A Multi-Pronged Management Approach to Manage a 3-D Seismic Program in a Complex Environment

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Abstract
The Big Sky Carbon Sequestration Partnership (BSCSP) recently completed a large seismic survey in Toole County, MT. This survey was partially funded by the US DOE in a remote location with sensitive areas that needed to be avoided. Due to the funding source and the myriad of public and private landownership, all activities needed to be conducted in compliance with several state and federal laws as well as in compliance with signed agreements. Additionally, the surveys were conducted in the winter with extreme weather conditions. To ensure safety and compliance with regulations and agreements, the management team developed the following approach:

A collaborative permitting effort was employed to obtain and track landowner permits and the permits were accessible through an online interactive mapping platform. BSCSP management held mandatory pre-season orientation sessions for crews at the beginning of each seismic season. Morning crew meetings were held daily to discuss safety, work plans, compliance, permits, and any other issues. The daily travel routes of each vehicle involved was tracked using a GPS for compliance verification and new maps were produced and distributed to the crews and management daily. Weekly management meetings were held with leadership to build relationships and resolve any issues. The field crews and BSCSP Field Office were located in a motel to improve communications and facilitate transfer of information. The team employed two ‘birddogs’ for oversight in addition to the BSCSP field manager. This was complemented by visits from upper management to provide leadership and resolve issues.

Description of the Seismic Survey

The BSCSP’s seismic survey covered 37 square miles and was conducted on land owned by 69 private landowners, the Montana Department of Natural Resources (DNRC), US Bureau of Land Management (BLM) and the US Fish Wildlife Service (USFWS). Due to federal funding, the seismic survey was subject to an Environmental Assessment for National Environmental Policy Act (NEPA) compliance. The majority of the permits obtained for the seismic survey contained specific stipulations that must be adhered to for regulatory compliance. For example, in consulting with the USFWS, the project agreed to start work after the local farmers harvested their crops in the fall. Additionally, the project agreed to avoid sensitive resources and wetlands that needed protection. To ensure that the sensitive resources were protected and that the crews only traveled on lands with permits within the travel corridors. All drivers had tablets with GPS maps that were updated daily with the approved travel and permit information. The compliance rules were printed on laminated cards and it was integrated with existing field operations. The application provided constant communications on permit status and it was simple to use for users ranging in technical ability; it reduced liability and risk of someone not knowing the correct status of a permit; it was easy to use for users ranging in technical ability; and it was integrated with existing field operations. The application showed all of the data in color-coded maps and provided status notes and copies of the permits files.

Permitting

The permitting was a collaborative effort between MSU and three subcontractors. Private permits were obtained by contacting the landowners by phone or in person visits. State and federal permits were obtained by working with the regulatory agencies. The most challenging part of the permitting effort was coordinating information between the teams obtaining the permits and the crews working in the field. To solve this problem, the MSU team developed a browser based application that allowed managers and field crews to access a central database with editing capabilities. This application provided constant communications on permit status for people in remote locations; it reduced liability and risk of someone not knowing the correct status of a permit; and it was simple to use for users ranging in technical ability; and it was integrated with existing field operations. The application showed all of the data in color-coded maps and provided status notes and copies of the permits files.

Preseason Training

The seismic survey was the first on the ground activity of an 8+ year carbon storage project. It was very important that everyone involved knew that this was a long term project and that there were many permitting stipulations and compliance regulations. The project also placed great importance on developing and maintaining long-term relationships with the landowners and local communities. The project had many cultural resources and wetlands that needed protection. To ensure that all crew members knew about the long term goals and objectives for the project, MSU held a mandatory training for every person working on the project. The trainings covered information on the project’s background, its high visibility, the project’s communication plan and guidelines, safety, do’s and don’ts and training on the protection of wetlands and cultural resources. This training helped reduce compliance and safety risks for the project and improved overall communications.

Operational Management

The survey was designed with 100% wide approved corridor travel routes that were centered on the source and receiver lines. Areas outside of the corridors were restricted since they had not been surveyed for sensitive resources. If the crew went outside of the approved travel corridors, there could potentially be compliance violations and grave consequences for the project. The management team took several measures to ensure that the sensitive resources were protected and that the crews only traveled on lands with permits within the travel corridors. All drivers had tablets with GPS maps that were updated daily with the approved travel and permit information. The compliance rules were printed on laminated cards and it was integrated with existing field operations. The application provided constant communications on permit status and it was simple to use for users ranging in technical ability; it reduced liability and risk of someone not knowing the correct status of a permit; and it was simple to use for users ranging in technical ability; and it was integrated with existing field operations. The application showed all of the data in color-coded maps and provided status notes and copies of the permits files.

Interactive Mapping

The team agreed to start work after the local farmers harvested their crops in the fall. Additionally, the project agreed to perform on lands with permits within the travel corridors. All drivers had tablets with GPS maps that were updated daily with the approved travel and permit information. The compliance rules were printed on laminated cards and it was integrated with existing field operations. The application provided constant communications on permit status and it was simple to use for users ranging in technical ability; it reduced liability and risk of someone not knowing the correct status of a permit; and it was simple to use for users ranging in technical ability; and it was integrated with existing field operations. The application showed all of the data in color-coded maps and provided status notes and copies of the permits files.

Conclusions

The management team is proud that the teams worked together to successfully collect seismic data while protecting sensitive resources and maintaining good relationships with the landowners, permitting agencies and the Blackfeet nation. The management recommendations described above helped to successfully manage a complex seismic program and could be applied to other large scale projects.

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