



AQS, Inc.
2112 Deer Run Drive
South Weber, Utah 84405

(801) 476-1365
www.aqsnet.com



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Mr. David Cobrain
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Dr. East
Building One
Santa Fe, NM 87505

RE: Status Report for the High Energy Laser System Test Facility Technical Support Area Gasoline Spill Site Solid Waste Management Unit (SWMU)-197 (CCSW-16). March, 2011.

Dear Mr. Cobrain:

This letter serves as a deliverable and provides our technical evaluation on the risk assessment related portion of the "Status Report for the High Energy Laser System Test Facility Technical Support Area Gasoline Spill Site SWMU-197 (CCSW-16)" for White Sands Missile Range, New Mexico, dated March 2011.

It appears that there are increasing concentrations of contaminants with increasing depth at the soil boring (SB) sample location 15. Initially, concentrations of volatile organic compounds (VOCs) are the highest at 26-30 feet, then decrease with depth. However, in the deepest sample collected at 42 ft, concentrations of 1,2,4-trimethylbenzene, m-xylene, toluene, and gasoline range organics begin to increase again. It is not certain whether deeper sampling would reveal increasing concentrations of VOCs. It is agreed that continued monitoring of groundwater be conducted at SWMU-197.

Risks for the vapor intrusion scenario exceeded target risk levels; WSMR has proposed institutional controls to prevent/limit exposure via this pathway. It is noted that Regional Screening Levels (RSLs) from 2009 were applied if data were not available in the NMED Soil Screening Guidance. Since the report was drafted in early 2011, the use of the 2009 RSLs is consistent with the available data at that time. It is unlikely that the results of the assessment would change incorporating 2011 screening levels.

As discussed in Section 5.1 of the report, groundwater data were evaluated against non-risk based levels (USEPA Maximum Contamination Level, MCL or NMAC Water Quality Control Commission, WQCC, levels) and were only compared to risk-based levels in the event an MCL or NMAC WQCC. Since this evaluation was only to assess whether groundwater had been impacted, the approach appears acceptable. For risk assessments purposes, all volatile organic

compounds (VOCs) were selected as contaminants of potential concern for the vapor intrusion evaluations.

Given that SWMU-197 is entirely covered with concrete pavement, there are no completed exposure pathways for ecological receptors. In these cases, ecological pathways are typically incomplete and an ecological evaluation is not included. For conservatism, WSMR included an evaluation of ecological risks.

Overall, the institutional controls outlined in Section 7 of the report appear adequate to address the risks (vapor intrusion) identified in the risk assessment.

If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you,



Paige Walton
AQS Senior Scientist and Program Manager

Enclosure

cc: Kristen Van Horn, NMED (electronic)
Joel Workman, AQS (electronic)
Sunny McBride, AQS (electronic)

Technical Review Comments on the Risk Assessment Related Portion of the Status Report for the High Energy Laser System Test Facility Technical Support Area Gasoline Spill Site SWMU-197 (CCSW-16). March, 2011.

General Comments

1. The screening level ecological risk assessment (ERA) involved comparing site concentrations with published ecological screening levels (i.e., US EPA Region 4, Region 5, and/or US EPA EcoSSLs) in order to: 1) calculate screening level hazard quotients; and 2) determine the list of constituents of potential ecological concern (COPECs) to be evaluated further. While an acceptable approach and consistent with USEPA guidance, this methodology is not in accordance with NMED's *Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Assessment* (2008). For future ecological assessments, please follow the protocol outlined in the NMED guidance. In addition, the NMED Soil Screening Guidance (February 2012) will include methodologies for conducting screening level ecological assessments. Again, for future evaluations, ensure the assessments are consistent with the preferred NMED guidance.
2. The ecological risk assessment did not include an evaluation of plants potentially exposed to COPECs. As stated in Section 2.4.1.2 of Appendix H, "the subsurface soils down to a depth of 10 ft bgs were included in the evaluation to address potential exposure scenarios in the event there are burrowing wildlife or vegetation with deep rooting zones". Modify the ERA to include potential hazards to the plant community at SWMU-197.
3. Throughout the report, groundwater is referenced as 'soil water', 'vadose zone water' and sometimes as 'groundwater'. This interchange of terms is confusing. It is suggested that the report include a definition of each of these terms and address whether they are interchangeable.

Specific Comments

1. Tables HHRA-9 through HHRA-12. Exposure factors are shown for adult and child receptors. Since intakes are not calculated for the inhalation pathway, and body weight is not considered in the inhalation risk and hazard calculations, a single residential receptor should be evaluated, using the exposure duration of 30 years. Usage of 24 years for an adult and 6 years for a child underestimates potential risk and hazard via the vapor intrusion pathway. For example, Tables HHRA-23 and HHRA-24 used the exposure duration of 6 years in the hazard quotient calculations, which are based on a child receptor. The hazard quotients are underestimated and should be based on the exposure duration of 30 years. Update Tables HHRA-9 through HHRA-12 accordingly. In addition, update the hazard calculations in Tables HHRA-23 and HHRA-24 to utilize the exposure duration of 30 years.
2. Tables HHRA-9 through HHRA-12. Averaging times for either carcinogens or noncarcinogens are omitted. Revise Tables HHRA-9 through HHRA-12 to include averaging times for both carcinogens and noncarcinogens.

