

**RESPONSE TO COMMENTS  
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY COMMENTS  
SEPTEMBER 9, 2009  
DRAFT REMEDIAL INVESTIGATION/RISK ASSESSMENT REPORT  
NAVAL STATION GREAT LAKES**

- 1) **General Comment** – This report utilizes a screening process whereby site concentrations are compared to published, acceptable environmental levels. In this report, the screening process is cumbersome, confusing, and contradictory. Screening results are presented at three separate locations. Tables 4-4 and 6-1 both present screening results for surface soil, but Table 6-1 shows one additional and four fewer chemicals captured by the screen. Appendix F Tables 2.1 and 2.2 split the surface soil screening into the direct contact and migration to groundwater pathways which adds further confusion.

It was observed that site-related risks were quantified based upon the chemicals identified in the screenings summarized in Tables 6-1, 6-2, and 6-3; however, the State has little confidence in the screening procedure and, therefore, the results of the risk assessment. The Agency requests that the screening process be reviewed and that consistent and uniform results be reported.

***Response:*** *Table 4-4 is presented as part of the Nature and Extent of the contaminants of potential concern at the site and their frequency of detection. It is intended to give an overall, general description of the potential concerns at the site and all screening values (direct contact, inhalation, migration to groundwater, etc.) in one table. Therefore different chemicals are flagged then in the tables in Section 6. Section 4 and Section 6 tables are intended to be looked at separately, because they display different information.*

*Table 6-1 is presented as part of the risk assessment to define and delineate the direct contact and inhalation surface soil chemicals of potential concern. Per USEPA RAGS guidance and the Site 19 HHRA Work Plan Section 1.2.1: “To evaluate the potential for chemicals detected in soil to impact groundwater, maximum chemical concentrations will be compared to SSLs for migration to groundwater. The comparisons will be presented in separate tables (from the COPC tables) and will not be used to select COPCs for soil.”*

*Direct contact/inhalation and migration to groundwater pathways are separately presented and evaluated as part of the risk assessment in Table 6-1 and 6-15, in addition to the Appendix F RAGS summary tables.*

*Antimony was erroneously not included in Tables 6-1 and 6-15, and Benzo(a)pyrene and Dibenzo(a,h)anthracene were erroneously duplicated in Table 4-4. Table 4-4, 6-1, and 6-15 were amended to correct these mistakes. The chemicals flagged in Tables 4-4 and 6-1 were double-checked and are correct and the chemicals flagged in Table 6-1 were correctly analyzed in the risk assessment quantification.*

- 2) **Page ES-2:** The meaning of the statement in bullet #4 is unclear. Please revise that statement.

**RESPONSE TO COMMENTS**  
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**NAVAL STATION GREAT LAKES**

***Response:*** *The statement has been revised to read: “Based on the human health risk assessment, the following contaminants were identified as chemicals of concern (COCs) based on non-cancer Hazard Quotients greater than 1.0 or cancer risks greater than  $1 \times 10^{-6}$ : arsenic and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and dibenzo(a,h)anthracene) in groundwater potentially used as drinking water and in soil. These are the primary COC risk drivers for total future residents. Groundwater at the site is not used and is not expected to be used in the future as drinking water. Naval Station Great Lakes is an active Navy facility and is expected to remain active for the foreseeable future. In accordance with Naval Station Great Lakes Instruction 11130.1 dated September 29, 2003, use of groundwater and surface water runoff within all geographical areas of the base, for any purpose, is strictly prohibited without prior written approval. Groundwater underlying Naval Station Great Lakes is not used for drinking water and is not expected to be used in the future. Drinking water for the base and residents of the surrounding communities is supplied from municipal systems drawing water from Lake Michigan.”*

