

May 14, 2010

RESPONSE TO ADDITIONAL COMMENTS
ILLINOIS EPA REVIEW
March 19, 2010
SITE 19 REMEDIAL INVESTIGATION & RISK ASSESSMENT REPORT—SMALL ARMS RANGE 910
NAVAL STATION GREAT LAKES

Response to Comment Number 7 – The Agency’s comment #7 asks for the specific input parameters employed when calculating the soil-to-air screening criteria. The response directs us to the location of the exposure frequency and duration information and the receptor intake parameters. This is helpful but not conclusive. The calculated screening values presented in revised Table 6-1 could not be reproduced. Additional comments regarding Tables 6-1 and 6-2 are presented in the replies for Comment #15.

Furthermore, it appears that the Residential and Industrial receptor values were calculated using the internet calculator as stated in Section 6.3.1. However, the Construction Worker values appear to be derived from the Supplemental SSL procedures (December 2002) Exhibit A-1 and A-2 equations. Section 6.3.1 should be corrected.

Response: *Some of the SSLs for the inhalation construction worker scenario were not the most current values and the units had not been correctly converted to ug/kg. They have been corrected. In addition, some of the references in Table 6-1 and 6-2 were listed incorrectly. The tables have been corrected and below are the correct references and additional information that is included in Section 6.3.1.*

- **Screening Level based on USEPA Generic SSLs for Migration from Soil to Air – Residential (11th column in Table 6-1 and Table 6-2):** *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites; USEPA, OSWER 9355.4-24, December 2002. Appendix A – Exhibit A-1*
- **Industrial SSLs for Inhalation (12th column in Table 6-1 and 6-2):** *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites; USEPA, OSWER 9355.4-24, December 2002. Appendix A – Exhibit A-2*
- **SSLs for Inhalation Construction Worker Scenario (13th column in Table 6-1 and 6-2)** *were calculated by Tetra Tech using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 using the following parameters and the equations from the guidance below.*

INPUT PARAMETERS		
Parameter	Value	Definition
$Q/C_{sr} = :$	23.02	inverse of 1-h average air concentration along a straight road segment bisecting a 0.5-acre square site (g/m ² -s)/(kg/m ³)
$F_D = :$	0.185	dispersion correction factor (unitless)
$T = :$	7.20E+06	total time over which construction occurs
$A_R = :$	274.231	surface area of contaminated road segment (m ²)
$W = :$	8	mean vehicle weight (tons)
$p = :$	110	number of days with at least 0.01 inches of precipitation (days/year)
VKT	175.5	sum of fleet vehicle kilometers traveled during the exposure duration (km)
$PEF_{sc} = :$	2.43E+06	subchronic road particulate emission factor (m ³ /kg)
$SSL_{carc} = :$		Soil Screening Level for carcinogenic chemicals (mg/kg)
$SSL_{ncarc} = :$		Soil Screening Level for noncarcinogenic chemicals (mg/kg)
$TR = :$	1E-06	Target cancer risk (unitless)
$THQ = :$	1	Target hazard index (unitless)
$AT_c = :$	70	averaging time for carcinogenic exposures (70 years)
$AT_n = :$	1	averaging time for noncarcinogenic exposures (years)
$EF = :$	250	exposure frequency (days/year)
$ED = :$	1	exposure duration (years)
URF	Chemical-specific	inhalation unit risk factor (ug/m ³)-1
HBL_{sc}	Chemical-specific	subchronic health based limit (mg/m ³)

$$SSL_{carc} = \frac{TR \times AT_c \times 365 \text{ days/year}}{URF \times 1,000 \text{ ug/mg} \times EF \times ED \times 1/PEF_{sc}}$$

$$SSL_{ncarc} = \frac{THQ \times AT_n \times 365 \text{ days/year}}{EF \times ED \times [1/HBL_{sc} \times 1/PEF_{sc}]}$$

Changes were made to the Section 6 in track change mode and the tables and appendix files in red.

Response to Comment Number 8 – The Agency’s comment asked for a description of how “BaP Equivalents” were derived. The initial response provided a reference that was later retracted. The subsequent reference provided an internet reference for the assignment of order-of-magnitude relative potency factors which is helpful. What is lacking is a detailed description of their application. For example, we need to know whether the highest or average

environmental concentration for each carcinogenic PAH was used and how non-detects were treated.

