

PBOW Acid Area 1 Baseline Human Health Risk Assessment Work Plan
Draft dated November 2008
Final dated April 2009

OEPA Reviewer: Dr. Janusz Z. Byczkowski

USACE Response to OEPA DERR Comments

USACE General Response on OEPA Work Plan Comments:

The OEPA assigned risk assessment reviewer refers to USACE as a PRP in the original comments for the Acid Area 1 Draft Risk Assessment Work Plans dated 11 December 2008. OEPA should note that this work is not of PRP status. The Department of Army is the Lead Agency for all FUDS, as defined in statute 10 USC 2701. The FUDS Manual USACE ER 200-3-1 (2004) is the primary regulation that provides specific policy and guidance for management of FUDS. DOD maintains Lead Agency authority at non-NPL FUDS, coordinates activities with the state agency, and provides notice and opportunity for comment to the state agency. It should also be noted that PBOW FUDS is not participating in the OH VAP, so OH VAP guidance may be used, but PBOW FUDS is not bound by that guidance.

When the risk assessment work plan was being developed for the TNT A and C sites (Final April 2001), the USACE and OEPA PBOW team members agreed to various protocols and methods that were to be used as standard protocol for risk assessment at PBOW. In August 2001 (refer to PBOW Team Meeting minutes), the PBOW Team agreed that team meeting minutes would suffice as Consensus Agreements for how the FUDS work is to be conducted at PBOW. Not one team member should be able to change the protocol for any portion of the FUDS projects without bringing the issue to the table of the PBOW Team where the team meeting agreements are to suffice as Consensus Agreements.

1. **OEPA December 2008 Comment 1:** *OEPA General Remark: I suggest a minor revision of the Document. If you have any questions or need further technical support, please give me a call at: 614-644-3070 or e-mail at jbyczkowski@epa.state.oh.us. Before OEPA can concur with RA work plan, this Document should be revised to include reference to OEPA-DERR - RI/FS programmatic recommendations (available on-line at: <http://www.epa.state.oh.us/derr/rules/guidance.html>), and to follow the other suggestions as listed below.*

Response December 2008 to Comment 1:

The OEPA-DERR reference to the guidance list has been added to the RA Work Plan per the comment.

OEPA April 2009 Follow-Up to Comment 1: Comment Resolved.

Response June 2009 to Follow-Up Comment 1:

Agreed.

2. **OEPA December 2008 Comment 2** S. 2.2.1 P. 2-4 L # 25 This Document states: "...acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of 1E-6 to 1E-4 (EPA, 1990), referred to as "risk management range"..."

While the RI/FS process should follow the U.S. EPA Risk Assessment Guidance for Superfund (RAGS), it should also consider that for multiple chemicals, the fixed cumulative OEPA-DERR (2004b) human health goals (ELCR=1E-5 and HI=1) should be met. The OEPA (2004b) guideline has been listed on Page 1-4 among "Protocols for the Baseline Human Health Risk Assessment", but apparently not applied in the work plan.

Please note, that in the list on Page 1-4, a crucial OEPA-DERR (2004a) technical decision compendium is missing, relevant to toxicity-based screening which may be performed differently than that described in U.S. EPA RAGS.

Reference:

OEPA – DERR (2004a) Use of U.S. EPA Region 9 PRGs as screening Values in Human Health Risk Assessments. Technical Decision Compendium, 28 April 2004. On-line: <http://www.epa.state.oh.us/derr/rules/screening.pdf>

OEPA - DERR (2004b) Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response and Office of Federal Facility Oversight. Technical Decision Compendium, 28 April 2004. On-line: <http://www.epa.state.oh.us/derr/rules/riskgoal.pdf>

Instead of using "risk management range", please apply and refer to fixed cumulative excess cancer risk goal of 1E-5, recommended by Ohio EPA-DERR (2004b).

Response December 2008 to Comment 2:

The text will be revised to state that OEPA applies fixed cumulative risk goals of ELCR=1E-5 and HI=1 for carcinogenic and non-carcinogenic constituents. However, the EPA risk management range referenced in the work plan will remain. It is acknowledged that OEPA recommends using EPA Region 9 PRGs for screening criteria as referenced in the comment. Application of EPA Region 9 PRGs is consistent with the completion of past risk assessments at Plum Brook. However, we have revised the Acid Area 1 RA Work Plan, based on USACE comment and EPA guidance, to apply EPA Region 3 RBCs rather than Region 9 PRGs. This change is recommended because Region 9 no longer updates their PRGs with updated toxicity values and data. In contrast, Region 3 updates the RBCs twice a year with input from EPA Regions III, VI, and IX. Region 3 values are considered more protective.

