

APPENDIX B

CONSERVATION MEASURES

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2.1.10 Conservation Measures

Thurston would implement conservation measures to reduce the potential short-term, long-term, and cumulative impacts to existing resources as a result of implementation of the Proposed Action. Specific references to Federal and State laws are not intended to be all inclusive. Therefore, all applicable Federal and State laws (in addition to those highlighted) would still apply to the proposed exploration and production activities. These conservation measures would represent the Service's specific terms and conditions for the issuance of the Special Use Permit.

General

- 1) Thurston will secure all required permits and approvals from the Service, State of Utah, and Uintah County prior to construction. Thurston will adhere to all applicable Federal, State, and county regulations while performing all operations associated with the Proposed Action.
- 2) Thurston will annually monitor its facilities to ensure that normal operations will be in compliance with: its SUP; other rules and regulations that apply to the Proposed Action; the Thurston Reclamation and Weed Plan; commitments presented by Thurston (as contained in this EA); and any conditions that may result from approval of the Proposed Action.
- 3) Thurston and/or its contractors shall save, hold harmless, defend, and indemnify the United States, its agents and employees for loss, damages, or judgments and expenses on account of bodily injury, death, or property damage, or claims for bodily injury, death or property damage of any nature whatsoever, and by whomever made, arising out of the Operator, their employees, subcontractors, or agents with respect to the exploration of any and all mineral rights within the lands administered by the Refuge.
- 4) Proof of general liability insurance in an agreed upon amount (as required by State law) must be furnished to repair/mitigate any damages. This does not limit the liability for damages to this amount.
- 5) Construction operations will be conducted in consideration of the *Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition* (Gold Book) (USDI-USDA 2007 as revised). Thurston will maintain existing and new roads and well pads in conformance with "Gold Book" standards.
- 6) Thurston will implement hiring policies that would encourage the employment of area residents and will purchase equipment and materials from local area merchants to the extent feasible.
- 7) Thurston's drug and alcohol policies will be rigorously enforced.
- 8) Summaries of all the results generated from existing water quality data, cultural resource surveys, biological resource surveys, paleontological surveys, and any other sampling or monitoring must be provided to the Refuge Manager or the Service Authorized Officer

(AO) prior to the onset of construction. The Service requests that Thurston provide information on the depths at which groundwater was encountered during drilling of the surface hole.

- 9) Impacts on sensitive habitat (e.g., wetlands, riparian areas), wildlife, plants, and other sensitive natural or historical resources must be avoided to the extent possible while constructing the access road and well pads. Existing roads shall be used to the greatest extent practicable to avoid erosion and minimize the footprint devoted to oil and gas operations. Roadbeds shall be engineered to avoid or minimize impacts to riparian areas or wetlands to the extent practicable. Unavoidable impacts shall be mitigated.
- 10) The Operator must provide detailed maps or plats of the proposed project layout (as required by the Refuge Manager or the Service AO) that shows routes, staging areas, construction areas, and work locations. The map should include the following minimum information:
 - 11) Dimensions on adjacent exterior section lines sufficient to completely describe the quarter section that contains the proposed well shall be indicated. If dimensions are not field measured, state how the dimensions were determined.
 - 12) The latitude and longitude of the proposed well location shall be provided on the drawing with a minimum of five decimal places of accuracy and precision using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345 N, longitude 104.45632 W).
 - 13) For irregular, partial or truncated sections, dimensions will be furnished to completely describe the entire section containing the proposed well.
 - 14) The field-measured distances from the nearer north/south and nearer east/west section lines shall be measured at 90 degrees from said section lines to the well location and referenced on the plat.
 - a. A map legend.
 - b. A north arrow.
 - c. A scale expressed as an equivalent (e.g. - 1" = 1000').
 - d. A bar scale.
 - e. The ground elevation.
 - f. The basis of the elevation (how it was calculated or its source).
 - g. The basis of bearing or interior angles used.
 - h. Complete description of monuments and/or collateral evidence found; all aliquot corners used shall be described.
 - i. The legal land description by section, township, range, principal meridian, baseline and county.

