetative/non-vegetative are significant covariates and not the season; therefore, it is appropriate to include data from the first year plus the spring data.
- Discussed whether dog detection data from the previous year was included in the estimated values. WEST indicated that only data from human searcher trails was used to estimate the searcher efficiency.
- Discussed the tabular presentation of results in the 2015 Spring Report; requested clarification regarding why there are higher total estimates than the sum of the individual categories within the tables. WEST explained that in categories with less than five detections ($N \leq 5$), no estimate is provided, but all detections are used in the total estimate; therefore, the total estimate is derived from all detections and may be greater than the sum of the categorical estimates when $N \leq 5$.
- Discussed whether higher mortalities are associated with particular units. Specifically, in past reports, data have not been parsed by unit.
- Discussed the evaluation of the avian deterrence showing the confidence interval for the estimate of single fatalities at Unit 1 does not overlap with Units 2 and 3 suggesting a potential benefit from the tested avian deterrents

- Discussed whether evaluation of the singed class alone was appropriate and whether the deterrence effects extended beyond the tower area. NRG representatives explained that the deterrence was designed to affect the birds that approach the tower within 600 feet from a level of just above the ground to above the boiler, which is the area believed to coincide with the area where singed fatalities occur (see Sandia study, below). Hence, the deterrence is not thought to affect avian species outside of the inner high density heliostat area. NRG representatives indicated that effects should not be seen in the heliostat area because of the attenuation of the sound from the auditory deterrence and the dispersal of the chemosensory deterrent over distance.
- Discussed power production across units and whether variation in operations may have affected the detection and estimate levels across units. NRG representatives indicated that all units were operational through the spring season and produced roughly the same amount of power during that period. Discussed whether effects of the deterrence should be seen in the heliostat areas.

Follow-up Items:

- The TAC requested that the tables in the 2015 Spring Report be revised from stating “total” to “total estimated” and include a footnote to explain that it is a total statistical estimate – not a sum.
- The TAC requested further analysis of the deterrence; specifically:
 - WEST will remove the deterrence analysis from the Spring Report and develop an estimate of all collision and unknown mortalities in the tower area by unit to determine if the confidence intervals overlap between the units without deterrence and the unit with deterrence.
 - WEST will examine the data to see if unknown/collision mortalities were affected by the deterrence deployed in Unit 1.

Update on Summer Avian Monitoring

- WEST Presentation on current summer seasonal monitoring
 - Bias trials were increased relative to last year: the number of searcher efficiency trials for summer were increased 58% more for small birds and 86% more for large birds relative to Summer 2014.
 - Small and large bird carcass discovery (carcass persistence) times have decreased, which may indicate learning by predators.
 - Preliminary searcher efficiency rates estimated are consistent with the plan goals.
 - Patterns of detections remain consistent with singed class in the tower area and collisions occurring primarily in the heliostat area.
Eight bats were detected during the summer and all finds were in the ACC.Unit 1, where pilot avian deterrence is deployed, showed detection levels generally on par (1 to 2 more detections) with Units 2 and 3.

TAC Discussion:

- Discussed the potential effectiveness during the summer period of the pilot avian deterrence installed in Unit 1. The mortality across units was comparable.
- The TAC discussed the bat detections. NRG indicated that it is not known if the ultrasound was working prior to these discoveries and may have been disabled for servicing of the ACC units. An ultrasonic detector has been purchased and a program has been put in place to test ultrasonic devices at regular intervals.
- Discussed the status of the avian deterrence for all units. NRG stated that sonic and chemosensory avian deterrence has been installed in all units.

Follow-up Items:

- TAC requested that WEST examine the species composition of the detections at the units for summer to consider the resident/non-residence status for deterrence and include that information in its further examination of the deterrence systems as provided in the Follow-up Item above.

