Appendix H
(continued)

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ATTACHMENT 3

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Power Company of Wyoming LLC
555 Seventeenth Street
Suite 2400
Denver, CO 80202
Tel 303.298.1000
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December 21, 2010

Clark McCreedy
U.S. Fish and Wildlife Service
Wyoming Ecological Services Office
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

Travis Sanderson
U.S. Fish and Wildlife Service
Wyoming Ecological Services Office – Rawlins
1300 North 3rd Street
Rawlins, Wyoming 82301

Re: Chokecherry and Sierra Madre Wind Energy Project

Dear Messrs. McCreedy and Sanderson:

Thank you for meeting with us on December 10, 2010 for a discussion of the Chokecherry and Sierra Madre Wind Energy Project. This letter is to confirm our understanding with respect to the draft Avian Monitoring Protocols for the Project.

As you know, Power Company of Wyoming LLC plans to construct and operate the 2,000 to 3,000 MW Chokecherry and Sierra Madre Wind Energy Project in Carbon County, Wyoming. The Project involves public lands under the management of the Bureau of Land Management, private lands and a small number of State lands. PCW has applied for a wind energy development right-of-way grant for the public lands. The Bureau of Land Management is analyzing the potential impacts of the Project under an environmental impact statement in compliance with its obligations under the National Environmental Policy Act.

As a part of the EIS process, the BLM through a third party environmental contractor conducted avian point count surveys of the Project between June 2008 and June 2009. We understand these data have been provided to the Service. As we have discussed, the Service and PCW believe that additional avian monitoring data will be useful in evaluating potential Project impacts to bald and golden eagles, as well as other migratory bird species. In conjunction with the efforts to collect additional avian monitoring data, receiving early technical advice from the Service with respect to site-specific metrics and methods by which potential Project impacts to bald and golden eagles will be evaluated is critical.

Power Company of Wyoming LLC

Attached as Exhibit A to this letter are draft Avian Monitoring Protocols for the Chokecherry and Sierra Madre Wind Energy Project. Marine radar technology has been identified by the Service and BLM as a desired method to map areas of high avian use. The Protocols; therefore, combine marine radar surveys with standard point count and breeding bird methodologies to determine raptor and other avian use across the Project area. The study design follows recommendations made by the Service, BLM, and Wyoming Game and Fish Department. The marine radar technology will also enable better identification of bat use areas and relative densities of bats in the Project area.

We understand that you will review the adequacy and appropriateness of these Protocols and provide to us your comments, suggestions and recommendations for revising and implementing the Protocols. Upon completion of the Service's review, additional evaluations of bald and golden eagle use of the Project will be made on a site-specific basis using these Protocols. We further understand that data from the 2008 and 2009 point count surveys, data generated from the implementation of these Protocols, and any additional site-specific data provided to PCW by the Service during implementation of these Protocols will be adequate to characterize site-specific eagle activities, develop an Avian Protection Plan, identify impacts from construction and operation of the Project on eagles, and identify avoidance, minimization, and mitigation efforts upon which the Service will evaluate the APP.

We have been informed that the Service is developing and will soon release for public comment guidance for APPs for wind energy projects. PCW's intent is to develop an APP based upon the following:

1. The APP will address conservation measures to avoid, minimize and mitigate direct and indirect impacts of the Project compatible with the Service's management objectives for bald and golden eagles.

2. The eagle use areas upon which impacts from construction and operation of the Project are to be evaluated shall be nests within four miles of the Project site, and breeding territories, communal roosts, and important foraging areas within the Project site.

3. The APP will identify practicable means by which impacts to eagles from the Project may be avoided, minimized, and mitigated, and in particular:

    a. the APP shall include, but shall not be limited to, the avoidance measure of prohibiting the construction of a turbine within 825 feet of an active eagle nest[1];

[1] Bureau of Land Management. 2008. *Record of Decision and Approved Rawlins Resource Management Plan*. pg. 2-53.

Power Company of Wyoming LLC

b. the APP shall include, but shall not be limited to, the minimization measure of implementing the recommendations of the Avian Power Line Interaction Committee[2];
c. the APP may include effective on- or off-site mitigation measures.

4. The APP will identify those adaptive management techniques that PCW will implement if post-construction monitoring demonstrates a statistically meaningful difference between estimated and actual levels of impact from the operation of the Project.

As discussed at our meeting, PCW is prepared to proceed with implementing the Protocols, including the purchase and deployment of a Merlin Avian Radar System, upon receipt of the Service's written concurrence confirming the appropriateness of the Protocols for the Chokecherry and Sierra Madre Wind Energy Project.

Thank you very much for your time and consideration and we look forward to hearing from you.

Sincerely,

Garry L. Miller
Director – Land and Environmental Affairs

cc: Jon Kehmeier, SWCA Environmental Consultants
Roxane Perruso, PCW

[2] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

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CONFIDENTIAL AND PROPRIETARY PRELIMINARY REVIEW DRAFT
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EXHIBIT A

PRELIMINARY DRAFT

Avian and Bat Monitoring Protocols for the Chokecherry and Sierra Madre Wind Energy Development Project

Prepared for:

Power Company of Wyoming, LLC
555 17th Street, Suite 2400
Denver, CO 80202

Prepared by:

SWCA Environmental Consultants
295 Interlocken Blvd, Suite 300
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October 2010

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In accordance with the U.S. Fish and Wildlife Service (USFWS) Wind Turbine Guidelines Advisory Committee *Recommendations on Developing Effective Measures to Mitigate Impacts to Wildlife and Their Habitats Related to Land-Based Wind Energy Facilities* (USFWS 2010), the Wyoming Department of Game and Fish (WGFD) *Wildlife Protection Recommendations for Wind Energy Development in Wyoming* (WGFD 2010), and the Bureau of Land Management (BLM) Rawlins Field Office *Wildlife Survey Protocols for Wind Energy Development*, an analysis of biological surveys conducted for the proposed Chokecherry and Sierra Madre Wind Energy Development Project (Project) has been completed to determine compliance with the recommended protocols of each agency.