- j. Operator name.
 - k. Well name and well number.
 - l. Date of completion of scaled drawing.
 - m. A line designating the 100-year floodplain for the Green River relative to pad and well placement.
- 15) Refuge officials will conduct an onsite meeting before rig-up with representatives of the Operator, drilling contractor, subcontractors, suppliers, and service companies. The purpose of the meeting is to review and reiterate regulations and conditions that apply to planned activities and work crew conduct on the Refuge. Thurston will be responsible for ensuring that employees, representatives, consultants, contractors, and subconsultants adhere to the Conditions of Approval (COA), conservation measures, and BMPs identified in the SUP and DR for this EA.
- 16) Service personnel will be subject to Thurston's safety procedures. Thurston shall provide any needed safety briefings for Refuge and Hatchery personnel prior to commencement of any operations at the site.
- 17) Prior to rig-up, Thurston must prepare an Emergency Preparedness Plan covering exploratory drilling, well control, materials, hauling, spill response, HAZMAT, and medical and fire evacuation. The plan must also identify the availability and capability of local and regional emergency services and must delineate strategies for addressing potential shortfalls or inadequacies contained in these resources. The Emergency Preparedness Plan must be provided to the Refuge Manager, the Ouray National Fish Hatchery Manager (and any other local governments and emergency response units required by Utah state law) and discussed in a pre-operation meeting to be held by Thurston. The plan must contain a telephone list naming key contacts for emergency operations and activation;
- 18) The Operator must upgrade and maintain all access routes, roads, and bridges designated for its use across the Refuge in accordance with acceptable specifications and standards as described by the "Gold Book" (USDI-USDA 2007 as revised). The Operator must have road maintenance equipment and operator(s) readily available to perform road repairs and maintenance as needed, or as directed by the Refuge Manager or Service AO.
- 19) General Refuge access conditions:
- a. Thurston and/or its contractors shall be allowed access to portions of the Refuge for the purpose of carrying out drilling of oil and gas exploration wells previously identified (50 CFR 26.22).
 - b. The Refuge Manager is the coordinating official having immediate jurisdiction and administrative responsibility for surface use and access related to oil and gas operations on Refuge lands and property; all entry upon the Refuge must be coordinated with the Refuge Manager or the Service AO. The Refuge Manager

must be advised at least 48 hours prior to initiation of construction (50 CFR 26.22).

- c. Any necessary personnel, vehicles, materials, and/or equipment shall be transported to the project site before sunset each day, and shall not depart the project site until after sunrise, except for materials/equipment transport needed for emergencies (e.g., rig repairs, spill response).
- d. The failure of the United States to require strict performance of the terms, conditions, covenants, agreements, or stipulations of this permit for access to conduct exploration activities on NWR lands shall not constitute a waiver or relinquishment of the right of the United States to strictly enforce thereafter such terms, conditions, covenants, agreements, or stipulations, which shall, at all times, continue in full force and effect.
- e. Operator shall be responsible for the actions of all exploration, and production and support personnel. Violations of applicable laws or regulations will subject the Operator and/or their employees to prosecution under State and/or Federal laws. Individuals using the Refuge under the Operator's authorization are subject to inspections of vehicles and their contents by Federal and State law enforcement officers.
- f. Operators will act in a manner that is respectful of Refuge habitats, wildlife, and property. Gates are to be locked or unlocked as they are found (50 CFR 27.21; 50 CFR 27.51).
- g. If necessary, a lockbox or similar security system will be provided to Thurston for after-hours access to the project site during drilling and completion operations. No unauthorized entry of non-project related personnel will be permitted on the Refuge after normal operating hours.
- h. All vehicle access will be restricted to developed roads. All-terrain vehicle (ATV) use and deviations to vehicle use must be pre-approved by the Refuge Manager in writing prior to any action taken (50 CFR 27.31).
- i. Thurston will instruct its employees and contractors: (1) not to exceed speeds on the Refuge/NFH road that will produce dust depending upon conditions; (2) under no circumstances to exceed 10 miles per hour traveling from the main Refuge/NFH road to the well pads; and (3) under no circumstances to exceed 25 miles per hour on the main Refuge/NFH road during construction, drilling/completion, or normal daily activities to discourage the generation of fugitive dust. These speed limits are set at the discretion of Refuge Manager and limits will be strictly enforced (50 CFR 27.31).
- j. No pets will be allowed on the Refuge.
- k. Person(s) entering or remaining on the Refuge when under the influence of alcohol is prohibited (50 CFR 27.81).
- l. Possession of drugs or controlled substances is strictly prohibited on the Refuge (50 CFR 27.82).

- m. Possession, transportation, or discharge of firearms, fireworks, or explosives on the Refuge is prohibited unless specifically authorized (50 CFR 27.41; 50 CFR 27.42).
 - n. Open fires are strictly prohibited in any areas of the Refuge (50 CFR 27.95).
 - o. Operators will not be considered agents of the Service and will not represent the Service in any matters (50 CFR 27.84).
 - p. Operators will perform all work in accordance with the highest standards of the industry and to the satisfaction of the Service.
 - q. Operators will perform all work in accordance with all applicable laws and regulations and will obtain all necessary permits or licenses when required to do so. Thurston must complete or obtain all necessary permits, contacts and clearances prior to the start of the activity (50 CFR 25.13; 50 CFR 29.32).
 - r. Thurston will modify drilling operations, as necessary, to reduce conflicts with regular Refuge management and public use activities.
 - s. All personnel and activities shall be restricted to the immediate drilling area and the direct access road to the drill site (50 CFR 26.22).
 - t. Harming, harassing, and feeding wildlife species are prohibited. Molesting or destroying the home or dens of wildlife is prohibited. If dens are found during the normal course of operations, distinctive flagging will be used to alert all personnel of the den location. Adverse impacts on fish, wildlife, and the environment shall be kept to an absolute minimum. All road kills will be reported to the Refuge Manager or the Service AO (50 CFR 27.51).
 - u. Littering is prohibited. All cans, bottles, lunch papers, operations trash, and any other type of litter must be removed. Cigarette butts are considered litter. All vehicles must be equipped with a container to carry out trash (50 CFR 27.94).
 - v. No overnight quarters will be permitted on the Refuge unless authorized by the Refuge Manager (50 CFR 27.92).
- 20) A brief Worker Environmental Awareness Program (WEAP) will be implemented by Thurston for construction and drilling crews prior to the commencement of the project activities. Training materials and briefings will include, but not be limited to, discussion of the Federal and State ESAs, the consequences of noncompliance with these acts, identification and values of wildlife and natural plant communities, threatened and endangered species within the Project Area, hazardous substance spill prevention and containment measures, and review of all conservation measures.

