EXECUTIVE SUMMARY

Natural gas is marketed on the basis of its heat content (950 BTU/cu ft or higher). U.S. pipeline specifications vary but generally require nitrogen (N_2) to be less than 5% resulting in 32 tcf (17% of known reserves) to be categorized as low-BTU "sub quality". N_2 is thus a major target for removal to upgrade natural gas to pipeline quality. A significant portion of the nation's N_2-rich low-BTU gas is trapped in modest to small fields owned by stripper operators, or isolated behind pipe. These small fields are not amenable to upgrading technologies such as cryogenic separation and conventional pressure swing adsorption (PSA) because these fields cannot usually deliver the large feed volumes necessary for profitable operations of these types of technologies.

In an attempt to encourage economically viable upgrading of low-BTU gas from stripper wells, a demonstration project that encompasses the planning, design, construction, operation, and optimization of an easily built, low-cost, 2-tower micro-scale PSA plant for N_2-rejection using non-patented processes and commonly available equipment is proposed. User-friendly public-domain or inexpensive well-analysis software will determine likely feed volumes (anticipated to be from 40 to 200 mcfd) which, in turn, will dictate the size of key components in the plant. The proposed plant will use easily obtained and inexpensive activated adsorbent charcoal. It will be designed to be mobile and scalable, with skid-mounted units being attached or detached depending on input volumes. It will have a small environmental foot print (400 sq. ft) and will produce no volatile organic compounds (VOCs). Labor and maintenance costs for the plant are anticipated to be minimal, for it will have few moving parts (<10) outside the engine and compressor, and will not require more than two daily visits by the operator.

This project is a joint effort by the Kansas Geological Survey and American Energies Corporation (a company that primarily operates stripper wells in Kansas). The project along with technology transfer workshops (to be scheduled upon completion) will show that stripper gas well operators can easily build micro N_2-rejection plants for about $100,000, operate it at attractive rates of return (of at least 40%), and significantly add (~1 tcf) to the nation's reserves.