The second part of our comment asked why some “BaP Equivalents” entries are qualified by “halfnd”. We assume this indicates that ½ the detection limit was substituted for non-detection results. As stated for Comment #5, we will accept this practice for this report. We do question, though, why the “halfnd” appears only for BaP equivalent results and intermittently. Please confirm the practice was used uniformly for all parameters.

Response: USEPA has adopted a Toxicity Equivalence Factor (TEF) approach to evaluate potentially carcinogenic PAHs based on the potency of each compound relative to that of BAP. TEFs for the individual carcinogenic PAHs are as follows:

<u>Compound</u>	<u>TEF</u>
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3 cd)pyrene	0.1

The TEFs are used to convert each individual carcinogenic PAH concentration into an equivalent concentration of BaP (BaP Equivalent concentration = Result x TEF). The individual BaP equivalent concentrations are then summed to produce a total BaP equivalent concentration for each sample. A BaP equivalent is calculated for each sample. For the BaP Equivalent, the PAHs with non-detects (result with the U qualifier) used the method detection limit concentration (result with the U qualifier) for the calculation using the TEFs. For the BaP Equivalent-halfnd, the PAHs with non-detects (result with the U qualifier) used the ½ the method detection limit concentration for the calculation using the TEFs. This practice was used uniformly for each sample (it was simply not repeatedly footnoted). The BaP Equivalents are treated the same as the rest of the chemical parameters, i.e., the maximum detected BaP Equivalent and the BaP Equivalent-halfnd concentrations are used to calculate the EPC, etc. in the risk assessment and the results are compared to the ICLR.

No changes made to Section 6 based on this comment.

Response to Comment Number 13 – The response provides the sub-chronic PEF calculation for the Construction Worker receptor. Recently, the response to a similar comment for NSGL Site 5 included site-specific inputs for all variables. The response for this site, other than the time variable (T), contains defaults from the Supplemental SSL reference. The use of defaults for site-specific inputs should be discussed and properly justified.

Response: The particulate emissions factor (PEF) relates the concentration of the chemical in soil with the concentration of dust particles in air. The PEF for construction workers ($1.27 \times 10^6 \text{ m}^3/\text{kg}$) was calculated using the equations presented in the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, December 2002). Site specific values were utilized, where they were available. If no site-specific data was available, the USEPA default values were utilized, as is the acceptable USEPA methodology described in the Supplemental Guidance for Developing Soil Screening

Levels for Superfund Sites (OSWER 9355.4-24, December 2002). The parameters used are listed and defined below:

Calculation of PEF for Construction Workers

<i>Q/C</i>	23.02	(g/m ² -s per kg/m ³)
<i>Fd</i>	0.185	dispersion correction factor (unitless)
<i>T</i>	8.64E+05	sec (3600 sec/hr x 8hr/day x 30day))s
<i>Area(A)</i>	274.213	m ²
<i>W</i>	8	tons
<i>P</i>	110	day/year
<i>VKT</i>	40.5	km
PEF =	1.27E+06	m³/kg

Q/C = inverse of the ratio of the 1-h geometric mean airsr concentration to the emission flux along a straight road segment bisecting a square site (g/m²-s per kg/m³). It is an acceptable average default value derived by the USEPA using EPA's ISC3 dispersion model for a hypothetical site under a wide range of average meteorological conditions. (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002)

Fd = dispersion correction factor (unitless) – This is an acceptable average default value derived by the USEPA (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002)

T = total time over which construction occurs (s) - This is a site-specific value.

A = surface area of contaminated road segment (m²) - This is an acceptable average default surface area value derived by the USEPA (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002)

W = mean vehicle weight (tons) – This is an acceptable average default surface area value derived by the USEPA (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002). It assumes that the daily unpaved road traffic consists of 20 two-ton cars and 10 twenty-ton trucks, the mean vehicle weight would be:
 $W = [(20 \text{ cars} \times 2 \text{ tons/car}) + (10 \text{ trucks} \times 20 \text{ tons/truck})]/30 \text{ vehicles} = 8 \text{ tons}$

P = number of days with at least 0.01 inches of precipitation (days/year) – This is a site-specific value based on Exhibit 5-2 in the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002.

VKT = sum of fleet vehicle kilometers traveled during the exposure duration (km) – This is a site-specific value.