Reclamation

- 1) Thurston has developed a Reclamation & Monitoring Plan/Noxious Weed Management Plan that will be used to direct reclamation and monitoring operations and to ensure that the results meet acceptable standards (included as Appendix F of the EA/BA).

- 2) Thurston will develop vegetation pre-disturbance baseline documentation/data for the proposed well sites or will implement other methods to determine reclamation success, in cooperation with the Service AO.
- 3) Thurston will provide the Service with an annual report describing the progress of its reclamation operations.
- 4) Thurston will reclaim as much of a well pad as possible by leaving level ground sufficient for work over operations and re-contouring the remainder of the initial disturbance;
- 5) All construction of roads and pads will occur in a manner that best facilitates their subsequent complete removal and reclamation once Thurston's activities have ceased at these sites. This includes separating, stockpiling, and covering topsoil layers onsite to be replaced during reclamation. All disturbed areas must be reclaimed with Service input at the time reclamation occurs. Only endemic plants and seed mixtures are to be used in reclamation. Thurston shall separate and store the topsoil horizon or the top 6 inches, whichever is deeper, and mark or document stockpile locations to facilitate subsequent reclamation. When separating the topsoil layers, the operator shall segregate the horizon based upon noted changes in physical characteristics such as organic content, color, texture, density, or consistency. All stockpiled soils shall be protected from degradation due to contamination, compaction and, to the extent practicable, from wind and water erosion during drilling and production operations. BMPs to prevent weed establishment and to maintain soil microbial activity shall be implemented. Final reclamation of all disturbed areas shall be considered complete as follows:
 - a. When all activities disturbing the ground have been completed and;
 - b. When all disturbed areas have been either built upon, compacted, covered, revegetated, paved, or otherwise stabilized in such a way as to minimize erosion, or;
 - c. When a uniform vegetative cover has been established that reflects pre-disturbance or;
 - d. When reference area forbs, shrubs, and grasses with total percent plant cover of at least 80 percent of pre-disturbance or reference area levels (excluding noxious weeds) or equivalent permanent, physical erosion reduction methods have been employed. Re-seeding alone is not sufficient.
- 6) Within 120 days following completion of drilling and testing operations, the Refuge Manager or the Service AO will be advised whether the well is to be retained or plugged. If the well site is to be abandoned, the well is to be plugged to meet the standards of the State requirements, All above-ground structures must be removed, and the site and road restored to near original condition as directed by the Refuge Manager or the Service AO. Any damage to existing surface vegetation, water channels, or other physical features must be restored to original site conditions. All costs shall be borne by the Operator.

Erosion and Sedimentation Control

- 1) The drill site and immediate access roads must be constructed of Refuge-approved material for all drilling locations. All existing drainage patterns within roads to be constructed must be maintained uninterrupted by the use of culverts, bridges, or other applicable techniques as specified and authorized by the Refuge Manager or the Service AO.
- 2) Thurston must provide a Stormwater Pollution Prevention Plan (SWPPP) that would be reviewed by the Service prior to the commencement of construction activities. This plan should be prepared according to industry guidelines and should include sufficient information and narrative descriptions regarding construction activities along the existing waterways, locations of all proposed potential discharges, identification of potential pollutant sources, maps detailing all ground-disturbing activities at sites, and details and figures for proposed BMPs for these construction activities.
- 3) Thurston shall implement and maintain BMPs at all oil and gas locations to control stormwater runoff in a manner that minimizes erosion, transport of sediment offsite, and site degradation. BMPs shall be maintained until the facility is abandoned and final reclamation is achieved. Operators shall employ BMPs, as necessary, to comply with this rule at all oil and gas locations, including, but not limited to, well pads, soil stockpiles, access roads, tank batteries, and pipeline ROWs. BMPs shall be selected based on site-specific conditions, such as slope, vegetation cover, and proximity to water bodies, and may include maintaining in-place some or all of the BMPs installed during the construction phase of the facility. Where applicable, based on site-specific conditions, operators shall implement BMPs in accordance with good engineering practices.
- 4) Stormwater drainage should be segregated from loading/unloading facilities, and operations areas from unimpacted areas;
- 5) No project vehicles will be operated along dirt access roads or at drilling pad sites during periods of saturated soil conditions when surface ruts greater than 4 inches would occur along straight travel routes;
- 6) As necessary during construction, drilling, and production operations, appropriate BMP sedimentation controls will be used in areas susceptible to erosion. The BMPs would be selected and constructed as described in “The Gold Book” (USDI - USDA 2007);
- 7) Sediment traps, swales, and mulching should be used during construction activities to reduce loss of sediment and contamination of runoff;
- 8) Straw bales and/or silt fences would be used as energy dissipaters where the possibility of erosional down-cutting exists. If straw bales are used for erosion and sediment control, the straw/hay must be certified weed-free; otherwise, only silt fencing would be allowed for this purpose. These structures would be installed prior to construction, and would be left in place and maintained for the LOP or until the adjacent disturbed slopes have revegetated and stabilized;

