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Recognition of Hydrocarbon Related Spectral Anomalies Using a Transect Method

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Many hydrocarbon reservoirs leak and the escaping fluids alter the rocks and soils through which they pass. This alteration of surface soils affects the vegetation as well. These changes in rocks, soils, and vegetation, though subtle, may be detected using spectrally sensitive satellite systems such as ASTER. Problems that have plagued using these spectral anomalies as exploration tools are that they are manifested differently in different environments and can be difficult to differentiate from background conditions.

By taking a spectral transect across a broad enough area, one can recognize spectral variations and differences that may signal the presences of a meaningful anomaly. These differences can include an incremental decrease in ferric iron, increase in kaolin at the expense of mixed layered clays, or change in vegetation communities.

This approach is useful in environments as diverse as Railroad Valley, NV and Upstate NY. In both areas, spectral transects across existing oil fields demonstrate the usefulness of this technique.