



GARY E. JOHNSON
GOVERNOR

TA 54

State of New Mexico
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 428-2500
Fax (505) 428-2567
www.nmenv.state.nm.us



PETER MAGGIORE
SECRETARY

M E M O R A N D U M

TO: Dave Cobrain, Santa Fe Group Manager
John Young, Head Of Corrective Action for LANL
Neelam Dhawan, Environmental Scientist and Specialist O,
Permits Management Program

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

SUBJECT: **Draft Addendum to the RFI Report for MDA H at TA 54**
Task # LANL-01-001

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I reviewed sections 4.1 and 4.2, the human health and ecological screening risk assessment sections of the RFI addendum. These sections evaluate concentrations of tritium measured at breathing zones over the site and concentrations of VOCs in pore gas (vapor phase contamination) at 50 feet below ground surface. The reported tritium concentrations reflect levels to which receptors may be directly exposed at the surface through inhalation over time and can be evaluated as such for carcinogenic risk. The concentrations of VOCs in pore gas at 50 ft below ground surface do not represent a direct exposure route; the site is to be capped and does not have buildings over the vapor contamination into which vapor phase contaminants may migrate. The most likely potential exposure pathway to this VOC contamination would be a short term exposure if the soil were excavated.

LANL compared the soil vapor concentrations to the OSHA 8 hour time weighted average (TWA) levels. These are levels judged acceptable for workers in particular industries; but they are based on different risk criteria than are used in RCRA and Superfund; OSHA risk criteria also vary from one chemical to another. In the table below I have compared the maximum concentration in pore gas for each chemical to minimal risk levels (MRLs) generated by ATSDR for both acute (less than 14 days) and intermediate/chronic (greater than 14 days) exposures. These MRLs are designed to protect the general public from potential noncancer health effects resulting from acute or chronic exposure. The MRLs are based on the most sensitive endpoints seen in studies; they are not expected to correspond to a level that causes harm. I have also compared the maximum



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concentration in pore gas for each chemical to the EPA RfCs (when available) and EPA ambient air screening levels. These levels correspond to an excess cancer risk of 1 in 10^{-6} for lifetime exposure to that air concentration. These screening levels would generally be used only for comparison to surface air concentrations over a site released for residential use.

Contaminant	Benzene	Methylene chloride	Toluene	1,1,1 Trichloroethane (TCA)	trichloroethylene
Max concentration in pore gas (table 2.5-5)	34 ppb 110 ($\mu\text{g}/\text{m}^3$)	17 ppb 59 ($\mu\text{g}/\text{m}^3$)	2300 ppb 8800 ($\mu\text{g}/\text{m}^3$)	26 ppb 140 ($\mu\text{g}/\text{m}^3$)	20 ppb 110 ($\mu\text{g}/\text{m}^3$)
ATSDR acute MRL	50 ppb	600 ppb	1000 ppb	2000 ppb	2000 ppb
ATSDR chronic or intermediate MRL	4 ppb	300 ppb	80 ppb	700 ppb	100 ppb
EPA RfC (for residential)	Under review	No data	400 ($\mu\text{g}/\text{m}^3$)	No data	No data
EPA Region 6 ambient air level (AAL) ($\mu\text{g}/\text{m}^3$)	0.25 ($\mu\text{g}/\text{m}^3$)	4.1 ($\mu\text{g}/\text{m}^3$)	400 ($\mu\text{g}/\text{m}^3$)	1000 ($\mu\text{g}/\text{m}^3$)	1.1 ($\mu\text{g}/\text{m}^3$)
A.A.L. endpoint	cancer	Cancer	cancer	noncancer	cancer

The maximum concentrations in pore gas of all these VOCs except toluene are below the ATSDR acute MRLs. This would indicate that future short term exposure to those VOCs due to accidental excavation is unlikely to result in harm to workers or the public. The toluene concentrations seen at depth could potentially represent a risk (MRLs are conservative) and controls might be necessary to address this. All of the VOCs exceed the ambient air levels for chronic residential exposure.

The maximum tritium concentration measured in air at the site was $54.5 \text{ pCi}/\text{m}^3$. Using the EPA final radionuclide PRG calculator cancer slope factor for inhaled tritium of $1.99 \times 10^{-13} \text{ risk}/\text{pCi}$ and the NMED SSL exposure parameters, the lifetime excess cancer risk for a resident associated with chronic exposure to this concentration of tritium in air would be 2.3×10^{-6} . For an outdoor industrial worker using NMED default values, the lifetime excess cancer risk associated with exposure to this concentration of tritium in air would be 1.4×10^{-6} . Using the 95% UCL of the mean for the tritium concentration ($17.1 \text{ pCi}/\text{m}^3$), the projected potential risk to the resident or worker would be 7.1×10^{-7} and 4.3×10^{-7} , respectively. The risk due to the measured concentrations of tritium in air at this site is below the NMED risk guideline for both the industrial and residential scenarios.

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The ecological screening compared concentrations of contaminants in surface sediment in the channel to LANL ESLs for ecological receptors. Selenium exceeded the ESL for plants, generating an HQ of 4.2. Considering that the background concentration of selenium is 3 times the selenium ESL for plants and that this ESL is the only one which generated an HQ greater than one; the HQ of 4.2 probably does not represent a prediction of ecological risk from selenium at this site.