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Study Plan for
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Characterization of the Unsaturated-Zone Infiltration

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Prepared by
U.S. Geological Survey

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3.2.3.1.3.1 Location and depth of boreholes

The geohydrologic-surficial units are the basis for locating most of the neutron-access boreholes. The locations of boreholes (existing and proposed) are shown in Figures 3.2-4a and -4b. For each borehole (existing and proposed), the location, elevation, hole depth, depth of the tuff/alluvium contact, geohydrologic-surficial unit, and topographic position are listed in Table 3.2-1. It should be mentioned that some of the existing holes may yet be deepened to monitor natural infiltration at greater depths and supplement tritium profiling data. Also, the locations of some proposed holes may be changed as more information about natural infiltration becomes available and topographic locations are isolated that require additional information. The depths listed in the fourth column of Table 3.2-1 are estimated depths for the proposed holes, and may be changed as results from new drilling become available.

For most boreholes located in unconsolidated deposits, boreholes were drilled through the entire thickness of the deposit and at least 1 m (3 ft) into the underlying bedrock. Two holes terminate in the alluvium: UE-25 UZN #28 encountered a drilling problem; and, UE-25 UZN #85 was drilled to correlate borehole lithology with a nearby alluvial fan facies. Boreholes that begin in bedrock were generally drilled to 15 m (50 ft), which extend (7 m) beyond and initially assumed depth of net infiltration.

Some boreholes were located perpendicular to the main axis of a canyon. This is to examine how natural infiltration is affected by the thickness of the unconsolidated deposits, the proximity of the boreholes to the canyon walls, and the proximity of the borehole to the center of the most recently formed channels. Other boreholes were located parallel to the main canyon axis to study the effects of increased drainage area on infiltration. The boreholes in upland-bedrock geohydrologic units were located to cover the range of topography and soil thickness within each unit.

3.2.3.1.3.2 Borehole logging

Neutron-moisture logging has been an on-going activity since July, 1984. A USGS Technical Procedure (NWM-USGS-HP-62, R5, [see Table 3.2-5, p. 3.2-50]) describes the method for logging neutron-access boreholes.

Neutron-access boreholes are logged with portable Campbell Pacific Nuclear neutron-moisture meters. Initially, the holes were logged on a monthly schedule from July, 1984 to December, 1988 and more frequently after intense precipitation events likely to cause measurable infiltration. A review of the logging data showed that very small changes occurred in water content profiles when there was no precipitation. Therefore, it was decided to decrease

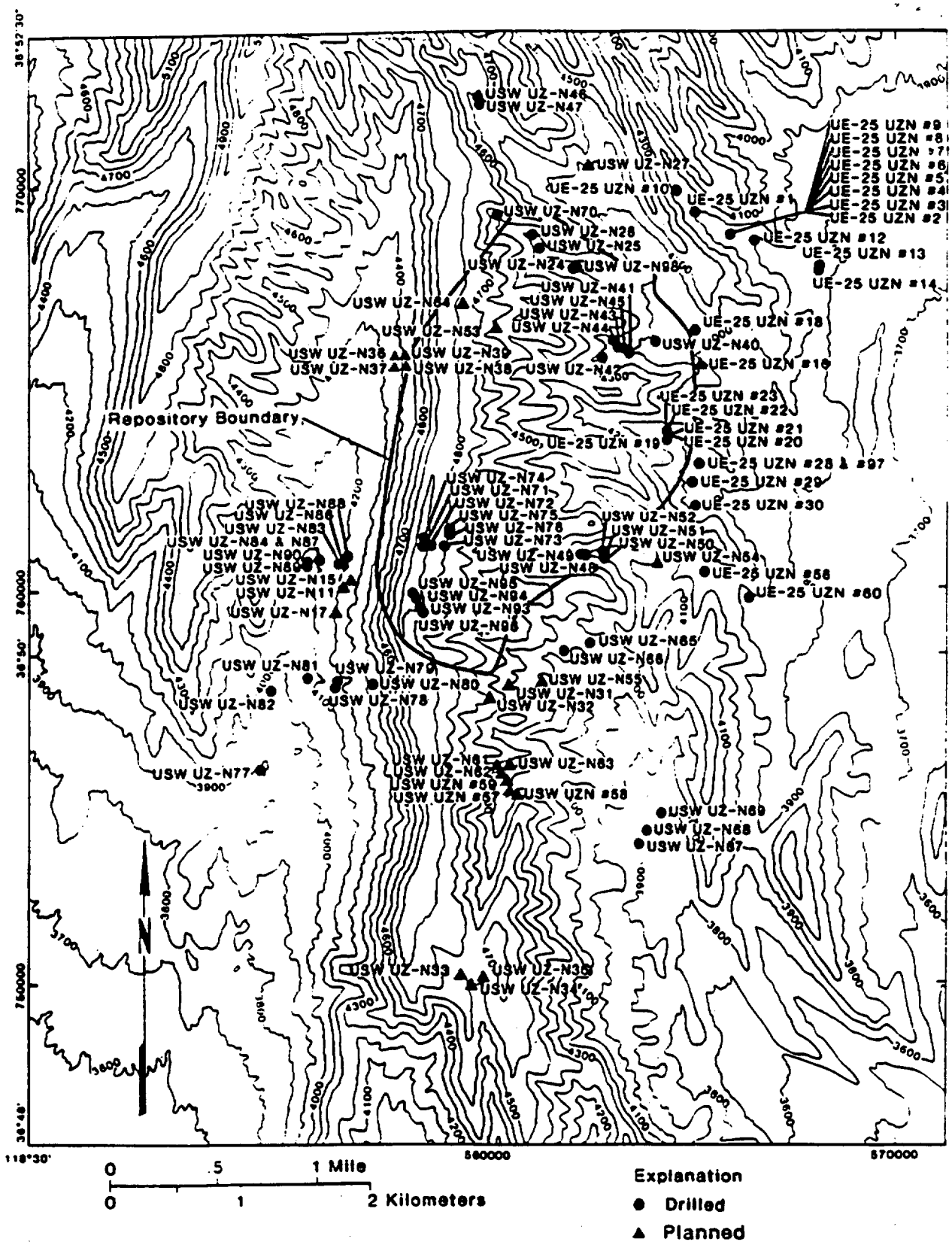

Figure 3.2-4a. Map showing neutron-access hole locations.

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Study Plan Number 8.3.1.2.2.1

Study Plan Title CHARACTERIZATION OF THE UNSATURATED-ZONE INFILTRATION

Revision Number 1

Prepared by: ALAN FLINT

Date: 5/23/92

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Director, Regulatory and Site Evaluation Division / Date

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