Plan of Operations

Iron Point 3D Seismic Project
Gunnison Energy LLC

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1.0 INTRODUCTION

Gunnison Energy LLC (GELLC) proposes to conduct a 3-D seismic program (Iron Point 3-D Project) north of Paonia in Delta and Gunnison Counties, Colorado. GELLC has current leases in both private and federal lands in the Project. The surface ownership in this area consists of both lands administered by the US Forest Service (USFS), the BLM and private lands (see attached Map). The earliest proposed action is expected to begin no earlier than Spring in the project year, during dry conditions. The earliest proposed action of the project will be conducted by surveyors and archeologists. Mobilization of drilling or any heavy equipment will begin July 1st of the project year on Federal land and done in consultation with CPW on private land if any work begins before July 1st.

The purpose of the seismic exploration is to gain a better understanding of the subsurface geology to determine if there is oil and gas potential and to also determine the best locations for exploratory drilling. The seismic exploration program will also provide information allowing identification of subsurface features that could impede drilling. Without the seismic program, the exploratory program would require more exploratory wells to provide similar information.

The 3-D seismic program will be conducted in two phases. The first phase (seismic surveying) will be conducted in support of permitting the program and will include land surveying of source and receiver locations along with access in support of cultural resource surveys on USFS lands which will be conducted concurrently with the seismic land surveying. The second phase will be the recording phase and will include the placement of source and receiver lines, heliportable shot hole drilling, data acquisition, and cleanup. The proposed Project includes the use of vibroseis buggies along roads and on other lands where appropriate and shot holes (buggy drilled and heliportable as appropriate) as the energy source. The seismic program is currently anticipated to last approximately 40 – 60 days.

2.0 SEISMIC SURVEY

To accurately define the extent and locations of project activities, a land survey crew will locate and place temporary pin flags at receiver and source points using a high-accuracy global positioning system(GPS). Several one or two-person crews will establish and flag the receiver and source point locations as well as access routes. The survey crew will be responsible for positioning receiver and source point stations such that they avoid all known and apparent cultural and natural resources, and existing topographical features. These locations will be modified as additional topographical, natural and cultural resources are identified. Vehicles bringing surveyors to and from the project area will remain on existing roads and trails. Crews will travel cross country on all-terrain vehicles (ATVs) and on foot during the survey. Snow mobiles are not expected for this project but may be used if adequate snow cover exists and USFS approval is received on administered lands. Cutting of vegetation is not expected to be required.

3.0 CULTURAL SURVEY

A Class III Cultural Resource Inventory will be conducted, if required, on lands administered by the USFS. Each source line, a portion of the receiver lines (to be determined – as required for access), and additional access routes will be walked. Within the project area, there are approximately 412 miles of source and receiver lines proposed on public lands. The inventory will include avoidance routes around any eligible sites that are located along source lines and any access routes or two tracks (snail trails) needed by the seismic crew on public lands.

It is not anticipated that a Class III cultural resource survey will be required on lands administered by the BLM as the current design allows for receivers on the limited BLM lands within the project area to be deployed on a walk only basis and possibly a limited number of source locations on existing roads.

GPS technology and field computers will be used to collect field data as efficiently as possible. The shape files of the surveyed or proposed lines and access locations will be loaded onto crew GPS units. The GPS units will also be used to record site data. Site and project data will be transmitted back to the contractor offices on a nightly basis to allow for changes in the seismic program design so that any eligible sites can be avoided. The land survey team will then record re-routes for source lines and access to ensure resource protection. Recording of prehistoric and historic sites (eligible and non-eligible) including isolates and scatters will follow protocols provided to the crews prior to fieldwork. Site, scatter and isolate definitions will follow USFS and State Historic Preservation Office (SHPO) standards. The protocols will guide how the standards are applied.

4.0 PROPOSED OPERATIONS

The 3-D seismic program includes the generation of acoustic energy transmitted into the ground using dynamite as well as vibroseis buggies. The recording equipment includes a series of geophones, which are magnets with a copper coil surrounding the magnet, a recording box and a battery (see Photos 1 and 2). Each set of geophones will be connected to a separate recording box and battery at each receiver location throughout the project area.

