

SUPPORT FOR CONTRACTOR REQUEST

CONTRACTOR: Dr. Everett L. Shock

RATE:

PERIOD OF PERFORMANCE: March 1, 1999 to March 1, 2000

STATEMENT OF WORK:

A review will be conducted on the aqueous geochemistry of actinides. A report will be prepared in collaboration with William M. Murphy on this subject. This review and the resulting report will be directly related to radionuclide mobilization and near-field transport at the proposed repository at Yucca Mountain. The data will be used in calculations for a set of near-field conditions. A preliminary outline of the report follows.

I. Introduction

II. Uranium and Thorium Concentrations in Natural Waters

- A. Generalities on Oxidation State, Speciation, Colloids, Sorption, and Rock Type
- B. Soil water
- C. Groundwater

III. Aqueous Concentrations of Natural and Fallout Transuranic Actinides

IV. Experimental studies of aqueous speciation

- A. Solubility studies
- B. Spectroscopic studies

V. Equation of State and Thermodynamic Properties of Ions

VI. Thermodynamic Properties of Aqueous Complexes

VII. Estimating Thermodynamic Properties of Aqueous Actinide Species

VIII. Kinetics of Homogeneous Aqueous Reactions

IX. Isotopic Fractionation and Radiolysis

X. Conclusions and Recommendations for Future Work Schedules

ESTIMATED UTILIZATION: 200 hours

PRIOR CONTRACTOR WORK EXPERIENCE WITH SWRI:

Dr. Shock has worked for SwRI on U.S. NRC projects since March of 1998.