*This was also changed in Section 7*

- 3) **Table 4-1:** The “minimum criteria” value for acenaphthylene, benzo(g,h,i)perylene, and phenanthrene are not in the reference provided. The groundwater remediation objectives for benzo(k)fluoranthene and chrysene have been revised in the Agency-proposed Amendments to the Tiered Approach to Corrective Action Objectives regulation (Illinois Pollution Control Board case no.: R2009-009, <http://www.ipcb.state.il.us/cool/external/CaseView.aspx?case=13524>). The current groundwater objectives are 1.2 µg/L and 12 µg/L, respectively. All criteria, for both groundwater and soil, should be reviewed and the TACO amendments should be incorporated. ***Response:*** *The minimum criteria values for those 3 chemicals (acenaphthylene, benzo(g,h,i)perylene, and phenanthrene) were added in Table 4-1.*

*The proposed TACO amendments to provisional and revised screening levels have not been finalized, and will be included in future risk assessments and COPC selection once they have been finalized.*

- 4) **Tables 4-3 and 4-5:** The TACO migration to groundwater criteria for the inorganic constituents are based on extraction procedures and are not comparable to the other listed criteria. The minimum screening value for aluminum, chromium, and iron must be revised in both tables. ***Response:*** *The TACO and NON-TACO migration to groundwater criteria are not comparable and the tables will be amended to remove those non-applicable criteria because extraction procedures were not used to analyze the samples. USEPA relevant criteria were included in the assessment of the nature and extent. NA has replaced the TACO and NON-TACO migration to groundwater criteria where necessary in Tables 4-3, 4-4, 4-5, and 4-6.*

The minimum screening value for vanadium should be corrected to 18 mg/kg based on one-tenth of the Regional Screening Level for migration to groundwater of 180 mg/kg.

**RESPONSE TO COMMENTS**  
**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY COMMENTS**  
**SEPTEMBER 9, 2009**  
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**NAVAL STATION GREAT LAKES**

**Response:** *The value for vanadium has been corrected to reflect this value.*

- 5) **Section 6.2** – At the conclusion of the third paragraph, use of one-half the detection limit for statistics is discussed. This is inappropriate when the ProUCL statistical software program is used. The unadjusted detection limit should be used in the ProUCL program.

**Response:** *The Human Health Risk Assessment was conducted in accordance with the work plan. Section 2.3 last sentence of the Human Health Risk Assessment Work Plan in the Sampling and Analysis Plan (October 2008) states that “data values less than sample-specific detection limits will be substituted with one-half the detection limit.” The Work Plan was reviewed and accepted by the Illinois EPA and ½ the detection limit was the previously agreed upon value. Future risk assessments will use the statistical procedures in ProUCL for evaluating non-detect values. No change to this section will be made.*

- 6) **Section 6.3.1** - In the Screening Levels for Soil paragraph, seven bulleted entries present the sources of the screening concentrations. It is imperative that these sources be kept current. The second, fourth, and fifth bullets should be updated to the January 2009 revision. The third bullet references tables that are no longer posted on the IEPA website and should be removed.

**Response:** *The bulleted entries have been changed to reflect these corrections.*

The lists of screening level sources for soil and for groundwater are incomplete. Many more sources are presented in the three sets of tables of screening levels than are included in the text of the report.

**Response:** *The additional sources have been added to the text.*

- 7) **Section 6.3.1** - The third paragraph discusses a screening comparison to USEPA SSL soil-to-air criteria. Table 6-1 footnote identifies an internet calculator as the source of these screening values. The default calculation provides criteria for the residential receptor. For several volatile chemicals, the construction worker criteria are lower for this pathway. The user determined inputs into the calculator must be provided for each receptor.

**Response:** *The footnote on Table 6-1 references Tables 6-6 and 6-7 for the inputs into the calculator. The construction worker parameters were also included in Tables 6-6 and 6-7.*

- 8) **Section 6.3.2** – The first bullet identifies “BaP equivalents” as a chemical of potential concern. This concept is poorly developed. More detail or documentation using references to literature should be provided. Additionally, soil screening values have been calculated for “BaP equivalents”. This process should be described in detail and its relevance to the risk assessment discussed. Finally, in some of the tables, the entry for “B(a)P equivalents” is qualified with the entry “(1/2 DL)”. As stated previously, use of one-half the detection limit to substitute for chemical non-detection in an analysis may be inappropriate.