- 9) Project vehicles will be restricted to use of the project-related travel routes and surfaces, including turn-outs on approved travel routes; and
- 10) Thurston would perform re-grading and watering of the access routes following inclement weather conditions as needed.

Spill Procedures

- 1) In accordance with EPA regulations (40 CFR Part 112) and UDOGM requirements, Thurston must prepare and implement a SPCC plan for each well within 6 months of beginning operations. Copies of the SPCC plans shall be provided to the Refuge Manager within 6 months of commencing production operations.
- 2) A Draft SPCC Plan, which illustrates the types of spill prevention measures that will be developed and implemented for each well, is included in **Appendix G** of the EA/BA. This plan will be reviewed by the Service and should include a listing of secondary containment and/or diversionary structures or equipment for all oil handling containers, equipment, and transfer areas. It should also include a table identifying tanks and containers at the facility with the potential for an oil discharge, the mode of potential failure, and the likely flow direction and potential quantity of the discharge, as well as provide the secondary containment method and containment capacity. In addition, the SPCC Plan should include the physical layout of the facility and a facility diagram that marks the location and contents of each container. The facility diagram must also include all transfer stations and connecting pipes.
- 3) All open-top oil, condensate, or produced water tanks, dehydration unit tubs, secondary containment tubs, and any other open tub, tank, pan, or similar item will be netted or screened to prevent entrapment and mortality of migratory birds. Where there are open-top tanks that do not contain harmful substance, such as stock water tire tanks, we recommend the use of escape ramps in these tanks to minimize the potential drowning of migratory birds and possible violations of the Migratory Bird Treaty Act (MBTA).
- 4) Thurston will construct a secondary containment berm of sufficient capacity to contain 110 percent of the storage capacity of the largest tank in the tank battery and sufficient freeboard to contain precipitation. Thurston will install containment for the chemical injection tanks.
- 5) Catch pans or other secondary containment systems consistent with industry standards are required for equipment and locations such as mud pumps, bulk mud additive tanks, fuel tanks, mixing sheds, generators, accumulator and lines, and under the entire rig floor. The catch pans must cover the entire surface area under the equipment. The rig floor catch pan (collector) must be properly secured to allow for wash down and mud drainage from the drill pipe. The catch pans must be kept free of accumulated debris and spill materials must be emptied on a regular basis.
- 6) Earthen berms and storage tank containment areas would be lined with a non-permeable liner in order to reduce the risk of groundwater and soil contamination. These liners will be maintained and replaced per manufacturer guidelines.

- 7) Substitute organic additives, polymers, or biodegradable additives for oil-based mud to reduce toxicity;
- 8) Lubricate with mineral oil and lubra-beads instead of diesel oil;
- 9) All on-site personnel would be trained in the proper management of waste types encountered at the site;
- 10) A copy of all MSDS sheets shall be provided prior to use of any chemicals or compounds that have an MSDS data sheet;
- 11) Thurston shall provide Refuge staff with any needed safety equipment for periodic inspection;
- 12) Fuel and lubricants will be temporarily stored in transportable containment trucks and trailers to minimize potential for accidental releases;
- 13) No other hazardous or potentially hazardous materials will be brought into the Project Area;
- 14) During daily site visits, visual inspections will be conducted to assure that no leaks of oil, brine, or chemicals are occurring.
- 15) All spills or leaks of drilling muds, diesel fuel, hydraulic fluid, lubricating oil, and coolant, including contaminated soil material will be excavated and placed in an appropriate container and then transported to an approved off-site disposal location; and
- 16) The soils at the location site must be tested by a USFWS-approved laboratory using approved standards to determine levels of heavy metals, chemical pollutant, and other contaminants prior to rig-up operations. Duplicate tests must be conducted before completion or at abandonment to determine impacts from potential undiscovered spills and releases of oil or other chemical constituents. If the exit test reveals levels above the background established by the pre-drilling test, clean-up will be required. The most practical method of clean-up is soil removal. Any quantity of soil removed must be replaced with a Service-approved equal and to the original contours.

