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Remote QC of Land Seismic Acquisition

Stephen K. LaFon[1]

[1]Exploration Operations, Saudi Aramco, Dhahran, Saudi Arabia.

ABSTRACT

In general, a lack of complete software tools to adequately control the quality of seismic acquisition will likely lead to inconsistent results, data errors, and delays in delivery of seismic data. In the past few years, with the industry adoption of high-productivity methods of seismic acquisition, the necessity of timely and effective quality control (QC) became even more critical due to the large volumes of data generated. In 2014, Saudi Aramco began a project to develop a complete set of software tools to systematically QC all of Saudi Aramco's land seismic data acquisition. These tools evaluate and analyze all available relevant acquisition system files and seismic support data. Quality control checks include GPS quality (such as number of GPS satellites used and positioning precision levels), source positioning, source performance (phase, distortion, and drive levels), recording spread quality (tilt values, resistance levels, distortion, etc.), and many more. Allowable tolerances and specifications are based on the seismic equipment manufactures' specifications and Saudi Aramco's work procedures and standards. The QC process is run remotely from a central location for efficient operations and provides a higher level of visibility across all the land seismic crews. As a result, all Saudi Aramco land seismic acquisition benefits from a consistent and effective QC process that enables efficient delivery of operational data, analysis, and reporting results. Up to 6 million items of QC information are evaluated for a single seismic crew on a daily basis. In addition, the QC evaluation from a central location with higher visibility enables the identification of operational best practices and gauging relative performance between seismic crews. A description is given of the design, development, and prototyping of the QC tools. This system is the basis of a current Saudi Aramco project to fully integrate these tools into the corporate's solution for data storage and handling.