**Response:** *BaP equivalents were further described in Section 6.5.3 (Toxicity Criteria for Carcinogenic) and additional information was added in Section 6.3.2. The following will be added to the first bullet: “Total BaP equivalents were calculated for comparative purposes. The concentrations of each individual PAH were multiplied by its Toxic*

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**NAVAL STATION GREAT LAKES**

*Equivalent Factor (TEF) to yield the concentration of BaP toxic equivalents represented by each PAH. The BaP approaches are used because an EPA derived cancer slope factor is available only for BaP. BaP is one of the most potent of the PAHs and TEFs are quantitative indicators of the comparative potency of a PAH compound compared to the potency of BaP (Kosteki et al, 1993)."*

*As stated previously in Response #5, Section 2.3 of the Human Health Risk Assessment Work Plan states that "data values less than sample-specific detection limits will be substituted with one-half the detection limit." The Work Plan was reviewed and accepted by the Illinois EPA and ½ the detection limit was the previously agreed upon value.*

- 9) **Section 6.3.2** – At the bottom of page 6-10, there is mention of "the Base background soil datasets." Illinois EPA has no knowledge of that data and it does not appear to be provided in this submittal. Please provide the data and whatever associated information is available.  
***Response:*** *Section 6.3.2 is corrected to read "Maximum surface soil concentrations were compared to concentrations in the background data set established for use by the Illinois EPA, which are included in Table 6-1. No contaminants in surface soil were excluded as COPCs based on background conditions."*
- 10) **Section 6.3.3** – See previous comment regarding "the Base background soil datasets."  
***Response:*** *Section 6.3.3 was corrected to read "Maximum subsurface soil concentrations were compared to concentrations in the background data set established for use by the Illinois EPA, which are included in Table 6-1. No contaminants in subsurface soil were excluded as COPCs based on background conditions."*
- 11) **Section 6.4.5.1** – In the Incidental Ingestion of Soil section, second paragraph, reference is made to the "...same exposure frequencies and durations used in the estimation of dermal intakes...", however, these parameters were not defined in the dermal section. Please provide the missing information.  
***Response:*** *The Incidental Ingestion of Soil section was amended to read "Exposure frequencies and durations for the incidental ingestion of soil are summarized in Tables 6-6 and 6-7, for RME and CTE respectively."*
- 12) **Section 6.4.5.1** – The definition of AT for non-carcinogens should be corrected to "ED x 8,760 hrs".  
***Response:*** *The RI has been amended to include this corrected calculation.*
- 13) **Section 6.4.5.1** – The first full paragraph on this page refers to a PEF calculation in Appendix F. That calculation could not be located.  
***Response:*** *The PEF calculation will be added to Appendix F.*
- 14) **Section 6.6.4** – The calculated value for the Adult Lead model should be provided in the last paragraph as it was for the Child Lead Model.

**RESPONSE TO COMMENTS**  
**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY COMMENTS**  
**SEPTEMBER 9, 2009**  
**DRAFT REMEDIAL INVESTIGATION/RISK ASSESSMENT REPORT**  
**NAVAL STATION GREAT LAKES**

***Response:*** Section 6.6.4 has been amended to include the Adult Lead model results. These results are included in Appendix F.

- 15) **Table 6-1** – The policy of dividing the literature source non-cancer screening level by 10 has been applied inconsistently. For example, the Regional Screening Level Table residential soil value for 2-butanone has been decreased but the TACO residential soil value has not.

***Response:*** Table 6-1 was reviewed and amended appropriately to correct mistakes and inconsistencies.

- 16) **Table 6-4** - The chemicals retained for risk assessment from the groundwater evaluation should also be summarized here or in a separate table.

***Response:*** Table 6-4 will be revised to include the chemicals retained for risk assessment from the groundwater evaluation. The chemicals identified from the soil to groundwater evaluation will be discussed qualitatively in Section 6.7

- 17) **Table 6-9** - The reference dose for barium should be corrected to the IRIS value of 0.2 mg/kg-day. The adjusted dermal RfD should also be corrected.

