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TO: Los Angeles Regional Water Quality Control Board

FROM: UCLA Expert Panel, Gary Krieger

PROJECT: Former Kast Property in Carson, California

SUBJECT: Soil depth intervals used to calculate the Site Specific Cleanup Goals

DATE: January 14, 2014

The Revised Site Specific Cleanup Goals Report (Revised Report) submitted by Shell to the Regional Board on Oct. 21, 2013 divides the upper 10-foot soil horizon into two intervals: 0-2 feet, and 2-10 feet. Shell used different exposure frequency to constituents of concern in the soil intervals based on the rationale that residents have more frequent exposures to shallower soils (0-2 feet) than to deeper soils (2-10 feet). On January 14, 2014, the Regional Board requested the UCLA Expert Panel comment on the appropriateness of this rationale of using different exposure frequencies for different soil depths within a 10-foot soil horizon.

The UCLA Expert Panel agrees that this methodology is appropriate to assess human health exposure. The USEPA (1993) has defined that the top 2 centimeters of soil is where direct contact for the residential receptor predominantly occurs. In the guidance for soil screening the USEPA states "the decision to sample soils below 2 centimeters depends on the likelihood of deeper soils being disturbed and brought to the surface (e.g., from gardening, landscaping or construction activities)" (USEPA 1996, page 12). In their supplemental guidance, the USEPA states that "residential activities (e.g., gardening) or commercial/industrial (e.g., outdoor maintenance or landscaping) or construction activities that may disturb soils to a **depth of up to two feet**, potentially exposing receptors to contaminants in subsurface soil via direct contact pathways such as ingestion and dermal absorption" (USEPA 2002, page 2-8). In USEPA's (2003) *Superfund Lead-Contaminated Residential Site Handbook*, the agency states that sampling "does not need to exceed 24 inches to define the vertical extent of contamination for clean-up purposes" as the remediation is being conducted to eliminate the potential for direct exposure in the residential setting. The Handbook (USEPA 2003) goes on to recommend for remediation that "Based on Agency experience, it is strongly recommended that a minimum of twelve (12) inches of clean soil be used to establish an adequate barrier from contaminated soil in a residential yard for the protection of human health. ... With the exception of gardening, the typical activities of children and adults in residential properties do not extend below a 12-inch depth." and "Twenty-four (24) inches of clean soil cover is generally considered to be adequate for gardening areas ..."



We agree that the 0-2 feet interval is appropriate for the typical residential exposure and expect, given the established nature of the neighborhood, the assumption that the resident is exposed 4 times per year to soils at depths greater than 2 feet to be highly conservative. It is our opinion that only if soil concentrations exist below 2 feet that may pose a unacceptable exposure to vapor intrusion should residential exposure be the driver for Site Specific Cleanup Goals for subsurface soil (2 to 10 feet) rather than the utility worker. This opinion is consistent with the Revised Site Specific Cleanup Goals Report submitted by Shell.

References Cited

- USEPA 1993, *The Urban Soil Lead Abatement Demonstration Project*. Vol I: Integrated Report Review Draft. National Center for Environmental Publications and Information. EPA 600/AP93001/A. NTIS PB93-222-651. as cited in USEPA 1996.
- USEPA 1996, *Soil Screening Guidance: User's Guide*, Second Edition, Office of Solid Waste and Emergency Response, Washington DC Publication 9355.4-23, July 1996.
- USEPA 2002, *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. Office of Solid Waste and Emergency Response, Washington DC OSWER 9355.4-24, December 2002.
- USEPA 2003, *Superfund Lead-Contaminated Residential Sites Handbook*. Office of Emergency and Remedial Response, Washington DC OSWER 9285.7-50, August 2003.