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Ivanpah Solar Electric Generating System (Ivanpah)
Avian & Bat Technical Advisory Committee (TAC) Meeting
July 2, 2015 – Meeting Notes

TAC Meeting on July 2, 2015 at Ivanpah Solar Electric Generating Station, Nipton, California

TAC Members Present:	Roger Johnson – TAC Co-chair – CEC Mike Ahrens – TAC Co-chair – BLM, Needles Field Office Magdalena Rodriguez, TAC Member, CDFW George Piantka – TAC Member – Solar Partners Mitch Samuelian – TAC Member – NRG Renew, Operations
Via teleconference:	Amedee Brickey – TAC Member- USFWS
Invited Guests:	Valerie Lenhatzen – Needles Field Office, BLM Wally Erickson, WEST, Inc. Karl Kosciuch – WEST, Inc. Cyrus Moqtaderi – Field Supervisor, WEST, Inc. Doug Davis – NRG Operations, Ivanpah Solar Marc Sydnor – Sydnor and Associates – Scribe
Via teleconference:	Dr. Clifford Ho, Sandia National Laboratories Daniel Riser-Espinosa – WEST, Inc.

Introductions
- Attendee introductions (TAC members and invited guests).

Review of Agenda
- Agenda is approved

Review of March/April 2015 meeting notes and follow up action items
- Item #1: Necropsies for unknown cause fatalities. USFWS Office of Law Enforcement collected unknown cause fatalities for necropsy; no formal report has been issued.
- Item #2: Request for additional carcass removal and searcher efficiency trials. In response to prior TAC request, WEST increased trials in spring; see discussion below.

Review 2014 – 2015 Winter Quarterly Report
- West Presentation on 2014 – 2015 Winter Quarter Monitoring Report:
    - Avian use surveys observed 1043 individual birds, consisting of 28 species, with statistically significant higher density in the desert than in the heliostats.
    - 10 raptor and 3 other large bird species were observed.
    - Six golden eagle observations, two observations over heliostats, the remainder outside of the facility fence, none were observed over the inner heliostats or tower area.
    - Annual data for searcher efficiencies and carcass removal was used to develop mortality estimates.
    - Estimates from the report were presented and WEST notes that 93% of unknown cause detections are partial carcasses or feather spots. The majority of unknown cause detections are mourning doves and roadrunners.

- 73% of the detections in winter are small passerine species that have high reproduction rates and populations are less sensitive to changes in survival.
- Mortality at the site is characterized as low for the winter period, where estimated avian mortality or injury levels have minimal or no potential to negatively affect local, regional, or national populations within a particular species or group of species.

TAC Discussion:

- Discussed the potential for visibility to effect the avian use surveys conducted in the heliostat fields. WEST indicated the quantitative method accounts for this variation.
- Discussed the how carcasses classified as predation are observed in the field. WEST stated impaled carcasses are characteristic of predation by loggerhead shrikes.
- Discussed the potential to determine the differentiation in the migration between years. WEST stated the numbers of detections per day show that migration may have extended into winter; however, the search interval is 21 days and reflects a look back at the previous interval.
- Discussed the lack of carcass removal trials in winter. WEST stated that as per plan these surveys were a one-year requirement, additional surveys were conducted in spring at the request of the TAC.
- Discussed the transition from HT Harvey to WEST for avian surveys. WEST indicated that the transition occurred at the end of the winter period, with limited surveys performed by WEST during winter.
- Discussed the method for collection of the incidental mortalities found within surveys plots. Method revised to collect specimens immediately, rather than as part of scheduled surveys.

Follow-up Action Items:

- WEST to revise the Winter report to:
  - reflect accounting for the variation in visibility between the heliostat fields and desert bajada in the report methods.
  - clarify that additional carcass removal trials began in spring.
  - provide additional information on the transition between avian survey contractors.
  - update the methods for incidental detections found within survey plots.

Update on Spring Avian Monitoring

- WEST Presentation on current Spring quarter monitoring:
  - WEST increased searcher trials for small birds by 377%, large birds by 275% and feather spots by 93% compared to spring 2014.
  - Searcher efficiencies were consistent with previous results for all large and small classes of birds.
  - Small bird carcass removal trials were increased by 700%, with large birds at the same sample size as spring 2014.
  - WEST described that average time for scavengers to discovery carcasses is short, 3 days for large birds, 4 days for small birds.
  - Ravens are most common scavengers and camera evidence collected shows ravens creating multiple feather spots during scavenging activities.
  - Kit fox are the next most common scavenger, and kit fox populations are hypothesized to be subsidized through large bird trials carcasses.

- As a result of consistent searcher efficiencies and carcass removal rates for large birds and the potential for large birds to subsidize scavengers, WEST recommends discontinuing the large bird trials.
- Detections in the spring totaled 185, approximately 29% were from unknown cause.

