

*Determination of 100-Year
Floodplain Elevations
at Los Alamos National Laboratory*



CN-92-984

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36

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Stephen G. McLin

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DETERMINATION OF 100-YEAR FLOODPLAIN ELEVATIONS AT LOS ALAMOS NATIONAL LABORATORY

by

Stephen G. McLin

ABSTRACT

Under existing permit requirements, the US Environmental Protection Agency stipulates that facilities regulated by the Resource Conservation and Recovery Act must delineate all 100-yr floodplain elevations within their boundaries. At Los Alamos these floodplains are located within ungaged watersheds that drain Pajarito Plateau. This report documents the floodplain computational mapping procedure and, along with supporting maps, is intended to satisfy this permit requirement.

The floodplain mapping procedure outlined here uses topographic data from AUTOGIS Mapping Overlay Statistical System (AUTOGIS-MOSS), a graphical information system database. About 65% of the Laboratory has 2-ft topographic contour interval coverage, while 35% has 10-ft coverage. Targeted stream channel segments are initially specified in the MOSS system, and topographic profiles of stream channel cross sections at user-designated intervals are extracted automatically. Each 2-D profile is stored as a 3-D MOSS line feature using New Mexico state plane coordinates. This procedure is initiated at a convenient downstream location within each watershed and is continued upstream to a selected termination point. These 3-D line features are then exported in a format that satisfies the US Army Corps of Engineers' (COE's) Water-Surface Profiles (HEC-2) input data requirements.

The COE's computer-based Flood Hydrograph Package (HEC-1) and HEC-2 were used on a PC-type microcomputer to perform floodplain hydrology simulations. HEC-1 generates storm hydrographs at selected channel locations within each ungaged watershed. This information, along with the stream channel geometry extracted from the MOSS system, is then used by HEC-2 to define each floodplain. The approach used here employs a 100-yr, 6-h design storm event for Los Alamos, but alternative floodplain elevations produced by different storm events are easily computed.

The HEC-2-computed water-surface elevations for each channel section, along with the left and right channel stations where this water surface intersects the ground, are read back into the MOSS system. This information is then transformed within MOSS to determine local geographically referenced coordinates that uniquely define the 100-yr floodpool. Finally, these paired coordinates are linked together as MOSS-area features to identify each watershed floodplain. In this particular application, 11 separate watersheds traverse LANL lands; individual channels range up to 9 mi in length. The 100-yr floodplain was defined on each channel segment at 250-ft intervals, and detailed 1:4800-scale maps were generated.