3. Table HHRA-17. The thickness of soil stratum A (1310 cm) is not equal to the depth below grade to top of contamination (625 cm). The thickness of soil stratum A should equal the depth below grade to top of contamination, or "Lt". Revise the calculations so that the thickness of soil stratum A is equal to the depth below grade to top of contamination.
4. Tables HHRA-5 and HHRA-6. There are several constituents for which an inhalation unit risk (IUR) factor is not listed. Following the hierarchy for toxicity data (USEPA, 2003), California Environmental Protection Agency Office of Environmental Health Hazard Assessment's Chronic Reference Exposure Levels (RELs) and the Cancer Potency Values, should be assessed. The following have IUR published by CalEPA that should be included in the risk assessment. Revise the tables and subsequent calculations accordingly.
 - a. Ethylbenzene: IUR of $2.5 \times 10^{-6} (\mu\text{g}/\text{m}^3)^{-1}$
 - b. Bromodichloromethane: IUR of $3.7 \times 10^{-5} (\mu\text{g}/\text{m}^3)^{-1}$
 - c. Naphthalene. An IUR of $3.4 \times 10^{-5} (\mu\text{g}/\text{m}^3)^{-1}$

USEPA, 2003. Memorandum. Office of Solid Waste and Emergency Response. Subject: Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53.

5. Table HHRA-5. Reference concentration (RfC) values are listed for n-butylbenzene and sec-butylbenzene and are referenced as found in US EPA's Integrated Risk Information System (IRIS). There are no RfCs listed in IRIS for these two chemicals. Clarify the sources of the RfCs for n-butylbenzene and sec-butylbenzene.
6. Section 2.3.4.5. Appendix H. Text states that "there are no buildings currently on or near SWMU-197." However, Section 2.3.4.3 describes a current building approximately 100 feet from SWMU-197. Modify text in Section 2.3.4.5 to state that there is currently a building near SWMU-197.

Minor/Editorial Comments

The following comments were noted with the review. NMED may not wish to include these, as modification of the report to address these comments does not change the overall risk conclusions.

1. Table HHRA-3. The footnotes indicate that the groundwater screening levels are from the ARCADIS, 2010 publication. Since the groundwater screening levels are ultimately taken from US EPA's (2002) Vapor Intrusion Guidance, the citation should include the source of the screening levels as US EPA (2002) in the footnote. No response is needed.
2. Table HHRA-3. The groundwater screening level for m,p-xylenes is based on the screening value for m-xylene. The p-xylene screening level (22 mg/L) is lower than the groundwater screening level for m-xylene (23 mg/L). Clarify whether the analytical results for m,p-xylene specifies the percentages of each isomer. If not, modify table HHRA-3 to utilize the screening level for p-xylene (22 mg/L).

3. Tables HHRA-7 through HHRA-13. The titles of the tables and the names of the equations indicate that chronic daily intakes were calculated. Chronic daily intakes via inhalation would be calculated based on inhalation rates and presented in mg/kg/day. The usage of the term 'chronic daily intake' can be misleading, as intakes were not calculated for inhalation. Rather, the equations in Tables HHRA-7 through HHRA-13 show how indoor air concentrations were predicted and adjusted for exposure frequencies, durations, and time. Revise Tables HHRA-7 through HHRA-13 accordingly.
4. Table HHRA-12. Body weight is shown as an exposure parameter in Table HHRA-12. Body weight is not used in the equation. Delete body weight as an exposure parameter in Table HHRA-12.
5. Table HHRA-24. It appears that Table HHRA-24 has an incorrect title, "Risk and Hazard Calculations for Hypothetical Future Resident Receptors (Adult and Child) from Exposure to Vapors in Indoor Air Migrating from Total Soil." Table HHRA-24 displays risk and hazard calculations from exposure to vapors in indoor air migrating from groundwater. Revise the title of Table HHRA-24 accordingly.
6. Section 2.3.4.3, Appendix H. In the subsections titled "Future Adult Resident" and "Future Child Resident", the text references soil ingestion rates, skin surface area, soil adherence rates, body weight, and age-adjusted ingestion factors. Soil ingestion and dermal contact were not evaluated for residents in this risk assessment. Remove all references to soil ingestion rates and dermal contact rates.
7. Section 2.3.4.3, Appendix H. Text describes evaluation of a "Future Medical Aid Worker". The exposure parameters are listed in Table HHRA-13. Provide additional justification of the exposure frequency (84 days/year) parameter selected for the medical aid worker (assume 7-days per month per year based on engineering judgment).