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MEMORANDUM



TO: Darlene Goering, Environmental Scientist and Specialist O,
RCRA Permits Management Program

FROM: Kirby Olson, Environmental Scientist and Specialist O,
RCRA Permits Management Program

SUBJECT: Review of VCA Completion Report for PRS 0-019
TASK # LANL-01-03

DATE: Dec 18, 2001

Los Alamos National Lab (LANL) divided this site into two areas for purpose of risk evaluation: the mesa top area and the outfall area.

Mesa Top Area

The mesa top area of site presents no human health risk by comparison to screening values. I compared the detections of inorganic constituents above background to the NMED residential SSLs. Only the one sample at 13-14 ft containing lead at 1800 mg/kg exceeded the SSLs. I compared the detections of radionuclides above background values with the EPA radionuclide SSLs for direct ingestion of soil under residential use (Table A.2 in EPA document; these levels are based on a 10^{-6} level of risk). All of the radionuclide detections above background/fallout were well below the EPA SSLs except for U-238, which was detected at a concentration about 75% of its screening value. A number of organic compounds were detected in the mesa top sampling at low levels (particularly PAHs and pesticides). Only detections of benzo (a) pyrene were at levels equaling NMED SSLs; and that consisted of one sample at the SSL and one sample at half the SSL (out of 409 samples). This is unlikely to represent a risk to human health at this site. The highest detection limit for dibenz (a,h) anthracene was at the SSL, but because the only two actual detections were far below the SSL; there in not likely to be a risk on the mesa top from this contaminant.

There is some question about whether the proposed future use will require excavation that may expose receptors to the subsurface contamination beneath structures left in place at the site. The



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potential for exposure to contamination under these structures needs to be addressed.

Although construction is anticipated on the mesa top, surface sample results should have been run against ESLs to determine if there even would be potential for risk, rather than relying on an argument that construction will "cap" the whole mesa.

Western and Eastern Outfall Areas

LANL used area-weighted averages for each "geomorphic package" to represent the mean value. An average for each area was calculated and multiplied by a weighting factor corresponding to the size of that area compared to the overall area. The average of these weighted averages was used to represent the entire area. It appears that LANL averaged values from the eastern outfall, western outfall, and canyon bottom together. This approach was used for both human health and ecological risk screening. As explained in the comments on the Acid Canyon Interim Action Plan by both myself and Allen Chang of US EPA, our agencies do not support the use of weighted averages for risk screening because 1) the 95% UCL statistics are not designed for weighted means and 2) the use of weighted means requires the demonstration of a strong correlation between the defined packages and the contaminants. The weighted means are inappropriate for this site because 1) the geomorphic packages are defined in the document only by location (i.e., "lower bench") not by any characteristic that would correlate with the distribution of contaminants, 2) all contaminants are assumed to distribute in the same manner throughout each package, even though they have very different chemical properties, and 3) there is probably not adequate sampling within each package to calculate a valid 95% UCL of the mean for that package. No information is presented in this plan to support the use of area-weighted means over a straight arithmetic mean that assumes a lognormal decrease in contaminants as one moves downstream from the outfall (assuming the data is lognormally distributed). For areas without sampling results adequate to support a 95% UCL of the mean, the maximum concentration of contaminant detected should be used for comparison to the screening values and for initial risk assessments.

also, since extent of contamination is always separately for each area (pg)

There is some question regarding risk from selenium because all hillside sampling results for selenium were discarded during the QA/QC procedure, but it is unlikely that selenium would be a risk driver at this site.

Use of Area Use Factor (AUF) as part of the ecological risk assessment is fine; but area weighted averages should not be used for this assessment either.

LANL asserts in this document that Hazard Quotients (HQs) between 1 and 10 are acceptable because it is assumed that the LOAEL is 10 times the NOAEL so effects are actually seen only at HQs above 10. Current ecological risk guidance does not support this assertion as a general guideline, and states that HQs greater than 1 should trigger a more in depth analysis to see if there is potential for risk to ecological receptors. In this document LANL also asserts that HQs less than 100 are acceptable since an HQ of 100 would equal an LC50 and effects on populations occur

only at LC50s. LC50s correspond to the immediate death of half of the population; this is obviously well beyond an acceptable population impact.

Uncertainty analysis eliminates some high HQs based on chemical probably not occurring in the toxic or bioavailable form. To eliminate contaminants on this basis, one needs sampling information on the forms of the contaminant in soil at the site and one needs to present how these forms are less toxic than the one used to generate the ESL.

Fill Material Sampling Results (Appendix H)

Some inorganic constituents occurred in higher concentrations than background in the fill material, but all were significantly below NMED SSLs. Concentrations of some radionuclides in the fill were also above background, but most were far below the EPA radionuclide SSLs for ingestion of soil and inhalation of dust. One Strontium-90 result of 4.94 was still below the SSL of 7.7 pCi/g. The single detection of Uranium-234 at 17.51 pCi/g did exceed the EPA radionuclide SSL of 5 pCi/g. Because the EPA SSL is based on 1 in a million residential risk, the risk corresponding to this U-234 detection would be 3.5×10^{-6} , a level within NMED risk guidance limits. All organic compounds detected were below NMED SSLs or EPA HH MSSSLs, except for one detection of benzo (a) pyrene at twice the NMED SSL. This single detection is unlikely to be representative of contamination posing a potential health risk. There are single detects at less than <1 ppb each of isopropyltoluene and 2-methylnaphthalene. I can't find any toxicity or regulatory information on the first compound; the second one is not regulated under RCRA and has no ATSDR advisories. These detections are unlikely to represent a potential risk to human health at the site.

Concrete Sampling Results (Appendix H)

Samples of the concrete left in place had radionuclide detections all well below the EPA radionuclide SSLs. All organic compounds detected were also well below NMED SSLs including methyl-2-pentanone (methyl isobutyl ketone). All inorganic compounds detected were at levels well below the SSLs except for arsenic; I compared mercury and chromium to the SSL for the most toxic form of these metals. Two arsenic detections were above the SSL of 3.9 mg/kg but below the LANL UTL of 8 mg/kg; therefore these detections do not represent background and not excess risk due to contamination.

Recommendations for re-analysis of data:

Hillside area

- Calculate 95% UCL of mean for each outfall for each contaminant. Record max values for those for which UCL cannot be calculated or for which UCL of mean would exceed max value
- Compare contaminant concentrations to NMED SSLs (or Region 6 SSLs) and LANL ESLs for receptors
- Area Use Factor (AUF) from Table 2.5-8 can be incorporated for calculating ecological

Review of VCA Completion Report for PRS 0-019

December 18, 2001

Page 4

risk. Present HQs for each receptor for each contaminant. HQs nominally equal to or less than one indicate no potential for ecological risk. Contrary to the statements in the VCA completion plan, HQs between 10 and 100 are not accepted as indicating no risk.

Mesa Top

- Develop a construction worker risk number for the short term exposure to the subsurface lead and nickel, or explain how exposure will be minimized/prevented
- Compare surface soil concentrations to ESLs to determine if there would be a potential risk to ecological receptors if some areas of the mesa top were not covered by the new construction.