As part of the BLM's NEPA process for the Project, WEST, Inc. (WEST) conducted avian point surveys of the Chokecherry and Sierra Madre wind resource areas between June 26, 2008 and June 15, 2009. A portion of these data are analyzed in WEST's report, "*Baseline Avian Use Studies for the Chokecherry and Sierra Madre Wind Resource Areas, Carbon County, Wyoming: Final Summer and Fall Interim Report, June 26-October 14, 2008*" (Johnson et al. 2008). WEST also prepared a report summarizing bat surveys conducted between July 13 through October 13, 2008 titled, "*Bat Surveys for the Chokecherry and Sierra Madre Wind Resource Areas, Carbon County, Wyoming: Final Report*" (Solick et al. 2008). SWCA has completed additional analyses of all data collected in 2008 and 2009 to determine compliance with the agency monitoring recommendations.

Between June 2008 and June 2009, avian use data were collected for much of the Project area as part of the BLM National Environmental Policy Act (NEPA) process [Johnson et al. 2008]. Data were collected using standard point count methods at 19 locations in all months except January and February when much of the project area was inaccessible due to adverse weather conditions. All sites except for three were visited 31 times during the survey period.

Data collected during the 2008 and 2009 surveys are sufficient to provide estimates of avian use of the Project area as well as to provide initial estimates of the frequency of each species at rotor-swept heights. Horned lark (*Eremophila alpestris*) was predominantly the most common avian species detected in the 2008 and 2009 surveys, having over 800 individual detections. The next most common species were the common raven (*Corvus corax*) with less than 200 detections, and vesper sparrow (*Pooecetes gramineus*) with less than 150 detections. Golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis),* and common raven were most commonly observed within the rotary height of the turbines.

In their recommendations to the Secretary of Interior, the Wind Turbine Guidelines Advisory Committee (Committee) recommends using standard sampling methods to determine avian use of a project area, the presence of sensitive species and other species of interest, and to provide a baseline for assessing displacement effects and habitat loss. The Committee further recommends that the sampling frequency, type, and duration be sufficient to account for variability of avian use between and within sampling periods. When more precise estimates of density are required for a special status species, other methods, including radar or nocturnal surveys are recommended. However, the Committee does not recommend using these types of special surveys unless high risks for collision are expected for migrating songbirds or special status species.

Similarly, the Bureau of Land Management (BLM) Rawlins Field Office Wildlife Survey Protocols for Wind Energy Development recommends that surveys be sufficient to detect temporal and spatial use patterns within the project area. Special emphasis is placed on surveys for raptors and sensitive avian species. BLM survey protocols recommend weekly, 20-minute point counts to record avian use of a project area. Survey times are recommended to be varied weekly to ensure that avian use during daylight hours is adequately documented. In addition to weekly surveys, marine radar is recommended to avian foraging, dispersal, and migration paths.

Wyoming Game and Fish Department's (WGFD) Wildlife Protections Recommendations for Wind Energy Development in Wyoming recommend sufficient numbers of weekly point count surveys during spring and fall migration periods following similar protocols as specific by BLM with survey periods of twenty minutes at each point. WGFD recommends that four surveys be conducted during winter months to capture overwintering avian species. For raptor species, WGFD recommends nest surveys and weekly day-long surveys during spring and fall migration periods.

Data collected during 2008 and 2009 comply with BLM, WGFD, and Committee wind energy survey recommendations and serve as one of the two years of suggested pre-construction monitoring data. Data collected for purposes of NEPA compliance provide estimates of collision risk and enable determination of avian use of the Project area, the presence of sensitive species and other species of interest, as well as providing a baseline for assessing displacement effects and habitat loss.

To supplement the 2008-2009 dataset and to better identify concentrated avian use areas, an intensive one-year survey will be used to better identify avian use areas in the Project area. A combination of marine radar surveys and standard point count surveys will be used to determine raptor use across the Project area. Marine radar technology has been identified by the BLM and USFWS as a desired method to map areas of high avian use. The study design will follow recommendations made by the USFWS, BLM, and WGFD by combining marine radar surveys with standard point count and breeding bird methodologies. The marine radar technology will also enable better identification of bat use areas and relative densities of bats in the Project area.

A single DeTect Merlin Avian Radar System will be used to map avian use across the Project area. The DeTect Merlin radar system is a trailer-mounted system with a 200-watt horizontal solid-state S-band radar and a 10–kilowatt (kW) vertically operating magnetron X-band open array radar. The horizontal radar has a range of 2 to 4 miles in a 360-degree pattern around the unit. The vertical radar has a 24-degree beam width and detects flight paths 0.75 to 2.00 miles above the unit.

Marine radar systems require weekly maintenance and fueling and cannot be moved over extremely rough terrain on a regular basis. Additionally, the system will not differentiate between large raptors such as golden eagles and other large birds including geese, other large raptors, and possibly even ravens and should be used in conjunction with field surveys to validate radar recorded data. However, the radar system, when coupled with point count verification of avian use, will allow for accurate horizontal and vertical mapping of avian use in the wind development area. The marine radar system will also enable mapping of high use areas for bat species.

A combination of raptor and point surveys and breeding bird surveys would be conducted in concert with the marine radar system. The intent of this study design is to provide intensive survey information regarding avian use patterns within the radar survey perimeter for each season. Raptor and point counts and breeding bird surveys will be used to validate the radar data and provide estimates of species-specific use patterns. Point count surveys will record the location, flight path, approximate height, and time of use for any individual observed from the point location. Point count locations will be surveyed for eight hours per day during periods with the highest likelihood for detection of migrating birds and/or large raptors. Timing of survey at each location will be varied to determine patterns of avian use during daylight hours.

In addition to the point count and radar surveys, breeding bird surveys will be completed at 15 locations across the wind development areas. Breeding bird surveys will be conducted following the grid monitoring protocols published by the Rocky Mountain Bird Observatory (RMBO) (Hanni et al. 2010). Grid survey locations will be randomly selected using a generalized random tessellation stratified design to ensure a spatially balanced design stratified by major vegetation and habitat types in the Project area. Data collected as part of the grid monitoring efforts would also be used to validate radar data and better determine avian species use to the extent possible. As part of the breeding bird surveys, waterfowl and water bird use surveys would be conducted three times annually (springs, summer, and fall) to identify migrating and resident species.

Locations for placement of the radar and for conducting point count surveys (Figure 1) and breeding bird surveys were determined using a four-tiered approach:

- Tier 1 – Survey areas should determine avian use within the wind development areas.
- Tier 2 – Survey areas should overlap possible foraging areas for large raptors (winter range areas, prairie dog towns, waterfowl use areas, etc.).
- Tier 3 – Survey areas should be in locations to allow for detection of avian movement into and out of the Project area.
- Tier 4 – Survey areas should capture variability in habitat and topography.