USGS Study Presentation

- Rob Diehl briefed the TAC on the status of a USGS study conducted at the facility.
 - The scope of the study was USGS testing of equipment, including radar, photographic and insect sampling equipment in the flux region of the towers; specifically USGS tested thermal imaging, electro-optical cameras, and radar at 900 meters from the tower as well as malaise and pitfall traps for insect gathering at the base of the tower.
 - The policy of the agency does not allow the presentation of results prior to release of a publication.
 - Delays in publication have been a result of a policy change by the publication journal, which now requires that all data be made available. For this study, the entire dataset consists of over two terabytes, resulting in logistical problems with data hosting. The USGS is working on a method to house and release the data.

Discussion of status of installation of deterrents on Units 2 & 3

- NRG presented the status of the installation of the deterrents for Units 2 and 3.
 - Bird Gard (sonic deterrent) installed on Unit 2 August 25, 2015 and on Unit 3 August 31, 2015.
 - Bird Buffer (chemosensory deterrent) installed on Units 2 and 3 September 29, 2015.

TAC Discussion:

- The TAC inquired as to any indication of the effectiveness of these new installations. WEST indicated that there is not enough data to evaluate the effects at this time.
- The TAC discussed whether there are any issues with deterrent devices that would prevent proper operations of those devices. NRG indicated that late delivery of some components delayed the start of deterrence. Design modifications were performed on the new chemosensory systems to provide a more robust system that should decrease maintenance.

Completion of Avian and Bat Monitoring and Management Plan Requirements

- NRG presented a summation of the Avian Plan goals, objectives and monitoring requirements.
 - The goals of the plan were to identify risks from collision and solar flux along with patterns of avian use, while providing a framework for management and response to risk.
 - The avian monitoring reports have shown consistent patterns of risk and avian use across the facility.
 - Seven specific objectives exist in the plan including: 1) estimating collision related mortality by project feature; 2) estimating flux related mortality; 3) documenting patterns of collision and flux related mortality associated with species, age/sex, season, weather and visibility; 4) documenting the spatial patterns of mortality; 5) providing quantitative information for development and implementation of adaptive management; 6) providing a framework for TAC review of monitoring results; and 7) documenting the use patterns of avian species.
 - The specific objectives have been met and documented in each of the seasonal reports.
 - The patterns in the data have been consistent over the seasons and additional monitoring is not anticipated to revise these results.
 - The management framework is specific within the plan and states that if avian mortalities are deemed as “low” as defined in the plan, then no management response is required.

- The facility has voluntarily deployed, tested, and installed deterrence methods for avian and bat species.
- The plan is specific and states that if avian mortalities are deemed “low” then studies may cease, if appropriate.

TAC Discussion:

- The TAC believes some additional monitoring to provide mortality estimates is important due to the season-to-season mortality estimate increases.
- The TAC would also like to see additional evidence that the deterrence is effective. WEST indicated that this question is not addressed by the current plan and may be difficult to answer regardless, since the deterrence is now deployed on all units. The deployment across all units removes avian deterrence as a tower-to-tower differentiation, so variations in mortality rates between units will not be attributable to deterrence measures.
- The TAC members indicated that modification to the current plan design would be preferred. Discussed that elements of the plan are not providing information relative to mortality levels (as a result of low mortality) and avian use studies have been consistent. However, measurements of mortality that provide a comparative metric for the facility would provide some evidence regarding deterrence.

Follow-up Items:

- The project will consider data from the Avian Plan and develop a proposal for modification.

Additional Topics:

- NRG presented that Sandia National Laboratory will undertake a study at Ivanpah to assess the flux levels and glare near the facility. In conjunction, Sandia will be testing flux effects on birds and then partnering with the facility to develop algorithms for heliostat deployment to further reduce mortality and glare.

Next Meeting:

- Meeting to discuss Avian Plan modifications on October 9, 2015 at 2pm via teleconference/WebEx.

