Seismic Acquisition and Processing Attributes Optimization In Structural Interpretation

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Abstract

Today's high productivity of seismic acquisition "supercrews" result in very large data volumes being created . Part of this data volume is a large set of metadata such as navigation data, vibrator performance attributes and Source-Receiver attributes. In blended acquisition, the net volume of metadata is even larger, before being reduced and refined in seismic data processing. During seismic data processing, only a subset of the metadata can be passed along with the common deliverable seismic volumes. However, during seismic interpretation, there could cases where the metadata is needed to investigate seismic data acquisition imprints and key surface conditions as inferred from vibrator performance data. Due to the bulk nature, management of this data is commonly limited to file storage of "final" products in network drives and Robotic Tape library (RTL) based Seismic Data Management (SDMS) systems. Extraction and loading the data from such systems requires a considerable amount of time and knowledge of the data base, which hinders such an investigation. Hence, Considering the growing demand for data access in the organization with respect to both seismic survey and acquisition QC data, a **unique data management system** is developed to manage seismic survey, navigation, and acquisition attributes, and reports. The solution mainly constitutes of commercial software that includes Navigation, Horizons/Event and Knowledge management system (KMS) modules. Seismic acquisition files and reports are individually processed to produce survey metadata, navigation data and advanced attributes of vibrator Quality Control . The navigation management module covers the comprehensive details of the survey metadata while coordinate data is managed as 2D navigation lines. Horizons/Event modules cover the wide range of acquisition attributes as surface layers for elevation, vibrator source points, output signal phase, frequencies and force etc. The reports and original data are managed and linked to their respective survey in the Knowledge Management System (KMS). Key benefits of inclusion of seismic data acquisition meta-data relate an easy access database is preservation and management of valuable company assets, easy search functionality, and direct access of acquisition attributes in interpretation suites, access to the acquisition attributes in advanced seismic studies is the unique feature that allows the interpreters to actively use basic details of data acquisition in data quality analysis, determination of surface features, inconsistencies in data, geological features confirmation and impact of acquisition parameters on interpretational seismic volumes.