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**Designing a New Radioactive Liquid Waste Treatment Facility for Los Alamos National Laboratory to Update Treatment Technologies and Meet Current Regulatory Requirements – 8205**

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## **ABSTRACT**

This paper discusses the new Radioactive Liquid Waste Treatment Facility (RLWTF) being designed for Los Alamos National Laboratory (LANL) and also provides information regarding the updates to the facility resulting from improvements in technologies and changes in regulations and codes that have occurred since the existing facility was built. It explains how the new facility will be a suitable replacement for the existing facility and how the new facility will allow LANL to continue its current mission as well as have the capability to treat any new waste stream resulting from a future expansion of the laboratory.

Specific topics relating to the improvements in technology that are discussed include replacing existing settling technologies with improved chemical precipitation technologies using hydrochloric acid, sodium hydroxide, magnesium chloride, and ferric chloride. Also discussed are improved filtration technologies and dewatering technologies.

Topics discussed regarding regulatory and code requirements include the current state and federal regulatory criteria and the new seismic criteria requirements that the design conforms to.

## **INTRODUCTION**

The existing RLWTF, located at LANL, has been in operation since 1963. This facility currently treats industrial, low-level waste (LLW), and transuranic (TRU) wastewater that is collected from 15-different technical areas within the LANL. Sixty-three buildings within these technical areas feed 1,800 different sources to RLWTF. The existing facility is 19 years beyond its original design life of 25 years.

The Radioactive Liquid Waste (RLW) system at LANL is a "mission essential" capability within the Readiness in Technical Base and Facilities (RTBF) program. However, the existing facility does not meet current authorization basis criteria for a Hazard Category 2 nuclear facility and its design is inconsistent with current International Building Code requirements. This limits the flexibility of operations to meet regulatory requirements and respond to system failures as they occur. The aging facility is also vulnerable to major system failures that could shut down the capability for both LLW and TRU wastewater treatment. [1]

The new RLWTF is being designed as a complete replacement for the existing facility that will receive liquid waste feed, treat the liquid stream, collect and package any solid wastes, and then discharge the treated effluent to a new Zero Liquid Discharge (ZLD) system. The new RLWTF will be designed as a single facility constructed to treat both the LLW and TRU waste. The new facility is being designed to process approximately 9.5 million liters per year of LLW, 42