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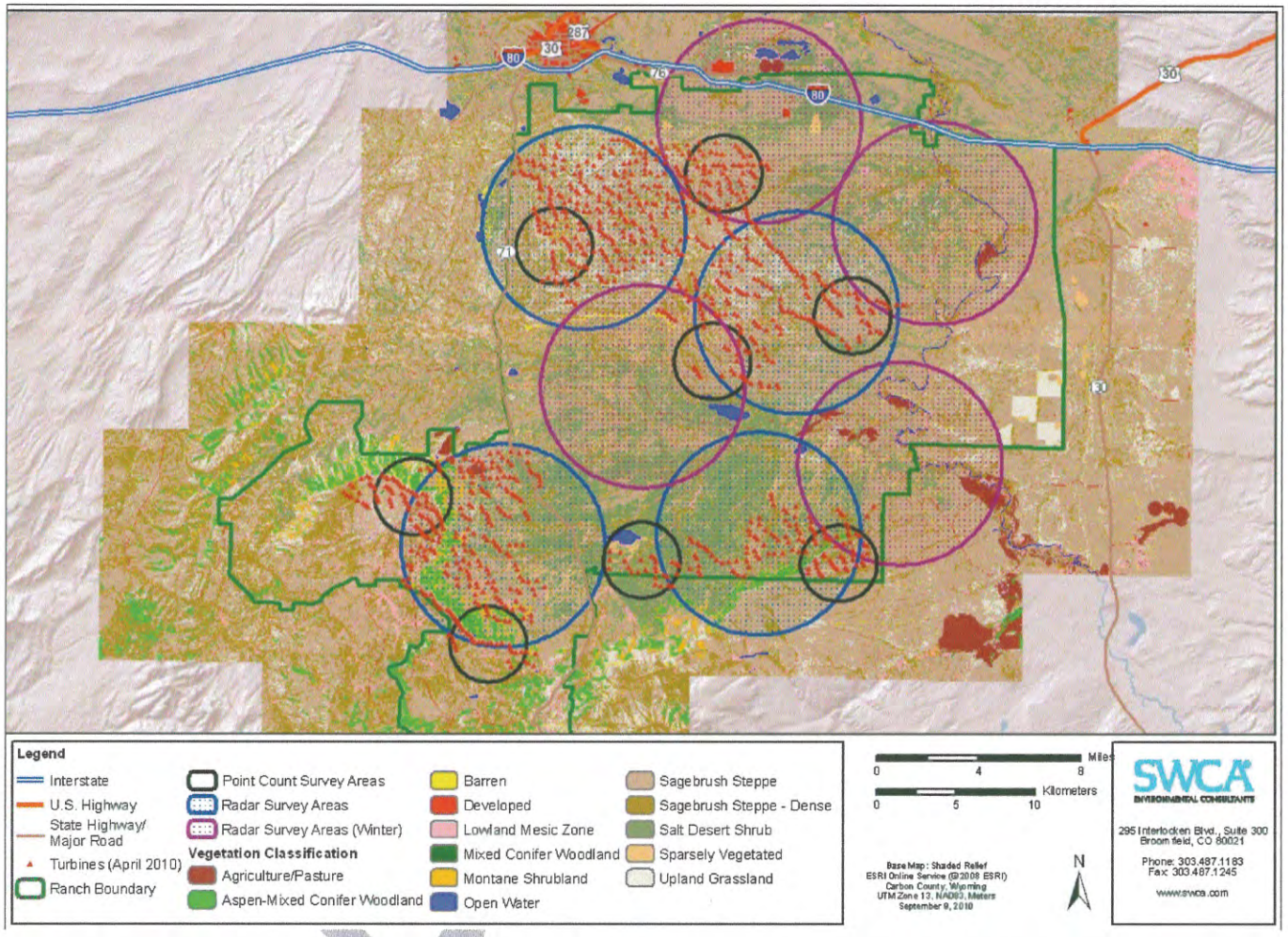

Figure 1. Approximation of area surveyed using avian radar and traditional point count methodologies with respect to possible wind turbine locations. Spring, summer, and fall radar installation locations are the center point of the large blue circles. Proposed point count locations are the center points of the small black circles. Potential winter radar locations are the center points of the large purple circles. Final locations for survey will be determined in coordination with BLM, WGFD, and USFWS.

The radar unit will be placed a 5 locations within the Project area (Figure 1) to cover as many of the turbine locations as possible. Point counts will be completed at nine additional locations to map avian use patterns when radar coverage is not possible. Eight of these point counts will be completed at permanent sampling locations. The ninth point count location will be completed at the radar site to validate the data being collected by the radar unit. This survey date will also be used to service the radar system and will require two technicians. During winter months, the radar will be placed in a location that has high probability of access on a weekly basis. As much of the project area will be covered in snow and large drifts, radar placement in winter will likely be near the Bolton Ranch headquarters, south of I-80 near the North Platte River, on the Bolton Road east of Teton Reservoir, or on the north side of the Chokecherry project area (Figure 1). Winter point count survey locations will also be adjusted as needed to account for winter weather conditions, access issues, and safety concerns.

Based on a four mile radius for radar surveys and a one mile radius for point count surveys, approximately 90-93% of the turbine locations, depending on winter radar placement, will be directly surveyed. It is likely that this percentage is higher than 90-93% for large raptors including bald and golden eagles as many of the point count locations have visibility of several miles. Point count locations outside of the radar survey perimeters have been placed to allow for detection of raptors moving into the project area and between radar surveyed zones.

This protocol assumes that BLM will conduct nest activity and productivity surveys for all known nests in the vicinity of the wind development areas. Incidental observations will be made of nest activity as part of this protocol; however, no formal nest activity or productivity surveys will be completed. Additionally, this protocol assumes that any additional point count surveys beyond the 9 per week specified above would be completed by BLM or USFWS.

The protocols and schedule outlined below will be followed for monitoring and mapping avian and bat use across the wind development area using the marine radar system, point counts, and breeding bird surveys.

