

SAFETY ANALYSIS AND RISK ASSESSMENT FOR THE
VITRIFICATION OF HIGH-LEVEL RADIOACTIVE WASTES

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ABSTRACT

In 1980, the United States Congress authorized the U.S. Department of Energy (West Valley Demonstration Project Act; PL-96-368) to solidify 2.1 million litres of liquid high-level radioactive waste (HLW) currently stored at the Western New York Nuclear Service Center (approximately 50 miles south of Buffalo, New York) into a form suitable for transport to and disposal in a federal geologic repository. The method chosen to accomplish this task is vitrification in borosilicate glass.

These wastes were produced during the period 1966-1972 when facilities at the center were used for the only commercial nuclear fuel reprocessing plant to have operated in the U.S. These wastes contain approximately 30 million curies of mixed fission products and transuranic radionuclides and are presently being stored in two underground tanks at the West Valley site.

This paper presents a brief overview of waste treatment and vitrification processes under development and construction at West Valley and the results of safety analysis/risk assessments that have been performed to estimate the radiological impacts to on-site and off-site individuals as a result of the waste treatment and vitrification programs. Projections have been made regarding the radiological doses expected from normal operations as well as a result of postulated, theoretical abnormal conditions and major accidents. The West Valley Safety Analysis and Environmental Impact Assessment program is performed in strict accordance with the requirements of the U.S. Department of Energy and other federal agencies.