HDOH EHE Guidance

Appendix 9: Summary of Summer 2016 Updates

General:

- EALs updated to reflect minor revisions to physiochemical constants and exposure assumptions used in USEPA Regional Screening Level models (RSLs; see details below).
- Overall adjustments to EALs for common contaminants of concern were relatively minor.
- Added EAL Surfer option to select chemical by CAS number.
- Clarified that soil EALs do not apply to bedrock (coral, basalt, etc.) and that no further soil sample collection is required when contaminated soil has been removed down to bedrock to the extent practicable (Volume 1, Section 1.2).
- Clarified that vapor intrusion action levels must be adjusted for use in non-tropical climates (Volume 1, Section 4.5.1; details in pending updates to Section 13 of the HEER office *Technical Guidance Manual*).

USEPA RSL Updates (Appendix 1, Sections 3, 4, and 5):

- Soil Parameters: Water filled porosity slightly increased, fraction organic carbon slightly decreased (negligible effect on action levels).
- Physiochemical Parameters (many chemicals): Minor updates to fate and transport parameter values (e.g., sorption coefficients, diffusivity constants, solubility; refer to Appendix H, changes in red).
- Toxicity Factors: Relatively minor updates to a small number of chemicals.
- Adult Body Weight: Increased from 70kg to 80kg (negligible increase in action levels);
- Residential Exposure Duration: Reduced from 30 years to 26 years (minor increase effect on cancer-based action levels).
- Commercial/Industrial Workers: Soil adherence rate reduced from 0.2 to 0.12 (negligible effect on direct-exposure action levels).
- Tapwater: Adult ingestion rate increased to 2.6 L/day; child reduced to 0.78 L/day (negligible effect on direct-exposure action levels); dermal exposure included in USEPA Tapwater model *not included* in EALs (use debated and negligible contribution to risk).
- Indoor Air: Commercial/Industrial ambient air action level model revised to reflect an 8-hour exposure time and linked to vapor intrusion models (previous vapor intrusion models assumed a 24-hour exposure time; increased C/I air action levels by a factor of up to three).
- Target risk of 10^{-4} applied to carcinogenic PAHs (e.g., benzo(a)pyrene) to address anthropogenic background in urban areas (auto exhaust, asphalt, etc.) and more efficiently identify localized areas of higher-risk soil contamination.
- Naphthalene target cancer risk adjusted to 10^{-5} to reflect higher confidence in noncancer toxicity factors and laboratory detection limit limitations.
- Key changes in EALs due to updates in USEPA toxicity factors:
    - Decreased by 50% to <100%: Trichloroethylene

  - Decreased by >10X: 2,6 Dinitrotoluene, 3, Nitrotoluene;
  - Increased by 50% to <100%: Chlordane (Technical), 1,2 Dichlorobenzene, 1,2,4 Trichlorobenzene;
  - Increased by ≥2X to <10X: Antimony, Methyl Isobutyl Ketone, Methylene Chloride;
  - Increased by ≥10X: Chloromethane, Tetrachloroethylene.
- Noncancer Reference Dose factors for aldrin and dieldrin updated based on review by Hooker et al 2013 (update to 1980s-era RfDs still referred to in USEPA RSLs).

Exposure Factors (Appendix 1, Section 4.2):

- Relatively minor changes in USEPA RSL default body weight, exposure skin area, commercial worker soil adherence factor and total residential exposure duration (see USEPA 2916). Changes to direct exposure soil action levels relatively minor.
- Commercial/Industrial worker exposure time of 8 hrs/day incorporated into USEPA RSL ambient air models. Increased C/I air action levels by a factor of three.

Vapor Intrusion (Appendix 1, Section 3.3):

- Modified vapor intrusion action level models to better reflect a reduced vapor intrusion risk in tropical climates in comparison to default assumptions used on the mainland for areas where buildings are routinely heated (Brewer et al. 2014). Revised action levels reflect good, year-round ventilation and little to no heating of buildings.
- This was done by reducing the "Soil-Building Pressure Differential" parameter of the vapor intrusion models from 40 g/cm-s^2 to 20 g/cm-s^2, which generates a more reasonable, conservative, annual average vapor entry rate of 2 L/min, versus typical subtropical to temperate climate defaults of 3 to 5 L/min.
- This generates a target Indoor Air:Subslab Attenuation factor of 0.0005 for residential structures and 0.00025 for commercial/industrial structures and led to an increase in subslab soil vapor action levels by a factor of two. Soil and groundwater action levels for vapor intrusion were not affected.
- Clarified that adjustment of VI action levels is required for use of EALs in non-tropical climates where heating and poorer ventilation can increase vapor intrusion risk.
- Guidance added on adjustment of vapor intrusion action levels in other climate zones.

Specific Chemicals:

Lead (Volume 1, Section 4.3.1.2):

- Reduction in current, risk-based USEPA Residential RSL of 400 mg/kg to <200 mg/kg anticipated in near future, possibly to <100 mg/kg.

- Clarified that use of a soil action level less than 200 mg/kg is not practical due to widespread, anthropogenic lead in urban areas from past, leaded-gasoline exhaust and other sources.
- Noted that remediation of lead-contaminated soil to the HDOH natural background action level of 73 mg/kg should be considered for residential areas recommended when practicable and when the contamination can be attributed to a specific, localized release.
- Clarified that no further action warranted if sample data indicate a concentration of lead above 200 mg/kg but below the USEPA RSL of 400 mg/kg and a specific source cannot be identified.
- Capping or other efforts to minimize exposure of young children should be considered where area-wide impacts exceed 400 mg/kg, regardless of the suspected source.

Dioxins (Volume 1, Section 4.3.1.2):

- Re-emphasized that remediation of dioxin-contaminated soil to the HDOH default background action level of 20 ng/kg should be considered as part of the remedial action plan for Category C (> 240 ng/kg TEQ dioxins) and Category C (>1,500 ng/kg TEQ dioxins) when practicable and when the contamination can be attributed to a specific, localized release, especially when the area is to be used for residential or other sensitive purposes (e.g., schools, daycare, etc.).

Gasoline (Appendix 1, Section 6):

- Assumed carbon range makeup of gasoline vapors revised to reflect median values in USEPA Petroleum Vapor Database (USEPA 2013).
- Decreased TPHg indoor air action levels by a factor of approximately 2.

Aquatic toxicity Action Levels (Appendix 1, Section 5.3):

- USEPA Region 4 Ecological Risk Assessment: Primary reference for updates. Compilation of acute and chronic aquatic toxicity goals from a similar set of sources used in previous editions of the EALs.
- USEPA Office of Pesticides Aquatic Life Benchmarks used as secondary reference if no value provided for subject pesticide in USEPA Region 4 reference.
- Other references used for chemicals not listed in above two sources.
- Aquatic toxicity action levels significantly reduced for several pesticides. The subject pesticides are not common, target COPCs for groundwater however and the reduction in groundwater and related soil (leaching) action levels is not anticipated to significantly affect typical site investigations.

Various

- Odor Recognition Thresholds for gasoline (0.25ppm) and middle distillate fuels (0.70ppm) revised to reflect New Jersey Dept of Health guidelines (refer to Table F series in Appendix 1).