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AIR MONITORING AT LANL FIRING SITES

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The Airnet program at Los Alamos National Laboratory (LANL) measures concentrations of radioactive materials in ambient air. The nuclides of concern are tritium, uranium (enriched and depleted), plutonium, and americium.

Events over recent years have raised concern about the shutdown of Airnet sampling stations at LANL firing sites in 2003 and 2004. This paper is intended to address why these stations were shutdown.

There are four general areas of discussion:

- the Airnet operating philosophy,
- the results of measurements obtained with Airnet around LANL firing sites,
- a brief description of ongoing environmental sampling at LANL firing sites, and
- the decision that was made to shut down three Airnet stations in the firing site areas.

Operating Philosophy

The goal of the Airnet program is to evaluate the effects of LANL operations on air concentrations of radioactive material at public receptor locations. Specifically, Airnet is used to measure radioactive releases from emissions sources that are not ventilated through a stack or duct. Effects from these “non-point” or diffuse emissions are measured using a network of Airnet stations located at public receptors, and not linked to a specific source.

There are two criteria used to determine if an Airnet station should be installed at a given location.

1. The station will measure air concentrations near a public receptor, either around the Laboratory perimeter or at selected regional locations in Northern New Mexico. This category of station is used to meet compliance goals under the Rad-NESHAP.
2. The station will measure air concentrations at an on-site LANL location to aid in interpreting data obtained by the off-site perimeter stations. This category of station is used to meet environmental surveillance goals.

If a proposed station location does not meet one of these criteria, an Airnet station will not be installed there. Likewise, existing Airnet stations are evaluated against these two criteria and if the station does not meet one of the criteria, the station is considered for removal.

Results of Measurements

LANL conducts experiments involving explosives at locations called “firing sites.” Three Airnet stations were installed in 1994 near Laboratory firing sites to evaluate any relationship between firing site activities and airborne concentrations of radioactive material. These stations were identified as station numbers 76, 77, and 78.

After ten years of sampling, Airnet stations on the LANL perimeter measured no detectable levels of airborne radiological emissions that could be linked to firing site operations during this time period. Similarly, no correlation between firing site activities and the three on-site Airnet stations could be made. Stations 76 and 78 were shut down at the end of 2003, while sampling operations continued at station 77. The ongoing sampling at station 77 was intended to continue searching for correlations between airborne levels of radioactive materials and firing site operations. Sampling continued here through all of 2004, but after failing to detect such a correlation, station 77 was shut down.

Station 77 was unique among these three in that it was sited in a location known to have detectable levels of depleted uranium in the surface soil, a result of legacy LANL activities in this area. This site, designated "IJ site," is part of the scheduled environmental cleanup of LANL. During windy conditions, this station detected airborne levels of depleted uranium, reflecting a localized re-suspension of contaminated soil. At worst case, the dose that an individual would receive from year-round occupation of IJ site would be less than 5% of the EPA standard for public exposure to radiological air emissions. Note, however, that this EPA radiation dose standard applies to public receptors located off-site from LANL property, not to a receptor in a controlled access, on-site location such as IJ site.

This re-suspension of contaminated soil in the immediate vicinity of station 77 made it impossible to discern if there were additional airborne concentrations of depleted uranium from individual experiments at the firing sites. There is no relationship between these local readings at station 77 and any measurements of depleted uranium at off-site locations, indicating the localized air concentrations of depleted uranium from IJ site are not moving off-site.

Ongoing Environmental Sampling

It should be noted that there are other ongoing environmental media sampling efforts at the Dual-Axis Radiographic HydroTest (DARHT) facility. DARHT is the principal experimental firing site location at LANL. Prior to commencing operations at DARHT, a Mitigation Action Plan (MAP) was developed which requires a broad suite of environmental surveillance activities. Under the MAP, LANL established a baseline level of environmental pre-operational contaminant levels. Current and future sampling results are compared against this baseline level as well as against risk-based screening levels to determine trends in environmental impacts from DARHT operations.

Under the DARHT MAP, radiological and chemical contaminants are evaluated in several media. These media include small mammals, honey bees, and migratory birds. In addition, general concentrations of radioactive material and chemicals in the soil and vegetation around DARHT are evaluated. These sampling activities continue as directed under the DARHT MAP or other guidance documents.

Decision

Since 1994, firing site experiments have included both open-air explosive "shots," and shots in which airborne releases were mitigated with foam. Some future LANL firing site activities will

continue to be open-air shots, but most experiments at DARHT will use a containment vessel to mitigate airborne emissions. Use of the containment vessel will result in concentrations of airborne radioactive material at off-site public receptor locations at levels which are the same as or less than those measured during historical operations.

Under LANL's Rad-NESHAP compliance program, emissions from non-point sources are evaluated using Airnet stations located along the LANL perimeter, at public receptor locations. Historical measurements indicate no correlation between firing site activities and measurements at the off-site receptor stations. Also, no relationship could be identified between firing site activities and measured air concentrations at Airnet stations 76, 77, and 78 in the ten years of measurements at these stations. Because criteria for maintaining these three Airnet stations were not met, the stations were shut down.

LANL has no plans to restart Airnet sampling operations at firing site locations in the future because the criteria for installation have not been met. The existing network of stations along the LANL perimeter meets air measurement compliance goals for LANL non-point emissions sources, including activities at the LANL firing sites. No further action is needed on this issue.