

DCN: 01255.2013.088

July 19, 2013

Ms. Emily Bartusek  
Stormwater Specialist  
Division of Water Quality  
195 North 1950 West  
Salt Lake City, Utah 84114

Reference: Upper-bound Adult and Child Trespasser Risk and Hazard Estimates for the Chevron Diesel Spill Site, Willard Bay State Park, Salt Lake City, Utah

Dear Ms. Bartusek:

Please find attached two Microsoft Excel files (Chevron\_Trespasser\_Surface Water Risk Final.xlsx and Chevron\_Trespasser\_Sediment Risk Final.xlsx) which present the adult and child trespasser risk and hazard estimates for use at the Chevron Diesel Spill Site, Willard Bay State Park, Salt Lake City, Utah (Site). These risk and hazard estimates represent upper-bound quantitative point estimates predicated on the maximum detected values for discrete analytes among all samples collected in sediment and surface water at the Site. These estimates are derived using a ratio-based methodology relating the maximum detected analyte concentrations, the lower brightline of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) relative risk range (1E-06), and the Willard Bay adult and child trespasser screening levels previously developed for and approved by the State of Utah. These screening levels were developed consistent with previously approved site documents specifying the exposure parameter values and State of Utah and United States Environmental Protection Agency (USEPA) risk assessment guidance documents.

Screening levels for each contact medium (i.e., sediment, surface water) reflect exposure routes including incidental ingestion and dermal exposure. Inhalation of volatile components and particulate emission components were not anticipated to be significant in derivation of these screening levels and exposure to ambient air was omitted, consistent with site working group discussions and direction.

These tables list the target analytes, the adult and child trespasser health-based screening criteria, the maximum detected chemical-specific concentration (MDC) (among all media-specific samples) for each analyte, and, in cases where the MDC exceeds a screening criterion, quantitative point estimates of adult and child trespasser risk and/or hazard.

- *Chevron\_Trespasser-Surface Water Risk Final.xlsx*
- *Chevron\_Trespasser-Sediment Risk Final.xlsx*

TechLaw has also provided four additional Microsoft Excel files to present the tabulated intake and screening level equations along with the exposure parameter values. Separate files are provided for surface water ingestion and dermal contact and sediment ingestion and dermal contact. These files include:

- *Chevron\_Trespasser\_Surface Water Ingestion.xlsx*
- *Chevron\_Trespasser\_Sediment Ingestion.xlsx*
- *Chevron\_Trespasser\_Surface Water Dermal Contact.xlsx*
- *Chevron\_Trespasser\_Surface Sediment Dermal.xlsx*

As a point of clarification, mutagenic mode of action is reflected in the spreadsheets for those chemicals designated by USEPA as mutagens. Derivation of the adult screening levels presumes an individual older than 16 years of age, and given the Exposure Duration of one year, an ADAF of 1 was applied. Derivation of the child screening levels presumes an individual of 6 years of age, and an ADAF of 3 was applied for the single year reflecting the Exposure Duration. Mutagens are highlighted in red in the tables.

#### **SURFACE WATER:**

- **VOCs:** Only one volatile organic compound (VOC), methylene chloride, was detected in surface water at a maximum concentration of 0.39 micrograms per liter ( $\mu\text{g/L}$ ), a value approximately two orders of magnitude below the screening criteria. Methylene chloride is a common laboratory contaminant and is not associated with diesel fuel. Because data validation is not complete, it is possible that this result is an artifact of laboratory handling/processes.
- **SVOCs:** Only one semi-volatile organic compound (SVOC), bis-2-ethylhexylphthalate, was detected in surface water, at sample location CS2-SW-02. This compound was detected at a maximum level of 106  $\mu\text{g/L}$ , exceeding both the adult and child-based trespasser screening criteria. The associated Adult Trespasser cancer risk is marginally above the lower brightline of the NCP relative risk range at 1.08E-06. The Child Trespasser cancer risk is above the lower NCP brightline at 5.03E-06. Bis-2-ethylhexylphthalate is a common laboratory contaminant, but it is uncertain if this constituent is associated with diesel fuel (it is listed as a component of diesel fuel exhaust and can be present in plastics incorporated into piping and storage vessels). Because data validation is not complete, it is possible that this result is an artifact of laboratory handling/processes. There were nine total detections of bis-2-ethylhexylphthalate in surface water samples. The range of detected values extended from 11 to 106  $\mu\text{g/L}$ , with an arithmetic mean of 43.2  $\mu\text{g/L}$ . If an upper-bound estimate of the mean was calculated, inclusive of the nondetect values, the estimate could be lower, but given the variability, it is more likely the 95 percent upper confidence limit on the mean (the preferred basis for estimating the exposure point concentration) would exceed the arithmetic mean. In any case, the incremental excess cancer risk associated with bis-2-ethylhexylphthalate is likely below a level of concern for the immediate future, based on the receptor populations

addressed in this assessment.

