Enhanced Oil Recovery

Directly delivering reagents through an injection well is a common means to increase the efficiency of resource extraction in the oil industry. Known as Enhanced Oil Recovery (EOR), this technique can increase the amount of crude oil that can be extracted from an oil field. Geophysical monitoring, when coupled with EOR methods, can provide cost efficient volumetric information on rock and fluid properties in subsurface reservoirs, helping to understand the fate of the reagents and their intended target. Monitoring changes in geophysical parameters creates a better understanding of dynamic subsurface processes and allows for oil recovery methods to be refined to optimize injection strategies.

HGI has developed advanced geophysical monitoring technologies to help ensure the effective delivery of reagents to subsurface targets.

As secondary and tertiary recovery processes are implemented, they are accompanied by changing properties within the subsurface reservoir. One significant change in the majority of recovery methods is in the convectivity of the reservoir. Geophysical methods are used to record and monitor these changes over time.

Case Study

Rocky Mountain Oil Testing Center Injection

These figures demonstrate geophysical monitoring methods used to track a solution injection at the Rocky Mountain Oil Testing Center. The images to the left show a plan view of the electrical properties of a reservoir before an injection (top left), and the percentage change during the injection (bottom left). An example electrical response from a monitoring well during a series of surfactant injections is shown below.

Geophysical Monitoring

HGI has developed a number of unique tools to monitor changing electrical properties during oil recovery. These tools use existing field infrastructure (injection and production wells) coupled with a dedicated geophysical data acquisition trailer to provide near real-time monitoring.

Subsurface Imaging

To monitor injections, HGI built the GeoStation™ system—a state-of-the-art, 183-channel geophysical monitoring system that can capture a complete snapshot of subsurface conditions (on average) every 20 minutes GeoStation™, along with the latest advances in modeling algorithms, provides the high-resolution imagery needed to capture dynamic changes within a reservoir.

- Multi-channel module-based acquisition system allows for flexible configurations
- Monitor dynamic subsurface processes on the order of minutes to months
- Remotely operable through satellite communication link
- Applicable to any monitoring project where fluid conductivity contrast exists, i.e. contamination plumes

Geophysics You Can Trust

HGI has been advancing the field of geophysical monitoring for Oil & Gas, Heap Leach Mining, and Remediation using electrical methods for over 15 years. Our technologies have been proven to provide better accuracy, faster acquisition, and clearer results than competing methods. We create custom-fit solutions for individual client needs, making us an industry leader in the field of geophysics and geosciences.

HGI professionals have the skills and experience to support every aspect of your project from concept and design to acquisition and interpretation.