

**STABILIZATION OF LIQUID LOW-LEVEL AND MIXED WASTES:  
A TREATABILITY STUDY**

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**ABSTRACT**

A treatability study has been conducted on liquid low-level and mixed wastes using the stabilization agents Aquaset, Aquaset II, Aquaset II-H, Petroset, Petroset-H, and Petroset II. A total of 40 different waste types with activities ranging from  $10^{-14}$  to  $10^{-4}$  curies/ml have been stabilized. Reported data for each waste include its chemical and radiological composition and the optimum composition or range of compositions (weight of agent/volume of waste) for each stabilization agent used. All wastes were successfully stabilized with one or more of the stabilization agents and all final waste forms passed the Paint Filter Liquids Test (EPA Method 9095).

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**INTRODUCTION**

Over the years, Sandia National Laboratories/New Mexico (SNL/NM) experimental research has generated a collection of small-volume liquid low-level and mixed wastes that include acids, bases, solvent mixtures, expired radiological standards, lubricants, pump oils, and liquids that have acquired radioactive and/or Resource Conservation and Recovery Act (RCRA) listed contaminants as a result of being exposed to a particular environment (e.g., liquids used in radiation decontamination).

The Liquid Waste Stabilization Treatability Study was designed to utilize the existing SNL/NM liquid low-level and mixed low-level waste inventory to develop standardized liquid waste stabilization procedures that would then be available for use by generators to stabilize liquid low-level and mixed low-level wastes. Stabilized wastes could then be picked up by the SNL/NM waste management group and would ultimately be disposed of at either the Nevada Test Site low-level waste disposal facility or a mixed waste disposal facility, as appropriate.

Stabilization immobilizes heavy metals by chemically binding them in a solid matrix. This decreases the potential for metals to leach out after disposal if the waste were to be exposed to moisture or weak acids. The two most common stabilization agents used to immobilize inorganic solids and aqueous liquids are Portland cement and lime/pozzolan. However, for this study, a series of compounds consisting primarily of either Montmorillonite clays or a mixture of Montmorillonite and cement that are sold under the trade names Aquaset and Petroset by Fluid Tech, Inc. of Las Vegas, Nevada were used. The stabilization agents Aquaset, Aquaset II, Aquaset II-H, Petroset, Petroset-H, and Petroset II, were chosen for several reasons:

- Reagents are particularly suitable for wastes that contain both organic and inorganic components in aqueous solution (Aquaset II, Aquaset II-H, Petroset, Petroset-H).
- Reagents can be combined to stabilize immiscible organic and aqueous layers (Aquaset II or Petroset with Petroset II).

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