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Timothy S. Collett[1], Tom Lorenson[2] (1) U.S. Geological Survey, Denver, CO (2) U.S. Geological Survey, Menlo Park, CA

The Eileen-Tarn Gas Hydrate Petroleum System, Northern Alaska

For the most part, the seismic and well-log inferred gas hydrate accumulations in northern Alaska are restricted to the updip portion of a series of lower Tertiary near shore deltaic sandstone reservoirs that overlie the more deeply buried Prudhoe Bay and Kuparuk River oil fields. The occurrence of the Eileen and Tarn gas hydrate accumulations in the Prudhoe-Kuparuk area have confirmed the possibility that gas hydrates may represent an important energy resource for the future. However, significant to potentially insurmountable technical issues need to be resolved before gas hydrates can be considered a viable energy resource option.

One of the primary objectives of the U.S. Geological Survey gas hydrate research efforts in northern Alaska is to document the geologic parameters that control the occurrence of gas hydrate. The Eileen and Tarn gas hydrate occurrences can be grouped into a single petroleum system, which contains a mixture of deep-source thermogenic gas and shallow, microbial gas that was either directly converted to gas hydrate or was first concentrated in existing conventional traps and later converted to gas hydrate in response to climate cooling or changes in surface conditions. The distribution of the Eileen and Tarn gas hydrate accumulations appear to be controlled in part by the presence of large scale regional faults that may have acted as vertical gas migration conduits. The occurrence of gas hydrates in a definable petroleum system provides us with an exploration model and ''play'' concept that may be used to predict where similar occurrences might be found in unexplored regions.