OEPA April 2009 Follow-up to Comment 2: Partly resolved. The PRP Response stated: "...to apply EPA Region 3 RBCs rather than Region 9 PRGs..."

OEPA-DERR Recommendation: The Region 3 RBCs should not be used for screening purpose. OEPA-DERR recommends instead either the Region 9 PRGs (as per 2004a Technical Decision Compendium), or current as of September 2008 U.S. EPA Regional Screening Levels (RSLs are available on-line at <http://www.epa.gov/region09/superfund/prg/index.html>).

Response June 2009 to Follow-Up Comment 2:

During the 26 June 2008 PBOW Team Meeting, USACE presented to the team the discussion of and recommendation to use the Regional Screening Levels (RSLs) adopted all three EPA regions which had screening levels previously, and being EPA Region 3, Region 6 and Region 9. The PBOW Team decision was to discuss RSLs with Bonnie Buthker, DOD Program Manager at OEPA and use RSLs for any new starts after being given the "go ahead" by Bonnie Buthker. On 18 March 2009, Bonnie Buthker stated that Brian Tucker of OEPA has directed her to direct USACE FUDs risk assessors to use the RSLs, and no longer the obsolete Region 9 PRGs. According to the 26 June 2008 PBOW Team agreement, when Bonnie Buthker gave the "go ahead" to use RSLs, any new starts there after should use the RSLs. The Acid Area 1 Risk Assessment Work Plans are dated April 2009 which is after 18 March 2009, and will incorporate the RSLs, not the obsolete EPA Region 9 PRGs from 2004.

3. **OEPA December 2008 Comment 3:** *S. 2.2.3 P. 2-5 L # 8 This Document states: "...groundwater BSC is either the MDC or the calculated 95 percent upper tolerance limit of the background groundwater data set..." and further: "...BSCs for soil were reported as the 95 percent upper tolerance limit for lognormal data sets or the 95th percentile for datasets with a nonparametric distribution..." Then, starting in line # 34: "...This will be performed using the nonparametric Wilcoxon Rank-Sum (WRS) statistical test (also known as the Mann-Whitney U test)..." The background sampling should be performed in OEPA-pre-approved location and in media of a similar type and horizon as those evaluated in Baseline Risk Assessment (OEPA-DERR, 2004c). The background levels should be calculated according to the method provided by OEPA-DERR (2004d). Accordingly, instead of "95% UTL" and/or "U test", the background levels should be calculated as point values, equal to upper quartile + 1.5 × (interquartile range) of the data set.*

References:

OEPA – DERR (2004c) Methodology for Evaluating Site-specific Background Concentrations of Chemicals. Technical Decision Compendium, 14 April 2004. On-line: <http://www.epa.state.oh.us/derr/rules/Methodology.pdf>

OEPA-DERR (2004d) Background Calculation Methodology. Guidance DERR-00-RR-039P, 30 June 2004, Final. On-line: http://www.epa.state.oh.us/derr/rules/RR-039_public.pdf

Please recalculate background levels in accordance with OEPA-DERR (2004c and d) guidelines.

Response December 2008 to Comment 3:

Background data being used in support of the risk assessment is site-specific data derived for Plum Brook. The background study was completed in 2001 with the approach and generated data being reviewed and accepted by OEPA. The background data has been used in the completion of past investigations and risk assessments for Plum Brook. No background data is being collected or derived in support of the Acid Area 1 RA.

OEPA April 2009 Follow-Up to Comment 3: Not resolved. The PRP Response stated: "...No background data is being collected or derived in support of the Acid Area 1 RA..."

OEPA-DERR Recommendation: If this is indeed the case, no chemicals detected in Acid Area 1 should be screened based on background level. Also, statements about BTEX and PAHs being "...attributable to background conditions..." (e.g., see p. 2-6, line 7), should not be used in the planned baseline health risk assessment.

Response June 2009 to Follow-Up Comment 3:

It is true, there is no recent background data taken specifically for Acid Area 1. However, there is a metals background data set from 2001, from background locations as agreed upon by the PBOW Team, including USACE and OEPA, that would suffice as the background data set for all PBOW FUDS AOCs to be investigated, including Acid Area 1. During the development of the appropriate background statistic to compare to for PBOW FUDS AOCs, the PBOW Team reviewed many statistics, including arithmetic mean, median, UCLs and UTLs. The OEPA risk assessors Bonnie Buttker, Laurie Moore with the rest of the PBOW team deemed the 95% UTL or the maximum detected background metal concentration, whichever is less, as the appropriate statistic to use during background screening of AOCs' metals, and as documented in the May 2000 PBOW Team Meeting Minutes as consensus for using this method.

