

7/30/2002

~~TA00~~
TA00

Summary of Selected LANL Sites with High Potential for Ecological Risk
Developed by Dr. Kirby Olson

For ecological risk, concentrations at a site are compared to a benchmark (a concentration in soil that is estimated to provide the given species with a dose considered to be unlikely to cause harmful effects when the size of the animal and amount of material ingested in soil or food are considered). The potential for ecological risk is given as a hazard quotient ($HQ = (\text{level at site}) / (\text{benchmark level})$) so an $HQ > 1$ indicates potential for risk. The benchmarks used to generate HQs aren't based on linear functions, so an HQ of 100 is not necessarily ten times worse than an HQ of 10. The potential for ecological risk is best described by presenting the number of HQs substantially above one for all the receptors that have those high HQs: sites with more high HQs for more receptors are more likely to present actual risk to ecological receptors.

The robin is screened with 3 different diets (herbivore, omnivore, insectivore) to be a surrogate for 3 different species of small birds, therefore each diet type represents a different receptor.

This comparison used only ESLs above the LANL soil background values so that the potential risk estimated can't be due to background. The maximum value detected at the site was used to generate the HQs.

PRS 21-024(i)

- From SWMU 21-024(i) Comparison of Sample Values to Human Health Screening Action Levels
- 9 HQs above ESLs:
- Antimony HQ = 2.7 (red fox)
- Lead HQ = 1.4 (shrew), 3.2 (kestrel 50-50 diet)
- Mercury (inorganic) HQ = 10.5 (herbivore robin), 24 (insectivore robin), 17 omnivore robin),
- Zinc HQ = 3.25 (insectivore robin), 1.5 (herbivore robin), 2.4 (omnivore robin)

PRS 16-021(c)-99

- From IM Report for Potential Release Site 16-021(c)-99, document # LA-UR-02-4229, July 2002, Table 5.3-3 (p. 57) and Table 5.3-6 (pp. 62-66)
- 19 HQs above ESLs
- Barium HQ = 5 (omnivore robin), 8.2 (herbivore robin), 19 (red fox)
- HMX HQ = 46 (deer mouse), 39 (cottontail), 7.7 (shrew), 4 (earthworm)
- RDX HQ = 130 (deer mouse), 109 (cottontail), 36 (shrew), 2.4 (earthworm)
- 2,4,6-Trinitrotoluene HQ = 471 (earthworm), 2.75 (kestrel 50-50 diet), 60 (herbivore robin), 19 (insectivore robin), 39.75 (omnivore robin), 6 (deer mouse) 4.3 (cottontail), 3.3 (shrew)



7637

Cañon de Valle (canyon bottom)

- From Tardiff, Mark. "Cañon de Valle Ecological Risk Assessment Pilot Step Four: Study Design", Feb. 2, 2001 Table 2 (p.5) Soil Hazard Quotients
- 16 HQs above ESLs
- Barium HQ = 690 (insectivore robin), 420 (omnivore robin), 160 (herbivore robin), 93 (kestrel 50-50 diet), 3.7 (kestrel all flesh diet), 120 (cottontail), 890 (deer mouse), 1600 (shrew), and 10 (red fox)
- Copper HQ = 1.4 (deer mouse)
- Silver HQ = 5 (insectivore robin), 11 (omnivore robin), 17 (herbivore robin)
- HMX HQ = 260 (cottontail), 290 (deer mouse), 29 (shrew)

PRs 73-001 (a-d) and 73-004 (d) (combined as Airport Landfill)

- From RFI Report for PRs 73-001 (a-d) and 73-004 (d) (Airport Landfill Areas), document # LA-UR-98-3824, Table 2.3.4.3-2, p. 2-81 to 2-83 and Table 2.3.4.3-17, pp. 2-119 to 2-122.
- 6 HQs above ESLs
- Antimony HQs unknown, detection limit ten times background and 3 times ESL.
- Copper HQ = 11 (herbivore robin), 7.5 (insectivore robin), 9.4 (omnivore robin)
- Zinc HQ = 4.7 (omnivore robin), 2.9 (herbivore robin), 6.3 (insectivore robin)

Pueblo Canyon

- From "Stats by subreach_rev3 max by subreach" table, 5/02/02, in Attachment 4 to LAPSAR Record of Communication, ER2002-0690.
- 8 HQs above ESLs
- Cyanide HQ = 5.5 (insectivore robin), 5.5 (herbivore robin), 5.5 (omnivore robin)
- Copper HQ = 1.8 (herbivore robin), 1.6 (omnivore robin)
- Manganese HQ = 2 (deer mouse)
- Zinc HQ = 2.3 (omnivore robin)
- Naphthalene HQ = 2.8 (kestrel 50-50 diet)

Los Alamos Canyon

- From "Stats by subreach_rev3 max by subreach" table, 5/02/02, in Attachment 4 to LAPSAR Record of Communication, ER2002-0690.
- 7 HQs above ESLs
- Manganese HQ = 2.9 (deer mouse)
- Copper HQ = 1.4 (herbivore robin)
- Cyanide HQ = 25 (herbivore robin), 25 (insectivore robin), 25 (omnivore robin)

- Zinc HQ = 4 (omnivore robin)
- Naphthalene HQ = 13 (kestrel 50-50 diet)

DP Canyon

- From “Stats by subreach_rev3 max by subreach” table, 5/02/02, in Attachment 4 to LAPSAR Record of Communication, ER2002-0690.
- 8 HQs above ESLs
- Antimony HQ = 1.46
- Copper HQ = 2 (herbivore robin), 1.8 (omnivore robin)
- Lead HQ = 2 (shrew), 1.4 (insectivore robin)
- Manganese 1.5 (deer mouse)
- Zinc HQ = 1.7 (omnivore robin)
- Naphthalene HQ = 16 (kestrel 50-50 diet)