

Shallow Coalbed Gas Assessment at Fort Yukon, Alaska

BARKER, Charles E.¹, CLARK, Arthur C.², CLOUGH, James G.³, MACLEAN, Elizabeth⁴, OGBE, David O.⁵, CLAUTICE, Karen H.³, WEEKS, Edwin P.⁶, and FISK, Robert F.⁷

¹US Geol Survey, PO Box 25046, Denver, CO 80225-0046, barker@usgs.gov

²U.S. Geol Survey, Mail Stop 406, Denver Federal Center, Denver, CO 80225

³Alaska Div. of Geological & Geophysical Surveys, 3354 College Road, Fairbanks, AK 99709-3707, jim_clough@dnr.state.ak.us

⁴U.S. Bureau of Land Management-Alaska, 6881 Abbott Loop Road, Anchorage, AK 99507

⁵Petroleum Engineering Dept, Univ of Alaska Fairbanks, P.O. Box 755880, Fairbanks, AK 99775

⁶U.S. Geol Survey, Mail Stop 413, Denver Federal Center, Denver, CO 80225

⁷U.S. Bureau of Land Management-Alaska, 222 W 7th Ave. #13, Anchorage, AK 99513

Rural communities in Alaska have very high energy costs for electrical power generation and space heating needs that are typically 3–5 times that of urban Alaska. To sustain a community through the entire winter, large oil storage facilities hold the diesel fuel delivered by barges or air transport during the summer, presenting the potential for catastrophic fuel spills during transportation, and surface and ground-water pollution from leaking storage tanks. With approximately 40 remote communities situated on or near coal deposits, one potential source of energy is coalbed gas, a clean burning fuel that is comparable in heating value (~1,000 Btu/scf) to conventional natural gas.

In 2004, a cooperative effort between federal and state agencies and the university of Alaska Fairbanks began evaluating the shallow gas potential in Fort Yukon, Alaska, a remote community of more than 500 people situated above the Arctic Circle on the banks of the Yukon River. This project was designed to demonstrate the use of a light weight slim hole coring drill rig and obtain the necessary data to assess the economic and environmental feasibility of producing natural gas from Tertiary-age lignitic coal that underlies Fort Yukon. In June 2004 the drill rig and associated equipment were shipped to Fort Yukon via river barge. The rig was sited directly over a 1994 USGS climate test hole to utilize existing surface conductor casing through Holocene river gravels. Drilling began August 21, 2004, with coring of the first lignite at a depth of approximately 1,280 feet on August 26. A second coal seam was successfully cored on September 1 at a depth of approximately 1,905 feet with the final hole depth of 2,287 feet reached on September 3. Coal core samples have been analyzed for their methane content, formation transmissivity and water quality, and economic modeling is underway. Preliminary results of gas content analyses indicate an average of 20% to 30% gas saturation in targeted coal seams, with a maximum of about 50% in one canister. Based on these test results, the low gas saturation levels would likely require pumping large volumes of water from the coal seams in order to produce gas. Preliminary water quality analyses indicate that the subsurface water is potable.