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The Proposal Review Committee
The National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Proposal Title: Conceptual Design for DUSEL at Kimballton, Virginia

Dear Committee Member,
This is a letter of interest and support for the above-mentioned proposal. Research in my laboratory deals with biochemical basis for microbial diversity. We are investigating the strategies that a deep-sea hydrothermal vent microorganism uses to survive and thrive in the extreme environment that exists in its habitat. In a U.S. Department of Energy (DOE) supported project we are examining the possibility of converting a part of coal to methane by use of microbes isolated from the coal beds. In another DOE supported project we are studying the microorganisms that consume methane under low oxygen tension.

We are very interested in learning the evolutionary processes that occurs in the subsurface. In particular, we are interested in learning the changes that occurred in the mesophilic microorganisms after they descended from hyperthermophilic ancestors. Such an understanding has a very applied relevance. Many of the microorganisms that are currently carrying out important geological processes at the subsurface formations, such as cola beds, are the descendents of early mesophiles that developed on the earth surface. An understanding the evolutionary processes (changes in the genetic make up and physiological characteristics) that made these descendents fit for the environment they live in, will help to design processes such as in situ bioconversion of coal or liquid hydrocarbon to methane or sequestration of carbon dioxide. It is also likely that the knowledge of the novel survival strategies of these organisms will help to develop biotechnological processes of commercial value.

The Kimballton site offers a very preferred location for the above-described research. It has the geological formations that we have been looking for. It has rock layers that at one time were on the surface. Since they have been buried, these layers remain isolated from the changes that occur on the surface. Therefore, the Kimballton site offers a chance of looking into very focused evolutionary processes.

Another attraction of this site is that, it will be investigated by geologists, hydrologists, physicists, material scientists and other biologists. These experts will uncover many aspects of the site that will definitely bring a synergistic effect to our work. For example, we will need information on the changes of the mineral and organic composition and in the physical parameters of the layers and that information will come from the geologists and the hydrologists. Our work will lead to the isolation of novel microorganisms that

may be useful to the experts working on carbon dioxide sequestration and bioremediation. I see a great opportunity of collaboration.

The examples that I presented above also apply to the environmental and evolutionary microbiologists and biochemists at large. I am certain that many of my colleagues will use the Kimballton site for their experiments and will collaborate with other investigating teams. I will work as a member of the Kimballton team to attract this community to the proposed deep surface laboratory.

Sincerely,

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