UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Mr. James (JD) Dotchin
Chief, Bureau of Industrial Site Cleanup
Nevada Division of Environmental Protection
Department of Conservation and Natural Resources
375 E. Warm Spring Rd., Suite 200Las Vegas, NV. 89119

Re: Justification for Focused Indoor Air Investigation for Chloroform at Nevada Environmental Response Trust Site, Operable Unit-2

Dear Mr. Dotchin:

Consistent with both your request and previous dialogue between Nevada Division of Environmental Protection (NDEP) & U.S. Environmental Protection Agency (EPA), we strongly-recommend that the Nevada Environmental Response Trust (NERT) conduct a focused, site-specific indoor air investigation for chloroform at prioritized residential locations within the NERT Operable Unit-2 (OU-2) plume footprint. Given the subsurface findings, we feel it prudent and protective of public health to conduct a limited and focused indoor air investigation at areas where soil vapor concentrations exceed a site-specific, risk-based threshold. The recommended health-based threshold for chloroform and technical support for pursuing this focused investigation are detailed below.

While we understand that remedial activities at the NERT Site are based on Lead Agency-approved and Non-Lead Agency-reviewed remedial investigation and risk assessment workplans, we clearly view the supplemental activities recommended herein as entirely consistent with the overarching objectives within the workplans with respect to protecting public health and assessing potential vapor intrusion threats at the NERT Site. Briefly, EPA's National Cleanup Programs routinely request multiple lines of scientific evidence when subsurface fate and transport modelling predicts a complete exposure pathway – accompanied with health risk-estimates within the range of acceptability – but subject to a significant degree of uncertainty.

According to the *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (EPA 2015), "**multiple lines of evidence are particularly important for supporting 'no-further-action' decisions regarding the vapor intrusion pathway** (e.g., pathway incomplete determinations) to reduce the chance of reaching a false-negative conclusion (i.e., concluding vapor intrusion does not pose unacceptable human health risk, when it actually poses an unacceptable human health risk)."*

We consider the Johnson and Ettinger (J&E) Model to represent one specific tool (or line of evidence), to estimate the range of potential indoor air impacts and concomitant human health risks at contaminated

sites. That is to say, subsurface fate and transport model predictions are but one, of several lines, of scientific evidence that should be carefully weighed with the other lines of evidence when characterizing the full dimension of the vapor intrusion threat.

When applying both historic and current subsurface media contaminant concentrations (shallow soil vapor), the J&E Model predicts that the vapor intrusion pathway at discrete locations within OU-2 is, indeed, complete. To date at the NERT Site, modeled health risk-estimates within a range of acceptability have been used as a technical justification for reliance on this sole line of evidence for the protection of public health. However, in addition to the inherent uncertainties associated with modeled health risk-estimates, previous subsurface characterization efforts within OU-2 were subject to additional levels of uncertainty due to modifications of EPA's version of the J&E subsurface fate and transport model, and a pending updated chloroform risk assessment from the Agency's Integrated Risk Information System (IRIS).

A limited and focused indoor air investigation is therefore strongly recommended. This focused investigation should be designed to develop an additional line of scientific evidence and the findings will be used for several purposes. Results from this investigation will be used to confirm that chloroform indoor air levels remain below chronic, health-based thresholds, and to also facilitate direct comparisons between the range of modelled indoor air estimates and findings from direct measurement of indoor air quality within residential locations proximate to the OU-2 chloroform plume.

Primarily, we recommend verification that chloroform concentrations within indoor **air are within the acceptable carcinogenic risk-range and remain less than the $1x10^{-4}$ acceptable cancer-risk threshold concentration** (12 $\mu g/m^3$). This effort is directly protective of public health. It should be noted that typical indoor air screening investigations apply the point of departure, or $1x10^{-6}$ excess cancer risk-level (0.12 $\mu g/m^3$ Chloroform), as the acceptable remedial metric. However, because of potential anthropogenic background indoor sources of chloroform, we have proposed applying the lowest-bound of the acceptable carcinogenic risk-range as a contaminant-specific remedial metric.

Secondarily, because measured indoor air concentrations can represent a more direct metric for the determination of a site-specific health risk estimate, these efforts will be used to reduce the level of uncertainty associated with exclusive reliance on modeled health risk-estimates. We also propose to contrast the range of empirical attenuation factors (calculated from the ratio of measured indoor air concentrations to the underlying measured soil gas concentrations) with J&E Model calculated attenuation factors. By comparing not only the empirical and calculated attenuation factors, but also the number of residences sampled, the building conditions, proximity to soil gas "source zones," and seasonal variation – the representativeness of the site-specific attenuation factor can be effectively evaluated.

Soil gas data will be used to select priority areas for indoor air investigation using a residential exposure scenario. **Locations within or near residential land use where chloroform soil gas concentration at 15 ft below ground surface is above 4,000 ug/m^3** (obtained by dividing an indoor air concentration of 12 $\mu g/m^3$ by an assumed median attenuation factor of 0.003, which is an order of magnitude less than the more conservative generic EPA attenuation factor of 0.03). In addition, the potential range of estimates assessed by the model should be presented and discussed in the uncertainty analyses of the model results around the median value.

If chloroform concentrations in indoor air are found above 12 µg/m^3 and therefore posing an unacceptable chronic human health risk, NERT and other BMI Companies contributing to the OU-2 Chloroform release should develop a series of appropriate health-based response actions.

Please let me know if you have any questions. Our hope is that we can work together on approving a plan in the next month.

Sincerely,

NICOLE MOUTOUX

Digitally signed by NICOLE MOUTOUX
Date: 2020.09.11 07:19:56 -07'00'

Nicole G. Moutoux
Assistant Director
Land, Chemicals and Redevelopment Division