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A Proposed Borehole Scientific Laboratory in Quay County, New Mexico, USA

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Our team has received funding from the US Department of Energy to initiate a Deep Borehole Field Test that will develop a subsurface test site to evaluate the drilling and scientific aspects of deep borehole disposal of nuclear waste in crystalline rock. Phase 1 of the project will focus on Public Outreach and land acquisition whereas Phase 2 will generate a drilling and testing plan and secure regulatory approvals. Phase 3 will complete the Drilling and Testing Plan and Phase 4 will include the drilling and testing. Phase 5 will be devoted to borehole science and experiments with emplacement technology. Although we are specifically considering issues associated with the disposal of waste, this project is a proof of concept, and no waste will be emplaced at our site. In brief, the concept envisions an 8-1/2 inch open-hole completion at a depth of 5000 m in crystalline rock. There will be an extensive program of sample collection (including core) and analysis as well as geophysical logging and borehole testing. Critical issues will be low permeability in the crystalline rock as well as the ability to manage borehole quality. Our team has proposed a site in Quay County, New Mexico that has an 850 meter thick Paleozoic section overlying homogeneous Precambrian granite. A subsequent phase of the project may drill a second hole with a 17-1/2 inch completion located about 200 m from the first. Our long-term plan is that this site will be managed as a deep scientific observatory that also provides a facility for scientific experiments and testing of borehole infrastructure and drilling equipment.