TAC Discussion:

- TAC requested clarification on the presence of kit fox dens onsite. NRG Ivanpah staff clarified that kit fox dens are present onsite.
- TAC discussed the potential that trials may be subsidizing ravens. WEST indicated that incidental observations and camera data supports this hypothesis.
- TAC requested clarification of the discontinuance of dogs for surveys. WEST data shows that human searcher efficiency rates are within plan specifications.

Follow-up Action Items:

- WEST to revise the Winter report to reflect discontinuance of the use of dogs for searches.

WEST Update on Deterrence:

- WEST presented analysis on results of monitoring pilot tests of avian sonic (BirdGuard) and chemosensory (BirdBuffer) deterrents on Unit 1.
- To allow for a comparison of monitoring results across units and over time, WEST first analyzed the bias trials from year 1 as compared to Spring 2015, showing that trial results are not statistically different.
- Data comparing spring quarter of 2014 to spring quarter of 2015 for Unit 1 shows a reduction of approximately 70% for avian mortality.
- Data comparing Units 2 and 3 to Unit 1 for Spring 2015 shows avian mortalities for Unit 1 that are 72% and 67% less than Units 2 and 3, respectively.

TAC Discussion:

- TAC noted that the number of total detections over years 2014 and 2015 is coincidental and hypothesized that birds may prefer other Units without deterrence. WEST stated that avian densities may have been higher (or lower) during the period and this effect is not amenable to analysis.
- TAC requested update on the bat deterrence. WEST stated that no bats have been detected in the spring period; bat deterrence appears to be effective.

Solar Partner's Update on Deterrence

- Non-insect attractive LED lighting in Unit 1 has been installed with the exception of the switchyard.
- Bat deterrence is installed in all three units and no detection have been discovered during the Spring quarter.
- Avian deterrence spikes have been installed on lighting in Unit 1.
- Ivanpah is working with Sandia National Labs to determine optimal algorithms for flux distribution to reduce glare and avian impacts, a formal study may be forthcoming.
- Ivanpah formally requested the approval of the installation of the BirdGard and BirdBuffer Systems on Units 2 and 3.

- Ivanpah presented a best management practice pilot project to decrease roadrunner fatalities consisting of an "escape hatch" that allows roadrunners to pass through the fence at certain intervals, while preventing access by tortoises to the solar field.

TAC Discussion:

- TAC discussed lighting at the switchyard and requested information on why this lighting has not been replaced. Ivanpah informed the TAC that an outage must be taken to safely replace the lighting, since the area has extremely high voltage lines present.
- TAC discussed the potential formal study with Sandia and CEC indicated that they would like to be included as stakeholders in the process. Ivanpah indicated that the study proposal includes a stakeholder component.
- TAC requested that the roadrunner best management practices pilot project, if implemented, include cameras to monitor effectiveness.

Follow-up Action Item:

- Ivanpah to submit a formal request to implement roadrunner best management practices.

Presentation by Sandia National Laboratories:

- Sandia National Laboratories (Dr. Clifford Ho) presented an analysis regarding avian vaporization potential, concluding that vaporization of birds at the Ivanpah facility would be highly improbable.
    - Two exposures were considered 1) the time of freefall past the flux zone of the boiler (2 to 3 seconds, since affected feathers do not allow for flight) and 2) a conservative 10-second exposure (3-5 X longer than freefall).
    - Results indicate that complete vaporization of birds with solar flux levels of less than 1 MW/m^2 is highly improbable.
    - Ivanpah produces a maximum flux of 0.6 MW/m2, indicating that avian vaporization at the facility is highly improbable.
    - Dr. Ho indicated that internal reviews have been conducted of these calculations.

TAC Discussion:

- TAC requested the purpose of the paper. Sandia indicated that the calculation was done to address the potential that undercounting of detection was thought to be possible as a result of the potential for vaporization.
- CEC expressed concern about the use of water as a surrogate for birds in the analysis and whether less energy may be required to change the phase of a bird carcass than water. Dr. Ho stated that he believes this model to be conservative and that vaporization of a bird or other solid material may require even more energy.
- TAC asked if the internal reviews at Sandia resulted in any revisions to the results. Dr. Ho stated that no results were revised.

Follow-up Action Item:

- Sandia to discuss the findings with CEC staff. Ivanpah will coordinate contact between CEC and Sandia.

Inspection of the Avian Deterrence Systems

- TAC Members toured Unit 1 to inspect the deterrence measures installed.

TAC Decisions:

- TAC agreed with the recommendation to eliminate large carcass trials.

- TAC agreed with the recommendation to install the deterrence measures at Unit 2 and 3. CEC to provide formal concurrence for implementation.

Additional Topics:

- TAC requested documentation of the changes to the avian plan. Ivanpah stated that a table is within the Annual Report that lists all approved changes. TAC requests additional description for the revisions within the table.

Follow-up Action Item:

- Ivanpah to provide additional description of plan changes for incorporation to the plan as an addendum.

Next Meeting

September 30, 2015 in Sacramento at CEC at 10:00 AM.