STATEMENT CONCERNING MANAGEMENT OF HIGH-LEVEL RADIOACTIVE WASTE TECHNICAL EXPERIENCE

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I was confirmed by the U.S. Senate to be Director of the Office of Nuclear Waste Management in DOE in April 1990, after nearly a year on hold by Senator Richard Bryan of Nevada. At the time, three lawsuits were in progress, the Yucca Mountain Project was not part of OCRWM, and a change of the principal technical support contractor was in process. Funding for the Office was highly limited.

A significant portion of the OCRWM resources were therefore devoted to reorganization in order to make the Yucca Mountain Project part of the Office, and to reallocation of program effort to the new technical support contractor. A decision to was taken to not press for significant increase in technical site characterization effort at Yucca Mountain until the lawsuits were resolved.

Program activities were concerned with waste storage and transport, and characterization of Yucca Mountain for the purpose of determining if it was a suitable location for permanent disposal of high-level waste. Activities concerned with storage and transport involved use or adaptation of existing technology or extrapolation and development that could be reasonably envisioned and accomplished. Issues and activities of principal concern were therefore associated with characterization of the Yucca Mountain site.

Because of the lawsuits and funding limitations, site characterization activities were limited to small-bore surface drilling in order to obtain cores of subsurface geology, characterization of the geologic and hydrologic features of the cores obtained, and to digging and characterization of trenches at the surface. Because of the geologic-core needs of the program (obtain core samples without using water in order to avoid compromising hydrologic features of the site) significant effort was devoted to design, development, and demonstration of a drill that could drill deep and obtain cores without using water. The effort was successful and this drilling machine concept is now in use around the world where and when needed.

An additional significant improvement in technology was development and use of a highly accurate rain gauge. This aided greatly to reliable determination of water infiltration into the subsurface geology.

The first indication of how difficult characterization of the site would be came from characterization of the surface trenches. The geologic features at and near the surface proved to be highly complex and there was considerable controversy concerning whether some of the chemical features were the result of infiltration of rainwater or upwelling of water within the geology. The weight of the evidence pointed to infiltration, but uncertainty could not be eliminated at the time.

An event of some significance to waste storage and disposal occurred during my service as Director. Because of the intense opposition to permanent disposal at Yucca Mountain on the part of the state of Nevada and other constituencies, Congress established the Office of the Nuclear Waste Negotiator. The Negotiator was empowered to contact all potentially interested parties to determine if they would permit activities potentially leading to detailed characterization in geologic features within their purview. A staged process was established and generous financial support was provided. All states and all Native American tribes (more than 500) were contacted. All states declined, and negotiations with one Native American tribe, which ultimately failed, were conducted. DOE supported the Negotiator's effort by building models of several alternative surface-based designs and technologies, and making presentations concerning the models and storage when invited. Eventually, only one possibility emerged: a County Commissioner from one of the states came, on his own resources and without endorsement of his Commission, to meet with the Director in order to discuss possibilities. After our meeting, when he

returned home and described what he had done, he was removed from office. The Office of the Nuclear Waste Negotiator was terminated by Congress after only two incumbents served.

No subsurface geologic characterization work was done during my tenure as Director. Site characterization activities remained restricted to small-bore drilling, hydrologic and geologic characterization of cores, and trench digging and characterization. In anticipation of future subsurface characterization, a determination was made that a tunnel boring machine would be used, a TBM diameter was selected, and procurement procedures were initiated. Work on the portal for the TBM was started in April 1993. Program activities and decisions in 1993 and following years were made without my participation.

As indicated above, trench characterization and cores obtained from surface-based drilling gave initial indications of the diversity and complexity of the geologic and hydrologic features of the Yucca Mountain site. Subsurface characterization in subsequent years has confirmed the diversity and complexity. These characteristics do not, however, compel a decision that the site is not suitable for permanent disposal of high-level waste. They (and data from sites under characterization in other locations throughout the world) do demonstrate, however, that there will inevitably be a residual uncertainty such that determination of site suitability based on technical data and models alone will not be possible. Parties dedicated to obstructing findings and decisions will always have an opportunity to exercise obstruction. To accomplish deep geologic disposal of high-level radioactive waste will require establishment of firm safety and suitability criteria, and consensus on an acceptable level and range of uncertainty in safety performance as determined by technical data and models.

As a footnote, I would like to note that the technical work done by DOE and contractor personnel in the OCRWM program during my tenure was always of the highest quality. Diversity and uncertainty are reality for the circumstances where the technical work was applied.

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