1. Fall 2010 – Final radar deployment locations, point count survey locations, and breeding bird survey locations will be identified for all areas of the wind development areas. When possible, point count locations or radar locations will be collocated or closely aligned with the data points surveyed in 2008 and 2009. Radar locations will consider suitable road access for movement of the radar system. Point count locations will be positioned along ridgelines to the extent possible to allow for detection of the highest number of migrating passerines and raptors. Breeding bird survey locations will be determined using a Generalized Random Tessellation Stratified (GRTS) (McDonald 2004; Stevens and Olsen 2004) design with oversampling. This design ensures a spatially balanced random design across all vegetation and habitat types.

2. Winter 2010/2011 – Radar construction, programming, and training. The Draft Avian Protection Plan (APP) will be delivered to USFWS, BLM, and WGFD for review. Among other descriptive sections, the preliminary plan will contain the detailed sampling protocols, preliminary mitigation and avoidance measures, and detailed adaptive management protocols.

3. Spring and Early Summer 2011 – Radar surveys begin in the southern portion of the project area. The radar system will be moved once during the spring migration period to capture as much data as possible during this period. During the migration period, weekly migratory bird counts and raptor use surveys will be conducted at the eight point counts identified in Figure 1 as well as at the point where the radar system is placed. Breeding bird surveys will be completed at 15 locations across the wind development areas. Surveys for waterfowl and other waterbirds will be conducted once during the spring migration at Kindt, Rasmussen, Sage Creek, and Teton reservoirs. Analysis of the radar data will be used to identify areas with high avian and bat use. The following schedule will be used for spring and early summer 2011 surveys:

    a. March 1 – May 15, 2011: Radar system will be initialized and debugged prior to main migratory period. Initial installation will occur in an area south of the Bolton Ranch headquarters in the southeastern-most radar survey location identified on Figure 1. This survey location will detect migrating birds in areas adjacent to the Platte River corridor and along the ridgeline north of the Jack Creek road. Weekly point count locations will be completed at the eight point count locations identified in Figure 1 as well as at the radar location south of the Bolton Ranch headquarters.

    b. May 15–July 31, 2011: Radar system will be moved to a location approximately 2 miles east of Miller Hill in the southwestern-most portion of the wind development area (Figure 1). This survey location will detect migrating birds in areas adjacent to and along the ridgeline of Miller Hill as well as in the basin east of Miller Hill. Between May 15 and June 30, weekly point surveys will be conducted at the eight locations identified on Figure 1 as well as at the radar location east of Miller Hill. During the month of July, the point count locations will only be visited twice instead of every week in compliance with BLM and WGFD recommendations. Additionally, this time is between migratory periods and typically bird movements are lower because of nesting activities. A point count will be conducted weekly at the radar installation location during this period during routine maintenance activities.

    c. May 25–June 30, 2011: Breeding bird surveys will be completed once at each of 15 locations across the wind development areas to determine relative abundance, species richness, and habitat use patterns. Breeding bird surveys will follow RMBO grid survey protocols (Hanni et al. 2010). Bird flight patterns will be documented to better define risks of wind development activities. All raptors as well as their flight paths and heights will be recorded at all breeding bird locations regardless of whether the raptor falls within the grid survey area.

    d. May 1, 2011: A revised draft APP will be delivered to the agencies for a 30-day review and comment period. The revised draft will contain some preliminary analyses of radar data from early spring migration to allow for more informed discussions of possible mitigation measures.

4. Late Summer – Fall 2011: The radar system will be moved to the Chokecherry portion of the wind development area on August 1, 2011. The radar system will be moved once during the fall migration period to capture as much data as possible during this period. During the migration period, weekly migratory bird counts and raptor use surveys will be conducted at the eight point counts identified in Figure 1 as well as at the point where the radar system is placed. Waterfowl and wading bird surveys will be conducted once during late summer to detect nesting activity and once during fall migration at Kindt, Rasmussen, Sage Creek, and Teton reservoirs. Analysis of the radar data collected during spring and early summer will be completed to evaluate bird and bat use and to identify appropriate mitigation measures that could be implemented. The following schedule will be used for late summer and fall 2011 surveys:

    a. August 1: A Final APP will be delivered to the agencies for review and approval. The final APP will contain the mitigation measures that will be applied to remove or minimize risks to avian species. The final APP will also identify the final adaptive management process that will be followed to update the APP and apply additional site-specific mitigation measures as additional data are obtained prior to, during and after construction. An interim report of radar data trends and observations will also be provided with the final APP.

    b. August 1– September 30, 2011: Radar system will installed at the western radar location in the Chokecherry project area radar survey location identified on Figure 1. This survey location will detect migrating birds in the western portion of Chokecherry as well as along the rim of Chokecherry and the basin between Chokecherry and Atlantic Rim. During the month of August, the point count locations will only be visited twice instead of every week. A point count will be conducted weekly at the radar installation location during August as part of routine maintenance activities. During September, weekly point count locations will be completed at the eight point count locations identified in Figure 1 as well as at the radar location.

    c. October 1–November 15, 2011: Radar system will be moved to a location southwest of the initial Chokecherry installation location (Figure 1). This survey location will detect birds along the southern rim of Chokecherry and the eastern half of the Chokecherry project area. Weekly point count surveys will be conducted at the eight locations identified on Figure 1 as well as at the radar location.

5. Winter 2011/2012 (November 16, 2011–March 30, 2012) – The radar system will be deployed in a location near the Bolton Ranch headquarters (Figure 1) or north of the Chokecherry project area to ensure weekly maintenance is possible during winter months. Weekly bird observations will be recorded during routine maintenance activities at the radar location. Weather permitting, monthly counts will be conducted at the point count locations in Figure 1.

6. Spring 2012 – PCW and the agencies will initiate the adaptive management process identified and approved in the final APP to incorporate site-specific mitigation and

avoidance measures into final project designs and the Final Environmental Impact Statement and Record of Decision. A final report documenting the results of the radar and point count efforts will be provided at least two weeks prior to the initiation of the adaptive management process to ensure adequate review time prior to discussions.

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U.S. Fish and Wildlife Service [USFWS]. 2010. Recommendations on developing effective measures to mitigate impacts to wildlife and their habitats related to land-based wind energy facilities. Submitted to the Secretary of the Interior by the Wind Turbine Guidelines Advisory Committee.

Wyoming Game and Fish Department [WGFD]. 2010. Wildlife protection recommendations for wind development in Wyoming. Commission approved version (4-23-2010). 70pp.

