fully developed conceptual system is comprised of the canister, the overpack, the waste form, the buffer, and the backfill. Of these, the first two provide physical isolation of the waste. The remaining three components resist waste dispersal by chemical action. The backfill has two primary functions; to exclude water, and to limit release of toxic material by either chemical reaction or surface adsorption (although reaction is preferred). Because it has more than one function, the backfill is likely to be a composite material. Similarly, the two functions operate competitively, so it is envisioned that a two layer backfill will be employed. The inner-most layer will contain reactive material and be porous in order that a sufficient amount of water will be present to encourage chemical reaction. The outer-most layer will be composed of a water retardant material to initially exclude and then restrict groundwater access. The two layer backfill will delay water from reaching the package, and later create a stagnant, reactive environment to filter contaminated groundwater. Acting in concert with the physical barriers, the chemical barriers form an engineered barrier system intended to supply redundant, long-term isolation of nuclear waste.

114. GEOCHEMISTRY OF THE DAKOTA FORMATION OF NORTHWESTERN NEW MEXICO: RELEVANCE TO RADIOACTIVE WASTE STUDIES. D. G. Brookins, Geology Dept., Univ. New Mexico, Albuquerque, NM 87131

The Dakota Formation of the San Juan Basin, northwestern New Mexico, consists predominantly of well cemented sandstones and arenaceous mudstones. Clay mineral-rich rocks, derived from volcanic ash, are mapped as bentonites. The likely physical conditions during burial were T ~35-60°C and P ≤0.5 kbr. X-ray studies reveal a mixture of montmorillonite, kaolinite, illite and mixed layer clay minerals. The typical cation exchange capacities range from 20-40 meq./100 g. for most samples. Radiometric age determinations of clay minerals by the K-Ar method yield 90-94 MYBP (millions of years before present) and Rb-Sr ages yield 93 ± 8 MYBP. These dates agree with paleontological ages and indicate closed system conditions for K,Ar,Rb and Sr in these rocks. Closed system conditions for Cs are inferred based on its greater retentivity than Rb and K in clay-rich rocks. Neutron activation analysis (NAA) of the Dakota samples indicates normal lanthanide abundances and distribution in the bentonitic rocks; local lanthanide enrichment is noted where local uranium accumulations are noted. The uranium has been derived from several sources and fixed in the Dakota Formation at various times from roughly 60 MYBP to near 0.25 MYBP. The chalcophile elements Cu, Sb, Pb are often fixed with uranium in organic-rich rocks and apparently have not migrated since fixation, even under oxidizing conditions. No mobilization for the lanthanides and Ba is noted as well. Collectively, the radiometric ages and NAA data indicate the bentonite and bentonite-sand mixed to be suitable for overpack in radioactive waste repositories.

115. BARRIERS IN RADIOACTIVE WASTE DISPOSAL. E. Peter Uerpmann, Gesellschaft fur Strahlen- und Umweltforschung mbH, Institut fur Tieflagerung, Wissenschaftiche Abteilung, Theodor-Heuss-Str. 4, D-3300 Braunschweig, West Germany.

This paper gives an overview of the development program in the Asse mine in the FRG for waste form, packaging and backfill materials. This program includes: leachability of various waste forms, canister stability, storage methods, criteria fo backfill material and borehole sealing techniques.

● WEDNESDAY MORNING - SECTION D - SYMPOSIUM ON INDUSTRIAL-SCALE PRODUCTION, SEPARATION, RECOVERY OF TRANSPLUTONIUM ELEMENTS - (CONTINUED) - JOINT WITH DIVISION OF INDUSTRIAL AND ENGINEERING CHEMISTRY - J. D. Navratil, Presiding - ABSTRACTS IN SECTION INDE

● WEDNESDAY AFTERNOON - SECTION A - SYMPOSIUM ON CHEMICAL COMPOSITION OF ATMOSPHERIC AEROSOLS: SOURCE/AIR QUALITY RELATIONSHIPS - (CONTINUED) - JOINT WITH DIVISION OF ENVIRONMENTAL CHEMISTRY - R. E. Jervis, Presiding

116. NEUTRON AND PHOTON ACTIVATION TECHNIQUES FOR AEROSOL CHARACTERIZATION AND SOURCE APPORTIONMENT. R.E. Jervis , Dept. of Chemical Eng. and Inst. for Environmental Studies, University of Toronto, Toronto, M5S 1A4.

Instrumental neutron and photon activation techniques are ideally suited for determination of 30-40 inorganic compounds in air particulate matter. Combined with the use of particle size samples that effectively fractionate airborne particulates into size