MEMORANDUM

TO: Tri-Valley CAREs' membership and interested members of the public

FROM: Peter Strauss, Technical Advisor to Tri-Valley CAREs on the Site 300 Superfund cleanup

SUBJECT: Update on Superfund activities at Site 300, Building 812 Operable Unit

DATE: July 17, 2011

Background

The Building 812 Operable Unit encompasses approximately 200 acres in the east-central part of Site 300. It is located almost directly over an earthquake fault that appears to intersect with the near-by Elk Ravine Fault.

Like many other buildings at Site 300, the buildings were used to test explosives through open-air testing. These experiments were designed to test the components of a nuclear weapon, except for the fissile material (materials such as plutonium and certain isotopes of uranium that are capable of splitting and forming a chain reaction). Experiments were halted in 2009, in part due to the construction of a closed firing and testing area. Wastes generated from experiments on the firing tables were periodically collected disposed in the Pit 7 Complex.

However, as a result of open-air testing, some of the materials were dispersed into the air, contaminating surrounding soil, surface water, and even making its way to groundwater. These hillsides and canyons need to be cleaned up, as well as the groundwater.

The major chemical found at the site is depleted uranium.[1] Recent studies indicate the entire Building 812 OU has surface soil contamination. Concerns over depleted uranium, or in parlance DU, are its toxicity as a heavy metal and its radioactivity, albeit low compared to some of the other radioactive isotopes found at LLNL's main site. Principal concerns about DU are derived from two isotopes of uranium (U): ^{235}U and ^{238}U. Maximum concentration of total uranium in surface soil was measured at 93 picocuries per gram (pCi/g); ^{235}U was measured at approximately one-one hundredth that amount. Both were above the preliminary remediation goal (PRG) set by EPA. And both were many times above background at Site 300. In soil five

[1] Depleted uranium (DU) is uranium with a lower content of the fissile isotope ^{235}U than natural uranium (natural uranium is about 99.27% ^{238}U, 0.72% ^{235}U, and 0.0055% ^{234}U). Most DU is derived from uranium enrichment for nuclear reactors. It is used in weapon shells because of its weight and pyrophoric properties. On impact with a hard target, such as an armored vehicle, it releases heat that causes fragments to disintegrate to dust and burn when it reaches air.

feet below the firing table, total uranium was measured at 22,740 pCi/g, and ^{235}U was measured at 110 pCi/g.

In groundwater, total uranium and the ^{235}U exceed standards. Nickel and copper also exceeded ecological screening goals. Potential other contaminants of concern include radium^{226} and lithium. For surface water and sediment found at Spring 26, uranium and metals were also found. However, the sampling location for Spring 26 is located west of the confluence of the Elk Ravine/Spring 26 and the B-812 drainage. There are not data available downgradient of this confluence.

Remediation Activities

In 2008, LLNL completed a Draft Remedial Investigation and Feasibility Study (RI/FS). In it, LLNL proposed a soil washing treatability study. After questions from EPA, DOE put together an independent panel of experts to review the RI/FS. The panel determined that additional characterization was needed to define soil cleanup technologies, provide better definition of locations requiring cleanup, and provide additional information regarding risk assessment. The open-ended recommendation about risk assessment led TVC to be concerned that human health and ecological standards could be altered.

After the panel provided its report, the first step in this process was to revise the Screening-Level Risk Assessment, both for human health risk and for ecological risk. These documents are partially complete, pending additional characterization and new assessments of risk. The primary purpose of these reports was to identify potentially contaminated media, identify specific areas where there are contaminants of potential concern (COPCs), and evaluate uncertainties. One of the important lessons learned at a previous site at Site 300 (i.e., Building 850) was that additional characterization to locate hot spots potentially could have reduced the amount of material that needed to be scraped from the hillsides, thus reducing environmental damage and reducing costs.

LLNL is now delineating those areas that need to be cleaned up. It is using a soil gamma survey to provide a better definition of the extent of contamination of DU, identify hotspots, and identify sites that need follow-on characterization. Because of the steep terrain, LLNL plans to deploy remote-controlled "androids" called RemCATs. The detectors survey gamma radiation at six inches above the soil, with six measurements per square meter. The human-carried backpacks will be used only in areas where the RemCAT cannot effectively survey the land.

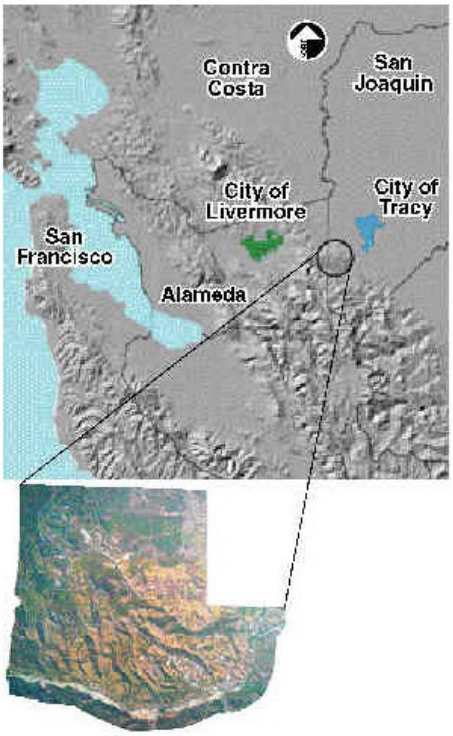
Issues

There are several unresolved issues in this cleanup activity.

- It is not clear how and when background levels will be established. Although we have a background level for Site 300, a more specific background area needs to be selected: similar to the B-812 area in geological, biological, chemical, and radiological characteristics. This area is not yet selected. We see this as a crucial point because background measurements are important in determining additional risks – if site background is high, there will likely be fewer hotspots.
- There has been some suggestion from the earlier expert panel recommendations that cleanup levels may need to be altered, especially for ecological receptors. LLNL has not given us an indication that they will follow this recommendation, and it is important that the regulatory agencies ensure that cleanup standards are not changed.
- Building 812 is planned to be cleaning up to industrial soil levels. Although the specific site of the firing table may not be suitable for residential use, we believe that the surrounding area should be cleaned to residential use. We think that by setting the cleanup levels to industrial standards, the costs of returning the land to residential standards will bias the re-evaluation, and may prohibit this land from ever being used productively.
- It is not clear how groundwater and sediments will be characterized, and eventually what remediation technique will be used for clean up.

Next Steps

The next step in this process is to perform additional characterization of the site, and revise the Baseline Risk Assessments (BRA). Additional characterization has already begun. Revisions to the Baseline Risk Assessment should occur next summer (2012). In addition, because there will be new information, the RI/FS will have to be amended, also thought to occur in the summer of 2012 (albeit there is not yet funding for this). After the RI/FS is amended, DOE will select a remedial alternative, which will be in a Proposed Plan. I expect that the soonest we can see a draft is Summer 2013. I expect that soil washing will not be a viable alternative, and that selected excavation and stabilization is likely to be ranked high.



SITE 300 MAP/LOCATION