Course: Introduction to Microseismic Frac Monitoring

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Duration: 1 day	Price: Member:U$S 1000 Non members: U$S 1200

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Gas and oil shale plays are the fastest growing segment in E&P operations these days both in the US and around the world. These plays, uneconomic just a decade ago, are now accounting for an increasing percentage of our reserve base. It's not that the rocks have changed, but rather horizontal drilling and hydraulic fracturing have allowed for hydrocarbons trapped in these rocks to be extracted as never before.

Microseismic monitoring has become an important facilitator to the development of shale fields. As many as 5% of the hydraulic fracture treatments performed in the US are now monitored, with some operators opting to monitor every well as they develop their field. Driving the increased adoption of this technology is an appreciation of the complexity of shales. The response of the rocks is seen to vary from well-to-well and stage-to-stage. The need to monitor more wells at a lower unit cost has led to the deployment of permanent monitoring arrays.

An important development is the extraction of more information from these data. The original analysis was more directed at getting a better frac design. Recent developments are directed at producing a better understanding of how the reservoir will perform as a result of the frac'ing. Such analysis consists first of extracting the failure mechanism of each microseismic event from the data as well as its magnitude. The nature of the failure mechanism is deterministic of the stress regime in the reservoir. The distribution of event magnitudes also appears to be diagnostic as to whether new fractures are being created or existing fractures are being reactivated.

Taking this analysis further, one can actually make estimates of the fracture planes that created the microseismic events. With an assignment of permeability, the fracture model can be upscaled to a grid model that then can be used in a reservoir production simulation model to begin predicting well and field performance.

This one-day course will introduce you to the technology of microseismic monitoring, its roots in passive seismic, how the data are acquired, processed and analyzed and where the technology may go in the future.