Human Health and Safety

- 1) Trash containers and a portable toilet will be located on site during construction. Upon completion of drilling operations, Tri-County Health Department would permit sewage system disposal at an off-Refuge location;
- 2) Accumulated trash and nonflammable waste materials will be hauled to an appropriate receiving landfill;
- 3) All debris and waste materials not contained in the trash containers and surrounding area would be cleaned up, removed from the well pads and access road corridors, and disposed of at the landfill;

- 4) No potentially harmful materials or substances would be left on the well pads, access road corridors, or the vicinity. Scrap metal and other recyclable refuse would be hauled to an approved recycling facility;
- 5) Project-related vehicle traffic would be limited to Service-approved access routes;
- 6) Thurston and subcontractor crew members would minimize daily personal vehicular traffic in and out of the Project Area by carpooling from surrounding towns;
- 7) A sign warning the public of project-related activity would be located at the closest road or travel route intersection on either side of the proposed drill-sites; and
- 8) Fencing and appropriate signage would be installed on all well pads if needed to prevent Refuge visitors from gaining access

Fire Hazards

- 1) To protect and minimize the possibility of fires during the construction phase, all project vehicles and construction equipment, including welding trucks, would be equipped with fire extinguishers and shovels;
- 2) Brush or vegetation located within 15 feet of mufflers, radiators, headers, and other engine parts would be avoided, and periodic checks would be conducted to prevent this build-up;
- 3) Smoking would only be allowed in company vehicles and/or designated smoking areas; all cigarette butts would be placed in appropriate containers;
- 4) Cooking fires, campfires, or fires of any kind are not allowed. Portable generators used in the Project Area would be required to have spark arresters;
- 5) Thurston would coordinate project activities with appropriate Service and/or County fire-fighting personnel when operating within the Project Area;
- 6) Thurston contractors would have a site-specific Health and Safety Plan that includes fire protection.

Air Quality

- 1) All internal combustion equipment would be kept in good working order;
- 2) To reduce potential impacts to air quality, all equipment associated with drilling and completion activities, as well as service equipment used for fracking and cementing, would be with Tier II or better drilling rig engines.
- 3) To reduce any potential impact on air quality, the Service requires that all vehicles with diesel engines be manufactured after 1996 and be kept in good working order;

- 4) Low bleed or no bleed pneumatics would be installed on separator pump valves and other controllers. The use of low bleed pneumatics would result in lower emission of volatile organic compounds (VOCs);
- 5) Thurston has agreed to use similar air pollution control technologies that are currently being applied for other oil and gas operations on Federal lands in the Uinta Basin. At a minimum, the following air pollution control practices will be used to address recognized issues with winter ozone formation:
 - a. Dehydrator VOC emission controls to +95% efficiency;
 - b. Tank VOC emission controls to +95% efficiency; and
 - c. If and when gas-powered engines are used, they will be required to meet the following standard: Stationary internal combustion engine standard of 2g NOx/bhp-hr for engines <300HP and 1g NOx/bhp-hr for engines >300HP.
- 6) During completion, flaring would be limited as much as possible. Production equipment and gas gathering pipelines would be installed as soon as possible;
- 7) Telemetry would be installed to remotely monitor and control production. This would reduce truck traffic and decrease associated dust and tailpipe emissions;
- 8) During production, tighten connections and replace packing to minimize leaks and fugitive emissions;
- 9) During production, use and maintain proper hatches, seals, and valves to minimize air emissions;
- 10) During daily site visits, or as needed, inspections will be conducted using soap solutions to identify and repair fugitive gas leaks from leaking compressors, valves, connectors, seals, and open-ended lines;
- 11) Eliminate unnecessary vehicle idling;
- 12) Thurston would prohibit any open burning of garbage or refuse at well sites or other facilities.

Noxious and Invasive Weeds

- 1) All vehicles and equipment originating from outside the Refuge must be decontaminated prior to arriving at the Refuge per Service procedures to prevent the introduction of noxious weeds to the Refuge. Decontamination would include removal of skid plates for inspection and cleaning if necessary. It is recommended that the operator consult with the local weed control agency or other weed control authority if weed infestation occurs. It is the responsibility of the operator to monitor affected and reclaimed lands for noxious weed infestations. The Refuge will require a weed control plan.

- 2) Any materials brought into the Refuge as fill material for construction must be certified weed-free or authorized by the Refuge Manager or the Service AO. To minimize the spread of invasive species, no top soils will be brought in from outside the Refuge.
- 3) To reduce the likelihood of introducing noxious and invasive weed species as a result of project-related vehicles and equipment entering the Project Area, Thurston and its contractors will remove weed seed and soil from all construction equipment and vehicles prior to the start of construction;
- 4) Any weed infestations noted at drilling sites and along project-constructed access roads would be treated as necessary and as approved by the Service to prevent additional spread; and
- 5) Thurston would implement an intensive weed control program at the beginning of the first growing season after construction in accordance with the site-specific reclamation and weed management plan.

