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NUCLEAR REGULATORY COMMISSION  
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August 28, 1997

NOTE TO: King Stablein, Acting Branch Chief  
ENGB/DWM/NMSS

THRU: Richard A. Weller, Section Leader *R. A. Weller*  
ENGB/DWM/NMSS

FROM: Alice Forman, Summer Technical Intern  
ENGB/DWM/NMSS

SUBJECT: ACTIVITY REPORT (JUNE 30, 1997 - AUGUST 29, 1997)

ACTIVITIES

My arrival date at the Nuclear Regulatory Commission was June 30, 1997. During my first week, I read background information and became acquainted with basic information regarding the NRC. During my final weeks at the NRC, I worked with Virginia Colten-Bradley to become familiar with the S+ statistical computer program. I was given a table of values and constructed a packet of computer generated plots and histograms of the data.

In addition, I was given an assignment on July 7, 1997, by Bret Leslie to prepare a technical report on the effect of concrete on the near-field environment at the proposed Yucca Mountain high-level waste repository. The bulk of my time this summer was spent working on this project. The report is entitled, "Estimating the Longevity of the Chemical Impact of Concrete on Near-Field Geochemical Fluids." The results of this study were presented at the Yucca Mountain Team meeting on August 27, 1997.

Technical Report on Concrete at Yucca Mountain

The report contains: (1) an overview of the chemistry of concrete; (2) a discussion of effects on the near-field from alkaline conditions induced by water reacting with cementitious material; (3) a presentation of the processes that determine the persistence and extent of the alkaline conditions caused by water-concrete interaction; and (4) a critical review of previous estimates relating to the persistence of high pH conditions in the repository. An overview of repository design aspects related to the use of concrete is presented. This information is used to calculate projected rates of carbonation of cement for expected repository conditions. A preliminary analysis of the potential rate of leaching was also completed.

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From this analysis and on the basis of my calculations, it is clear that neither carbonation nor leaching will permit non-alkaline fluid conditions to be present in the near-field environment during the first 10,000 years. These results indicate that high pH conditions should be assumed for performance assessments of the potential high-level nuclear waste repository at Yucca Mountain, Nevada. A copy of the report is attached to this memorandum.

Attachment: As stated

cc: M. Federline  
B. Leslie  
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