ATTACHMENT 4

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Roxane Perruso

Subject: FW: PCW Revised Avian Monitoring Protocols
Attachments: PCW Draft Avian Monitoring Plan March 2011.docx

From: Jon Kehmeier
Sent: Wednesday, March 02, 2011 05:11 PM
To: Clark_McCreedy@fws.gov; Travis_Sanderson@fws.gov
Cc: garry.miller@tac-denver.com
Subject: PCW Revised Avian Monitoring Protocols

Clark and Travis,

I have attached a copy of revised protocols for Power Company of Wyoming's wind development project. The changes made reflect our better understanding of what the radar system can and cannot do and take into account the Service's recent draft Eagle Conservation Plan guidelines. Please take a look at the new protocols and provide me with any comments or questions that you might have. We are still very interested in getting some feedback from you on the protocols to make sure we have addressed the issues that we have discussed with you over the past months.

Also, the radar system should be delivered in the next 2-3 weeks. We have a call tomorrow morning with DeTect to discuss the delivery logistics. Once we know a bit more I will let you know. After it is up and running we will have you out to take a look at the system.

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Avian and Bat Monitoring Protocols

for the

Chokecherry and Sierra Madre Wind Energy Project

DRAFT

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Prepared by:

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March 2011

Review of Agency Recommendations

The following protocols have been developed in accordance with the following agency recommendations:

U.S. Fish and Wildlife Service (USFWS)
Wind Turbine Guidelines Advisory Committee *Recommendations on Developing Effective Measures to Mitigate Impacts to Wildlife and Their Habitats Related to Land-Based Wind Energy Facilities* (USFWS 2010)
USFWS Draft Land-Based Wind Energy Guidelines (USFWS 2011a)
Draft Eagle Conservation Plan Guidance (USFWS 2011b)

Wyoming Department of Game and Fish (WGFD)
Wildlife Protection Recommendations for Wind Energy Development in Wyoming (WGFD 2010)

Bureau of Land Management (BLM)
Rawlins Field Office *Wildlife Survey Protocols for Wind Energy Development*,

Generally, UFWS survey recommendations (USFWS 2010, 2011a, and 2011b) include using standard sampling methods to determine avian use of a project area, fatality risk in a project area, the presence of sensitive species and other species of interest, and to provide a baseline for assessing displacement effects and habitat loss. USFWS recommends that sampling frequency, type, and duration be sufficient to account for variability of avian use between and within sampling periods. When more precise estimates of density are required for a special status species, other methods, including radar or nocturnal surveys have been recommended when risks for collision are expected.

Similarly, the Bureau of Land Management (BLM) Rawlins Field Office Wildlife Survey Protocols for Wind Energy Development recommends that surveys be sufficient to detect temporal and spatial use patterns within the project area. Special emphasis is placed on surveys for raptors and sensitive avian species. BLM survey protocols recommend weekly, 20-minute point counts to record avian use of a project area. Survey times are recommended to be varied weekly to ensure that avian use during daylight hours is adequately documented. In addition to weekly surveys, marine radar is recommended to better define avian foraging, dispersal, and migration paths.

Wyoming Game and Fish Department's (WGFD) Wildlife Protections Recommendations for Wind Energy Development in Wyoming recommend sufficient numbers of weekly point count surveys during spring and fall migration periods following similar protocols as specific by BLM with survey periods of twenty minutes at each point. WGFD recommends that four surveys be conducted during winter months to capture overwintering avian species. For raptor species, WGFD recommends nest surveys and weekly day-long surveys during spring and fall migration periods.

Review of Existing Data

In compliance with its obligations under the National Environmental Policy Act of 1969 (NEPA), BLM is preparing an environmental impact statement (EIS) analyzing the potential impacts of the Chokecherry and Sierra Madre Wind Energy Project (Project) on lands and resources within the Project area. Between June 2008 and June 2009, avian use data were collected for much of the Project area as part of the BLM NEPA process [Johnson et al. 2008]. Data were collected using standard point count methods at 19 locations in all months except January and February when much of the Project area was inaccessible due to adverse weather conditions. All sites except for three were visited 31 times during the survey period.

WEST, Inc. (WEST) conducted avian point surveys of the Project area between June 26, 2008 and June 15, 2009. A portion of these data are analyzed in WEST's report, "*Baseline Avian Use Studies for the Chokecherry and Sierra Madre Wind Resource Areas, Carbon County, Wyoming: Final Summer and Fall Interim Report, June 26-October 14, 2008*" (Johnson et al. 2008). WEST also prepared a report summarizing bat surveys conducted between July 13 through October 13, 2008 titled, "*Bat Surveys for the Chokecherry and Sierra Madre Wind Resource Areas, Carbon County, Wyoming: Final Report*" (Solick et al. 2008). SWCA has completed additional analyses of all data collected in 2008 and 2009 to determine compliance with various agency monitoring recommendations.

Data collected during the 2008 and 2009 surveys are sufficient to provide estimates of avian use of the Project area as well as to provide initial estimates of the frequency of each species at rotor-swept heights. Horned lark (*Eremophila alpestris*) was predominantly the most common avian species detected in the 2008 and 2009 surveys, having over 800 individual detections. The next most common species were the common raven (*Corvus corax*) with less than 200 detections, and vesper sparrow (*Pooecetes gramineus*) with less than 150 detections. Golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), and common raven were most commonly observed within the rotary height of the turbines.

Data collected during 2008 and 2009 comply with the agency wind energy survey recommendations described in the previous section and serve as one year of suggested pre-construction monitoring data. Data collected for purposes of NEPA compliance provide estimates of collision and fatality risk and enable determination of avian use of the Project area, the presence of sensitive species and other species of interest, as well as providing a baseline for assessing displacement effects and habitat loss.

Project-Specific Protocols

To supplement the 2008-2009 dataset and to better identify concentrated avian use areas for development of a Project-specific Avian Protection Plan (APP) and an Eagle Conservation Plan (ECP), an intensive one-year survey will be used to better identify avian use areas in the Project area. Protocols have been developed following the various agency recommendations discussed above and in coordination with local USFS, BLM, and WGFD biologists. The protocols are consistent with agency recommendations and will provide more detailed site-specific use data than the protocols individually recommended by any of the agencies.