***Response:*** The reference dose and dermal RfD in Table 6-9 were changed to reflect this value.

- 18) **Table 6-10** - Oral reference concentrations of 0.00003 mg/m<sup>3</sup> for arsenic from California EPA and 0.0003 mg/m<sup>3</sup> for mercury from IRIS should be added. Extrapolation of RfC values to inhalation reference doses is inappropriate unless the effect can be reasonably determined to be a systemic effect. Effects on the respiratory system are not generally considered to be systemic. The inhalation RfD extrapolations for chromium and cobalt should be removed.

***Response:*** The value for mercury is for elemental mercury and typically mercury is not evaluated in risk assessment as elemental mercury. To keep consistent across with the RfDs, the value for mercury as inorganic salts are used. Arsenic has been corrected in Table 6-10.

- 19) **Table 6-12** - Oral cancer slope values should be estimated and included for the other carcinogenic PAHs based on the slope value for benzo(a)pyrene and adjusted using the USEPA approved order-of-magnitude relative potency factors. PAHs are contact carcinogens, thus extrapolation of PAH inhalation unit risk values to inhalation slope factors is inappropriate. Extrapolation to inhalation slope factors is also inappropriate for arsenic, chromium, and cobalt.

***Response:*** Oral cancer slopes values are included for the other PAHs using USEPA's method in Table 6-11. All other toxicity values have been double-checked and are correct in Tables 6-9 through 6-12.

- 20) **Section 7.2** – The recommendation herein is for no further investigation at this site. However, it does not provide a recommendation as to the next step in the CERCLA process. Illinois EPA believes the recommendation should be for no further investigation and to move forward with a Feasibility Study to evaluate potential remedial alternatives. Potential remedial alternatives would include, but not be limited to; No Action, Limited Action (Land

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NAVAL STATION GREAT LAKES**

Use Controls), some form of treatment technology, and a Removal Action for contaminated surface soil.

***Response:*** *Minimal recommendations were provided in the draft report so that the results could be discussed with all team members after the review of the report and the recommendations could be developed by the team members. The recommendations in the Executive Summary and this section will be changed based on what the team develops. The suggested recommendation could be: “Based on the results of this RI/RA and the comparison of the analytical data with the Illinois EPA background concentrations in TACO, no further investigation or remedial action is warranted at this site. A Proposed Plan and Record of Decision for this site will be prepared and will state that No Further Action is necessary. The site should be removed from the list of potentially contaminated sites at Naval Station Great Lakes.”*

*The above recommendation is supported by the following changes that will be made to the 5<sup>th</sup> bullet of the conclusions shown below*

- No chemicals in soil ~~and groundwater~~ 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.

<u>COPCs/COCs</u>	<u>Surface Soil Average*/Maximum</u>	<u>Illinois EPA Background Soil</u>	<u>Subsurface Soil Average*/Maximum</u>	<u>Illinois EPA Background Soil</u>
<b><i>Inorganics (mg/kg)</i></b>				
<u>Arsenic</u>	<u>11.5/32.2</u>	<u>13</u>	<u>9.77/25.1</u>	<u>13</u>
<u>Manganese</u>	<u>889/1820</u>	<u>636</u>	<u>736/1600</u>	<u>636</u>
<b><i>Polynuclear Aromatic Hydrocarbons (ug/kg)</i></b>				
<u>Benzo(a)anthracene</u>	<u>444/1700</u>	<u>1800</u>	<u>17/20</u>	<u>NA</u>
<u>Benzo(a)pyrene</u>	<u>314/1200</u>	<u>2100</u>	<u>14.5/22</u>	<u>NA</u>
<u>Benzo(b)fluoranthene</u>	<u>429/1700</u>	<u>2100</u>	<u>16/18</u>	<u>NA</u>
<u>Chrysene</u>	<u>372/1900</u>	<u>2700</u>	<u>10.6/18</u>	<u>NA</u>
<u>Dibenzo(a,h)anthracene</u>	<u>68.3/160</u>	<u>420</u>	<u>N/A</u>	<u>NA</u>

***\* Average is the average of the samples collected with positive results (not including non-detects).***

*Other changes were made in the text of the report (such as spelling and grammatical, editorial, etc.) that were identified during the review of the report.*