Wildlife

- 1) Project personnel would be subject to the following requirements: (1) no harming, harassing, or shooting of wildlife or horses, (2) no dogs or other pets admissible in the Project Area, (3) no firearms permitted, and (4) no littering. Workers will be required to check under their vehicles prior to departing the project site;
- 2) Thurston will conduct preconstruction surveys, as needed.
- 3) Noise abatement methods (e.g., acoustic barriers and mufflers) will be implemented to reduce noise impacts of natural gas pumpjack engines to levels at or below noise levels of an electrified system. Thurston will monitor noise levels from the installed equipment to insure that the noise level from the equipment does not exceed 60 dB at 50 feet. The specific noise abatement methods may include but are not limited to best available technology for natural gas engine exhaust noise muffling and/or cancellation and must be provided to the USFWS for concurrence prior to initiation of drilling activities.
- 4) During drilling and completion operations, Thurston will perform dust abatement measures on proposed access roads and/or well pads as necessary. Dust control measures will be performed on access roads as needed during normal daily operations.
- 5) Construction and drilling operations conducted during the Refuge's sensitive wildlife period (May 1st through August 31st) must be coordinated with and authorized by the Refuge Manager or the Service AO to avoid conflicts with wildlife. At the discretion of the Refuge Manager or the Service AO, additional wildlife monitoring or mitigation may be required during this sensitive period based on site-specific conditions.
- 6) Should the project schedule construction activities between March 1st and August 31st, all areas within 0.5 miles of the proposed project would be surveyed for the presence of raptor nests by a Service-approved biologist. If occupied raptor nests are found within the recommended spatial buffers, the Utah ESO would be consulted to determine if the recommended spatial buffers can be modified on a nest-by-nest basis by considering the species, timing, nest status, disturbance type and duration, vegetation, and topography.

- 7) Burrowing owl surveys would be conducted concurrently with the raptor surveys within 0.25 miles of the proposed project if the project schedule occurs between March 1st and August 31st. If occupied burrowing owl nests are found within the recommended spatial buffers, the Utah ESO would be consulted to determine if the recommended spatial buffers can be modified on a nest-by-nest basis by considering the species, timing, nest status, disturbance type and duration, vegetation, and topography.
- 8) Project activities would comply with applicable requirements of the MBTA, Bald and Golden Eagle Protection Act (BGEPA), and ESA, as amended;
- 9) To avoid and minimize impacts to birds during construction and operations and to ensure ground-disturbing activities do not result in the “take” of an active nest or migratory bird protected under the MBTA, the Service requires the following of Thurston:
 - a. Any groundbreaking activities or vegetation treatments should be performed before migratory birds begin nesting or after all young have fledged to avoid take;
 - b. Time tree and shrub removal and ground disturbing activities should occur during the non-nesting season (approximately September 1st to February 28th). If this is not possible, surveys should be conducted prior to disturbance to determine whether active nests are present; active nests found in the area should be left untouched until the young have fledged;
 - c. If activities must be scheduled to start during the migratory bird breeding season, appropriate steps to prevent migratory birds from establishing nests in the potential impact area should be taken. These steps could include covering equipment and structures and use of various excluders (e.g., noise). Birds can be harassed to prevent them from nesting on the site;
 - d. If activities must be scheduled during the migratory bird breeding season, a site-specific survey for nesting birds should be performed starting at least 2 weeks prior to vegetation treatments. Established nests with eggs or young cannot be moved, and the birds cannot be harassed (see item b above), until all young have fledged and are capable of leaving the nest site; and
 - e. If nesting birds are found during the survey, appropriate spatial buffers should be established around nests. Vegetation treatments within the buffer areas should be postponed until the birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist.
- 10) The Refuge Manager or the Service AO may require drill pads to be fenced and signed, if necessary, to prevent both wildlife and Refuge visitors from gaining access to the sites. All appropriate warning signs should be placed along all sides of the fence.
- 11) As necessary, Thurston will notify the appropriate authorities (Utah Department of Transportation [UDOT] on highways and Utah Division of Wildlife Resources [UDWR] or USFWS on County and Refuge roads) of the presence of roadside carrion and ask that they remove the carrion as soon as possible. Carcasses may be covered in the interim to

discourage scavenging by bald eagles and other raptors. However, only authorized personnel may touch or remove the carcasses.

Special Status Species

Yellow-billed Cuckoo

- 1) Thurston would not commence or conduct construction, drilling, or completion activities during the yellow-billed cuckoo nesting season (June 15th to August 31st).
- 2) Noise mitigation measures listed under “Wildlife” apply to the yellow-billed cuckoo, and will reduce noise disturbance to this species.
- 3) Tanker trucks would be limited to dustless speed or 10 mph and would only be allowed to access facilities from 1:00 – 4:00 p.m.
- 4) Noise abatement methods (e.g., acoustic barriers and mufflers) will be implemented to reduce noise impacts of natural gas pumpjack engines to levels at or below noise levels of an electrified system. Thurston will monitor noise levels from the installed equipment to insure that the noise level from the equipment does not exceed 60 dB at 50 feet. The specific noise abatement methods may include but are not limited to best available technology for natural gas engine exhaust noise muffling and/or cancellation and must be provided to the USFWS for concurrence prior to initiation of drilling activities.