A combination of avian radar, raptor count stations, standard grid sampling, and point count surveys will be used to determine avian use across the Project area with emphasis on large raptors including golden eagles. Avian radar technology has been identified by the BLM and USFWS as a desired method to map areas of high avian use. The sampling design will follow recommendations made by the USFWS, BLM, and WGFD by combining radar surveys with standard point count and breeding bird methodologies. The radar technology will also enable better identification of bat use areas and relative densities of bats in the Project area.

A DeTect Merlin Avian Radar System will be used to map avian use across the Project area. The DeTect Merlin radar system is a trailer-mounted system with a 200-watt horizontal solid-state S-band radar and a 10–kilowatt (kW) vertically operating X-band open array radar. The horizontal radar has a range of 2 to 5 miles in a 360-degree pattern around the unit. The vertical radar has a 24-degree beam width and detects flight paths 0.75 to 2.00 miles above the unit.

The avian radar system requires weekly maintenance and fueling and cannot be moved over extremely rough terrain on a regular basis. Additionally, the system will not differentiate between large raptors such as golden eagles and other large birds including geese, other large raptors, and possibly even ravens and; therefore, will be used in conjunction with field surveys to validate radar recorded data. However, the radar system, when coupled with point count verification of avian use, will allow for accurate horizontal and vertical mapping of avian use in the Project area. The radar system will also enable mapping of high use areas for bat species.

A combination of raptor and point surveys and breeding bird grid surveys will be conducted in concert with the radar survey. This design will provide intensive survey information regarding avian use patterns within the radar survey perimeter for each season. Raptor count stations, point counts, and breeding bird surveys will be used to validate the radar data and provide estimates of species-specific use patterns. Raptor stations and point count surveys will record the location, flight path, approximate height, and time of use for any individual observed from the count location. Raptor count locations will be surveyed for 8-12 hours per day during periods with the highest likelihood for detection of migrating birds and/or large raptors. Standard 20-minute point counts will be completed at each raptor count location. Timing of point count surveys at each location will be varied to determine patterns of avian use during daylight hours.

In addition to the raptor, point count, and radar surveys, breeding bird surveys will be completed at 15 locations across the Project area. Breeding bird surveys will be conducted following the grid monitoring protocols published by the Rocky Mountain Bird Observatory (RMBO) (Hanni et al. 2010). Grid survey locations will be randomly selected using a generalized random tessellation stratified design to ensure a spatially balanced design stratified by major vegetation and habitat types in the Project area. Data collected as part of the grid monitoring efforts will also be used to validate radar data and better determine avian species use. As part of the breeding bird surveys, waterfowl and water bird use surveys will be conducted three times annually (springs, summer, and fall) to identify migrating and resident species.

Locations for placement of the radar and for conducting point count surveys (Figure 1) and breeding bird surveys were determined using a four-tiered approach:

- Tier 1 – Survey areas should determine avian use within the Project area.

- Tier 2 – Survey areas should overlap possible foraging areas for large raptors (winter range areas, prairie dog towns, waterfowl use areas, etc.).
- Tier 3 – Survey areas should be in locations to allow for detection of avian movement into and out of the Project area.
- Tier 4 – Survey areas should capture variability in habitat and topography.

Locations of radar placement were refined following attendance at DeTect's radar training courses and during coordination with DeTect's radar placement specialists. Figure 1 reflects the revised radar locations. Final placement of the radar unit and final point locations for survey will be determine in early spring 2011 following radar unit delivery.

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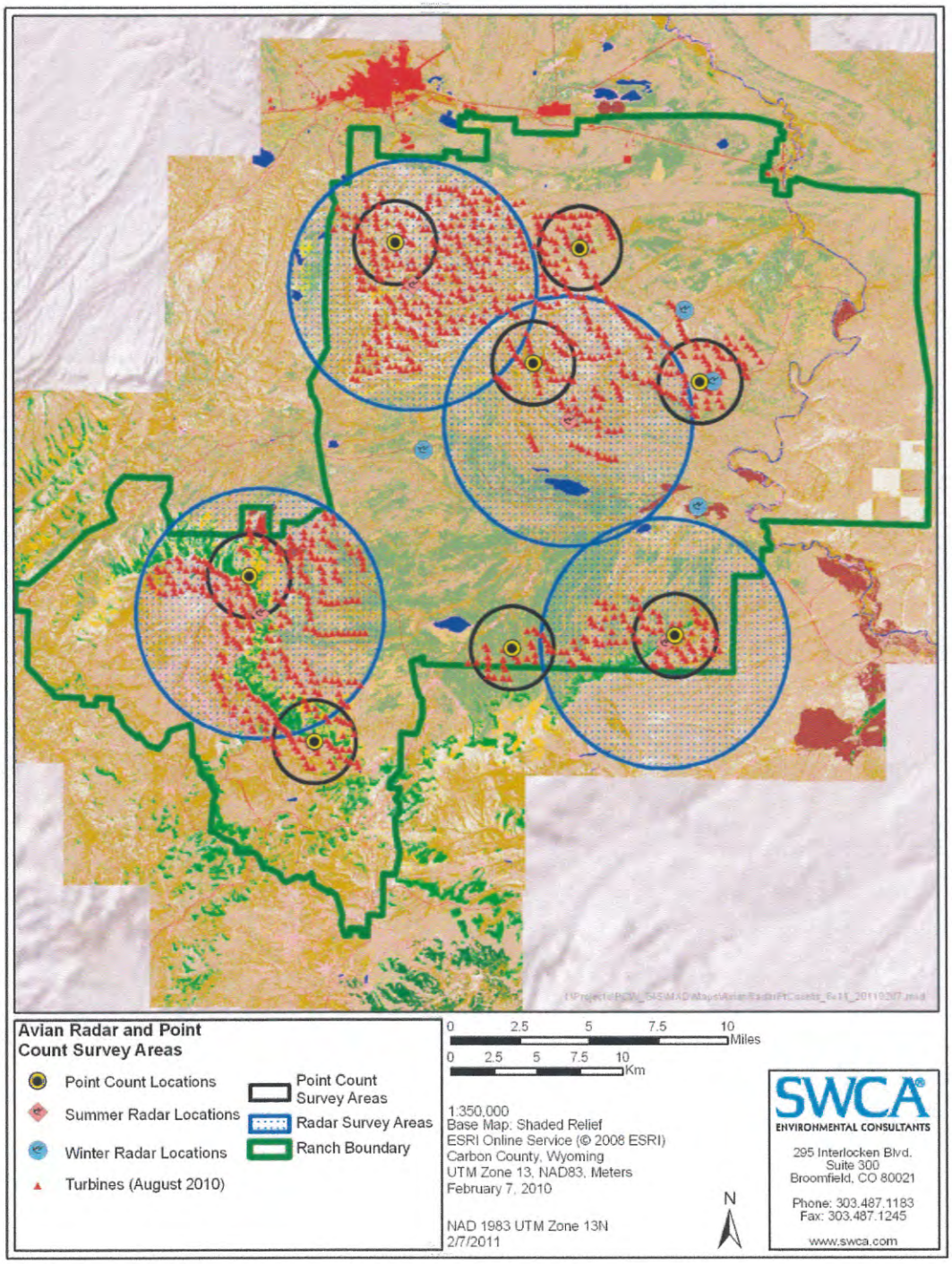

