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December 12, 1996

Dr. Daniel Dreyfus, Director  
U.S. Department of Energy  
Office of Civilian Radioactive Waste Management  
Room 5A-085  
1000 Independence Avenue SW  
Washington, DC 20585

Mr. Wesley E. Barnes, Project Manager  
U. S. Department of Energy  
Yucca Mountain Site Characterization  
Office, M/S 523  
Post Office Box 98608  
Las Vegas, NV 89193-8608

**Annual Report**

Dear Dr. Dreyfus and Mr. Barnes:

The *Annual Report of the Nye County Nuclear Waste Repository Project Office Independent Scientific Investigations Program* is enclosed for your information and use. The Report is the second produced by the Nye County Nuclear Waste Project Office (NWRPO) since the instigation of its Independent Scientific Investigation Program (ISIP) [see NWRPO, 1995]. Nye County fully believes that the quality of our efforts, and the value they have provided for all parties responsible for considering Yucca Mountain health, safety and environmental impact issues, warrant ongoing financial support from the federal government.

This Report is a preliminary document that summarizes the first year of monitoring data from two boreholes that were instrumented by Nye County in March and April of 1995, as well as monitoring data collected from instrumentation mounted on the tunnel boring machine in the Exploratory Study Facility (ESF) tunnel. The Report provides representative examples of observations, and limited and preliminary interpretations for the purpose of discussion. Further evaluations of these results may provide alternative interpretations. Therefore, these preliminary interpretations do not constitute and should not be considered as the official position of Nye County.

NWRPO's ISIP presently includes borehole and tunnel instrumentation, monitoring, data analysis, and numerical modeling activities. NWRPO has installed and is currently monitoring pressure and temperature instruments in boreholes UE-25 ONC#1 and USW NRG-4 to evaluate the long-term pneumatic conditions at strategic depths in the subsurface both in response to fluctuations in atmospheric conditions and in response to other possible disturbances resulting from site characterization activities such as ESF tunnel construction. Nye County has also installed instruments to measure temperature, pressure, and humidity within the ESF tunnel to characterize the air being used to ventilate the tunnel which could potentially impact the performance of the repository. Finally, Nye County is conducting numerical modeling simulations to evaluate factors (including tunnel ventilation)

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which affect both short-term and long-term pneumatic and moisture conditions in the repository host rock.

The design of ISIP accounts for several key scientific issues that could be significant for repository conceptual design and performance but, in Nye County's judgement, are not currently being adequately addressed by the U.S. Department of Energy's (DOE) Yucca Mountain Program (YMP). These issues include the following:

- Spatial characterization of pneumatic properties and pneumatic potential of the repository host rock.
- Potential geochemical disturbance of the repository host rock caused by site characterization activities such as construction of the ESF.
- Collection of pertinent data from the repository site before it is disturbed by characterization activities and could not be readily obtained after construction of the ESF.
- Characterization of hydraulic properties of the deep hydrogeologic units and understanding of the geologic and hydrogeologic system in these units.
- The nature of the steep groundwater gradients to the north and west of the repository.
- The western boundary of the repository block and, potentially, the interaction of the atmospheric processes with the repository horizon in the Solitario Canyon where the repository horizon is exposed.
- Radionuclide diffusion and dispersion investigations in the saturated zone.

As a result of the analysis and simulation of the ESF tunnel climatological data collected, Nye County has found that substantial moisture is being removed from the rocks penetrated by the tunnel ventilation. One conclusion is that it is possible to design a repository that is naturally ventilated with peak rock temperatures of less than 30 degrees Celsius over a 10,000-year period. Simulations have also demonstrated that the capillary pressure distribution would promote a strong gradient for water flow towards the emplacement tunnel during the entire 10,000 years. NWRPO believes, therefore, that the long-term waste containment implications of a naturally-ventilated repository warrants additional analysis.

As you are aware, Nye County has requested funding to perform several additional investigations to understand some of the issues outlined above. New wells have been proposed to be installed in both the saturated and unsaturated zones for sample collection and testing, and subsequent data analysis and modeling.

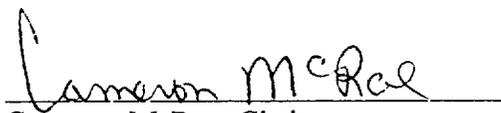
Dr. Daniel Dreyfus and Mr. Wesley Barnes

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Nye County appreciates the support you have shown our program. Should you or your staff like to discuss this letter of Nye's proposal for financial assistance, I can be reached at (702) 727-5777 or Nick Stellavato, NWRPO On-site Representative can be reached at (702) 295-6142.

Sincerely,



Cameron McRae, Chairman

Nye County Board of Commissioners

Enclosure (2 Volumes)

*on the shelf*

cc: Richard Carver, Nye County Commissioner  
W. Wayne Perkins, Nye County Commissioner  
Ira "Red" Copass, Nye County Commissioner  
Jeffrey R. Taquchi, Nye County Commissioner  
Les W. Bradshaw, Nye County Manager  
Nick Stellavato, On-site Representative  
Parviz Montazer, Multimedia Environmental Technology, Inc.  
Phillip Niedzielski-Eichner, Governmental Dynamics, Inc.