Colorado River Endangered Fish

- 1) Conservation measures listed under “Erosion and Sedimentation Control,” “Spill Procedures,” “Water Resources, Including Wetlands and Floodplains,” and “Hazardous Materials and Solid Waste” apply to the Colorado River endangered fish and will reduce the potential for an accidental spill that could contaminate the Green River and associated wetlands, thus greatly reducing the likelihood that these species could be adversely affected.
- 2) A 430-foot Jersey barrier would be installed along the Refuge/NFH road to minimize spill potential into the Green River.

Uintah Basin Hookless Cactus

- 1) A new Uinta Basin hookless cactus survey would be conducted by a FWS certified botanist.
- 2) Pre-project habitat assessments were completed across 100 percent of the project disturbance area within potential habitat prior to any ground-disturbing activities to determine if suitable Uinta Basin hookless cactus habitat was present. Within suitable habitat, site inventories were conducted to determine occupancy. No cactus were found within the project disturbance area or associated buffers. In addition, the following

conservation measures that are part of the project design will reduce the likelihood that cactus could be affected:

- a) Limit new access routes created by the project;
- b) Roads and utilities should share common ROWs where possible;
- c) Vehicles will stay on designated routes and other cleared/approved areas; and
- d) All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.

Water Resources, Including Wetlands and Floodplains

- 1) Thurston must provide the Refuge Manager or the Service AO a copy of the wetland determination/delineation that was issued by the U.S. Army Corps of Engineers (USACE) for the Project Area showing that none of the well pad locations or roads will impact wetland areas. The USACE would also need to be contacted if any wetlands may be disturbed by the proposed exploration activities;
- 2) The Operator will be responsible for providing all water needed for drilling operations from outside the Refuge. No wastewater will be discharged onto Refuge lands, ditches, or water bodies. The Operator will provide a containerized or temporary septic system for domestic sewage disposal during drilling operations, which must be removed upon completion of drilling. Use of portable toilets at the drill site or the installation of a temporary septic system, or similar treatment system or tanks, will be required for any trailer onsite. No surface discharge of septic system or portable toilet water is permitted. Septic tanks must be inspected weekly during operations and pumped as necessary. Upon completion of operations, the septic tanks must be pumped out, removed, and all material hauled away.
- 3) Thurston shall provide a detailed map of the Project Area and the location of the well pads and associated roads with respect to wetlands and waters of the United States.
- 4) Thurston would sample and test any known water wells located within a 0.50 mile radius up-gradient or immediately down-gradient of the oil extraction wells. The testing protocol will be developed jointly by the Service and Thurston.
- 5) Thurston's proposed casing program will be designed and implemented to adequately protect usable quality groundwater such that impacts to groundwater from drilling and production are not anticipated. Risks to groundwater from unanticipated downhole failures would be considered low, correctable, and manageable (O'Dell 2014).

Dust Abatement

- 1) Thurston will instruct its employees and contractors: (1) not to exceed speeds on the Refuge/NFH road that will produce dust depending upon conditions; (2) under no circumstances to exceed 10 miles per hour traveling from the main Refuge/NFH road to

the well pads; and (3) under no circumstances to exceed 25 miles per hour on the main Refuge/NFH road during construction, drilling/completion, or normal daily activities to discourage the generation of fugitive dust.

- 2) Dust levels on regularly traveled access routes must be kept to a minimum. During drilling and completion operations, Thurston will perform dust abatement measures on the main Refuge road and proposed access roads and/or well pads at least once a day or as needed, as determined by the Refuge Manager. Thurston must have a water truck and operator(s) readily available to perform dust abatement. Only water from an off-Refuge source will be allowed for dust suppression efforts. Magnesium water or an approved equivalent may be used as needed with prior approval from the Refuge Manager or the Service AO. Dust control measures must be implemented throughout the traveled areas of the Project Area, including construction sites and existing and proposed roads.

Hazardous Materials and Solid Waste

- 1) A closed-loop mud and drill cuttings system must be used to minimize surrounding habitats. In addition, drill cuttings will be isolated in an AST during drilling. All cuttings and drilling fluids will be temporarily stored in tanks and then removed from the Refuge and disposed of off-site at an approved disposal facility;
- 2) Onsite disposal of produced water is prohibited. Produced water may only be disposed of at an offsite State-approved facility.
- 3) All toxic construction and equipment supplies and refuse (oil, grease, gasoline, diesel, paint, and other petrochemical derivatives) must be centrally stored. Wastes must be removed from the Refuge immediately following completion of drilling operations and disposed of properly. In the event of an accidental spill or discharge of oil, brine, or any other petrochemical substance, the Operator must immediately notify the Refuge Manager or authorized representative. The Operator must remove contaminated soils for proper disposal off Refuge and replace them with the same type soils or one specified and approved by the Refuge Manager or the Service AO. A site reclamation plan may be required by the Refuge Manager or the Service AO.
- 4) All disposable type materials and trash brought onto the Refuge or generated at the drill site must be removed from the Refuge on a weekly basis and upon completion of the drilling activities. The drill site and operational area must be kept free of debris and trash at all times. Trash must be contained securely at the drill site in such a manner (fully enclosed trash cages) to prevent trash from being spread by wind or wildlife. No trash may be disposed of or buried on the Refuge.
- 5) Pits, ponds, and/or open tanks are prohibited. Fully enclosed portable tanks must be used in circulating operations for the temporary storage of all drilling fluids, cuttings, mud, and contaminants. All drilling fluids, cuttings, mud, contaminants, portable tanks, and other equipment must be transported off the Refuge to a State-approved facility upon cessation of drilling activity. Onsite disposal of drilling fluids is prohibited.

