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NUCLEAR REGULATORY COMMISSION
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MEMORANDUM FOR: Ronald L. Ballard, NRR Environmental Coordinator
and Chief, Environmental and Hydrologic Engineering
Branch, DE

FROM: Frank J. Congel, Chief
Radiological Assessment Branch, DSI

SUBJECT: REVIEW OF ENVIRONMENTAL ASSESSMENT OF YUCCA
MOUNTAIN SITE

As requested, we have reviewed the radiological assessment portion of the Department of Energy's environmental assessment for locating a high-level waste repository at Yucca Mountain Site, Nye County, Nevada DOE/RW-0012, December 1984. Our comments on DOE's environmental assessment are enclosed.

This review was performed by T. Mo.

Frank J. Congel

Frank J. Congel, Chief
Radiological Assessment Branch
Division of Systems Integration

Enclosure:
As stated

cc: R. Bernero
D. Muller
W. Gammill
I. Spickler
C. Hickey
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WM Record File 102.5 WM Project 11
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COMMENTS ON RADIOLOGICAL ASSESSMENT PORTIONS OF DRAFT
"STATUTORY ENVIRONMENTAL ASSESSMENT FOR YUCCA MOUNTAIN SITE,
NYE COUNTY, NEVADA", DOE/RW-0012 (DECEMBER 1984)

GENERAL COMMENTS

The radiological assessment portions of the draft Environmental Assessment are contained in the following sections: 3.4.7 Radiological Background; 5.1.4 Decommissioning and closure; 5.2.9 Radiological effects; 6.2.2 Preclosure system guideline; 6.4.1 Preclosure Radiological Safety Assessments; 7.3.1 Preclosure Radiological Safety; and 7.4.3.2 Preclosure Guidelines.

The EA contains estimates of doses to individuals and the population within the vicinity of the site. Doses are estimated due to exposure to potential releases during the construction phase, the operation phase, and for accidents (See Tables 5-26, 5-27 and 5-28). Estimates of the quantities of radionuclides released are given in Table 5-25 and 6-41. The principal pathways of exposure (inhalation, ingestion, and submersion) are evaluated using generally accepted models. Doses to the general public (i.e., individuals and the population) are estimated to be minimal for exposures resulting from construction activities, normal operations and accidents. Estimated doses to the individual members of the public are within the guidelines of 10 CFR 960.5.

5-1

Section 5.2.9.2.1 Worker Exposure During Normal Operation, p. 5-57

This section contains an inadequate discussion of available data and incomplete discussion of source terms for worker exposure.

This section of the EA gives estimates of the annual worker exposure to radiation of about 70 man-rem and the collective worker radiation dose of about 2100 man-rem over the 30-year life of the repository. The basis for these estimates is only briefly described in the EA and a reference is made to Dennis et al. 1984. Examination of the Dennis et al reference of 1984, Volume I reveals that the above worker exposure estimates are due only to working with spent fuel and high-level waste and do not include worker doses from handling transuranic waste. According to Volume I of the 1984 Dennis et al report (p. 1-3), Volume II of the same report (which is to date unpublished and unavailable) will address repository worker exposure from transuranic (TRU) waste. This section of the EA is incomplete as it ignores worker exposure from transuranic waste. It should be revised so that the estimate of the worker exposure during normal operation includes estimates of worker exposure to transuranic waste and documentation of the bases for the TRU dose estimate.

Dennis, A. W., et al. 1984. NNWSI Repository Worker Radiation Exposure, Vol. I, Spent Fuel and High-Level Waste Operations in a Geologic Repository in Tuff, SAND 83-7436/1, Sandia National Laboratories, Albuquerque, N. Mex.

(T. Mo 1/18/85 X27621)

5-2

Section 5.2.9.2.2 Public Exposure During Normal Operation, pp. 5-58 and 5-59.

This section lacks a quantitative description of the bases for its findings.

This section of the EA concluded that the radiation exposures to airborne effluents are not significant because of the atmospheric dilution of negligible quantities of radionuclides released. No quantitative estimate of the public radiation exposures was made or references provided. The EA should either provide "less than" values for effluent and dilution rates and dose estimates or specific references made.

(T. Mo 1/18/85 X27621)

6-1

Section 6.4.1, Preclosure Radiological Safety Assessments for Yucca Mountain,
page 6-300

The source term presented for routine operational releases (spent fuel pin leaks that begin while being transported to the repository site) is only one of the source terms expected from the various operations indicated in the facility description, Section 6.4.1.2.2. There will be other source terms associated with cleaning and decontamination of shipping casks, with fuel disassembly and pin consolidation, with the handling of DHLW

containers and TRU packages, with the processing of radioactive liquid wastes and with the management of the low-level wastes generated on site. Spent fuel when removed from the reactor has a layer of radioactive crud on its outer surfaces that provides a source term for fuel handling operations even if no leaky fuel pins are present. Leaky fuel pins are present in most spent fuel pools and must be disposed of also. In the contamination found in spent fuel pool water the predominant radionuclides are usually Cesium-134, Cesium-137, Cobalt-58, Cobalt-60, and Ruthenium-106, depending upon the history of the spent fuel and the pool water. The Final Environmental Assessment should present a Preclosure Radiological Assessment that addresses the source terms originating in the various cleaning, handling, packaging, and processing operations that might be conducted in the Waste Handling and Packaging Facility, the expected emissions after cleanup in the HVAC and any other gaseous waste handling systems, and the resulting radiological impacts in the environment (cf NUREG-0695, "Environmental Impact Appraisal Related to the Renewal of Materials License SNM-1265 for the Receipt, Storage, and Transfer of Spent Fuel," June 1980, concerning the Morris Operation).

(T. Mo 1/16/85 X27621)