256196

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Ground Water Branch
Box 302, University Station
Albuquerque, N. Mex.

0950 TA-21

December 14, 1956

Mr. Robert Dunning, Chief
Atomic Energy Commission
Engineering and Construction Section
Los Alamos AO
Los Alamos, N. Mex.

Dear Mr. Dunning:

In compliance with your request for a geologic investigation for proposed burial pits at Los Alamos, Messrs. Weir and Abrahams inspected the Mesita del Buey and adjacent area on December 7, 1956. The following is a summary of their findings and conclusions.

Mesita del Buey, which slopes to the east, is situated on the Pajarito Plateau between Cañada del Buey on the north and Pajarito Canyon on the south. The Tshirege ruins are on the eastern extremity of the mesa, where the crest of the mesa is about 70 feet above the canyon floors. The western extremity of the area considered for burial sites is approximately the junction of Pajarito Road with the road on top of Mesita del Buey. The crest of the mesa at this junction is about 180 feet above the canyon floors. Two test wells have been drilled in Pajarito Canyon; one (T5) is about 50 feet east of the security fence in the canyon and the other (T6) is about 6,000 feet west of the security fence. The logs of the holes are given in "Geology and ground-water resources of the Los Alamos area, New Mexico" by R. L. Griggs, Geologist, U. S. Geological Survey.

Mesita del Buey is capped with the welded tuff (upper) member of the Bandelier tuff, which may be subdivided into several distinct layers. The top layer of the mesa-capping Tshirege member is about 65 feet thick near the road junction and a maximum of about 50 feet thick near the Tshirege ruins. The layer beneath this, a pumiceous tuff, is about 30 feet thick toward the west end and thins to about 10 feet thick toward the east end of the proposed burial area. The upper few feet of the basal unit of the Tshirege member crops out in Pajarito Canyon and Cañada del Buey, and was noted to be agglomeratic and moderately pumiceous. Information from the logs of the two test holes drilled in Pajarito Canyon show that layers of welded tuff occur in the subsurface of the basal unit. This lower unit of basically welded tuff is 60 to 100 feet thick under the area studied.

10013

The two basal members of Bandelier tuff are more pumiceous and permeable than the Tshirege member and underlie the top member. The Puye conglomerate underlying the Bandelier tuff is encountered in drilling about 200 feet beneath the base of the Tshirege member toward the west end of the proposed burial pit area. A basalt bed occurs about 130 feet beneath the base of the Tshirege member toward the east end of the proposed burial pits. The Puye conglomerate is a water laid deposit and has a relatively high permeability but the basalt bed, which interfingers with the Puye, is impervious except for large joints and fractures. The 300-foot hole (T6) drilled into the upper part of the Puye conglomerate in Pajarito Canyon is dry and the main saturated zone of the ground water is thus more than 210 feet beneath the base of the welded tuff (Tshirege) at this point.

Although the exact location of the pits should be determined after an engineering survey of the area is conducted, there are several basic factors to be considered. First, the Tshirege member is a relatively impermeable rock and percolation from dry waste material due to seepage from precipitation would be negligible. Thus the extent and depth of this impermeable cap should describe the limits of excavation. Second, as the thickest section of the Tshirege member occurs at the central axis of the mesa, construction for the pits might begin near the axis of the mesa and proceed toward the edge of the mesa to a minimum of 50 feet from the south cliff. By so excavating, the size and number of the joints in the rock can be observed, for the joints tend to become more open near the periphery of the mesa. It was noted in the burial pit near Ten Site, however, that joints were filled with clay and silt.

Considering that the pits are to be established on a long-term basis, it is important that future erosion possibilities be contemplated. The pits should be kept as far as practical from well defined drainage courses such as the ravines that dissect the mesa, mainly along its south side. Furthermore, any natural vegetation on the mesa that feasibly can be preserved will aid in erosion control.

Mr. Abrahams of this office can visit the sites at times during the course of excavation and may be able to render additional advice.

Yours very truly,

Clyde S. Conover

Clyde S. Conover
District Engineer-GW

JHA:lb

cc: Mr. C. V. Theis
Mr. John Bolton