Determination of additional site-specific values would involve a significant amount of assumptions; therefore, we feel that retaining EPA default values is appropriate. No changes were made to Section 6 based on this comment.

Response to Comment Number 15 – The response states that Table 6-1 was reviewed and amended. Additional work is needed, however. For example, values are incorrect such as the ORNL-RSL-residential criterion for chromium: 280 vs. 0.29, values are missing such as no ORNL-Industrial and Construction Worker-inhalation for nickel, 1/10 not applied to non-carcinogens such as the TACO-Residential-inhalation value for naphthalene, and 1/10 applied to carcinogens such as the TACO-Residential-ingestion for benzo(k)fluoranthene. These are only examples; numerous other errors appear in this table and in Table 6-2. Additionally, the URL in footnote 6 is incorrect. Corrections in Tables 6-1 and 6-2 will impact Table 6-4.

***Response:** Some of the criteria included in Table 6-1 and 6-2 were not the most current values and/or the units had not been correctly converted to ug/kg. Old values from a previous table were accidentally included without being updated. In addition, some references in Table 6-1 and 6-2 were listed incorrectly. The tables have been corrected. Risk-based non-carcinogenic criteria are divided by 10 to correspond to a systemic hazard quotient of 0.1. The criteria were reviewed and mistakes were corrected and old/outdated values were updated to include the most current ORNL, USEPA, TACO, and non-TACO criteria.*

Response to Comment Number 19 – The first part of our original comment was unclear, so we must apologize. The comment was meant to request the inclusion of inhalation unit risk values for non-BaP carcinogenic PAHs. The unit risk values are available from the California EPA internet site and should be used. The response to the second part of the comment regarding removal of extrapolated values is acceptable.

***Response:** Table 6-12 has been updated to include the California EPA unit risk values.*

Response to Comment Number 20 – The response states that the Recommendations in the Executive Summary and Section 7.2 will be changed based upon what the team develops. That is acceptable. However, given that there are still revisions to the document to be made and reviewed, specifically regarding the risk quantification calculations; such discussion cannot yet be conducted.

The second part of the response proposes changes to the 5th bullet of the conclusions, which make use of the background values found in the Agency's Tiered Approach to Corrective Action Objectives (TACO) regulations. Those values are useful when discussing the uncertainties regarding the calculated risk numbers. However, the Navy is reminded that TACO is not an Applicable nor Relevant and Appropriate Regulation (ARAR) at this site. It is merely a To Be Considered (TBC) regulation. This should be pointed out here as well if the proposed table is to be provided. The final determination for whether remedial action is required at this CERCLA site will be based upon the calculated risk.

***Response:** The Executive Summary and Recommendations for this RI/RA report will be changed based on what the team develops as the next step in the CERCLA process for this site.*

The 5th bullet will be changed to indicate that the TACO regulations are TBCs. The 5th bullet will be read

- No chemicals in soil were eliminated as COPCs/COCs on the basis of comparisons to background concentrations. Most PAHs selected as COPCs/COCs in exposed surface soil were detected at maximum concentrations that did not exceed surface soil background data as shown in the table below. Based on this information and Illinois EPA determination of PAH background urban concentrations, it is possible that these PAHs could be attributed to background conditions and inclusion of these chemicals as COPCs/COCs may result in an overestimation of total risks for this site. In addition, based on the Illinois EPA Summary of Selected Background Conditions for Inorganics in Soil study, it is possible that the arsenic and manganese concentrations could also be attributed to background as shown in the table below. The Illinois EPA TACO regulations that include the concentrations of PAH in background soil (Title 35, Part 742, Appendix A, Table H) and the concentrations of inorganics in background soil (Title 35, Part 742, Appendix A, Table G) are not Applicable nor Relevant and Appropriate Regulations at this site but merely a To Be Considered (TBC) regulation.*

Additionally, several of our original comments potentially impacted the outcome of the Appendix F risk quantification calculations. This situation persists. Therefore, our review of the Appendix F risk calculations is again postponed until our comments have been satisfactorily addressed.

Response: *The COPC screening tables have been corrected and updated. Based on the updated COPCs retained, the risk calculations and HHRA text has also been corrected and updated to incorporate these changes. Changes were made to Table 6-4 and the appendix files in red.*