Figure 1. Approximation of area surveyed using avian radar and traditional point count methodologies with respect to possible wind turbine locations. Spring, summer, and fall radar installation locations are the center point of the large blue circles. Proposed point count locations are the center points of the small black circles. Potential winter radar locations are the four blue points. Final locations for survey will be determined in coordination with BLM, WGFD, and USFWS.

The radar unit will be placed at five locations within the Project area (Figure 1). Point counts will be completed at nine additional locations to map avian use patterns where radar coverage is not possible. Eight of these point counts will be completed at permanent sampling locations. The ninth point count location will be completed at the radar site to validate the data being collected by the radar unit. During winter months, the radar will be placed in a location that has high probability of access on a weekly basis. Much of the project area is covered in snow and large drifts during winter; therefore, radar placement in winter will likely be near the Bolton Ranch headquarters, south of I-80 near the North Platte River, on the Bolton Road east of Teton Reservoir, or on the north side of the Chokecherry project area (Figure 1). Winter point count survey locations will also be adjusted as needed to account for winter weather conditions, access issues, and safety concerns.

Based on a four mile radius for radar surveys and a one mile radius for point count surveys, approximately 90-93% of the turbine locations, depending on winter radar placement, will be directly surveyed. It is likely that this percentage is higher than 90-93% for large raptors including bald and golden eagles as many of the point count locations have visibility of several miles and recent radar advancements may allow for detection of large raptors out to 5+ miles. Point count locations outside of the radar survey perimeters have been placed to allow for detection of raptors moving into the Project area and between radar surveyed zones.

Helicopter flights will be completed in mid-April or early May to document eagle nesting activity as well as nesting activity of other raptors that are incidentally observed. Aerial nest activity surveys will be completed in accordance with the recent draft eagle guidance (USFWS 2011b). Following identification of active eagle nests, follow-up productivity surveys will be completed from the ground above/below the nest to determine nesting and fledging success.

The protocols and schedule outlined below will be followed for monitoring and mapping avian and bat use across the Project area using the marine radar system, point counts, and breeding bird surveys.

1. Winter 2010/2011 – Radar construction, programming, and training. The Draft APP/ECP will be delivered to USFWS, BLM, and WGFD for review in late winter/early spring. Among other descriptive sections, the preliminary plan will contain the detailed sampling protocols, preliminary mitigation and avoidance measures, and detailed adaptive management protocols. Monthly reconnaissance surveys will be completed to document eagle use of the Project area during winter months and to help determine best locations for winter 2011/2012 deployment of the radar system.

2. Spring and Early Summer 2011 – Radar surveys will begin in the southern portion of the Project area. The radar system will be moved once during the spring migration period to capture as much data as possible during this period. During the migration period, weekly migratory bird counts and raptor use surveys will be conducted at the eight point counts identified in Figure 1 as well as at the point where the radar system is placed. Breeding bird surveys will be completed at 15 locations across the Project area. Surveys for waterfowl and other waterbirds will be conducted once during the spring migration at Kindt, Rasmussen, Sage Creek, and Teton reservoirs. Analysis of the radar data will be

used to identify areas with high avian and bat use. The following schedule will be used for spring and early summer 2011 surveys:

a. March 15 – May 15, 2011: Radar system will be initialized and debugged prior to main migratory period. Initial installation will occur at the southeastern-most radar survey location identified on Figure 1. This survey location will detect migrating birds in areas adjacent to the Platte River corridor and along the ridgeline north of the Jack Creek road. Weekly point count locations will be completed at the eight point count locations identified in Figure 1 as well as at the radar location.

b. May 15–July 31, 2011: Radar system will be moved to the northeastern survey location (Figure 1). This survey location will detect migrating birds adjacent to and along the Bolten Rim as well as in the basin below the Bolten Rim. Migratory use and raptor soaring locations within and adjacent to the ridgelines in this portion of Chokecherry will also be surveyed using the radar system. Between May 15 and June 30, weekly point surveys will be conducted at the eight locations identified on Figure 1 as well as at the radar location. During the month of July, the point count locations will be visited twice instead of every week in compliance with BLM and WGFD recommendations. Additionally, this time is between migratory periods and typically bird movements are lower because of nesting activities. A point count will be conducted weekly at the radar installation location during this period during routine maintenance activities.

c. May 25–June 30, 2011: Breeding bird surveys will be completed once at each of 15 locations across the Project area to determine relative abundance, species richness, and habitat use patterns. Breeding bird surveys will follow RMBO grid survey protocols (Hanni et al. 2010). Bird flight patterns will be documented to better define risks of wind development activities. All raptors as well as their flight paths and heights will be recorded at all breeding bird locations regardless of whether the raptor falls within the grid survey area.

d. May 1, 2011: An agency meeting will be scheduled to discuss preliminary analyses of radar data from early spring migration to allow for more informed use of the radar and survey data that will be used in the APP/ECP.