**Ivanpah Solar Electric Generating System (Ivanpah)
Avian & Bat Technical Advisory Committee (TAC) Meeting**
October 9, 2015 – Meeting Notes

TAC Meeting on October 9, 2015 via WebEx

TAC Members via Teleconference: Roger Johnson – TAC Co-chair – CEC
Mike Ahrens – TAC Co-Chair – BLM, Needles Field Office
Amedee Brickey – TAC Member – USFWS
Magdalena Rodriguez, TAC Member – CDFW
George Piantka – TAC Member - Solar Partners
Mitch Samuelian – TAC Member – NRG Renew, Operations

Invited Guests via Teleconference: Karl Kosciuch – WEST, Inc.
Wally Erikson – WEST, Inc.
Daniel Riser-Espinoza – WEST, Inc.
Marc Sydnor – Sydnor and Associates, Inc.

Introductions

- Attendee introductions (TAC members and invited guests)

ABMMP Extended Monitoring

- WEST Presentation on ABMMP Proposed Extended Monitoring
 - Discussed goals and objectives as stated by the plan, concluding they have been met to date and will be met in full at the conclusion of the Fall 2015 monitoring season.
 - Goals 1 and 2 are identification of avian collision and solar flux risk. The heliostat and tower areas have been identified as locations where the detections have been > 5 . Other areas (offsite transects, collector line, and fences) typically have detections ≤ 5 .
 - Goal 3 was to identify avian use patterns – these patterns have been consistent to date, with higher small bird use in the desert plots than in the facility plots and with common raven being the most abundant large bird in both areas.
 - No additional avian use surveys or monitoring for the offsite transects, collector line, fences is recommended. No additional avian use surveys onsite either.
 - Continued monitoring and bias trials are recommended in the tower area and in the heliostat area.
 - No modification to the tower area monitoring is recommended.
 - Modification to heliostat area monitoring is recommended; specifically, it is recommended to monitor one unit's heliostat fields, since similar numbers of detections occur across units and overlapping confidence intervals exist in the unit by unit estimates for the last two seasons.
 - Modifications are further supported by the analysis within the ABMMP that shows the coefficient of variation used to determine the percentage of the heliostat area originally surveyed can be achieved through the heliostat area monitoring of one unit.
 - Heliostat area monitoring at one unit allows for the comparison over time for the particular unit at the same level of precision and for estimate of the facility-wide mortality at the level of precision required in the plan.
 - The management components and risk response of the plan is recommended to continue as per the ABMMP.

TAC Discussion:

- The TAC discussed which unit's heliostat area would be preferred for monitoring and whether there would be change to how it was monitored. WEST indicated that the selected heliostat area would be monitored throughout the year on the same plots as the previous two years. NRG indicated that the company did not have a preference as to which unit's heliostat field should be selected.
- The TAC discussed the continued monitoring in the tower area and requested clarification whether the tower area at all three units would be monitored. WEST indicated the proposal was to monitor the tower area at all three units in the same manner as the previous two years.
- The TAC discussed the elevated upper confidence interval bounds presented for the fatality estimate in Unit 1 in Spring 2014 relative to Units 2 and 3. WEST indicated that the elevated upper confidence interval is an artifact of the discovery of high numbers of feather spots in Unit 1. In addition, since these feather spots consisted mainly of small birds, the estimate adjustment would be elevated, since higher scavenger rates were estimated for this class of bird.
- The TAC requested clarification for source of the upper limits of the coefficient of variation presented in the ABMMP. WEST explained that in the original ABMMP a scenario analysis was conducted that considered three different levels of mortality occurring at the facility and that at the lowest level of mortality, this coefficient of variation was determined to be the minimal acceptable level.
- The TAC requested clarification on the proposal relative to searcher efficiency and scavenger trials. WEST stated that these trials are to be continued in all tower areas and in the selected heliostat area at the current level of effort.
- The TAC discussed the size and output of each unit and was interested in whether these factors may affect the results. NRG stated that Unit 2 is the average of the units in area and output.
- The TAC requested information on the scavenging rate across all units. West indicated that scavenger rates across all units were not disaggregated in the reports.
- The TAC requested species composition information across the various units. WEST indicated that this information has not been disaggregated in the reports.

Follow-up Items:

- WEST to provide a formal proposal to the TAC for the plan modification to address questions of variation across units, particularly for species composition and bias trial results.

Next Meeting:

- December 8th 10AM at CEC, Sacramento