In reference to Section 2.2.3 paragraph 2 organic compounds screening, this paragraph will be deleted. It is not the intent, of USACE to eliminate any organic compound from being assessed in a risk assessment, nor should organic compounds be "screened out" due to background levels before the quantitative risk assessment. It is the intent of USACE to bring to the attention of the reader that there are naturally occurring BTEX in the subsurface of PBOW, that is not DOD related.

4. **OEPA December 2008 Comment 4:** *Figure 2-1, The paradigm presented in the Human Health Risk Assessment plan on Figure 2-1 does not follow the OEPA – DERR RI/FS Program, and the decision tree, as presented, could be misleading. It is recommended that the Figure 2-1 should not be included at or followed in preparing the Risk Assessment report based on this draft. Instead, the OEPA – DERR (2004e) should be applied along with other relevant technical decision documents (TDCs).*

Reference:

OEPA-DERR (2004) *Use of Risk-Based Numbers in the Remedial Response Process Overview* (revised June 28, 2005). Available on-line:
<http://www.epa.state.oh.us/derr/rules/RR-038.pdf>

Please delete fig. 2-1 and follow screening methodology as described in OEPA-DERR (2004 a and e).

Response December 2008 to Comment 4:

The decision process presented in Figure 2-1 is consistent with EPA guidance and the process that has been used throughout the investigations at Plum Brook. It is also consistent with the decision process employed at Acid Areas 2 and 3.

OEPA April 2009 Follow-Up to Comment 4: Not resolved. The PRP Response stated: "[decision] ...process that has been used throughout the investigations at Plum Brook..."

OEPA-DERR Recommendation: If OEPA-DERR guidelines were disregarded in the past, it does not mean that they should not be used in the planned baseline health risk assessment. Please do not use potentially misleading Figure 2-1 and instead please follow the OEPA-DERR (2004e) Technical Decision Compendium.

Response June 2009 to Follow-Up Comment 4:

The decision tree in Figure 2-1 is consistent with EPA guidance, and is consistent with risk-based screening as described in OEPA, 2005. Figure 2-1 is consistent with the data screening protocol agreed upon during PBOW Team Meetings, and considered as Consensus Agreements with the PBOW Team. Figure 2-1 will be deleted from the Work plan.

5. **OEPA December 2008 Comment 5:** *Table 3-2 This document states in Table 3-2 (On-Site Resident, in several rows): "...Exposure duration (ED), years [...] Adult 24..."*
Comment: According to U.S EPA (1989) the default ED is 30 years or more, unless otherwise justified on Site-specific basis. Quoted from U.S EPA (1989) Page 6-22: "...the upper-bound value of 30 years can be used for exposure duration when calculating reasonable maximum residential exposures. In some cases, however, lifetime exposure (70 years by convention) may be a more appropriate assumption..."

Reference:

U.S. EPA (1989) Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989. On-line: <http://www.epa.gov/oswer/riskassessment/ragsa/index.htm>

Please either justify the applied exposure duration on Site-specific basis (a reference to U.S. EPA Region 9 seems to be inappropriate in this place), or use the default of 30 years.

Response December 2008 to Comment 5:

An exposure duration of 24 years for the on-site resident is based on EPA 1991 Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors, Interim Manual, OSWER Directive: 9285.603. The reference notation in the table will be corrected.

OEPA April 2009 Follow-Up Response to Comment 5: Not resolved. The PRP Response stated: "...exposure duration of 24 years for the on-site resident [...]
OSWER Directive: 9285.603..."

OEPA-DERR Recommendation: The OSWER Directive 9285.603 provides information on how to split the 30 year residential exposure duration only in the case of ingestion of soil/dust.

Quoted from U.S. EPA OSWER Directive 9285.603:

"...Please note that the equation for calculating a 30-year residential exposure to soil/dust is divided into two parts. First, a six-year exposure duration is evaluated for young children which accounts for the period of highest soil ingestion (200 mg/day) and lowest body weight (15 kg). Second, a 24-year exposure

duration is assessed for older children and adults by using a lower soil ingestion rate (100 mg/day) and an adult body weight (70 kg)..."