The Project involves a series of 32 source lines oriented in an east/west pattern and 80 receiver lines oriented in a north/south pattern that total approximately 620 miles (416/receiver and 204/source). Of the 416 miles of receiver lines, 275 miles cross USFS-managed lands, 5 miles cross BLM managed lands and 136 miles cross private lands, and of the 204 miles of source lines, 132 miles cross USFS-managed lands and 72 miles cross private lands. Vibroseis buggies will be used to produce seismic waves at the source points along existing roads and trails and on any other lands that are appropriate for their use. Where vibroseis buggies are not appropriate due to topographical relief, slope or forest cover dynamite shot holes will be used as the energy source. Where appropriate to field conditions the shot holes will be drilled using wheeled or tracked drill buggies. Much of the project area has slopes and terrain that is both inappropriate and/or not accessible to wheeled or tracked buggy drills (see attached slope map). In these areas shot holes will be drilled using heliportable shot hole drill rigs. Shot holes will use 2.2 pounds of dynamite at depths of 20 to 30 feet. Heliportable shot hole drill rigs will

significantly reduce surface and vegetation disturbance in slopes of greater than 15 percent. Shot holes will be plugged per Colorado regulations.

It is currently anticipated that all staging (equipment and helicopters) will be on private property within the project area on previously disturbed ground.

Portions of the project area fall within USFS roadless areas (see attached Seismic Pre-Plot map). Within these areas operations will be conducted using either heliportable deployment of both personnel and equipment or via ATV if operations can be conducted in such a way as to not cause damage to the surface. Snow mobiles are not expected but may be used if adequate snow cover exists and USFS approval is received on administered lands. No roads will be constructed in any portion of the project area, and none of the activities are surface disturbing beyond the 3-inch diameter shot holes.

The Project design calls for approximately 4,900 source points that run east/west in parallel lines and are approximately 1,320 feet apart. The receiver operations would employ an array of approximately 10,050 receivers spaced 220 ft apart in lines that are approximately 660 feet apart, with a set of geophones at each receiver station. Receiver stations will not be connected to one another.

The source and receiver lines will use a 220-foot station interval. Helicopters will be used to lay out the receiver lines in most areas while receivers in some areas may be deployed on foot, snowmobile or by ATV.

When enough sources have been recorded such that a receiver line is no longer active, it will be picked up and moved from the trailing end of the active recording patch to the front edge of the patch in an assembly line fashion to allow recording to move smoothly across the project area. Each receiver line is expected to be on the ground for 2 to 3 weeks. Line maintenance may be required once the receiver lines are laid out. This will be conducted using ATVs, snowmobiles and/or on foot depending on the line location.

Photo 1 – Geophone along Receiver Line

Photo 2 – Receiver Line Layout

Photo 3 – Recording box and battery

5.0 SCHEDULE AND WORKFORCE

The seismic program is currently anticipated to begin no earlier than spring 2019, and will last approximately 40-60 days, and will require roughly 50 workers (depending on the contractor crew size). Seismic operations will be conducted 7 days per week during daylight hours. Field operations will be coordinated with any wildlife stipulations and avoidance buffers that may be in affect within the project boundary such as for Elk and Mule Deer (see attached Wildlife Stipulation map). Existing roads and trails will be used for access to the project area. Vehicles anticipated during seismic operations include 8 to 12 pickup trucks (e.g., line trucks, flatbed trucks, etc.), 1 fuel truck, 2 vans, 10 to 15 ATV/Kubota's/snowmobiles, and up to 5 vibroseis trucks, one helicopter and up to 8 shot hole drill rigs.

6.0 PROJECT MEASURES TO PROTECT RESOURCES

6.1 CULTURAL

If unknown cultural resources are found during operations (Phase 2 after Class III inventory in Phase I), GELLC will implement an Unanticipated Discovery Plan for Cultural Resources which includes immediate stoppage of all work in the vicinity and immediate notification of the USFS designated point of contact.

Prior to commencement of operations, GELLC will inform all employees and contractors of the requirement for compliance with the National Archeological Resources Protection Act (NRPA), Colorado SHPO specific guidelines, and the National Historic Preservation Act (NHPA).

6.2 WILDLIFE RESOURCES

GELLC will inform employees and contractors that harassing or shooting of wildlife will not be permitted, dogs may not be brought to the project area, no firearms will be allowed, and no smoking will be allowed on site, and there will be no littering. A 300-foot buffer distance will be maintained from Cutthroat designated drainages unless access is provided with existing roads, per the attached map.

6.3 SOILS AND VEGETATION

No truck traffic will be operated during wet periods or in areas of saturated ground when surface rutting could occur. If operations cause unplanned surface rutting or have otherwise removed all surface vegetation, the areas will be reclaimed and reseeded as directed by the USFS.

6.4 EXISTING FACILITIES

A 300-foot buffer distance will be maintained from hazards (infrastructure, houses, barns, concrete pads, radio antennae).

Any facilities damaged in connection with this seismic operation will be immediately restored to original condition or replaced with a similar facility.

Fences will be avoided, and gates will be used whenever possible. Gates will remain the position found after going through them. Any gates or cattle guards damaged in connection with this seismic operation will be immediately restored to original condition or replaced.