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Los Alamos
NATIONAL LABORATORY

Ideas That Change the World
Risk Reduction & Environmental Stewardship Division
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Date: April 8, 2003
Refer to: RRES-DO:03-36

Mr. Randy Merker
NM Dept. of Health, Office of Epidemiology
1190 St. Francis Drive, Room N1350
Santa Fe, NM 87502-6110

Dear Mr. Merker:

SUBJECT: FIREWOOD DISTRIBUTION

Thank you for your letter of February 25, 2003 to Stephen Mee regarding the firewood from Los Alamos National Laboratory (LANL). The trees and the soil have been characterized for potential contamination, the relevant human exposure pathways have been evaluated; and there are no detectable health risks. We welcome your review of the following discussion of these issues.

The distribution of firewood is subject to the "Procedure for Identification, Removal, and Disposition of Potentially Contaminated Trees from Los Alamos National Laboratory Technical Areas", LA-UR-01-6855, which is enclosed. According to the procedure, all potentially contaminated trees are retained on LANL property.

We have measured the potential contamination in LANL trees; the most recent LANL report, LA-UR-01-6157, is enclosed. Note, the highest concentrations of contamination occur in wood ash. For example, David Englert (NMED OB) measured about 10 pCi/g of Cesium-137 in Cerro Grande ash, which is in general agreement with the data obtained by LANL. The ashing process concentrates some elements by up to a factor of 250. Cesium-137 concentrations in wood from global fallout are on the order of 0.1 pCi/g (dry weight), so concentrations in ash of 20 to 30 pCi/g from fallout are routinely encountered, worldwide.

Wood-ash is often spread on agricultural land as a potassium fertilizer and to raise the pH of acidic soil, though this practice is less common in New Mexico because the soil is usually alkaline. An upper limit is one ton of wood ash per acre of farmland. When tilled to a depth of 6 inches, this results in a dilution of a factor of 1,000, i.e., ash with a concentration of 10 pCi/g results in a soil concentration of 0.01 pCi/g. The resulting dose calculated for a residential farmer scenario is 0.01 mrem/year from cesium-137 at 10 pCi/g ash. A residential gardener is unlikely to use more than 100 pounds of ash, so in this case, the dose will be much smaller.

The following table summarizes the concentrations and potential doses from other radionuclides. The wood-ash concentrations are the highest of: (a) the reference values from LA-UR-01-6157; (b) the IFRAT report; and (c) David Englert's data.

Radionuclide	Wood-ash concentration	Potential dose
K-40 (natural)	100 pCi/g	0.1 mrem/year
Cs-137	10 pCi/g	0.01 mrem/year
Sr-90	4 pCi/g	0.01 mrem/year
Am-241	0.2 pCi/g	0.001 mrem/year
Pu-239	0.5 pCi/g	0.0001 mrem/year
Pu-238	0.03 pCi/g	0.00001 mrem/year
U-238	0.1 pCi/g	0.00001 mrem/year

We have also calculated the dose from cutting, splitting, and carrying the wood, inhaling the wood smoke, carrying and inhaling the ash, and sitting near the ash while it is in storage. In each case, the dose is smaller than in the table.

To summarize:

- LANL has a procedure to prevent the release of contaminated wood;
- LANL has thoroughly characterized the potential health risks;
- the health risks from natural sources are small;
- the health risks from global fallout are extremely small; and
- there are no detectable health risks from LANL sources.

Please contact me or Doug Stavert, Environmental Protection Program Manager, at 667-2211 if you should have any further questions regarding this matter.

Sincerely,

Beverly A. Ramsey, Division Leader
Risk Reduction and Environmental
Stewardship Division

BAR/DS/rbb

Enclosures: a/s

Cy: D. Stavert, RRES-EP, MS J591
RRES-DO File, MS J591
IM-5, MS A150