For calculations of adult resident's risk, please use the default 30 years of total exposure duration. Calculating the total risk, it can be split into different periods of exposure, but then it should be re-integrated to reflect the default residency time.

Response June 2009 to Follow-Up Comment 5:

In 1999, during the draft TNT A and C risk assessment work plans, a 30 year ED was proposed. Through OEPA risk assessor guidance, Risk Assessment Guidance for Superfund Part B USEPA 1991, and PBOW Team agreement (May 2000), the residential scenario was to be split up to 24 years ED for a 70 kg adult, and 6 years ED for a 15 kg child. The rationale was to make sure that the sensitive population of the residential scenario, which is the infant through child age 6, has a calculated risk and hazard that may otherwise be diluted through the adult scenario only. The results of the residential risk calculations will be presented as this example: 5E-6 (adult 3E-6, child 2E-6) (May 2000 PBOW Team Meeting Minutes).

6. ***OEPA December 2008 Comment 6:*** *Table 3-2 This document states in Table 3-2 (Dermal Contact with Sediment; On-Site Resident): "...Child: 1750^g Adult: 4550^g..." Comment: The quoted (U.S. EPA, 1992b) reference "g" is obsolete. Please use values recommended by U.S. EPA (2004) in RAGS Part E, (see Exhibit 3-5, page 3-20).*

Reference:

*U.S. EPA (2004) Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005. On-line:
<http://www.epa.gov/oswer/riskassessment/ragse/index.htm>*

Please either justify the applied exposure duration on Site-specific basis (and delete reference to U.S. EPA 1992b), or use the RAGS E default of 2,800 and 5,700 cm², respectively.

Response December 2008 to Comment 6: Skin surface areas are based on a wading scenario and assume exposure to the lower legs and feet plus the forearms and hands.

OEPA April 2009 Follow-Up to Comment 6: Not resolved.

OEPA-DERR Recommendation: Please refer to and apply U.S. EPA (2004) RAGS Part E.

Response June 2009 to Follow-Up Comment 6:

The original parameter decisions for the surface area exposed to sediment was taken from the reasonable maximum exposure (RME) parameter values from USEPA 1992, with a check of the USEPA Exposure Factors Handbook for lower arms, hands, lower legs and feet to see if the 1992 values were reasonable for an RME. There is no water body that is deeper than a few inches in Acid Area 1, just ephemeral ditch/creeks, ephemeral areas with wetland indicator flora, and one ephemeral pond with a few inches of water. The RAGS Part E recommendation

for exposed skin surface area is for a person to be able to submerge into an area where there is wading and swimming near shore every day for 350 days per year. The exposure scenario of what is possible on site and the generic RAGS Part E scenario for swimming and wading are different. The RAGS Part E scenario does not represent the site as well as the original PBOW Team agreed upon parameters and scenario that has been used for all preceding risk assessments at other AOCs at PBOW. It is possible to change to the RAGS Part E (2004) Table 3.5 RME values, including reducing the adherence factor for an adult to 0.07 rather than 0.2, and changing the exposed surface area for an adult and child, but that would need to be a PBOW Team decision, but the exposure parameters will not reflect the exposure available on-site. If the PBOW Team were to change the parameters, it would be important to re look at all surface water and sediment exposure parameters. It is unrealistic to assume 3 hrs of exposure to sediment for 350 days per year every year, when there is no water in the ditches, areas with wetland indicator flora or the pond that is dry most of the year, and when there is severe winter weather at PBOW for at least 1/4 of the year, when people limit their exposure to the outside.

- 7. OEPA December 2008 Comment 7:** *Table 3-2 This document states in Table 3-2 (Dermal Contact with Surface Water; On-Site Resident): "...Child: 2100^g Adult: 5450^g..." Comment: The quoted (U.S. EPA, 1992b) reference "g" is obsolete. Please use values recommended by U.S. EPA (2004) in RAGS Part E, (see Exhibit 3-2, page 3-8).*

Please either justify the applied exposure duration on Site-specific basis (and delete reference to U.S. EPA 1992b), or use the RAGS E default of 6,600 and 18,000 cm², respectively.

Response December 2008 to Comment 7:

Skin surface areas are based on a wading scenario and assume exposure to the lower legs and feet plus the forearms and hands.

OEPA April 2009 Follow-Up to Comment 7: Not resolved.

OEPA-DERR Recommendation: Please refer to and apply U.S. EPA (2004) RAGS Part E.

June 2009 Response to Follow-Up Comment 7:

See June 2009 Response 6. We can change the parameters, but we need to do it through the PBOW Team process.