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Interpretation of Experiments

Paul J. Dotson* and N. Krikorian

Abstract

This is the final report of a one-year, Laboratory-Directed Research and Development (LDRD) project at the Los Alamos National Laboratory (LANL). This project was to attempt to characterize the effluent and debris from hydrodynamic tests. Only preliminary tests were conducted and preliminary samples obtained before the end of the year and the end of the funding. The ultimate utility of the methods has not yet been demonstrated.

1. Background and Research Objectives

This project was to attempt to characterize the effluent and debris from hydrodynamic tests.

2. Importance to LANL's Science and Technology Base and National R&D Needs

This effort draws on the strengths of the Laboratory in the areas of earth and atmospheric analysis, such as x-ray diffraction and electron microscopy to address questions of interest to the nuclear weapons technology program.

3. Scientific Approach and Accomplishments

This project was to attempt to characterize the effluent and debris from hydrodynamic tests. Samples collected from tests were subjected to various tests, including x-ray diffraction (XRD) and scanning electron microscopy (SEM). Only preliminary tests were conducted and preliminary samples obtained before the end of the year and the end of the funding.

Initially, our samples mostly consisted of quartz, feldspar, cristobalite, etc. Also, we frequently had difficulty distinguishing our signal from the background in the XRD analyses because of the nature of the filters used. During the brief course of the project we were able to refine our sample techniques. By elevating our collectors, using dissolvable

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filter materials, and other procedural changes, we learned to collect samples that could more easily be analyzed.

The SEM analyses showed that we could distinguish metal particles which were residue from the tests from the minerals that were also captured on the filters. However, the ultimate utility of the methods has not yet been demonstrated.

Figure 1: XRD spectra from one of the samples.

DTime: 37%

LOG1

LTime: 206

TakeOff: 40.3

KV: 20.0

nA: 0.000

Sample 1B, Bagdust, Au-coated

Area 1, particle 3, Spherical particle

B -5

0.000

Cursor: 0.000 keV = 0

SPEC0: SPEC0

20.470

Area 1, particle 3 -

Figure 2: SEM results from one of the samples.