3. Late Summer – Fall 2011: The radar system will be moved once during the fall migration period to capture as much data as possible during this period. During the migration period, weekly migratory bird counts and raptor use surveys will be conducted at the eight point counts identified in Figure 1 as well as at the point where the radar system is placed. Waterfowl and wading bird surveys will be conducted once during late summer to detect nesting activity and once during fall migration at Kindt, Rasmussen, Sage Creek, and Teton reservoirs. Analysis of the radar data collected during spring and early summer will be completed to evaluate bird and bat use and to identify appropriate mitigation measures that could be implemented. The following schedule will be used for late summer and fall 2011 surveys:

a. August 1: A revised APP/ECP will be delivered to the agencies for review and approval. The revised APPECP will contain the mitigation measures that will be applied to remove or minimize risks to avian species. The revised APP/ECP will also identify the adaptive management process that will be followed to update the APP/ECP and apply additional site-specific mitigation measures as additional data are obtained prior to, during and after construction. An interim report of radar data trends and observations will also be provided with the revised APP/ECP.

b. August 1– September 30, 2011: Radar system will be installed at the western radar location in the Chokecherry project area radar survey location identified on Figure 1. This survey location will detect migrating birds in the western portion of Chokecherry as well as along the rim of Chokecherry and the basin between Chokecherry and Atlantic Rim. During the month of August, the point count locations will be visited twice instead of every week. A point count will be conducted weekly at the radar installation location during August as part of routine maintenance activities. During September, weekly point count locations will be completed at the eight point count locations identified in Figure 1 as well as at the radar location.

c. October 1–November 15, 2011: Radar system will be moved to a location along the rim of Miller Hill in the southwestern portion of the project area (Figure 1). This survey location will detect birds in the Miller Hill area and below the Miller Hill rim in the Sage Creek Basin. Weekly point count surveys will be conducted at the eight locations identified on Figure 1 as well as at the radar location.

4. Winter 2011/2012 (November 16, 2011–March 30, 2012) – A final APP/ECP will be delivered to the agencies for review. The final APP/ECP will identify the avoidance, minimization, and mitigation measures to reduce threats to eagles and other avian species. The radar system will be deployed in a suitable location to ensure weekly maintenance is possible during winter months. Weekly bird observations will be recorded during routine maintenance activities at the radar location. Weather permitting, monthly counts will be conducted at the point count locations in Figure 1.

5. Spring 2012 – PCW and the agencies will initiate the adaptive management process identified and approved in the final APP to incorporate site-specific mitigation and avoidance measures into final project designs and the Final Environmental Impact Statement and Record of Decision. A final report documenting the results of the radar and point count efforts will be provided at least two weeks prior to the initiation of the adaptive management process to ensure adequate review time prior to discussions.

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ATTACHMENT 5

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Roxane Perruso

Subject: FW: PCW Revised Avian Monitoring Protocols

From: Travis_Sanderson@fws.gov [mailto:Travis_Sanderson@fws.gov]
Sent: Thursday, March 03, 2011 08:24 AM
To: Jon Kehmeier
Cc: Clark_McCreedy@fws.gov; Travis_Sanderson@fws.gov; garry.miller@tac-denver.com
Subject: Re: PCW Revised Avian Monitoring Protocols

Jon,
We are currently drafting a response to the first set of protocols. We will review the latest version, particularly the changes that you mentioned. I understand you are in town on March 8 for a meeting, I would like to take that opportunity to discuss some things. As we have stated all along, we are 100% behind the monitoring protocols, but we will need to discuss the proposed timeline, specifically the development of the APP. As an office we are still trying to wrap our heads around what an APP will consist of, but it appears your projected timeline may be a little ambitious. But we can definitely discuss in person next week. I hope all is well, and look forward to meeting with you next week.

Travis Sanderson
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-----"Jon Kehmeier" <jkehmeier@swca.com> wrote: -----

To: <Clark_McCreedy@fws.gov>, <Travis_Sanderson@fws.gov>
From: "Jon Kehmeier" <jkehmeier@swca.com>
Date: 03/02/2011 05:10PM
cc: <garry.miller@tac-denver.com>
Subject: PCW Revised Avian Monitoring Protocols

Clark and Travis,

I have attached a copy of revised protocols for Power Company of Wyoming's wind development project. The changes made reflect our better understanding of what the radar system can and cannot do and take into account the Service's recent draft Eagle Conservation Plan guidelines. Please take a look at the new protocols and provide me with any comments or questions that you might have. We are still very interested in getting some feedback from you on the protocols to make sure we have addressed the issues that we have discussed with you over the past months.

Also, the radar system should be delivered in the next 2-3 weeks. We have a call tomorrow morning with DeTect to discuss the delivery logistics. Once we know a bit more I will let you know. After it is up and running we will have you out to take a look at the system.

Jon Kehmeier

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ATTACHMENT 6

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Roxane Perruso

Subject: FW: PCW Revised Draft Avian Monitoring Plan

From: Travis_Sanderson@fws.gov [mailto:Travis_Sanderson@fws.gov]
Sent: Thursday, May 05, 2011 04:10 PM
To: Jon Kehmeier
Cc: Garry.Miller@tac-denver.com; Scott_Covington@fws.gov
Subject: Re: PCW Revised Draft Avian Monitoring Plan

John,
couple of questions regarding the revised draft monitoring plan: at the 3/18/11 (I believe this was the right meeting?) we discussed concerns that the Service had regarding the time line. It was brought to my attention during the office review that our suggestions might not have been incorporated. We voiced concerns about finalizing an APP/ECP after only 1 year of radar surveys (in the spring of 2012). I know that WEST conducted surveys during 2008-2009, but these surveys did not provide information regarding avian utilization of the project area. In past meetings we have discussed that WEST's surveys will account for 1 year of the recommended 3 years of pre-construction surveys, but we have strongly suggested that PCW conduct an additional 2 years as well. This is consistent with the recent correspondence that was sent the BLM regarding the appropriateness of an APP for this project. Below I have outlined the time line that we discussed at the March 18, 2011 meeting for your consideration:

Spring 2011 - Draft Preliminary APP/ECP containing preliminary mitigation measures. This document would primarily be a detailed outline.
Spring 2012 - Draft Final APP/ECP. This document would incorporate an entire year's worth of data, thus will more adequately dictate mitigation and avoidance measures.
Spring/summer 2012 - Final APP/ECP. A finalized document that takes into account two complete years worth of intensive radar and field observations.

Based on the notes from our last meeting this is the time line that was discussed, though PCW never formally committed to it. Unless I am mistaken, this time line fits well within the EIS process and would not result in delays to the project due to monitoring efforts or finalizing documents. As discussed previously, the Service is entirely on-board with the proposed monitoring protocols, I would just like to clarify the issue regarding the duration of monitoring and time line of APP/ECP development. I would like to send a letter of endorsement from our office that does not address any of these concerns. Please email or give me a call tomorrow to discuss. I will be out in the morning conducting sage grouse surveys, but will be in the office late morning and all afternoon. Thanks.

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