- **PAHs:** Four polynuclear aromatic hydrocarbons (PAHs) (naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and Indene) were detected in surface water (all at sample location CS3-SW-02). None of the detections exceeded the health-based screening criteria predicated on protection of trespasser populations.
- **TPH:** Chevron product-specific screening criteria predicated on hydrocarbon volatile and extractable fractions were not developed. The Practical Quantitation Limit for diesel range organics (DRO) analyses is given as 500 µg/L. A site-specific surface water screening criterion for (unfractionated) DRO, utilized previously by the State of Utah at the Red Butte site, is given as 28 µg/L. Clearly, the PQL achieved by the laboratory was not sensitive enough to allow comparison of results to the screening value. From a pragmatic standpoint, the DRO data are not crucial, as the risk assessment is more significantly dependent on the discrete analyses. The DRO analyses are primarily utilized in a trend assessment to verify discrete analytical results.
- **Surface Water Summary:** With a maximum associated cancer risk estimate significantly below the midpoint of the NCP relative risk range (1E-05) and in consideration of the basis of these risk estimates (e.g., utilization of the maximum detected value as the exposure point concentration), TechLaw sees no impediment on the basis of surface water exposure to opening the remainder of the park while restricting access within the Willard Bay Study Area.

#### **SEDIMENT:**

- **VOCs:** Thirty-two VOCs were detected in sediment. None of the maximum detected concentrations exceed either the adult or child trespasser health-based screening criteria. Several of the detected compounds, all detected at low levels, do not have direct contact-based screening criteria. Several, like 1,2,3-trimethylbenzene or 1,2,4-trimethylbenzene are not associated with an oral reference dose of oral cancer slope factor and only have inhalation-based toxicity criteria (inhalation is correctly assumed within this assessment of sediment not to contribute substantively to overall expressions of risk or hazard). In another case, where a suitable surrogate is available, such as substituting isobutyl alcohol for isopropyl alcohol, the detected concentrations are several orders of magnitude below a level of concern. In this case, the detected value of isopropyl alcohol of 0.083 mg/kg is orders of magnitude below the USEPA Residential Regional Screening for Soil of 18,000 mg/kg for isobutyl alcohol.
- **SVOCs:** Fourteen SVOCs were detected in sediment. Only one constituent, 7,12-dimethylbenz(a)anthracene (a PAH), was detected at a maximum concentration (0.318 mg/kg) in excess of a health-based screening criterion, namely the Child Trespasser Screening Criterion (0.08 mg/kg). The risk associated with this exceedance is 3.81E-06. This value is above the lower brightline for excess cancer risk as specified in the NCP, but well below the midpoint of the NCP relative risk range (1E-05). The maximum detected concentration represents the only detection of this constituent in sediment. However, the lowest recorded method detection limit (MDL) of 0.129 is still above the child Trespasser SL.

TechLaw is unable to refine the current estimate; however, the associated incremental excess lifetime cancer risk is not substantive and does not preclude the opening of the greater park, if institutional controls remain in place to preclude routine access to the impacted areas of Willard Bay, pending additional investigation.

- **PAHs:** Eleven PAHs were detected in sediment. None of the maximum detected concentrations exceeded a health-based screening criterion. (Please note that one PAH, 7,12-dimethylbenz(a)anthracene, was tabulated within the SVOC summary table and represents the sole exceedance among any target analytes for this contact medium.)
- **TPH:** Volatile and extractable petroleum hydrocarbon fraction data are presented within the VOC table. No exceedances of the petroleum hydrocarbon fraction screening criteria were recorded.
- **Sediment Summary:** With a maximum associated cancer risk estimate significantly below the midpoint of the NCP relative risk range (1E-05) and in consideration of the basis of these risk estimates (e.g., utilization of the maximum detected value as the exposure point concentration), TechLaw sees no impediment on the basis of sediment exposure to opening the remainder of the park while restricting access within the Willard Bay Study Area.

There were approximately 100 tentatively identified compounds lacking screening criteria. It is highly unlikely that any of these constituents contribute meaningfully to the assessment of risk. These compounds will be evaluated to a greater extent within the Uncertainty Analysis in the forthcoming baseline risk assessment, but this effort is beyond the scope of the current assessment.

#### **RISK ASSESSMENT SUMMARY:**

The total incremental lifetime cancer risk attributable to an Adult Trespasser is 1.08E-06, a value marginally above the lower brightline of the NCP. There is no hazard index above unity for this population. This value, in consideration of the assessment basis (i.e., use of the maximum detected concentrations as the exposure point concentrations) does not indicate evidence of any excess cancer risk for Adult Trespassers at the site. The total incremental cancer risk attributable to a Child Trespasser is 8.84E-06. This value is composed of surface water (5.03E-06) and sediment (3.81E-06) direct contact cancer risks. This total cancer risk value is above the lower brightline of the USEPA's relative risk range as specified in the NCP, but it does not exceed the midpoint of the range (1E-05). TechLaw was unable to refine these conservative point estimates in the currently available timeframe; however, this level of risk is not considered untenable in light of the conservative basis of the screening criteria, the likelihood of trespasser routine exposure, and the actionable level of excess risk commonly applied to receptor populations other than chronic residential exposure. There is no hazard index above unity for this population. TechLaw sees no impediment to opening the remainder of the park as long as institutional controls remain in place to preclude routine recreational exposure within the impacted areas of Willard Bay.

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This deliverable is being forwarded to you through electronic mail (via the internet) in Microsoft Word and Excel formats. We appreciate this opportunity to assist the Utah Division of Water Quality and look forward to providing continued support. If you have any questions, please feel free to contact me at (703) 818-3226.

Sincerely,

A handwritten signature in black ink, appearing to read 'Travis R. Kline', with a stylized flourish at the end.

Travis R. Kline

VP/Program Manager

cc: A. Westenskow, UDSHW (electronic)  
C. Bittner, DWQ (electronic)  
J. Whitehead, UDEQ (electronic)  
H. Wood /TL Central files  
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