Cultural Resources and Native American Concerns

- 1) Thurston has conducted a Class III cultural resource survey on lands that would be affected by surface-disturbing activities and will avoid all sites determined to be eligible to the NRHP or will perform mitigation as recommended by the cultural resource consultant and directed by the AO. The results of the survey were submitted to the Service.
- 2) In the event that unanticipated cultural resources are uncovered during surface-disturbing activities, procedures outlined in the Service's 614 FW 2, Survey and Identification Manual (USFWS 1992) and other applicable regulations would be followed. Thurston would suspend operations at the site and immediately contact the Service, who will arrange for a determination of eligibility in consultation with the State Historic Preservation Office (SHPO) and if necessary, will recommend a recovery or avoidance plan.
- 3) If the proposed surface disturbance will affect an NRHP-eligible site, data recovery will be performed. Data recovery will include detailed recordation and archival research. The gathered information will be analyzed and described in a report that details the results of the investigation. The report will be submitted to the Service and the SHPO in Salt Lake City.
- 4) Thurston is responsible for informing all persons in the area who are associated with this project that they may be subject to prosecution for knowingly disturbing historic or archaeological sites or for collecting artifacts. All vehicular traffic, personnel movement, and construction and restoration activities would be confined to the areas evaluated in the pre-disturbance survey.
- 5) Thurston will educate its contractors and employees about the relevant Federal regulations intended to protect cultural resources. Furthermore, Thurston will educate staff and contractors regarding illegal collection or destruction of cultural resources. All vehicular traffic, personnel movement, construction and restoration activities will be confined to existing roads and to areas cleared by the site inventory unless mitigation measures are undertaken. In the event historic or archeological resources are uncovered during construction, work will stop immediately and the Service AO will be notified.

Paleontological Resources

- 1) Thurston has conducted paleontological surveys on lands that would be affected by surface-disturbing activities. Recommendations to minimize potential damage to paleontological resources (e.g., a permitted paleontologist will be present to monitor construction in certain circumstances) will be followed. The results of the survey were submitted to the Service with the APD for each well.
- 2) Thurston will educate its contractors and employees about the relevant Federal regulations intended to protect paleontological resources. All vehicular traffic, personnel movement, construction, and restoration activities will be confined to existing roads and to areas cleared by the site inventory unless mitigation measures are undertaken. If any potential paleontological resources are uncovered during construction, work will stop immediately in the area and the Service Authorized Officer (AO) will be notified.

- 3) Per consultation with the Utah SHPO, a contracted paleontologist will be onsite when construction occurs.
- 4) If paleontological resources are uncovered during ground disturbing activities, Thurston would suspend all operations that would further disturb such materials and immediately contact the AO, who will arrange for a determination of significance, and, if necessary, recommend a recovery or avoidance plan.

Aesthetics

- 1) Cuts and fills would be kept at a minimum and blended with the natural environment to minimize disturbance to visual resources;
- 2) During all phases of this project, noise levels must be kept to a minimum and should not exceed the established industry standard above ambient day and nighttime noise levels.
- 3) Thurston must implement the following measures and/or conditions to reduce the impacts on daytime and nighttime visual resources:
 - a) All permanent (onsite 6 months or longer) structures either constructed or installed infrastructure must be painted a flat, non-reflective, earth-tone color (Covert Green), as determined by the Service AO, to blend with the natural landscape background.
 - b) During pad construction, when erecting or disassembling the drilling rig, and during production, outdoor lighting should be kept to a minimum and turned off when not needed.
 - c) Whenever possible, each series of lights must be either on a separate switch, timer, or motion sensor to allow the operator to tailor their use to activity in a specific area of the drill pad.
 - d) All area lights must be downward pointing and fully shielded, with the exception that upward angled lighting would be used during the operation of the drilling rig in order to provide a safe working environment for drilling personnel. All lighting focused on a particular apparatus must be laterally shielded so that all light falls upon the intended work area and a minimum amount of light is emitted sideways or upward.
 - e) Lights that are required by OSHA for emergencies must be linked to alarms so that they are only operational when an emergency situation arises.
 - f) No light shall exceed 400 watts.
 - g) All lamps must be ≤ 3500 ° Kelvin color temperature to reduce blue-rich light, which causes greater sky glow and is typically more attractive to wildlife.

- h) A Service designee will observe the facility from critical angles and distances. Excessively glaring lights must be shielded, re-aimed, or otherwise mitigated with an adaptive approach without compromising worker safety requirements.
- i) Following well completion, lights at the pumpjack area and tank battery area will be kept off except when needed for emergency maintenance.
- j) Lighting will be minimized where applicable unless safety is an issue.